

Evolution of Oil Field Service Industry Contracts: Challenges and Strategies for Sustainable Success

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ABSTRACT

The oil and gas industry has experienced significant growth in recent years, resulting in a corresponding expansion of the oil field service industry. As the industry has grown, the nature of service contracts has evolved to meet changing needs. This paper examines the different types of service contracts used in the industry, including fee-for-service, integrated service, partnering, risk-service, and production sharing contracts. The paper also discusses the challenges faced by service companies, including competition from national oilfield service companies, the development of individual product lines, and volatility in oil prices. Finally, the paper offers strategies for sustainable success in the face of these challenges.

Keywords: Oil and Gas; Service contracts; Negotiations; Agreements; Sustainable

1. Introduction

With exponential rise in human population over the last century and the prevalent prosperity for the last few decades, the demand for energy has skyrocketed which has resulted in significant expansion of oil and gas industry. (Figure 1) shows primary energy demand in Billion Tone of oil equivalent (TOE) from three different perspectives: the sector in which energy is used, the region in which it is consumed and the share of different fuel types¹. The global demand in energy is expected to grow by around a third by 2040 with major growth in energy demand coming from fast-growing developing economies, led by India and China which will account for 80% of project growth in gas demand². With oil and gas accounting for more than half of the total energy demand, the global oil consumption is expected to rise even further than the current humungous figure of 95 million barrels per day (MBD) in 2018 to 110 MBD in 2040¹. This ever-increasing demand for petroleum coupled with the increasing complexity in the development of oil fields has caused the oilfield services sector to grow rapidly as well.

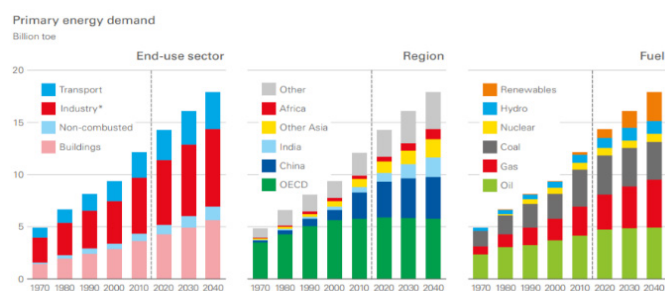


Figure 1: Primary energy demand in BTOE from three different perspectives¹.

This report discusses the volatile nature of the oil and gas industry and the response of oilfield services sector with particular focus on service contracts. Initially, an overview of the oilfield services sector is provided for the reader followed by the evolution of services sector keeping in view the sharp changes in oil prices. Different types of contracts employed in this industry are then discussed. In the latter half of this paper, the challenges faced by the services sector and the strategies adopted to survive in low oil price environment are discussed.

2. A Mosaic of Energy Research: Uncovering Sustainability Beyond Fossil Fuels

Several recent papers delve into the multifaceted complexities of the oil and gas industry, exploring avenues for both optimization and a shift towards renewable energy sources. These studies, published in esteemed journals, tackle challenges faced by traditional fossil fuel exploration and extraction while charting pathways towards a more sustainable future.

One paper³ focuses on enhancing wellbore stability, a crucial aspect of safe and efficient drilling operations. It details the development of a computational tool capable of analyzing borehole stability and optimizing drilling mud weight, promising both cost reduction and heightened drilling safety. Another paper explores⁴ the promising potential of closed-loop enhanced geothermal systems. These systems harness the untapped power of underground heat, presenting a viable alternative to fossil fuels and contributing to reduced dependence on traditional energy sources. The quest for sustainability within the oil and gas sector is addressed in another paper⁵, which proposes a comprehensive framework for balancing economic viability with environmental and social responsibility. This framework offers valuable insights for navigating the industry's complex landscape towards a more sustainable future. Further research tackles the technical challenges encountered in various domains of energy exploration. One paper⁶ analyzes the intricacies of phase equilibrium calculations using a specific equation of state, paving the way for more accurate fluid analysis in diverse energy environments. Another delves into the challenges associated with the industry's transition towards renewable energy⁷, highlighting potential obstacles and avenues for smoother transformation. Finally, one study explores⁸ the impact of surface diffusion on mass transport within shale gas reservoirs, providing key insights into this significant factor influencing gas extraction efficiency.

Collectively, these papers paint a multifaceted picture of ongoing research efforts within the oil and gas industry. From optimizing traditional methods to venturing into renewable energy alternatives and prioritizing sustainability, this body of research paves the way for a more dynamic and environmentally conscious future for energy exploration and utilization.

3. Oilfield Service Industry - The Big Picture

In the oil and gas value chain, the oilfield service industry is an essential partner for exploration and production companies providing drilling, completion, production, supply and logistical support services - both offshore and onshore (upstream sector). The services offered by these companies are not limited to the exploration and production segment (upstream side) of the industry; they also provide support & services in refining the crude oil and transporting it from the surface facilities to the refinery, and eventually to the consumer (downstream side). Limiting our discussion to upstream side, these companies can broadly be divided into 3 categories:

- Companies that provide equipment for drilling operations such as National Oil Varco (NOV) and Cameron.
- Companies that provide equipment and technical services during drilling, completion and production phases of field development such as Schlumberger, Weatherford and Baker Hughes.
- Companies that provide drill ships, jack-up and other types of rigs for offshore drilling such as Transocean, Seadrill and Noble.

Of the three segments that make up the oilfield services industry - exploration and evaluation, drilling and completion and production - it is the latter that garners the most substantial income. GBI Research forecasts the completion and production services portion of the industry to create \$148 billion in revenue during 2017, climbing from revenue of \$105 billion in 2012⁹. These figures give an idea of the mammoth size of the service industry.

4. Oilfield Service Industry - A Brief History

The oil and gas industry have gone through many ups and down in recent decades and in fact significant fluctuations in oil prices is a norm rather than an exception. (Figure 2) shows the history of oil prices for the last 150 years and clearly shows it is a strong function of the geopolitical conditions rather than just supply and demand. In order to meet the ever-changing needs of the oil and gas industry, the oilfield service companies need to adapt quickly and efficiently to this continuously changing industry landscape.

The oil field services sector went through a transformation in the 1970s and early 1980s and grew rapidly due to the high oil prices after many large upstream producers outsourced a considerable amount of their E&P drilling and field operations to smaller, specialized firms⁹. The slump in oil prices during the mid-1980s to late-1980s forced the companies to specialize in certain products to differentiate themselves from the competition. Simultaneously, the rate of mergers and acquisitions increased which caused some very familiar names in the services sector to disappear. Also, during 1970s and 1980s, the dramatic rise of the National Oil companies (NOC's) changed the dynamics of the oil industry. In the 1970s, NOCs controlled a mere 10% of world's oil and gas reserves; today, they control more than 90%¹⁰. With this dramatic reversal, NOCs became more comfortable and adept in procuring human and technical resources directly from oilfield service companies.



Figure 2: History of oil prices¹¹.

During 1990s, with the aim to remain relevant to NOC's and their parent governments and to control reserves in open-access fields, IOCs became focused on more complex plays and increased activity in remote and offshore locations as well as more challenging sub-surface environments. These conditions presented the oilfield service sector with the opportunity to become inventors and innovators - finding solutions for the upstream sector's more complex needs.

With the exponential rise in demand for oil in the 2000's, upstream companies ventured into even riskier endeavors with wells getting deeper and the field development becoming

more and more complex. This led to the introduction of integrated services concept within the oilfield service industry where cross-disciplinary project management teams focused on specific projects and part of the risk was shared by these service companies, hence reducing risk exposure to E&P companies. Particularly, NOCs wanted the OFSC's to provide whole solutions rather than discrete services allowing them to focus more on strategic activities. Also, it would cost less to buy services bundled together rather than procuring them separately¹⁰. According to Spears and Associates, in 2010, 5% of a major service company's sales were integrated services. In 2015, the number was 15% and in 2020 it is 25% as shown in (Figure 3)¹².

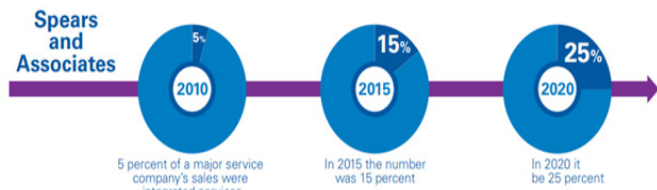


Figure 3: Share of integrated services in company' sales¹².

During the recent 2014-2016 downturn, the oil prices crashed to \$28/barrel in January 2016, its lowest since 2003. This led to a decline in upstream development activity and the oilfield services sector was hit hard by reduced revenue and cancelled or renegotiated contracts at lower rates. Between 2014 and 2016, 36% of oil field services companies ceased operations; revenues contracted by almost 55% and job losses reached over 50% in some sub segments¹³. This forced services sector to take swift measures to cut costs and protect cash flow and adopt new strategies to survive in these harsher conditions.

5. Types of Contracts

A service contract is a long-term contractual framework that is used by some host governments to acquire the international oil/service company's expertise and capital without having to hand over the field and production ownership rights to them¹⁴. In such contracts, the service company renders a service or expertise for a pre-determined fee. Service companies have been forced to consider a wide range of contracting models and challenge traditional fixed-fee type strategies in order to survive and prosper, as the lower oil price squeezes margins in the exploration and production industry. Below are some of the common types of contracts prevalent within the services industry along with their characteristics:

5.1. Fee-for-service contracts

A fee-for-service contract is one that is designed to pay for rendered services after an invoice is submitted for the services. Traditionally, oil companies would plan and execute drilling wells and field operations while the expertise of service companies was utilized for specific tasks to be completed in the most efficient and cheapest way possible. This meant that the objectives of both the exploration and production companies and the service companies were not aligned. To set this right and in order to create more open and trusting relationship between the two parties, a new type of contract was devised called integrated services contract.

5.2. Integrated service contract

Rather than providing services in a specific domain, an integrated service contract combines expertise from different product lines and third parties to work as a team on a given

project. In this way, the goal of both parties is the same to achieve maximum production in the most efficient and cheapest possible way. Traditional operator-contractor relations required the oil company to supervise and coordinate many specialist services, however, under such contracts, oil companies can focus on their core business and manage fewer contractors¹⁵. The OFS Company will provide a greater range of services, and share in costs, but will not directly invest capital in the project. Major players in the service sector have created technical and operational centers of excellence that serve as a hub of cross-disciplinary collaboration. Schlumberger, for example, has successfully executed integrated services projects globally through its Integrated Project Management organization (Figure 4).

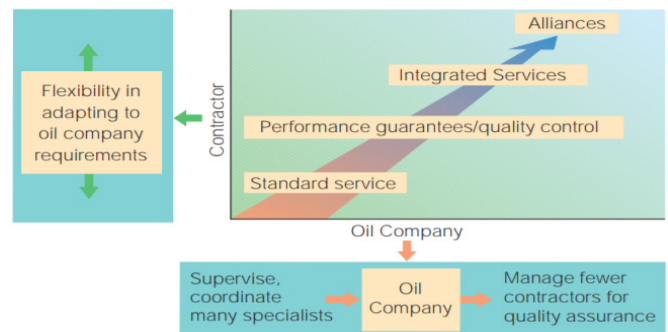


Figure 4: Contractor flexibility vs operator management¹⁵.

5.3. Partnering

This type of contract also called a "Productivity-based" contract describes a long-term commercial relationship between traditional E&P Company and the OFS Company¹⁶. These agreements between operators and contractors are designed to produce a win-win situation where the parties share parallel goals. This type of relationship typically shifts the emphasis from job cost to job quality and performance thereby placing more responsibility and accountability for job performance and quality on the vendor¹⁷. This model gives E&P company certainty over rates and quality while OFS Company in return achieves assurance of its reward and demand without having to renegotiate new contractual terms for each piece of work.

5.4. Risk-service contracts

Under risk-service contracts, the service company provides its expertise to a national oil company from exploration through production phases for an agreed-on fixed fee or some other form of compensation. The name of these contracts arises from the fact that it is the service company that bears the cost of exploration and hence the risk associated with execution of these activities¹⁶. Incentive contracts (sometimes called "risk contracts") traditionally have been based on footage or turnkey concepts emphasizing several objectives and characteristics, including financial inducements for good contractor performance, cost predictability for a given well or series of wells, transfer of operational control and risk from operator to contractor, transfer of responsibility and administrative burdens associated with ancillary services and procurement of well consumables from operator to contractor and procurement of well consumables from operator to contractor¹⁶. In case a discovery is made, the NOC allows the service company to recover its cost from sale of hydrocarbons in addition to a fixed fee based on the percentage of remaining revenue. OFSC is entitled to a share of profits and not a share in production¹⁵. These contracts are only available under certain jurisdictions such as Malaysia, Iraq and Iran.

5.5. Production enhancement contract

As the name suggests, National and International oil companies utilize these types of contracts to increase production from mature fields. Under the PEC, the OFS Company assumes both the execution and production risks, and its fees is based on achieving certain production improvements¹⁶. The service company make the investment while the right to reserves and production stay with the NOC/IOC. The service company develops the field with the aim to increase production utilizing latest technology and enhanced oil recovery techniques. The service company is then paid on a “per barrel produced” basis.

5.6. Production sharing contract (PSC)

Under PSC, the state and the contractor share the production from the asset, although the rights to petroleum in the ground stay with the state. In these contracts, the contractor assumes execution, production, and commodity price and market risk and adds value through its surface and subsurface capabilities. These contracts have generally been awarded to IOCs, there have been cases where OFS companies have contracted directly with states.

Under these contracts, the OFS Company would have to fund the operations as well as execute them and will be able to recover their capital and operational costs from an allocated share of production. However, it must be kept in mind that costs are not recovered unless operations result in commercial discovery and development. The reward under these types of contracts is attractive, however, the OFS Company is also exposed to significant risk particularly in terms of commodity prices. (Figure 5) summarizes the characteristics of the above contracts and shows the risk vs reward relationship for each of the contract types.

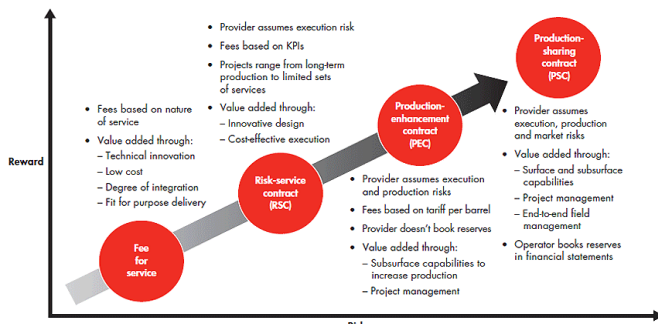


Figure 5: Risk vs reward for various contract types¹⁰.

6. Future Challenges for Oil Service Companies

The global demand for energy is expected to rise significantly particularly due to developing economies led by India and China, however, mature assets continue to decline rapidly, and it is predicted that almost 80% of them have passed their peak production. This has forced the operators to target more and more complex fields requiring cutting-edge technology and significantly higher capital costs. Price volatility on the other hand seems to be the new norm within the industry exposing operators and service companies to significant risks. In a nutshell, the oil and gas industry and the services industry are facing a myriad of challenges. We will briefly discuss some of the major challenges for oil field service companies:

6.1. Risk associated with contracts of the future

With volatility in oil prices being the new norm and oil companies targeting more complex hydrocarbon fields, E&P companies are going for integrated Service contracts where

service companies share the risk in execution, production and commodity prices with the operator unlike fee-for-service contracts where risk associated with reward is minimum. The exposure to these risks can significantly affect the financial performance of the company and hence service companies need to strike a balance between the risk and reward and decide the extent to which they can go in offering services to operators without critically affecting their finances. In future, Oilfield service companies will have to develop substantial operating and risk management capabilities if they want to compete as a lead operator under integrated service contracts.

6.2. Competition from national oilfield service companies

With ever rising demand in energy in the last few decades, some of the oilfield service companies have become huge conglomerates with their revenues going into billions of dollars. This has not gone unnoticed by the E&P companies and quite a few of the National Oil Companies (NOC) have established their own subsidiaries dealing with services sector. This poses a significant threat to the International Oilfield Service companies (IOSC) to deal with National Oilfield Service Companies (NOSC) particularly in their home countries. These companies offer mature technologies to their founder NOCs at a much lower cost without wasting much time on negotiation of contracts. About 65% of the oilfield services market in China and about 60% in Russia is collectively owned by these NOSC¹⁰ and as they grow, they are moving into international markets posing tough challenge to already established IOSC's. Also, the recent trends in R&D spending suggest that the dominance of IOCs in R&D is being challenged by these NOC's and their service subsidiaries¹⁸. Since 2005, five of the largest NOCs in the world (PetroChina, Petrobras, Sinopec, Lukoil and Petronas) have grown their research budgets at twice the rate of the supermajors (ExxonMobil, Shell, Total, BP and Chevron)¹⁰.

6.3. Development of individual product lines

Each big OFS company has different strengths and specializes in a particular product line. Another huge challenge for OFSC's will be to keep realizing the value of investment in their areas of strength while at the same time enhancing their integrated services portfolio. With the rise of National Oil companies in the last few decades, currently almost 90% of oil and gas reserves are now controlled by NOC's. These companies often outsource the entire exploration to production phase of field development to OFSC's requiring them to have an extensive integrated services portfolio. On the other hand, international oil companies select OFSC's based on their strengths to achieve very specific tasks. Hence, striking a balance between individual product lines and integrated services portfolio is of utmost importance. OFSC's will have to continue investing in research and development and build capabilities to attract a large variety of clients.

6.4. Volatility in oil prices

One of the biggest challenges for survival faced the OFSC's is the volatile nature of the oil prices which became evident during the recent downturn. The oil price collapse, which began in June 2014, triggered a wave of cost reduction among upstream businesses. Global oil and gas companies slashed capital expenditures by about 40% between 2014 and 2016. As part of their cost-cutting campaign, some 400,000 workers were let go, and major projects that did not meet profitability criteria were either cancelled or deferred¹⁹. The oilfield services sector is as much affected by commodity price volatility as the upstream

sector, but generally has a shorter time frame to stabilize cash flow since the sector does not usually hedge prices. When oil prices fall, revenue of oilfield service companies fall more sharply as compared to E&P companies because producers reduce purchases and renegotiate or cancel short-term supply contracts. This can force OFSC's to take swift action to cut costs and protect cash flow.

Deloitte recently conducted a study of 56 OFSC's to identify the characteristics of companies that fared better during this downturn¹³. They identified the following three factors common in all companies that demonstrated more resilient performance during this time:

Size: large and mid-size companies fared better than small companies

Geographic diversity: companies earning revenue from multiple regions fared far better than the companies' providing services in a single region

Focus: companies providing services in a low number of market segments performed better than companies providing a wide range of services.

An underlying feature of all these characteristics was the presence of long-term contracts. These long-term contracts apparently worked as a safety net during the recent downturn, functioning as a type of hedge for oilfield services sector.

7. Strategies for Suitable Success

For the most part, the oilfield services sector has finally picked itself up and dusted itself down following the 2014 price crash and the subsequent meltdown that occurred in the industry as the tightened purse strings of the E&P companies hit the revenue streams of the support industries very hard. As the services sector begins to recover, it needs to go through another transformation by developing strategies to prosper in upturn and remain robust in future price cycles. An independent consultant in a report titled "Phoenix rising - the oil field services sector transforms again" identified seven key strategies grouped under three categories as critical to the sustainable success in future¹³. (Figure 6) provides a summary of these strategies.

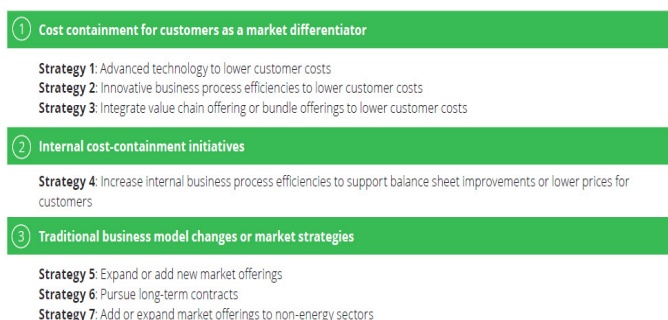


Figure 6: Strategies for future sustainability¹³.

Category 1: Cost Containment for customers as a market differentiator

With the current low oil price scenario, E&P companies are looking for service companies that offer the most advanced technology in the cheapest and most efficient manner hence having the least impact on their finances. Oilfield service companies can play a key role to lower down the cost base of customers by designing and offering deep business process improvements in their customer's operations including services integration and smart technology deployment.

Oilfield service companies being the leader in industry as inventor and innovator over the last few years, can offer their clients cutting edge technology to drive down their capital and operating expenditures. Service companies can also offer services and products to increase the business process efficiencies of customers hence lowering their cost base by reducing redundancies. Another strategy adopted by service companies to lower the cost for E&P companies is by merging several market segments targeting the entirety of upstream production cycle and offering integrated services. This can reduce cost for clients because it is intended to drive business process efficiencies by collaborating with customers at the start of project and optimizing workflow procedures. This is a holistic approach to extracting higher efficiency to cut costs further, then the traditional approach of using technology in isolation.

Category 2: Internal Cost-containment initiatives

Another important strategy to be adopted in future to become more robust for future price cycles is to seek sustainable cost reduction in internal operations through business process improvements, integration and technology. This can help oilfield service companies to offer better services to clients at cheaper rates than their competitors and remain relevant to E&P companies even in low oil price environment.

Category 3: Traditional business model changes or market strategies

Oilfield service companies need to optimize their market, geographical and contractual portfolios in alignment with core strengths and customer needs in order to remain profitable through price cycles. One way of standing out of its competitors is to expand or add new market offerings by either developing new product enhancements inhouse or acquiring a competitor. Schlumberger is a prime example of this and has been a serial acquirer of companies. From 2012-2016, Schlumberger allocated \$1 billion per year on average for acquisitions compared to Halliburton's \$100 million and \$50 million by Baker Hughes²⁰. Schlumberger recently acquired Cameron, Thru Bit (shale wireline logging company), Peak Well Systems (specialist in designing downhole tools) and Meta Downhole Limited (engineering and service company) to expand its market share and portfolio.

Another strategy to be adopted is to pursue long-term contracts even at the cost of lower service fee. This acts as a sort of hedge during the low oil price environments and make the service company more resilient in such environments. Moreover, in order to make the company more robust, service companies should expand their offerings outside the oil and gas business such as renewable energy market. Merger of Baker Hughes and GE is an example of this as GE had a wide variety of offerings in sectors unrelated to oil and gas.

8. Conclusions

With the prevalent low oil price environment, integrated service contracts can be considered the most common type of future contracts where oilfield service companies (OFSC) share risk with the operators along with reward. OFSC need to keep expanding their portfolio of integrated services to offer better expertise to clients particularly National oil companies (NOC) at a cheaper and in a more efficient manner and to stand-out from other competition. However, they need to keep investing in research and development of specialized product lines to remain relevant to International Oil companies (IOC). Oilfield service

companies that were the most resilient during the downturn were the large and mid-size service companies that had operations in a number of different regions and had a greater presence in service sectors like offshore operations that benefited from long-term contracts. In order to better handle the price cycles in future and have sustainable profits, the strategies adopted by Service companies can be broadly divided into three categories: Prioritize services that lower the cost base of upstream operators such as application of cutting-edge technology, optimization of business processes and offering integrated services to further drive down the costs. Use of innovative ideas to optimize business processes within the company to reduce internal costs and hence enabling the company to offer services to clients at cheapest possible rates. Develop new product lines and services either in-house or by acquisition. Diversify offering into sectors not related to oil and gas industry.

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