

The Projects, Technology & Procurement Organization

The Emergence of a New Organization Form in E&P



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Emergence of a New Organizational Form

The integration of Project management, Technology and Procurement functions into an integrated unit can improve performance by achieving better control, project cost reduction and the opportunity to achieve performance leadership through technology. This organisational form has the potential to help the industry deal with some its greatest challenges – this white paper describes the approach and the trends that led to its adoption and extracts some key lessons from two case studies from the lead adopters (Shell and Statoil) of this organisational form.

The oil industry has always struggled to introduce new technologies in development projects and to deploy such new technologies in existing assets. Concerns are also increasingly emerging in some companies about the speed and effectiveness with which new technologies can be applied. This is especially relevant for 'greenfield' projects where, in theory, technological innovations should have the greatest impact given that the performance levels "baked in" with that technology selection are locked-in for the full 20-40 years of an asset's life.

Furthermore some key technologies, that all players may wish to deploy, are owned and controlled by Oil Service Companies. These suppliers, together with key components manufacturers, have a significant role in the industry, especially in the exploration and development phases where a significant chunk of the overall spending is dedicated to procurement of goods and services.

One of the major hurdles for oil companies is the strong pressure on "first oil" and early revenue generation. As a result, Project Managers are typically rewarded against delivery on schedule and scope, and do not like surprises. The E&P industry as a whole has therefore struggled to incentivize teams managing complex development projects to encourage them to standardize procurement or adopt new technologies, even if these have already been field tested. This challenge is heightened by the relative scarcity of staff in some key technical disciplines and by the shift towards unconventional resources which has highlighted the need to "experiment at scale" in order to maximize opportunities for moving up the learning curve after applying new technologies.

One relatively new organizational form that is increasingly being employed to tackle these challenges is the integration of all relevant Projects (including Drilling), Technology (including R&D) and Procurement units into one single, integrated global division which is then tasked with the full burden of delivery. This approach seems to accelerate value creation by boosting the capability of project delivery functions, enabling cost effective deployment of appropriate technologies and constrained technical resources while ensuring value-driven procurement.

This paper examines this approach to oil company design in order to understand the strategic drivers for, and the key features of such integrated Projects, Technology and Procurement (PTP) divisions. We review the publicly reported experiences of Shell, Statoil and several other major players, highlighting best practices and issues to overcome in operating this organization style.

The Projects, Technology and Procurement (PTP) Organization

The main features of such an integrated Projects, Technology and Procurement (PTP) organization are illustrated by the recent changes seen at both Shell and Statoil, and to a degree by the changes in organizations such as OMV, PETRONAS and others.

Our analysis suggests that such centralized PTP organizations lead to:

- a clearer accountability for on-plan project delivery because of the greater ease in aligning relevant stakeholders
- an improved integration of key suppliers both in project delivery and in technology transfer

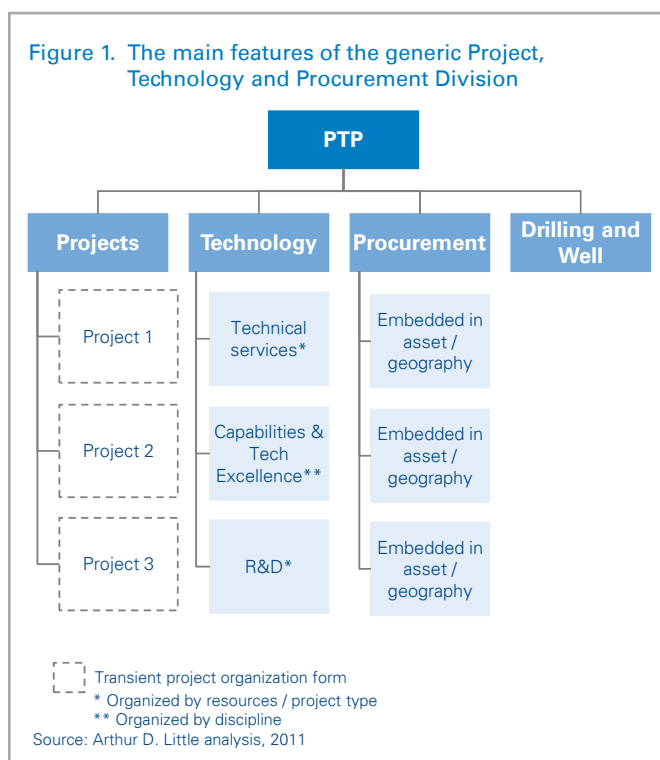
This is also often reflected in more coherent business planning and targeting of technology development which drives better knowledge transfer and greater standardization of delivery. They also seem to enable better understanding of the risk – reward balance of major greenfield projects, through a more streamlined development process leading to better overall coordination of resources (see Figure 1).

The PTP division reports as one of the main organizational divisions with board representation from the head of division.

Procurement is fully centralized, with global responsibility for all contracting and procurement strategies and enterprise framework agreements across all categories of materials goods and services. Procurement staff may be operating in different geographical areas but they report in direct line to the PTP procurement function but have management representation in the local geography or asset.

Project delivery is centralized for large CAPEX projects and project delivery lies with PTP which has project responsibility and accountability from feasibility to delivery and commissioning; this is structured to speed up delivery, improve cost control and ensure optimum technology deployment.

Well Delivery is often largely centralized, operating in a matrix, reporting to both local asset and global functional units and with responsibilities for drilling, completion, intervention and well maintenance.



Technology may be geographically dispersed but operates in a fully integrated function which provides:

- **Technical support** delivered at the asset level by pooled technical staff operating in a matrix. Centralization creates better use of resource constrained technical staff
- **Development of technical capabilities and disciplines** through creation and enforcement of standards, discipline control and assurance framework, and application of the latest approaches as developed by lead engineers and discipline heads
- **Research and Development** with an increased focus on implementation of technology

The integration of technical operations standards, both upstream and downstream, is also expected to drive costs down across projects.

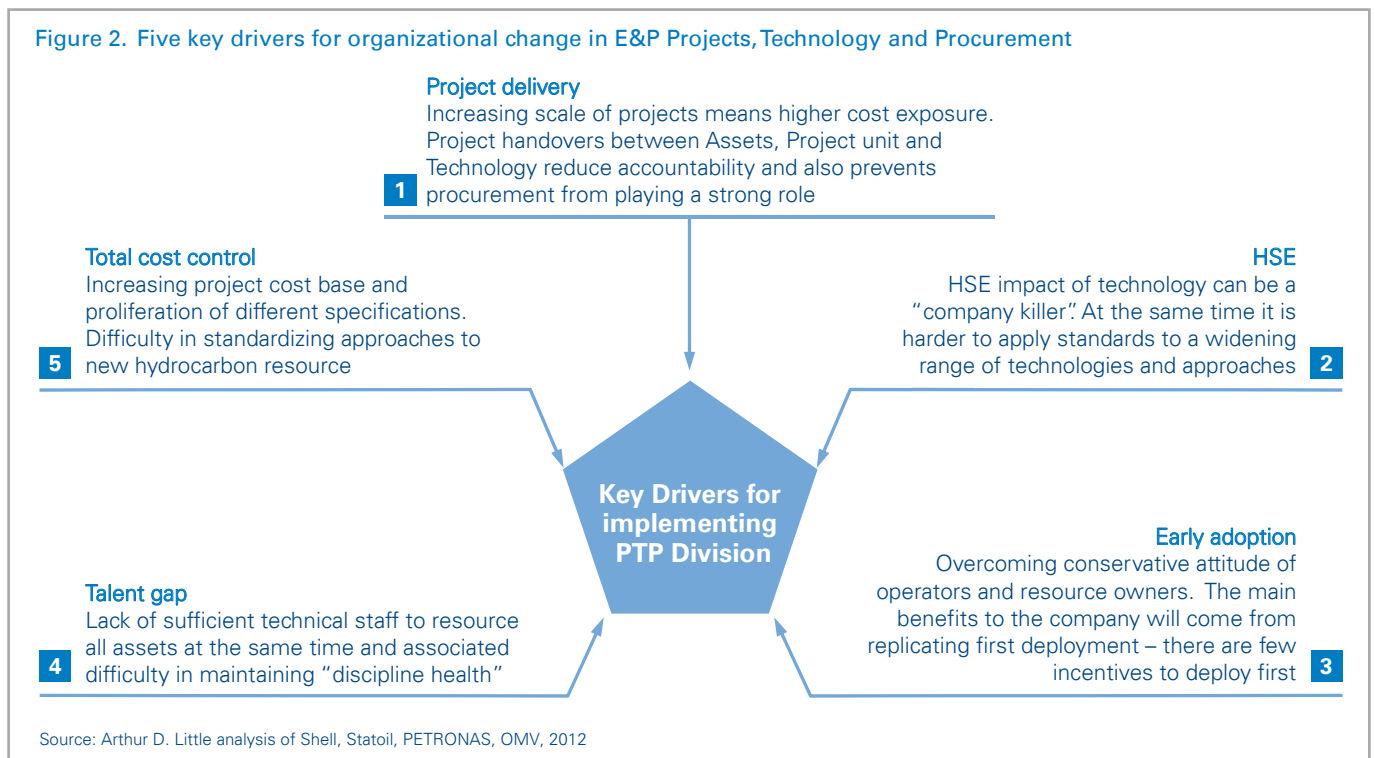
Drivers for Change

Arthur D. Little identifies five key industry drivers which commonly contribute to the development and adoption of the PTP organizational form (Figure 2). These reflect the increased importance of procurement in reducing project delivery cost while also managing risk, HSE concerns and overcoming the conservative nature of the industry. It also addresses the global issue of the talent gap that the industry is experiencing by allowing a better pooling of resources.

in different divisions (often with conflicting views) typically slows down decision-making and execution, resulting in a high cost-base and significant project overrun.

The PTP approach creates an opportunity to better manage projects which have strong technology components and to address the risks associated with technology. By overcoming the fragmentation of responsibilities through focusing accountability

Figure 2. Five key drivers for organizational change in E&P Projects, Technology and Procurement



Project delivery

The industry (especially the majors) has experienced both increasing project size and increasing reserve replacement costs (CAGR 2004-11 over 10%) over the last decade with corresponding increases in the risks associated with delayed delivery, delivery of sub-optimal technology or the costs of upgrading technology. Some analysts report that only 22% of mega-projects over \$1 billion USD meet their cost and schedule targets.¹ A complex organization with technical expertise and decision-making located

within a single organization it is possible to make smarter and faster decisions (i.e., with fewer people taking decisions and more people implementing). In a PTP organization, this is achieved by reducing project handovers between asset owner, project execution function, and technology / R&D management, and by focusing the accountability for key decisions. Critically, it also strengthens the role of procurement in maintaining cost control.

HSE

The Macondo incident demonstrated that weak project execution, especially around drilling and well operations, can have significant HSE and economic consequences. It also resulted in significant efforts to tighten up the management of global technical standards to manage companies' exposure to technical risk.

Providing a functional role for Drilling & Wells, involving performance validation, control and the enforcement of global technical standards by specialized teams, improves the quality of operations delivery. When these specialized D&W teams are then globally deployed (working closely with assets) they can be trusted to deliver the best possible solutions and reduce the problems of delay and lack of ownership that are associated with centralized checking and reporting. A close interaction between drilling operations and the teams that set technical standards also improves the speed of adoption of new standards and the ability of the organization to react to potential problems.

Early Adoption

The oil and gas industry has time-to-technology deployment characteristics that are consistent with other high-CAPEX industries. In addition to the typical problems of such high upfront CAPEX projects, technology is typically deployed in hostile, hard-to-reach environments where its operation is "mission critical" or with a high cost of failure in loss of production. Early adopters are obviously more exposed to technology risks, yet the rewards of implementation are often only realized by the next generation of that technology. From an asset perspective there are therefore few incentives to be an early adopter, and ADL estimates it can take 10-15 years to mature a completely new technology from early TRL to field trial and widescale adoption.

In contrast, from a corporate perspective, the introduction of new technology creates most value when the best available technology is incorporated into long-life assets. There is also a real need for leading companies to demonstrate their claims about technology leadership to unlock access to resources: there is no substitute for demonstrating an approach at scale to cement a leading technical reputation. This is particularly true

when dealing with new resources (e.g. investment in shale gas) where pilot projects need to deploy technology and rapidly integrate the lessons from project development and operations back into the next wave of projects, and to provide a strong feedback loop into technology development to speed up cycle-time in technology development.

Another benefit of the PTP division approach is its ability to integrate areas of technology which cross over between upstream and downstream activities (e.g. heavy oil) and those which sometimes fall between gaps within companies with separate upstream and downstream divisions.

A centralized PTP division, with responsibility for deploying cost-effective technologies, can partially overcome conservative attitudes by strengthening delivery and assuming overall project responsibility. It can also make sure that technology and approaches are replicated across regions and assets. Finally, it can provide a better level of integrated Technical Service support to operating assets.

Talent gap

The last few years have seen the growing shortages in key petro-technical staff start to bite across the industry. This is constraining industry growth at a time when high oil prices are driving all companies to increase their investment significantly¹¹ (ADL 2008).

A centralization of technical functions, and the ability to pool technical support, project staff and R&D teams together into a single division, improves the ability to balance and plan future resource needs and to allocate resources where they create most value. Increasingly, a pool of technical staff also creates more flexibility in resource allocation by overcoming issues of geographical dispersion to assets. With a degree of centralization we see better staff rotation, deployment planning and more efficient temporary allocation to projects.

Total Cost control

The industry has always experienced significant cost problems in its mega-projects and still faces increasing cost pressures today. A competitive cost structure is critical for all companies to achieve sustainable growth. As an example, Shell reported a doubling of its cost base between 2004 and 2009 and this was undoubtedly a factor in their decision to adopt the PTP model.

Centralized global procurement is clearly best practice in high CAPEX industries; however it is not always appliedⁱⁱⁱ. The opportunity to centralize procurement within a global project function has therefore resulted in material cost reduction for those companies that have implemented such procurement strategies.

A PTP division offers the opportunity to realize in full the benefits of a strong procurement function by ensuring that cost and performance trade-offs are considered at a companywide level and that supply risks are properly managed along the whole project lifecycle. It can also mandate the standard deployment of best practice technology by controlling outdated specifications. The earlier that procurement is involved in project design the more leverage it can achieve in terms of final cost reduction (e.g., by deploying design-to-cost approaches or by advising on cost effective approaches from its own experience of global operations).

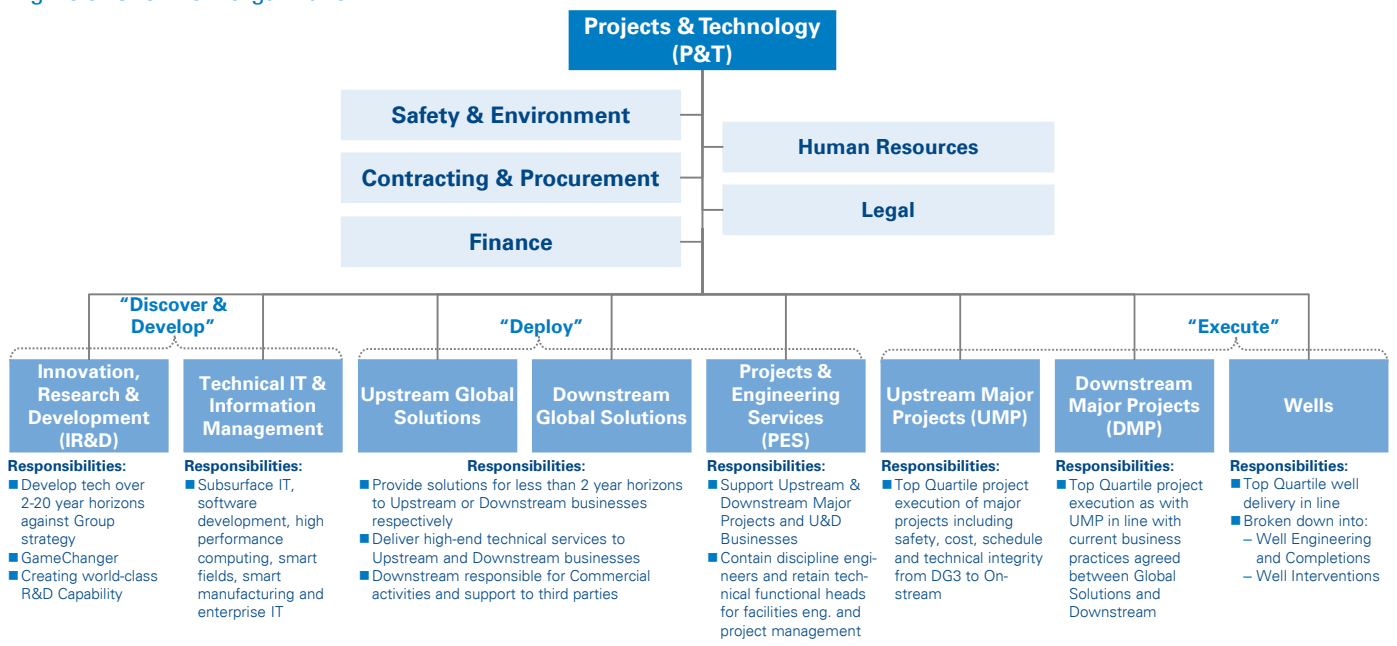
In addition, ADL believes that where projects have a high technology content and are working at the cutting edge of performance it is critical to make sure that the procurement function can deliver on qualifying technology for acceptance and that there are strong connections between Projects, Technology Development and Procurement so that procurement becomes an enabler rather than a constraint.

Shell Case Study

So far only Shell and Statoil have fully adopted the PTP structure and there is considerable interest from other companies facing large scale technical challenges. We have used these two companies as case studies to highlight the drivers, benefits, organizational options and remaining challenges from their implementation of the PTP structure.

Shell's Projects and Technology (P&T) Division

Figure 3. Shell P&T organization



Note: In contrast to Statoil which has kept its third line technical staff (lead engineers) centralized, Shell has dispersed what used to be its capability function to enable discipline heads to be located as close to the coal face as possible^V
 Source: Arthur D. Little summary from open source documentation^V

Figure 4. Rationale for Shell's P&T division

Reduce costs	<ul style="list-style-type: none"> Cost reduction by de-layering or reducing support functions and merging duplicated expertise Standardize and simplify concepts and processes Closer integration with procurement to strengthen pursuit of cost effectiveness Fit-for-purpose, cost-effective technical services for Shell assets on demand
Simplify Organization & faster delivery	<ul style="list-style-type: none"> A flatter organization with larger span of control and more accountability for faster decisions Fewer interfaces by reducing project handovers and fragmentation to speed up delivery Better use of technical resources. Fewer staff make strategic choices; more staff implement
Capture lessons and force technology deployment	<ul style="list-style-type: none"> Builds on global experience and captures learnings in a single global centre of excellence Leverage a technology developed in one area for adoption in another part of the world Central R&D supports communication and idea exchanges to facilitate such interaction

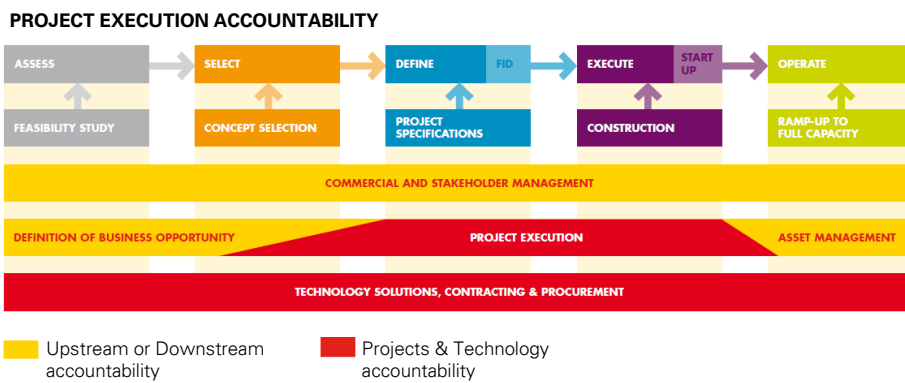
Source: Arthur D. Little analysis from open source documentation^{VI, VII, VIII}



In mid-2009 Shell announced a reorganization of its operations to combine its E&P Projects and Technology divisions into one of four new Divisions (P&T) with Board representation. Figure 3 presents this new organization which now incorporates all Upstream and Downstream Technology, Projects, Wells and Procurement into one single Division. The combination of upstream and downstream activities was expected to create critical technical mass, while also supporting a more integrated approach to project delivery. The aims for the new division (presented in Figure 4) were reported to be to: reduce costs and simplify the organization for faster delivery and more efficient use of technical staff and to strengthen deployment of technology.

One of the main features of the new organization is its capability to strengthen project execution (Figure 5). The relevant Asset/ Business manages all stakeholder and commercial issues but once a project moves into concept selection (DG2) P&T takes over accountability to provide conceptual engineering, contracting and procurement with full responsibility only handed back to the Assets at start-up/ commissioning. This project-execution model builds on the experience of operating with this approach in the Gulf of Mexico and other Shell major projects.

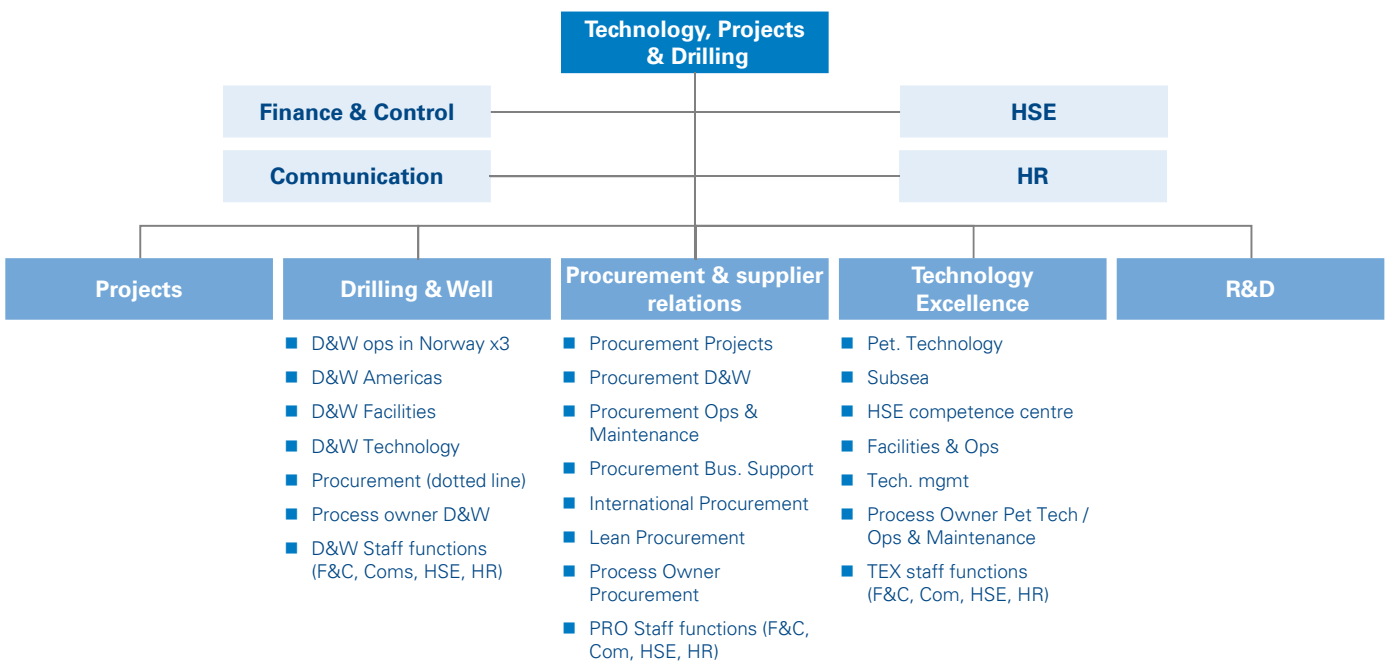
Figure 5. Project responsibility within Shell P&T



Source: Shell Documentation 2009^{IX}

Statoil's Technology Projects and Drilling (TPD) Division

Figure 6. High level organization of Statoil TPD



Source: Statoil communication to Arthur D. Little 2011^x

Figure 7. Rationale for Statoil's TPD division



Source: Arthur D. Little analysis from open source documentation^x



In January 2011 Statoil announced it was re-organising its operations and combining its Technology, Projects and Procurement functions into the TPD division. The new Technology Projects and Drilling division integrates Projects, Drilling, Procurement, Technology Excellence and Capability Development and R&D (Figure 6). In contrast to Shell, Statoil did not have to integrate upstream and downstream activities as it is principally an E&P organization.

The aim of the 2011 merger of the Projects and Technology and New Energy Divisions (presented in Figure 7) were reported to be to reduce costs and strengthen delivery of projects; simplify the development organization and processes; and support Statoil's continuing internationalization drive. Associated with these ambitions, ADL believes that the new organization may also be expected to help strengthen Statoil's efforts and investments in shale-gas in North America.

The Procurement division appears to be organized in a way that facilitates easy interaction with the Projects, Drilling & Wells and Operational divisions. One point to note here is that procurement is embedded within the Division and is, although not considered a staff function, it is also operated on matrix lines: for example there is a VP of procurement in charge of D&W who has dotted line to D&W and participates in D&W management but reports to Procurement.

The autonomy of the Drilling and Wells Unit is relatively strong and ADL understand that they are organized geographically and have access to their own technical pool of special services. D&W Americas has reporting responsibilities to Development and Production International.

The re-organization was designed to overcome the issues of multiple handover points during project development by creating a single, integrated organization with clear accountability for project and well delivery able to deal with projects delivery from DG1 to DG4. The new Division is expected to have a support and delivery mindset, with clear (and measurable) deliverables for Statoil's operational units. Such a combination of Technology and Project expertise is also expected to strengthen its application of technology by making R&D and Technical services responsible for implementation as well as development.

Some of the Challenges of this Organizational Model

Together with the advantages that companies adopting such a centralized Projects and Technology organization have been able to extract, there are also some organizational and structural challenges which need to be considered. Some of these relate to the implementation and management of the new organization while others reflect broader limitations of the approach which can be partially overcome by tailoring organizational design and processes to fit with company strategy or individual characteristics.

Implementation issues

The effective implementation of such centralized designs, which require an effective interaction with the underlying regional businesses that “own” the assets and which may perform exploration and subsequent production operations, leads to an often very complex matrix structure whose real benefits can only be extracted by the more sophisticated organizations. Because of this complexity, not only is a very careful implementation imperative, but there will often need to be a very sensitive, on-going “policing” of interactions (for example through bespoke common key performance indicators) in part to ensure the clean and effective hand-over and governance of assets at appropriate times.

We see this being offset however by both the continuous interaction between project and asset teams during project delivery and by the advantages that derive from having stronger technological innovation driven from the Centre.

Clarity in implementation is critical for all organizational changes. However, the roll-out of this new organizational form requires particular attention in order to ensure that the transfer of current and impending projects is managed with absolute clarity and clear accountability within the new PTP structure. There also needs to be enough autonomy left in the field to ensure proper day-to-day management of issues. There needs to be a clear set of criteria for project handover before the project organization can begin to operate. If not, there is a real risk of delay as staff get to grips with new processes and new, often complex reporting lines.

Meeting asset needs

A further key challenge is that a move to a more centralized project development approach shifts responsibility for project delivery away from the asset, reducing local content and host-country involvement and potentially diluting or losing some of the benefits of a local, strongly P&L-focused, asset-based project delivery team. Some of the drive towards long-term production optimization and cost cutting may be blunted in this way by the shorter-term project imperatives.

Engineers sometimes have a tendency to “gold plate” processes or only address the technical challenges that are most obvious at the time, perhaps diluting the operational focus that production and operations need. Furthermore, handing the project over for development and delivery means that there may often be subtle pressures for the project team to deliver on its KPIs (time and CAPEX) with accompanying tradeoffs on operational issues (perhaps de-prioritizing OPEX impacts, maintenance or abandonment costs).

To address these issues, ADL typically advocates strong stakeholder representation on Project Boards, setting clear Operational Readiness and Assurance procedures and teams and the development of a set of operational project KPIs to ensure the asset-owning customer gets what they really need.

Sustaining Exploration and Production R&D

The PTP division creates strong links between R&D Technology and the Development function, with the R&D function being entirely embedded within PTP. There is therefore a potential to over-concentrate on technology issues associated with Development at the expense of those within Exploration, Production or New Energy, which may have weaker relationships with PTP. Technology funding for these areas may therefore need to be ring-fenced and managed with strong formalized links to these relevant organizational areas.

Another potential cause for concern is the almost inevitable bias towards a focus on short-and medium-term technology delivery for the organization that may result from combining Projects and Technology teams. This can mean that some of the longer-term R&D and technology activities are not given adequate resources. In the long term this could even lead to a gap in technology capabilities or undermine the organization's technology strategy.

However there are effective Technology Management tools that can be used to protect technology funding and create strong guidance by identifying customer / business needs, by careful design of the technology planning process and by using stakeholder-based technology portfolio techniques.

One approach that is often used to compensate for this natural bias is to invest in accessing early stage R&D outside the company through the use of open or networked innovation or by creating different "ring-fenced" budgets for short-, medium- and long-term R&D (with different governance and investment approval mechanisms) as part of developing a balanced R&D portfolio.

Concluding Remarks

PTP integration can be adapted to company context

Though this organizational approach carries many benefits, for the right company, the challenges of applying it, especially in terms of the interaction between a PTP unit and the asset owners, are such that many companies have considered a partial implementation to have been sufficient to generate enough of the benefits identified.

For example, companies like ExxonMobil and BP, which are functionally organized into Exploration, Development and Production units, capture many of the benefits of this approach: with BP having restructured its upstream operations in 2010 in this way with the Development division having two technical functions dealing with Global Projects and Global Wells. Critically however, in both these cases, Technology and Procurement are retained in separate parts of the organization and so will not be able to fully capture the benefits of the PTP organization form.¹

PETRONAS partially applied the PTP approach when establishing its EP Technology Centre (EPTC) in 2011. Having identified technology areas critical to delivering its corporate strategy, it has achieved a strong focus of technical resources on EOR and CO2 Management and has made EPTC responsible for a combination of Project Development and R&D (including external collaborations), using resources at its R&D Centre in Bangi. However, it did not integrate the Procurement function into EPTC and complementary projects and downstream technology development continue elsewhere.

While a Statoil or a Shell may be large enough and culturally sophisticated enough to sustain the various trade-offs involved, smaller companies, such as OMV, seem to find it sufficient to install a central Corporate function which combines and governs all Technology and Procurement activities but with just an oversight and governance responsibility for Project activities. The bulk of Project work is carried out elsewhere in the organization, closer to the assets.

Many other companies, such as BG Group, still further removed from the PTP model, retain only a central PTP function which supports and governs technology development and project competence application, without any direct integration to Project delivery or Procurement controls.

Takeaway

Organizational design must always be crafted to a company's particular business circumstances and cultural texture. Whatever the precise organizational path taken, it seems clear to us that the PTP approach, or certain key elements of it, offer a range of benefits for companies needing to improve project performance through deployment of leading technology. The organisational model and processes will continue to evolve to optimise the approach to balance some of its inherent organisational challenges. However, with increasing asset development challenges, the benefits of the PTP organisation model means that that this is an organizational design that we will see adopted more frequently in the coming years as companies re-organise to meet industry challenges.

¹ In BP's case this is made more complex by its asset BU design

References

- I Merrows, E., 2011, Oil Industry Megaprojects: our recent track record, Offshore Technology Conference, Texas, http://www.otcnet.org/2011/pages/schedule/tech_program/documents/otc218581.pdf
- II ADL, 2008, bridging the talent gap: labor shortages in the energy sector, http://www.adlittle.com/downloads/tx_adlreports/ADL_Labour_Energy.pdf
- III Arthur D. Little, 2010, Purchasing Excellence study, <http://www.adlittle.com/operations-viewpoints.html?&view=457>
- IV <http://goo.gl/DMglg>; <http://goo.gl/oISJE>; <http://goo.gl/ldep2>; <http://goo.gl/quBcx>; <http://goo.gl/rkCYa>
- V <http://www.shellnews.net/images/EC-1.pdf>, retrieved January 2012
- VI <http://tinyurl.com/P-TRationale>, retrieved January 2012
- VII *World Oil*, Interview with Gerald Schotman, March 2011. Retrieved from <http://www.worldoil.com/March-2011-Organizing-for-innovatio.html>
- VIII Parshall, J., 2011, Shell Focuses on Innovation, Technology, *Journal of Petroleum Technology*, Vol. 63, 1, (p34). <http://www.spe.org/jpt/print/archives/2011/01/11ShellFeature.pdf>
- IX SShell, 2009, Shell Financial and Operational Information 2005–2009: Projects & Technology, p50-52. Retrieved from <http://tinyurl.com/Shell-P-T-delivery> February 2012
- X Statoil, 2011, Technology, projects and drilling. Retrieved from <http://www.statoil.com> December 2011
- XI ADL analysis of Statoil documents and press releases



The combination of Projects, Technology and Procurement (PTP) functions into a single division offers some key advantages in successful project delivery with reduced costs and improved deployment of technology. As asset development challenges drive the development and adoption of more and more complex technologies, it seems that we will see this organizational design adopted more frequently in the coming years. So far Shell and Statoil have fully adopted the PTP structure and there is considerable interest from other companies with similar challenges for large projects delivery and technology deployment. However, there are some organizational and structural challenges which need to be considered such as the implementation and management of the new organization – this white paper provides a starting point for reflection.

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