Point of View

Enterprise IT Service Provision

Unearthing Value for the Oil and Gas Industry

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Executive Summary

The role of technology in finding, extracting, and processing oil and gas is causing a fundamental shift in the way energy companies approach their information technology (IT) strategies. With the advent of remote sensors, nanorobots, Big Data analytics, and machine-to-machine (M2M) networks, IT is no longer just a provider of basic commodity information services. Rather, information technology has become a platform for innovation – and is fast becoming a leading best practice for creating core business value in the oil and gas industry.

"Every day, technology is reducing the cost of finding and producing oil and gas."

John Browne
Chief Executive, BP Group (1995-2007)

"Smart Fields will yield 8 percent higher ultimate oil recovery and a 10 percent increase in rate of recovery."

Pieter Kapteijn
Smart Fields Program Manager, Shell Exploration

Through engagements with major global oil and gas companies, the Cisco® Internet Business Solutions Group (IBSG) has developed a new model for IT provisioning that changes the way basic services are provided, enables innovation, and creates new value that can be delivered at scale as a service to the business.

This paper will discuss the trends that have shaped IT provisioning today and the resulting tension these trends create within oil and gas enterprises. We will then present a vision of next-generation IT provisioning that will cost-effectively deliver both standard information services and the advanced technologies that can create powerful new value streams for the core business.

The Economics of Oil and Gas Production

The increasing challenges of hydrocarbon exploration, production, transport, and refining mean that technical innovation and associated investment will play a rapidly increasing role in the core business of oil and gas production. However, the long-term outlook on crude oil prices is extremely uncertain,[1] so the economics of finding and lifting hydrocarbons (which include information technology costs) must be robust throughout the full business cycle.

IT budgets are already viewed as questionably "high," so chief information officers (CIOs) are being challenged to continue delivering basic services with improved service levels, while reducing overall costs. There is little fiscal headroom to create new value and deliver advanced services at scale to the business functions, either upstream for exploration and production, or downstream for refining and transport.

Among leading oil and gas companies, IT costs represent about 1 to 2 percent of revenues, a level that is often perceived as high. This is in contrast to other industries, such as financial services, where IT costs are in the range of 5 to 7 percent of revenue; or completely Internet-based businesses, whose IT costs can range from 12 to 15 percent of revenue.

Another factor to consider is the distribution of capital and operational expenditures (CapEx and OpEx) for IT. Oil and gas companies have policies defining access to basic IT capabilities and services. These determine the percentage of IT budget allocated to OpEx. Over and above this basic platform, the business will have a number of strategic business areas that also drive investment in more innovative information technology. This will determine the percentage of IT budget allocated to CapEx. While these vary slightly, the prevailing business priorities of most oil and gas companies are as follows:

- **Oil and gas production:** overall daily production, in terms of barrels of oil equivalent per day (boepd) or millions of cubic feet per day (MMcfd)
- **Refinery and associated supply-chain efficiencies:** profit margin per product produced
- **Capital project management and efficiency:** ability to deliver capital projects in accordance with the sanctioned cost estimate – the cost agreed at boardroom level

Finally, the cyclical nature of the oil and gas industry is a factor in determining IT budgets. The price of oil and gas, as well as the prices of refined / manufactured products, are not controlled or determined by individual companies. This fact applies short-term pressure on fixed-cost structures, including the basic or commodity services provided to most employees within an enterprise. In a downward phase of market prices, investments in the core business priorities of oil and gas production and delivery are much more likely to be sustained in the interest of long-term benefits to the business.

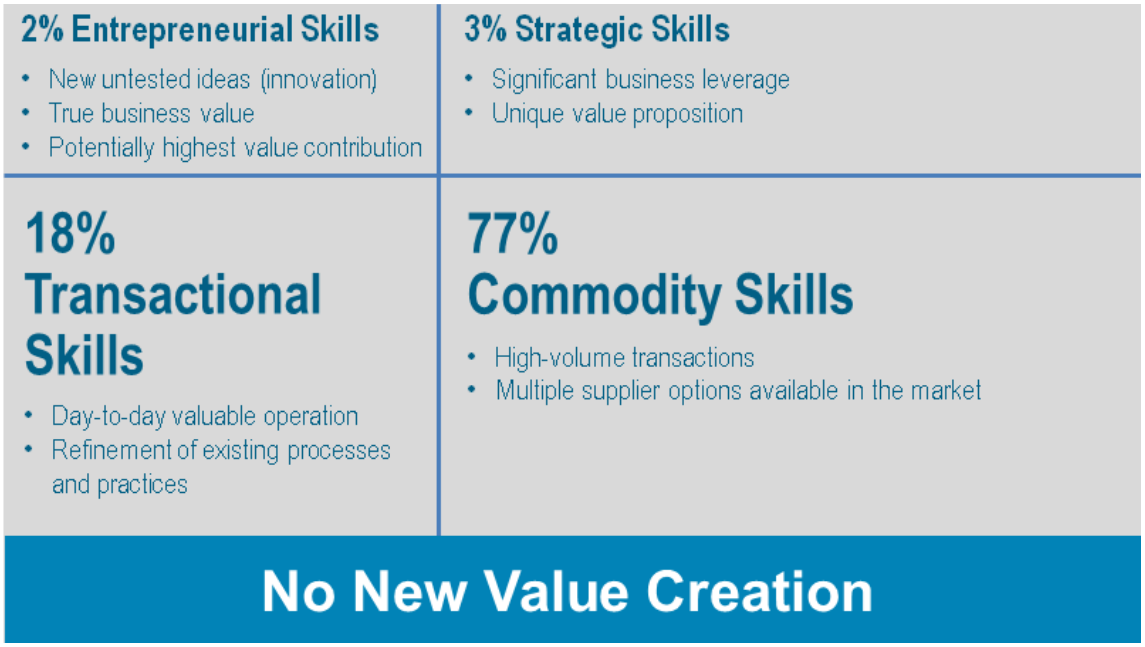
Need To Align Resources to Strategic Priorities

The relationship between CIOs and their sponsoring business unit leaders is under extreme pressure. Evidence for this fundamental problem can be seen in three particular areas:

1. The IT capability of an oil and gas company – whether nationalized or international – should be a value-added, strategic component of the core business. Increasingly however, business leaders see IT as the provider of commodity services with limited ability to introduce and manage strategic investment in innovation. To address this perceived **budget imbalance** and facilitate changes in the IT organization to better support the core business, IT operating funds for "commodity services" are being reduced and reallocated to capital investment projects that will deliver new, innovative services to the core business.

2. The **competency profile** of staff working in the IT organization should reflect the value proposition IT can offer the core business functions of exploration, production, refining, and petrochemical manufacture. The IT organization needs to have accountability for services delivered to the business, coupled with management skills to control and direct the provision of commodity services from external service providers. It must also include competencies to establish, execute, and deliver capital investment projects of the highest value.

Figure 1. Current Staff Competency Profile Does Not Support Strategic Business Requirements.



Source: Cisco IBSG, 2013

However, analysis of oil and gas companies in both nationalized and international segments shows that IT competencies are still heavily biased toward delivery of lower-value commodity services. Figure 1 reveals a strategic flaw in the profile of competencies within an IT organization of a large oil field services company. The total percentage of staff focused on "strategic" or "entrepreneurial" activities is only 5 percent. In contrast, 95 percent of staff is focused on "commodity" or "transactional" IT activities (which, by definition, bring significantly less value to the business).

3. Oil and gas companies need unified and integrated IT organizations that can deliver scalable and cost-effective services for both corporate and industrial functions. Most oil and gas companies still maintain different / fragmented IT functions (including applications, telecommunications, and telephony). The lack of a *single organizational construct* impacts budget efficiency, change management, and overall strategic investment.

Strategic IT: Delivering Value Through Services, New Investments, and Technology Adoption

The charter for next-generation oil and gas IT will encompass emerging virtualized technology, people with entrepreneurial competencies, and an organization that retains accountability for all services delivered, whether by internal or external organizations. The approach to implementation is divided into service delivery, new investment, technology strategy, and strategic sourcing.

Service Delivery

The IT service delivery organization is where value is delivered at scale. It should be a single capability that continually looks for and identifies new innovations, clearly defines them as services, and enables the core business to take advantage of them as required.

Core business users may be based primarily in an office environment, or in an industrial environment. New technologies that enable mass mobility are blurring this distinction rapidly. However, job roles plus health and safety regulations will restrict the number of people who move freely between the corporate and industrial environments. All users will increasingly embrace mobility for an "occasionally disconnected" work style.

The service delivery charter of a next-generation information technology organization could be defined as follows:

- Provide a portfolio or catalog of defined information technology services to the business user or industrial user. There could be between 10 and 15 services (such as collaboration or workspace solutions) described in nontechnical terms, with a clear service-level agreement, again in user terms.
- Ensure that all defined services have a unitized price ($ / user / month) that is scalable. In this way, business units can increase or decrease demand for services, and their cost will vary accordingly.

- Provide financial assurance that the unit price of each service is competitive within the oil and gas industry.
- Offer technical assurance to ensure that investments are strategic, architected, and secure, with nonproprietary, multiple sourcing options.
- Deliver performance assurance to monitor and report against agreed-upon service levels.

Mobility was originally considered "a service." However, leading corporate and industrial implementations are now delegating mobility to an infrastructure function, which is then used by high-level business-centric services.

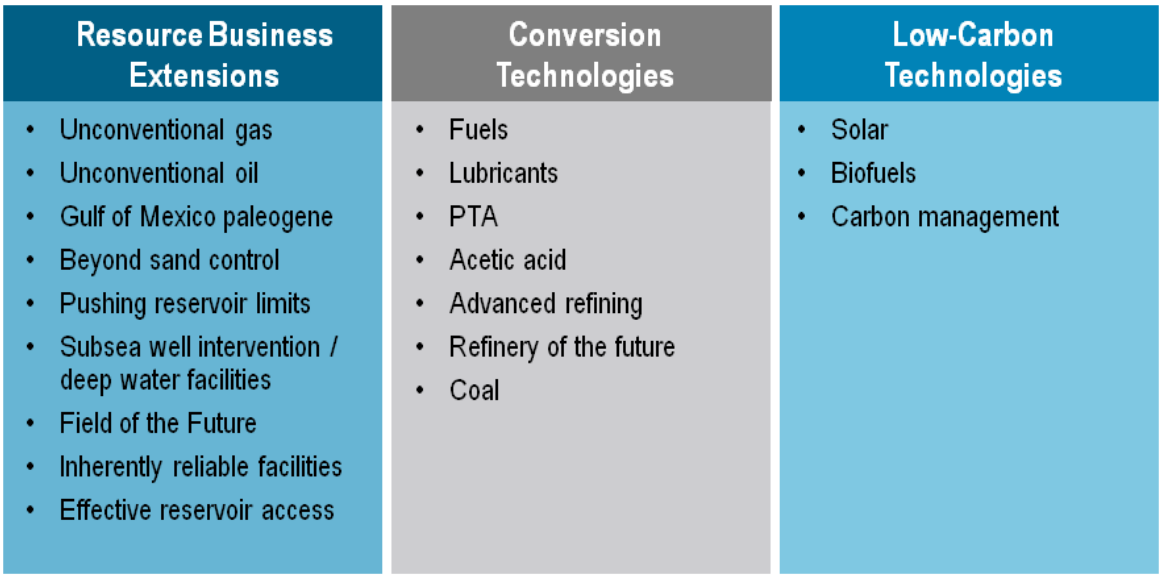
With the corporate and industrial service portfolios "protected" by a single rigorous change-management process and a culture of continuous improvement and cost reduction, service excellence will be visible over time.

New Investment

The new-investment organization (sometimes referred to as the "IT projects" organization) is the point at which the relationship with the core business should have the most strategic impact. It is the interface across which the core oil and gas business can gain insight and knowledge of new technology capability and how such technologies can support the business priorities through innovation.

BP is an example of a major oil and gas player with a significant technology program that is frequently referenced in reports to industry analysts (see Figure 2).

Figure 2. Major BP Technology Initiatives.



Source: BP, 2009

Under the BP Major Technology Program,[2] the IT new-investment organization must "shadow" the areas identified by the core business as having the highest value. The objective is to understand the business requirements and apply digital / information technology. Once the business decides to deploy a major technology program at scale, the IT organization must create the necessary supporting services, which will then be transferred to the service delivery organization through the change-management process.

To operate effectively and focus on the highest-value contributions to the business, the new-investment organization must have the following capabilities:

- **Technology scanning:** Many oil and gas innovations do not originate in the oil and gas industry, so companies must have the ability to formally conduct technology scanning and identify new innovations. A common technique is to track the investment of venture capital organizations.
- **Project management:** All activity must be managed as discrete projects, which are ranked according to business priority. This will require the necessary competencies to manage large-scale capital projects with IT content, sometimes referred to as a Center of Excellence for Project Management.
- **Education to share knowledge (usually by partnering with the core business):** For example, IT leaders share with the core business the new capabilities available in the open market now or emerging in the near future. The core business people share the challenges and requirements of the major technology programs.
- **Understanding of the company's capital investment and control process:** Most oil and gas companies have a high-level process to manage large investments, beginning with the initial appraisal, and then moving to identification of options, selection of the preferred option, execution, and finally, operation.

Technology Strategy

Oil and gas companies have been relatively slow to adopt new ways of working. This stagnation was caused by the lack of an impetus for change given the historic economics of hydrocarbon exploration and production. Technology, on the other hand, is probably the fastest-changing and developing industry in the world. With new challenges upstream (gaining access to new hydrocarbons and extending production of existing reserves) and downstream (impacting refining efficiency, crude supply logistics, and marketing), the interface between IT and the core business is potentially a high source of value to the oil and gas industry and its owning nations.

Technology strategy decisions will focus on the following considerations:

- The new economics of virtualized (or "cloud") delivery of services and infrastructure are a step change in performance (cost / quality / service) and offer an inherent ability to scale costs according to demand.
- New functionality such as mobility in the corporate and industrial domains can be applied cost effectively to virtualized or cloud-based service delivery models.

- Collaboration has moved from simple document sharing and video conferencing to an all-inclusive ecosystem of people involved in the business (regardless of their employer, equipment included in the asset design, and modeling of the asset's performance).
- Companies will need to determine which user devices, points of automation, and/or sensing mechanisms can be securely connected to the corporate network.
- Advances in Big Data management and analytics will make business intelligence (BI) far more effective in deriving intelligence from vast new quantities of available data.
- Miniaturization and nanotechnologies will provide the core business functions of exploration, with the ability to sense subsurface pressures and temperatures — fundamentally changing the way hydrocarbons are produced. For example, Saudi Aramco EXPEC Advanced Research Center has introduced the concept of reservoir nanorobots, known as Resbots. Nanoscale Resbots can be deployed along with the fluids injected into a hydrocarbon reservoir to record reservoir pressure, temperature, and fluid type. Information is stored in the Resbot's on-board memory and then retrieved to better manage the reservoir and pave the way for increased recovery rates.

Strategic Sourcing

Nationalized oil and gas companies with an agenda focused on providing employment have traditionally turned away from changes to sourcing of IT services. However, the emergence of a nation's information and communications technology (ICT) capability is creating greater and more credible options for the outsourcing of services. The focus on strategic sourcing decisions will consider the following:

- Strategic sourcing does not equate to outsourcing. To provide the greatest value, all information technology leaders must revisit the criteria for deciding where to procure services, including their associated economics and impacts on existing resourcing.
- Oil and gas companies are training IT staff to be more educated in the core business drivers and requirements, and how technology can be applied to these challenges (as opposed to education in industry-agnostic information technology).

Examples and Benefits of Strategic IT Provisioning

In the following section, we will provide examples from Cisco IBSG engagements with two oil and gas companies that are embracing the enterprise IT service delivery principles outlined in this Point of View. One is focused on the service delivery aspect we talked about above, while the other emphasizes new investment.

Service Delivery Organization

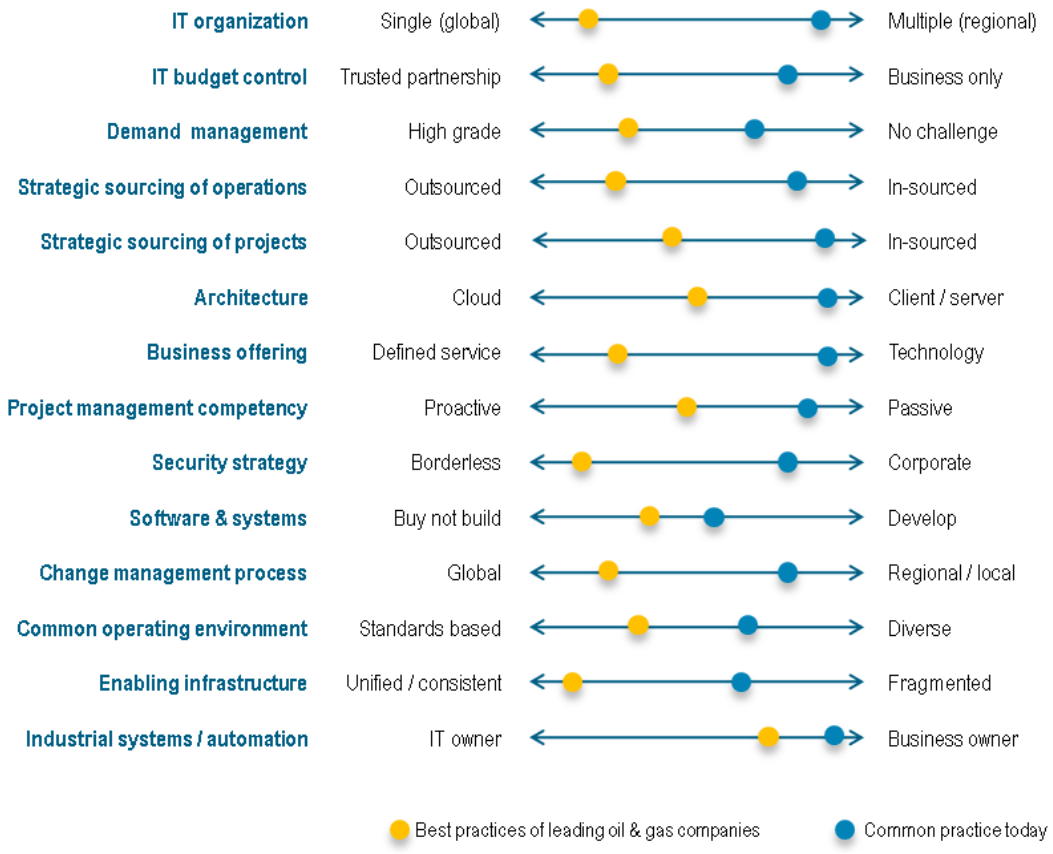
A nationalized oil and gas company in Africa is looking to scale up its information technology capability and provide services to all subsidiary companies within its group, some of which operate outside the country. The company aspires to create a next-

generation service delivery organization that may eventually extend its IT services to other enterprises operating within the same country.

Figure 3 illustrates the strategic changes the company will have to implement in key areas to adopt the best practices of leading oil and gas organizations. The changes in strategy were driven by the following objectives:

- Create a clearly defined portfolio of services to be provided at a significantly lower cost than the current organization can offer (reduce capital).
- Deliver information and collaboration services to lessen the need to provision and control users' devices (increase service level cost effectively).
- Remain compliant with national directives for employment and local content.

Figure 3. Next-Generation IT Service Delivery Will Require a Change in Approach to 14 Key Areas of Strategy.



Source: Cisco IBSG, 2013

New Investment

An oil and gas company in the Americas was challenged by the logistics costs of moving crude oil from its deep-water assets to storage terminals and then to its refineries. With an aggressive growth plan in place, the challenge was to constrain the need for additional capital investment while increasing the capacity and efficiency of the crude oil supply chain.

The oil and gas company had optimized the supply chain, but IT leaders suspected that additional efficiencies could be gained by using new modeling techniques. The company implemented new models using real-time sensing and monitoring to provide continual updates to the model, thus delivering more optimized logistics.

In addition to making higher-quality information available earlier in the planning process, the company is delivering collaboration as a service across the entire supply chain to further accelerate decision making.

Initially, this "new investment" has the potential to deliver $60 million per year of logistics cost savings. The company anticipates an additional $30 million in savings with the full automation of the planning model.

To realize such benefits, it is critical that the IT organization works as a trusted partner with the core business to create services that can be utilized at scale.

Next Steps for CIOs

Based on the experiences and direction of "best in class" oil and gas IT capabilities, CIOs should consider the following questions:

- Does your IT service delivery organization provide a clearly defined set of services to the business, and do you know the cost-per-seat for these services?
- Under a single, unified IT organization, is there a clear distinction between service delivery and capital projects, separated by a single process that controls all changes to ongoing services?
- What is the profile of staff competencies in the IT function, and do these competencies support an agenda of business innovation?
- If the exploration and production functions challenged IT to allocate more capital and resources to innovation, what would be the source of that capital and resources?

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Endnotes

1. United States Energy Information Administration, Annual Energy Outlook 2010, reference case.
2. BP Analysts Conference, London, March 2009.

More Information

Cisco IBSG (Internet Business Solutions Group) drives market value creation for our customers by delivering industry-shaping thought leadership, CXO-level consulting services, and innovative solution design and incubation. By connecting strategy, process, and technology, Cisco IBSG acts as a trusted adviser to help customers make transformative decisions that turn great ideas into value realized.

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