

strategy&

Formerly Booz & Company

*Large capital
projects in the
oil and gas sector*

&

**Keys to successful
project delivery**



Contacts

Aberdeen

Brian J. Campbell
Director, PwC Advisory
+44-7730-068732
brian.j.campbell
@uk.pwc.com

Dallas

John Corrigan
Partner
+1-214-746-6558
john.corrigan
@strategyand.pwc.com

Dubai

David Branson
Senior Executive Advisor
+971-4-390-0260
david.branson
@strategyand.pwc.com

Houston

Anthony Caletka
Principal, PwC Advisory
Capital Projects & Infrastructure
+1-347-574-2285
anthony.caletka
@us.pwc.com

London

Douwe Tideman
Partner
+44-20-7393-6437
douwe.tideman
@strategyand.pwc.com

**Hinne Temminck
Tuinstra**
Principal
+44-20-7393-3272
hinne.temminck
@strategyand.pwc.com

Melbourne

Malcolm Garrow
Partner
+61-3-9221-1928
malcolm.garrow
@strategyand.pwc.com

São Paulo

Arthur Ramos
Partner
+55-11-5501-6229
arthur.ramos
@strategyand.pwc.com

About the authors

Douwe Tideman is a partner with Strategy& based in London. He specializes in upstream oil and gas and has industry experience with large and small operators.

**Hinne Temminck
Tuinstra** is a principal with Strategy& based in London. He focuses on upstream oil and gas and has both industry and consulting experience in this area.

Brian J. Campbell is a director with PwC based in Aberdeen, U.K. He is the Aberdeen leader for oil and gas in PwC's capital projects & infrastructure practice and has served as a project manager in all stages of managing oil and gas assets.

Executive summary



Oil and gas exploration and production (E&P) companies around the globe have experienced declining capital efficiency since 2005, as production has not kept up with development costs. Culprits include the need to look for oil and gas in challenging “frontier areas,” increased difficulty in acquiring acreage, soaring input costs, and difficulty delivering large capital projects (LCPs) on time and within budget. Since companies have the most control over the last item in this list, they can benefit significantly by rethinking their LCP planning and delivery strategy and practice.

An LCP diagnostic framework can help E&P firms improve their project delivery performance. The diagnostic poses questions regarding a company’s practices in three “activity segments”: resourcing and capabilities, planning and organizing, and managing for success and risks. These activity segments are relevant across a project’s life span and cover specific capability areas, such as training, procurement, front-end loading, field development design, governance, partners, and risk management. Generating candid answers to the questions in the diagnostic can help executives identify and thus address the main LCP delivery issues they face in a timely fashion.

Our application of the framework at numerous E&P companies suggests that companies need to alter the way they design, plan, and execute LCPs. The key is to strengthen weak capability areas in each activity segment.

Capital efficiency on the decline

To boost their exploration and production (E&P) efforts, oil and gas companies have increased their annual capital budgets by a factor of two or even three in the last eight years. Yet during that time, they have failed to enhance production by the same degree (*see Exhibit 1*). Making the situation even more challenging, oil prices did not grow as fast as capital expenditures (capex) per barrel over that same period.

Put simply, E&P firms' capital efficiency has decreased since 2005. This development has eroded profits and made investors nervous about whether future operational cash flows will be enough to fund ambitious investments and deliver adequate shareholder dividends (*see Exhibit 2, next page*). If oil prices were to significantly decrease, the situation would become even more worrisome.

Exhibit 1
Oil and gas production has not kept up with development costs

Capex and production for five supermajors*
(indexed to 2005)

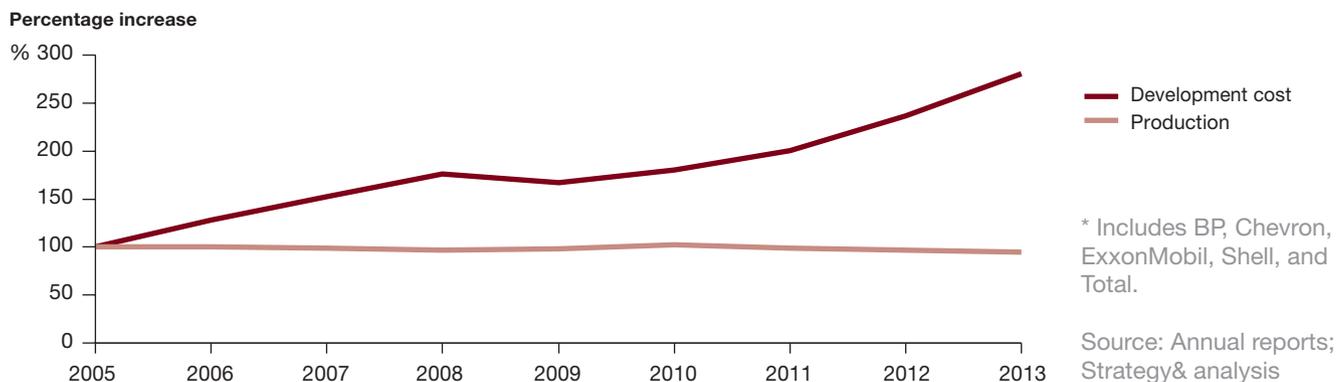
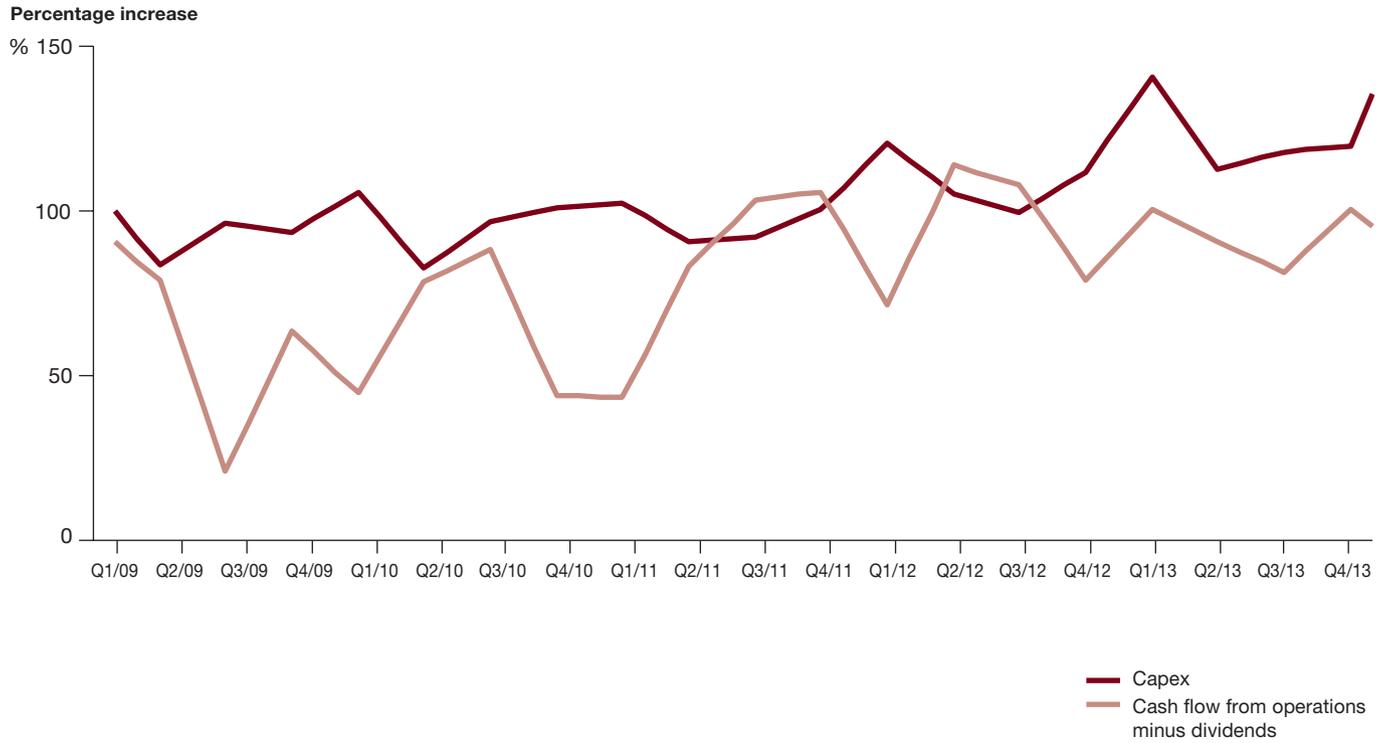


Exhibit 2

Operations cash flow is falling while capex spending climbs

Capex and operations cash flow for European majors, excluding dividends

(indexed to 2009)



Note: Rolling three-month average taken; selected peer group includes BG Group, BP, Eni, Shell, and Total.

Source: Bloomberg; Strategy& analysis

The culprits behind lower capital efficiency

A confluence of forces is driving the decline in capital efficiency for E&P firms. First, companies are having trouble finding enough reserves to replace their current production in their current geographies. They must now look for oil and gas in more challenging “frontier areas” characterized by difficult conditions, such as the Arctic and the Gulf of Mexico’s ultra-deep water. Second, acreage has grown harder to acquire, due to factors including resource nationalism, the preference among more powerful national oil companies to work with oil-field services firms, and tougher terms governing E&P companies’ collaboration with resource holders.

Third, E&P firms’ input costs have soared over the last decade, including expenses related to construction of offshore facilities. The costs of constructing these facilities hinge on prices for materials such as steel. In addition, rig rates have climbed, as demand has outpaced supply and companies face more challenging drilling conditions in frontier areas (*see Exhibit 3, next page*). Some E&P firms try to control input costs by forging more enduring partnerships with their suppliers through framework agreements that cover longer time periods and more standardized end products. For example, a supermajor inked a long-term agreement with its platform supplier that covered offshore platforms.

Fourth, E&P firms are having difficulty delivering their large capital projects (LCPs) on time and within budget. Delays can be on the order of years, and cost overruns can reach as high as 350 percent (*see Exhibit 4, next page*).

E&P firms have some influence — albeit limited — on the physical and political challenges beleaguering frontier areas, as well as on input prices. However, they can directly influence planning and delivery of their LCPs. For that reason, this report focuses on project planning and delivery strategy and practice.

E&P firms can directly influence planning and delivery of their LCPs.

Exhibit 3
Global rig rates are rising

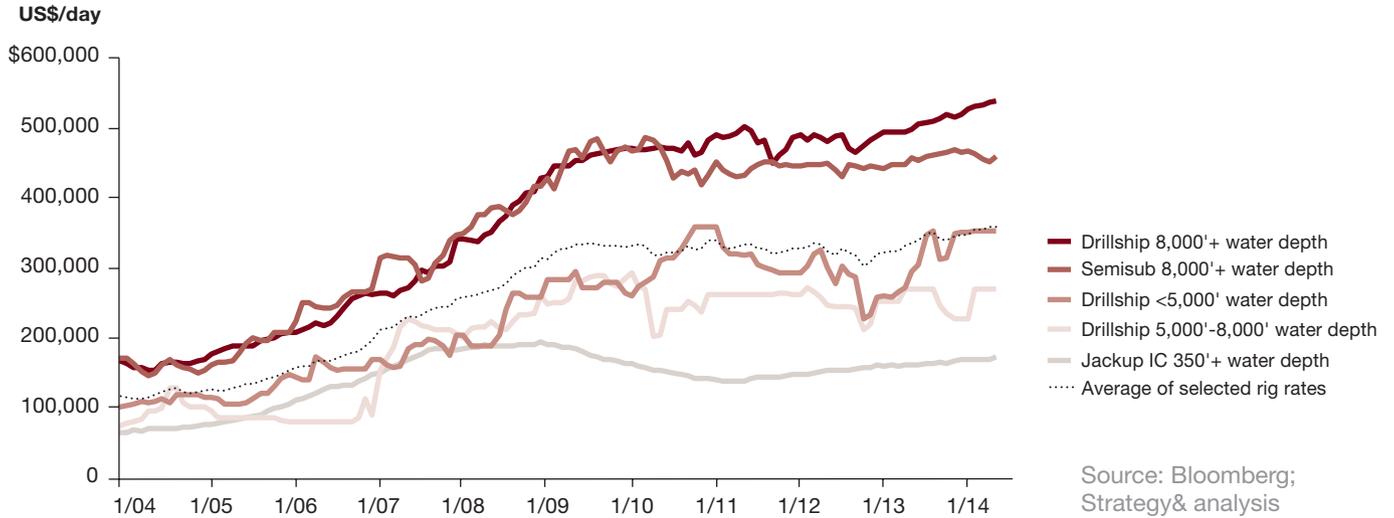
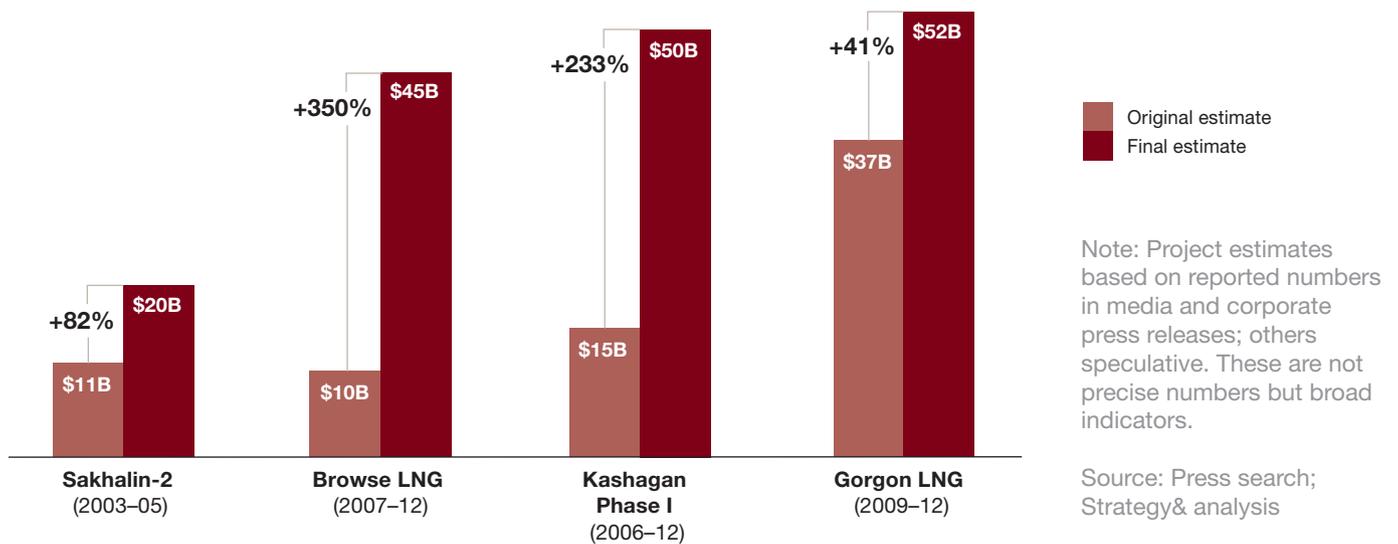


Exhibit 4
E&P LCP overruns can reach alarming proportions

Cost overruns for selected major projects
(in US\$ billions)



Forces behind poor LCP delivery

E&P firms are not the only companies having trouble executing LCPs on time and within budget. A recent study from IPA Inc. showed that LCPs (those with capital expenditures larger than US\$1 billion) underperform in all industries.¹ IPA's research indicated that the main reasons for such underperformance are poor up-front planning and changes in a project's leadership. When it comes to E&P firms, underperformance can also stem from overly ambitious and optimistic time lines for LCPs.

Outsourcing is a factor as well. In the last few decades, E&P firms have outsourced most of their project delivery work to external service providers, a move driven by cost pressures and by increased project complexity that calls for more specialized project management skills. As a result, LCP management now centers on orchestrating a variety of specialized subcontractors. Add in more demanding requirements from local stakeholders in frontier areas, and delivering LCPs successfully becomes even more daunting.²

In thinking about their LCP delivery problems, many E&Ps cite external, seemingly uncontrollable causes including increased project complexity, unforeseen labor cost increases or labor shortages, unfavorable exchange rates, and unexpected policy changes (such as new permit requirements) by host governments.

We maintain that most such causes are manifestations of risks that companies can identify during project planning. Many E&P firms underestimate these risks because of insufficient planning early in a project, or failure to consider possible cost or schedule deviations, cross-functional interdependencies, and risk mitigation strategies throughout the project management life span. Add to that shareholder and host government pressure for fast achievement of "first oil," and one can see how a project development team might rush toward an early final investment decision (FID). And with a premature FID, companies tend to force aggressive milestones into a project's time line without sufficient preparation.

Many E&P firms fail to consider possible cost or schedule deviations, cross-functional interdependencies, and risk mitigation strategies.

A diagnostic framework to improve LCP performance

Based on our experience working with E&P firms around the world, from independents to supermajors, we have developed a diagnostic framework that can help E&P firms improve their project delivery practices. The framework addresses the spectrum of issues that can hamper LCP delivery. It is structured on three main activity segments — resourcing and capabilities, planning and organizing, and managing for success and risks. These activity segments are relevant across a project’s life span and cover specific capability areas (*see Exhibit 5, next page*). The framework poses a set of initial questions for each capability area, which serve as starting points for identifying the main LCP delivery issues facing a company.

Exploring the questions in the diagnostic with multiple stakeholders can generate valuable insights. For example, in discussing questions related to the risk management capability area, executives at one firm found that their company has a clear structure in place for moving a capital asset from appraisal to production. This structure includes stage gates and codified processes for assurance and decision making. However, they acknowledged that assurance had historically been more of a “check the box” exercise than an effort to honor the true spirit of good assurance. They agreed that they could make the assurance criteria and decision-making process more granular. But they concluded that an even more effective solution would be to encourage more critical questions at the stage gates. For instance, they could have independent reviewers or assurers from outside their company’s project delivery department or country organization conduct part of the assurance.

Executives at another E&P firm, while discussing questions related to the planning/front-loading capability area, said they often plan their projects tightly with an eye toward garnering first-oil revenue as quickly as possible. They set optimistic goals for a first-oil end date, and then create a very tight project plan to meet that deadline. They acknowledged that once projects are under way, everyone involved soon realizes that the tight project plan will be impossible to achieve with the given budget. Project managers then exceed their budgets, aiming to meet the deadlines. This practice has led to cost overruns on the company’s individual LCPs.

Executives at one firm concluded that an even more effective solution would be to encourage more critical questions at the stage gates.

Exhibit 5

The Strategy& LCP diagnostic framework, which encourages E&P executives to explore critical questions

LCP activity segment	Example capability areas	Sample questions
Resourcing and capabilities	People	<p>What skills are required for our projects?</p> <p>How might we strengthen or acquire these skills?</p> <p>Where do we need to deploy resources?</p> <p>How can we get these resources in place?</p> <p>Do we really use our best people most effectively?</p>
	Training and values	<p>How sufficient are our standards and values?</p> <p>To what extent do employees meet the standards and “live” the values?</p>
Planning and organizing	Procurement and contracting	<p>What do we typically need to procure, and under what conditions do we contract for it?</p> <p>Which contracted items are on projects’ critical paths?</p> <p>How well are incentives aligned between us and our suppliers?</p>
	Planning/ front-loading	<p>How well are our projects scoped?</p> <p>Which areas have been covered during initial planning, and to what extent?</p>
	Field development design and robustness	<p>How do we design field development for various scenarios?</p>
	Operating model and governance	<p>What project operating model do we need from end to end, and how might it evolve over time?</p> <p>How effective are our functional interfaces?</p> <p>How well defined are our governance and accountabilities?</p>
Managing for success and risks	Partners and stakeholders	<p>What steps do we take to align our interests with those of our partners and stakeholders?</p>
	Performance management	<p>How do we define, measure, and report project success? And how quickly do we improve?</p> <p>How transparent is our project performance reporting?</p> <p>What decision forums have we put in place to guide projects based on their performance?</p>
	Risk management	<p>What are the main internal and external risks facing us?</p> <p>How well do we mitigate such risks?</p> <p>To what degree do all the right parties give sufficient input on risks at main project milestones and decision points?</p>

Note: Depending on an E&P firm’s needs, executives may want to explore additional or alternative capability areas, such as asset operability, feasibility analysis, environmental assessment, regulatory strategy and assessment, schedule analysis, business case analysis, and project finance and tax.

Source: Strategy& analysis

It has also resulted in even less accurate planning in the long term by sending the message that project deviations can be fixed simply by spending more. The resulting inaccurate planning, in turn, increases the likelihood of future delays — starting the cycle all over again. These insights encouraged the executives to use more realistic milestones — and to stick to them. The above phenomenon is compounded when an oil company has insufficient high-quality prospects to develop. In such cases, prospects that are marginal from the start may be presented in a biased way to meet short-term development targets.

Infusing discipline into LCP delivery

Our experience in applying the diagnostic suggests that rather than trying to get project after project “back on the rails,” firms can benefit by altering the way they design, plan, and execute their LCPs. Deploying the diagnostic framework is a good start, because it can help them ask the right questions. They can then use the answers to those questions to build the right capabilities for each activity segment.

Some E&P firms try to improve LCP performance through externally focused means, such as sourcing key materials from low-cost countries, reducing complexity by using modularized equipment, having their suppliers take on more risk, and forming longer-term partnerships with local suppliers. Such solutions are well intended and can be useful, but they make E&P firms dependent on how well these external partners can strengthen their capabilities.

For this reason, we advise E&P firms to focus on making internal changes aimed at improving their own LCP delivery capabilities. Again, the diagnostic framework can be helpful here. The capability areas in the framework are interrelated. By thoroughly exploring the questions for each area, executives can identify fundamental capabilities — those that cut through several activity segments. By focusing on strengthening those fundamental capabilities (which will be different for each firm, depending on its circumstances), executives can make a step-change in their LCP delivery approach. And that will help them to improve their capital efficiency. Examples of such initiatives include making LCP management a career and establishing an early presence in LCP host regions. (See “*Sample initiatives for building fundamental LCP delivery capabilities*,” next page.)

E&P firms should focus on making internal changes aimed at improving their own LCP delivery capabilities.

Sample initiatives for building fundamental LCP delivery capabilities

Make LCP management a career

Many LCPs fail because E&P companies do not identify interdependence risks inherent in collaborations and handovers between employees from different functions or departments. For instance, when the project department is designing for the development phase, managers need to make sure that their designs support operability of the asset post-development. Companies also must make certain that the person in charge of planning and delivering an LCP understands what interdependencies exist, where the risks lie, and what good cross-functional interfacing looks like. It's best if such an individual is a project manager with broad functional experience. Armed with that experience, these individuals gain a cross-silo view of the organization. This overview enables them to effectively use functional interfaces and to identify cross-departmental risks at every stage in a project's life span, thus preventing schedule and cost deviations. These managers can ask the right questions when vetting output from the different functions and can easily see how the output fits into the overall picture of the LCP in question.

E&P firms need more of these specialized LCP managers. To develop them, they can

design a clear and highly rewarding career path for this critical role. Once developed, these managers need to be retained.

Establish an early presence in LCP host regions

Securing an early presence in host regions where LCPs will be executed constitutes another smart practice. By doing this, E&P companies can ensure that all relevant local information is incorporated during project planning. Having this information on hand early can minimize the risk of interference — and subsequent delays — from local agendas in a project's host region.

How to establish such a presence? One approach is to set up a significant technical team in a host region and charge it with establishing working relationships with local stakeholders and suppliers under the assumption that the LCP is going ahead. This way, the staff can gather information about local developments that will factor into planning and management of the LCP.

Establishing an early presence in a host region can seem costly, but it often proves less expensive than the typical LCP cost overrun. Thus it constitutes a worthwhile up-front investment.

Conclusion

In the oil and gas industry, executing large capital projects in E&P will continue to pose daunting challenges. Companies that are ready to take an honest look at their performance and practices in this area have a better chance of surmounting those challenges and can expect fewer delays and cost overruns with their LCPs. As a result, their capital efficiency should start to improve.

By grappling with tough questions about their LCP capabilities, E&P executives can begin gaining insights into what capabilities they need to strengthen in order to improve their LCP delivery approach. The strengthening of those capabilities requires an up-front investment of time, effort, and financial and human resources. But such an investment can pay big dividends — in the form of LCPs that come in on time and within budget.

Endnotes

¹ Edward W. Merrow, “Oil and Gas Industry Megaprojects: Our Recent Track Record,” *Oil and Gas Facilities*, April 2012.

² For more insights on management of local stakeholders, see “Government-Facing Strategy for Oil and Gas Companies,” strategyand.pwc.com/global/home/what-we-think/reports-white-papers/article-display/government-facing-strategy-companies-developing.

Strategy& is a global team of practical strategists committed to helping you seize essential advantage.

We do that by working alongside you to solve your toughest problems and helping you capture your greatest opportunities.

These are complex and high-stakes undertakings — often game-changing transformations. We bring 100 years of strategy consulting experience and the unrivaled industry and functional capabilities of the PwC network to the task. Whether you're

charting your corporate strategy, transforming a function or business unit, or building critical capabilities, we'll help you create the value you're looking for with speed, confidence, and impact.

We are a member of the PwC network of firms in 157 countries with more than 184,000 people committed to delivering quality in assurance, tax, and advisory services. Tell us what matters to you and find out more by visiting us at strategyand.pwc.com.

www.strategyand.pwc.com

© 2014 PwC. All rights reserved. PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see www.pwc.com/structure for further details. Disclaimer: This content is for general information purposes only, and should not be used as a substitute for consultation with professional advisors.