

## State of the oil & gas industry



Never let a good crisis  
go to waste

# *Introduction: A predictable shock but an uncertain future*

Rapidly plunging oil prices—at the time of writing below USD 60 per barrel—shocked the global oil & gas industry. Although many did not see the price collapse coming, the fundamental changes in supply and demand that caused it were already manifest in early 2014. Going forward, structural changes and disruptive trends will exacerbate the challenges facing the industry and could lead to a significant shakeout.

Facing one of the many crises of his time, Sir Winston Churchill supposedly quipped: “Never let a good crisis go to waste.” The remark was meant to identify a crisis that demanded immediate and thoroughgoing change. Over the intervening years, the phrase has been used by statesmen and business leaders as a rallying cry to regroup, revamp and reinvent. In this article, McKinsey continues that tradition by applying a keen lens to the oil & gas industry’s fundamentals and the needed business changes the shifting fundamentals imply. This crisis is an opportunity for the industry to significantly reshape how it works.

## *The oil price shock was predictable*

Harbingers of the current collapse of global oil prices were already visible in early 2014 on both the supply and demand side of the equation. In fact, during the past year our clients have focused increasingly on the implications of low oil prices.

From the demand perspective, OECD oil demand peaked in 2005 and has subsequently declined by nearly 10%. The Chinese economy, which drove half the net demand growth since 2005, has slowed down. In addition several megacities in China have imposed or are considering restrictions on car purchases. The EU economic slowdown in the third and fourth quarters dragged demand down even further. In response, the International Energy Agency (IEA) cut its outlook for growth in petroleum demand from 1.4 to 1% annual growth (between June and September). Although economic conditions in China and the EU contributed equally to the 2014 revised outlook, petroleum demand growth in China slowed more than expected (from 6% to less than 3% annual growth between 2009 and 2014, according to IEA figures), and the EU recovery did not materialize.

While demand fell, supply grew well beyond expectations. US light tight oil (LTO) production was a major contributor. Throughout 2014, US production exceeded projections by more than one million barrels per day.<sup>1</sup> At the same time, Iraq and Libya boosted production by 200 and 300 kboed respectively at different points in the year.<sup>2</sup> By August, US LTO and Libyan production were increasing the global oil supply by 1.3 mbd above projected levels. Although forecasting Libyan and Iraqi oil production is difficult and complex, growth in the LTO supply was fairly predictable. McKinsey’s Energy Insights has been forecasting 2014 daily LTO production of about 3 mmbd (2.9 to 3.4 mmbd) since 2012.

1 IEA Medium-Term Oil Market Report 2013 projection for 2014, IEA Medium-Term Oil Market Report 2013 latest estimate

2 Ibid.

## Uncertainty and disruption in the future

Supply and demand uncertainty will continue. The US LTO revolution, for example, is picking up speed and has already exceeded most 2014 industry projections. On its current trajectory, US LTO production could reach some 7 mbd by 2020, with an additional potential of approximately 1 mbd with favorable subsurface quality (see Figure 1).

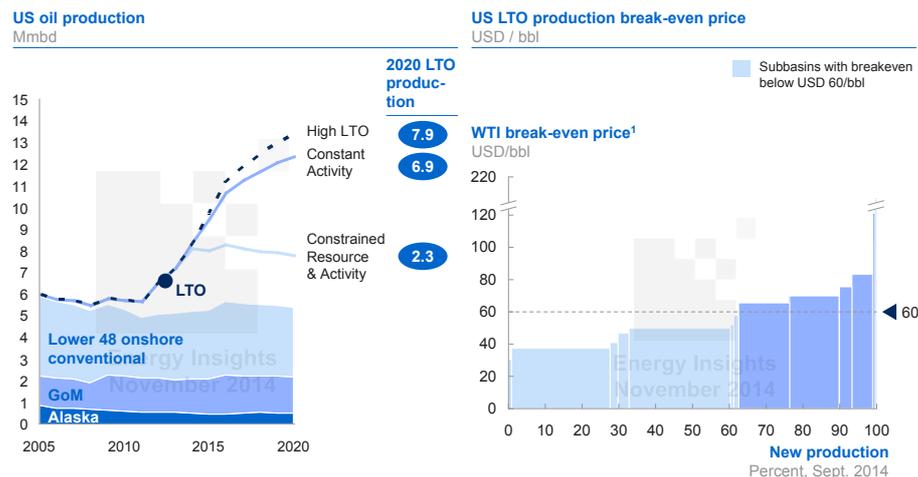
Although some speculate about OPEC's intentions to maintain production quotas to pressure LTO producers, evidence suggests that current actions may slow but not thwart LTO production. At USD 60/bbl crude oil, we estimate that over 60% of production from new wells will be economic. Experience indicates that it can take up to eight months before drilling activity responds to price declines. US oil rig activity, for example, only dropped slightly in the weeks following the sharp oil price decline in October—from 1,600 to 1,575 actively drilling oil rigs reported by Baker Hughes.

Despite the profitability of LTO, its growth could be limited by cash constraints. Independent players are more heavily leveraged than they have been in recent history. Investor opinions vary greatly about whether independents will have sufficient access to debt markets in order to maintain current growth rates. Majors are also cash-constrained. Ramping down LTO and onshore production may be more cost effective and less disruptive than ramping down deepwater production.

Geopolitical factors compound uncertainties in supply and demand. The Ukraine-Russia crisis, sanctions against Russia, the dispute in the East and South China seas, and conflicts in Iran and Iraq are some of the many situations creating uncertainty around much of the global petroleum supply.

Figure 1

### We expect US LTO production to continue to grow



<sup>1</sup> Half-cycle break-even price of WTI for a new well (includes a 10% return), given local price differential (Bakken differential assumed at USD 9/bbl), excludes finding and land costs

In addition, radical reductions in the cost of renewables make some technologies profitable in certain uses and settings, affecting gas-to-power in the short and medium term, but potentially oil-to-transport in the longer term. Emerging technologies including electric vehicles, car sharing, and driverless cars could further disrupt the structural dynamics of global oil demand. In addition, new fuel efficiency standards (e.g., CAFE) and a real push in the automotive and aerospace industries to increase fuel efficiency will also affect demand.

*The state of the industry—a decade in the making*

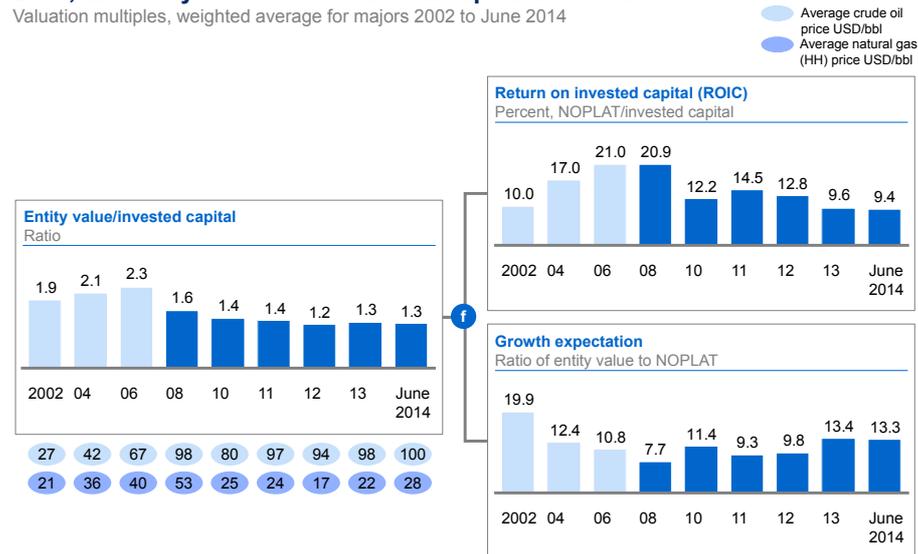
The fact of the matter is that the oil & gas industry had been underperforming the market since the credit crisis—long before the recent plunge in oil price. Majors and independents have been under investor pressure and the recent price collapse is shaking investor confidence further in an industry that has been marked by missed growth targets since the early 2000s and declining returns on investment during the last several years.

Capital markets' deteriorating confidence in the industry is reflected in lower total returns to shareholders versus the S&P 500 during price declines in 2008 (13% for the petroleum industry versus 18% for the S&P 500) and recovery after 2009 (17% versus 23% respectively).<sup>3</sup> Declining enterprise value (EV) to invested capital (IC) ratios since 2008 is further evidence of capital market concerns.

Figure 2

**Before oil price drop: valuations of majors had declined significantly since 2006, driven by erosion in return on capital invested**

Valuation multiples, weighted average for majors 2002 to June 2014



SOURCE: Company reports; Datastream; McKinsey analysis

Declining returns on invested capital (ROIC) have been lowering valuations across the industry. As of June 2014, the ROIC of majors has dropped to 9.4%, a precipitous fall from its 2006 peak of 20% and the lowest ROIC since 2002 (see Figure 2). Net capital expenditure as a share of operating cash flow has nearly tripled since 2005. The leap hampers the ability of companies to generate free cash even when oil prices are above USD 100 per barrel.

For independents, the enterprise value to invested capital ratios has not dropped as much as for majors, as industrywide decline in ROIC was offset by stronger growth expectations.

# *The roots of the matter*

Capital market confidence in the ability of upstream oil & gas companies to create value—on the part of both majors and independents—has been deteriorating significantly over time. Disappointing exploration results, declining production efficiency, exploding capital intensity and investments that do not drive growth are making investors uncomfortable with the industry's future.

## *Disappointing conventional exploration results*

Conventional exploration has been a critical component of resource replacement for both majors and large independents. The golden period was in the early 2000s when companies could access many new, prolific basins. However, deliveries from conventional wells have stalled. New major discoveries in Brazil and East Africa mask the underlying trend that only 30 to 40% of industry production is being replaced and only a few companies are able to make exploration work for sustained periods of time.<sup>4</sup> The exploding costs of development are making matters worse. Even when a company discovers resources, the economics are marginal for many projects.

While conventional exploration has been disappointing, especially for majors, unconventional oil & gas has opened up an entirely new global resource base with more than a trillion barrels to exploit. In 2008, we questioned whether conventional peak oil would drive prices up to USD 140 per barrel. Currently, vast resources are profitable below USD 100. If costs come down, resources could be profitable at USD 80 per barrel. The paradox is that although investments in conventional exploration have been a debacle, the world has more profitable resources available than it has had in the last 50 years.

## *Exploding capital costs*

Development projects are becoming larger and more complex. Local markets and value chains are overheating as supply of contracted services struggles to catch up with growing demand. As a result, project delivery results have suffered. It is no secret that cost and time overruns are common in the oil & gas industry. In fact, most current projects miss both targets. Spiraling project development costs may soon strain the ability of companies to earn adequate returns. The culprit isn't supplier margins or commodity costs. It is soaring levels of inefficiency that can be avoided.

A review of offshore development costs illustrates the point (see Figure 3). First, we examined the costs in 2000 (index = 100). Then we estimated what 2013 costs should have been if they were in line with inflation (an index value of 144). Finally, we reviewed 2013 cost estimation models applied in the industry, and used 2013 industry models to estimate development costs for assets with identical functional specifications as those developed in 2000. Most cost categories more than doubled. An analysis of root causes revealed an increase in non-value-adding specifications, a vast increase in documentation requirements, mounting project management costs, negative development in drilling productivity, lack of standardization, and little movement up the learning curve.

4 Rystad, McKinsey Global Exploration Service Line, McKinsey analysis

The North Sea is a prime example. It is one of the oldest basins and its trajectory, challenges, and opportunities are indicative of overall production today and in the future. McKinsey recently analyzed costs and activities in the basin and interviewed more than 50 field managers. We found that increases in total expenditures often mask cost inefficiencies of up to one third of the increase in opex and capex costs per category. Inefficiency from lower productivity, increasingly overspecified activities, and poor purchasing practices are major causes of upward spiraling costs. For example, the time needed to drill a typical well on the United Kingdom Continental Shelf (UKCS) has risen by 17 days during the past five years.<sup>5</sup> According to one manager, the operator's drilling speed has dropped from 175 meters per day in 2004 to less than 100 meters per day in 2013 to 2014. Although water and well depths have affected drilling efficiency, the manager acknowledges that less experienced drilling crews and the scarcity of appropriate drilling facilities and other specialized inputs have significantly compounded the problem.

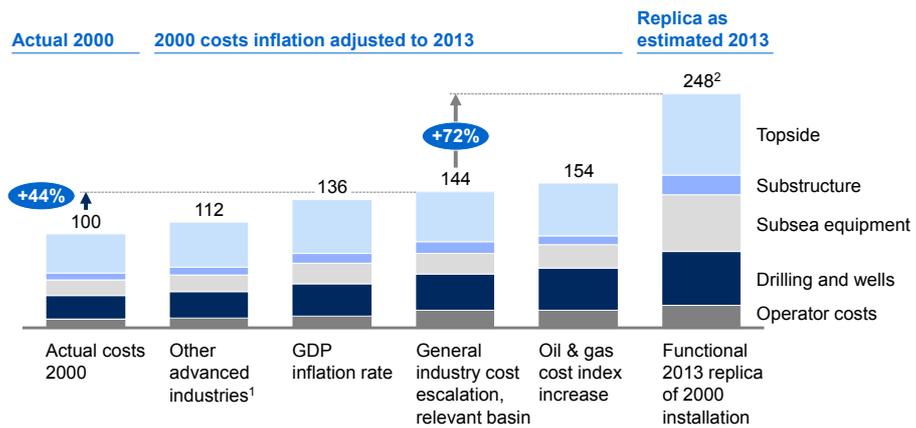
To understand mounting capex costs, we compared topside designs of several platforms with similar production capacity. We discovered that the weight of living quarters per bed had climbed over time as operators demanded higher living standards. For example, larger automation and temperature control can lead to a nearly 50% increase in the weight of the operator's HVAC systems. The larger weight increases the installation costs.

Purchasing processes and efficiency are another source of escalating costs. According to the McKinsey Global Purchasing Excellence survey of more than 400 organizations

Figure 3

**In general it's not supplier margins or commodity costs – we have met the enemy and it is us**

Development cost; index, 100 equal to year 2000 cost of field developments: example offshore projects



<sup>1</sup> Calculated based on automotive example of cost for a standard vehicle in Germany, converted into comparable currency  
<sup>2</sup> Includes 10% contingency on topside and substructure, 15% on subsea, and contingency for expected additional weight. All contingencies were used in 2000 and are included in the no. 1 base value

SOURCE: HIS; Oil & Gas Practice UK; NP; Capital projects cost review; McKinsey

in 20 sectors, oil & gas was among the lowest-scoring sectors. That ranking raises deep concerns for an industry where 70 to 80% of all spend is through third parties.

### *Declining production efficiency*

The inefficiencies discussed above are escalating opex costs as well. Continuing with the North Sea example, in the last decade lifting costs have risen by 10% per year — nearly five times higher than the UK national rate of inflation.<sup>6</sup> The average UKCS unit lifting cost is now double that of five years ago. In 2013, inflation-adjusted operating expenditures were the highest since production began on the UKCS in the 1970s.<sup>7</sup>

As costs rise, asset production efficiency is deteriorating. Data recently released by the UK's Department of Energy & Climate Change reveals that production efficiency on the UKCS fell from 81% in 2004 to just 60% in 2012. McKinsey analysis of information from regulators and our own proprietary benchmark data shows that, over the past decade, annual asset production efficiency has declined by more than 1% across the North Sea. Furthermore, our analysis found that Norway is following the UK trend when the ten-year difference in maturity between the two continental shelves is factored in. We estimate that this deterioration in asset production efficiency has cost the North Sea upstream industry more than 900 million boe of production and USD 60 billion in revenues since 2005.

6 McKinsey Energy Insights, SSB, ONS, Oil & Gas Practice UK

7 Oil & Gas Practice UK Annual Activity Survey 2014

# Put the crisis to work

Where oil prices will go in the future is an open question. However, even at USD 100 per barrel, international and North American independents will be squeezed for cash (see Figure 4). Majors are struggling to generate sufficient cash to cover their expenses and post healthy profits. The pressure is significant at USD 100 dollars, and even more so below.

Irrespective of oil prices, players in the sector need to assure the viability of their business models. To do so, they need to focus stringently on cash, bolster project delivery, and revamp exploration. Those who are able to can use the current crisis to reposition their portfolios. However, significant portfolio moves will be driven by differences in players' long-term views on the oil price outlook, organic resource availability, and fundamental project affordability.

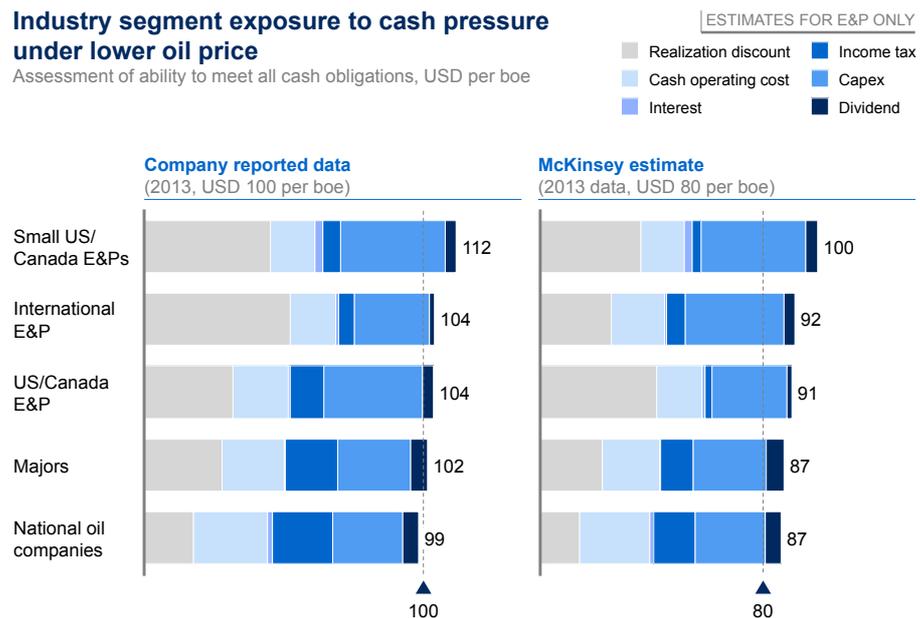
## A stringent focus on cash

### Radically reduce costs

In our experience in working with organizations globally, we have found that the greatest driver of cost reduction is increased productivity in current operating assets. To increase that productivity, oil & gas companies should embrace the following:

- Cease low-value or value-destroying activities.** Eliminating these activities is the simplest, most sustainable means to rein in costs. To identify which activities to cut, companies should challenge current working practices and conduct rigorous analyses

Figure 4



SOURCE: IHS Herold; McKinsey analysis

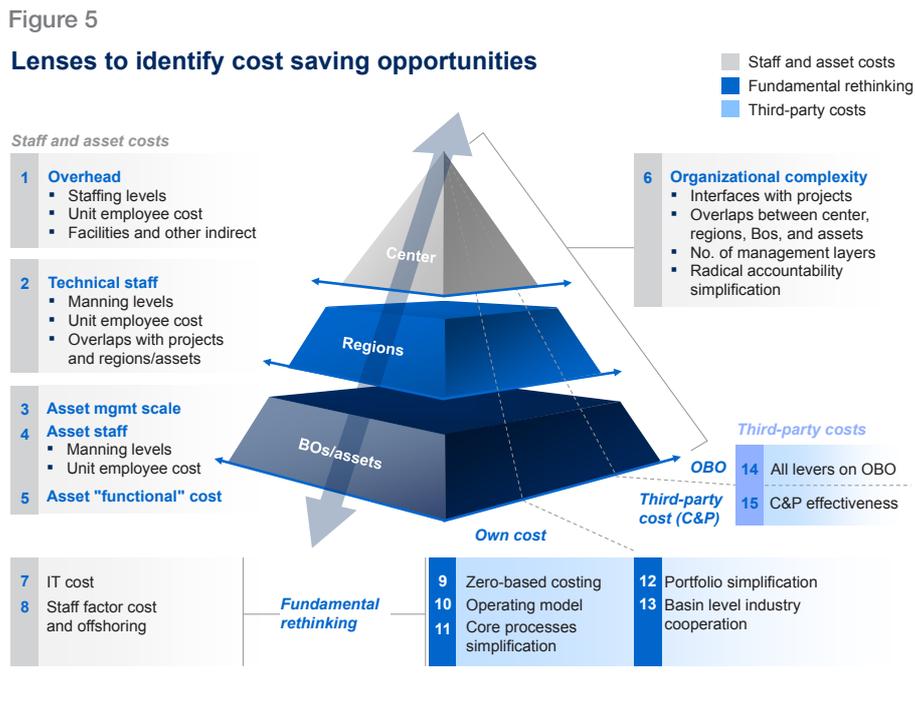
of all current and planned activities to identify those with the greatest impact on safety and business performance. We have found that 10 to 15% of activities in any given year neither add value nor decrease risk.

- Clarify and communicate cost drivers.** Operators that control costs most effectively understand and track what drives those costs. Senior leaders should instill the importance of cost drivers by diligently analyzing data with their teams and encouraging their direct reports to do the same up and down the organizational hierarchy. In addition, company leaders should make cost and efficiency targets real for frontline workers. For example, organizations can create highly visible whiteboards showing how many days rented maintenance equipment has been offshore or how many days in the last month the full maintenance workload was achieved. They can also display how many times the 90-day plan has been changed onshore.

To identify cost reduction opportunities, players can use multiple lenses, including staff and asset costs, third party costs, and central office and support costs (see Figure 5).

**Significantly improve asset efficiency**

McKinsey research in the North Sea found a set of management practices that decisively improved performance in offshore environments. We believe that these practices can apply to all oil & gas operations. Specifically, we found that high-performing operators were highly likely to do the following:



- **Minimize planned downtime.** Top performers plan in great detail to assure that all necessary parts, equipment, and manpower are in place to complete work as quickly as possible. However, mindset is the most important hallmark of top performers: they fundamentally believe that work done during these events must be minimized.
- **Improve reliability by learning from failures.** Top-performing companies regularly investigate failures that result in lost production and identify their root causes. The investigations often include advanced analytics. Once the root causes have been found, top-performing organizations reduce the chances of recurrence by making appropriate changes to equipment, operating protocols, or maintenance strategies.
- **Create a culture of responsibility in operations.** The best-performing operators create a real sense of responsibility for equipment on the part of employees who use it. This culture of responsibility is supported by widespread use of operating standards. The most productive platforms not only maintain written standards that minimize the possibility of equipment damage, they also ensure that standards are written in plain language, and use visuals. Top performers also have processes in place to identify and manage deviations from those standards. On the best platforms, identifying such deviations is the standard operating procedure for supervisors and managers.

### *Bolster project delivery*

In the short term, improvements to **contracting and procurement processes** can save needed cash. Recent surges in construction and third-party contractor activity have weighed heavily on project owners' ability to manage capital projects on time and on budget. The returns achieved by oil field service companies and contractors, for example, outpace those of project owners' by as much as 50% in some supply categories. At the same time, procurement controls a significant cost base — analysis of financial statements of oil & gas companies shows that from approximately 60% of spend in upstream operations to 90% of development projects costs and 95% of drilling and well expenses are external (procured from third parties). Procurement improvement has a significant and direct impact on EBIT—reduction in spend by 1% results in 5% EBIT improvement. Finally, procurement can improve cash flows quickly and dramatically: in McKinsey studies we found that a typical ramp-up garners 20 to 25% in potential savings in year one, and an additional 50% savings cumulatively in year two.

Companies are increasingly moving beyond procurement efficiencies driven by supplier consolidation and competitive negotiations (see Figure 6). Designing to cost, demand management, and clean-sheet costing can reduce expenses by up to 15%. Designing to value, collaborating with suppliers, and broadening the sourcing base (e.g., using “wild card” suppliers) reduces total cost of ownership by an additional 5 to 10%.

Continuing efforts to **optimize front-end concepts, designs**, and a push for **modular standardization** can improve a project's net present value by up to 25%. In many cases, engineering designs are developed or modified without thinking about, let alone optimizing, cost consequences. Simply considering alternatives in a transparent way can reduce costs by 10 to 15% without changing the solution. For repeat orders

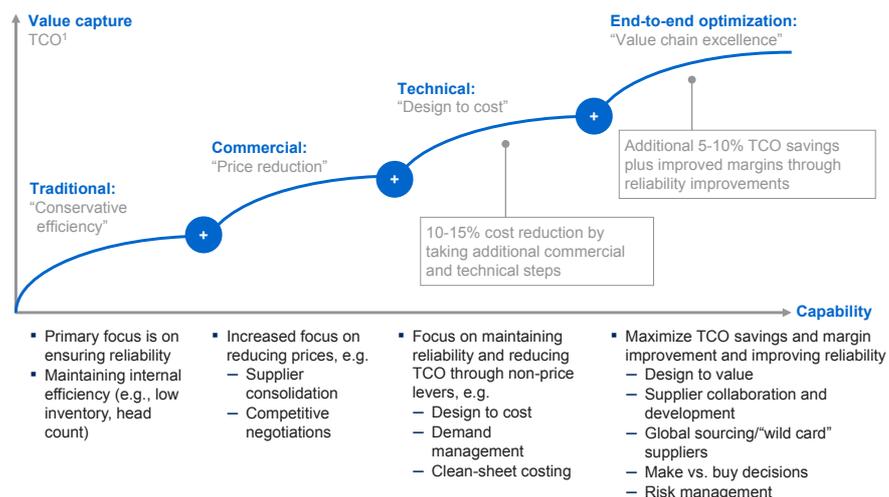
of complex equipment, we sometimes even “tear down” the equipment—completely disassembling it, weighing and measuring parts—to arrive at a more accurate estimate of cost and to optimize the specification to suit operator needs at a lower cost.

There is also an opportunity for **basin-based collaboration** to drive sustainable, structural cost reductions across the industry. Standards are a potent means to achieve these reductions. For example, McKinsey estimates that approximately 75% of welding requirements differ between companies in terms of technical specifications, worker qualifications, and inspections. Although these differences aren’t critical to safety, they drive higher costs for suppliers which are then passed on to operators. The supply chain is another prime opportunity for industry collaboration. Individual operators can share scarce resources in the North Sea by sharing standby vessels or coordinating the scheduling of their annual turnarounds so each operator can access the right skills at the right time without overwhelming contractors.

To fully exploit these approaches, oil & gas companies need to change the mindsets of their organizations. Most oil & gas companies hail from a tradition of stand-alone projects designed to meet specific geological conditions. Going forward, the challenges will demand optimizing concepts and design, including standardizing solutions and technical specifications. Potentially it could encompass collaborating with competitors to bring down supplier costs.

Figure 6

**We see companies evolving their procurement approach over time towards further value capture**



1 Total cost of ownership, includes "commercial", "demand/specification", and "procurement process" optimization levels

### *Rethink exploration*

In times of financial stress, exploration has historically been one of the first areas where companies cut costs. In our view, these cost reductions have not always been approached in the most effective way. In fact, they often weaken the pipeline of future prospects. So how can companies best respond and optimize exploration costs? We suggest three actions:

- **Maximize core basins.** Proven prolific basins continue to deliver volumes from new plays. Companies should maximize efforts in their core basins across near field and new play exploration which can deliver both volume and attractive value per barrel.
- **Optimize frontier exploration spend.** Despite the high levels of investment, commercial discoveries in new frontier opportunities are very limited and the chances of success for individual companies are very low. Organizations should take a hard look at their frontier spend and assess the trade offs of risk and reward compared to other growth options.
- **Use the cutbacks of others to achieve growth.** Companies with successful track records can use the cutbacks of others to seize new growth opportunities at attractive terms through farm-ins or new license round entries.

### *Reposition the portfolio*

Should low oil prices persist, the industry is likely to see new pressures on independents and a continuation of oil field services and equipment company mergers. Low prices could also usher in a new era of megamergers and partnerships. With the industry under pressure to improve returns, we are seeing many companies move toward high-grading their portfolio assets.

Given the industry's need for long-term sustainability in the wake of its struggles to achieve organic growth, buyers have the opportunity to reshape their portfolios and acquire long-term growth—as we saw in previous waves of large-scale M&A activity. The winning companies will be those that are financially robust (e.g., have strong balance sheets or equity) and proactive in shaping deals that create value through operational or commercial synergies.

An industry shake out provides an opportunity to reposition portfolios for maximum value creation. The opportunities may arise from synergies in cost and value, fundamentally different beliefs about the oil price outlook, and assumptions about organic access to resources with attractive return profiles.

Companies need to actively seek asset acquisition deals, creative arrangements with national oil companies, new technologies, and small or niche M&A opportunities to unlock new opportunities and basins. Our research shows that expert acquirers excel at identifying and defining the discontinuities that lead to deals with the greatest value. Some examples of lenses that proficient acquirers use to assess opportunities include a distressed asset or company (e.g., needing investment partners), technology capability that creates an upside (e.g., gas to liquid or liquefied natural gas), privileged

resource holder relations and positions, roll-up plays (e.g., Exxon's scale-up play with Mobil's portfolio), and option positions for medium-term development (e.g., strategic partnership with emerging resource holders or yet-to-open negotiated access).

When evaluating potential moves, it is critical to look beyond intrinsic value and synergies. Great moves stem from close consideration of options and upsides available in already discovered resources, and the options of undiscovered resources in existing and adjacent plays.

\*\*\*

In this cyclical industry, different segments fare better than others at different times (see Figure 7). If we look at total return to shareholders over the last 40 years, majors have outperformed independents. Independents, however, led the pack between 1998 and 2008, and from the credit crunch up to the recent oil price drop. Because of stronger balance sheets and some offsetting effect from downstream portfolios, majors have been more resilient in periods of oil price declines, as we saw during the 2008 oil price crisis and since June 2014.

Oil prices dropping to below USD 70 per barrel has created a sense of industry crisis. The price shock is a burning platform and impetus to act and reverse the trend we have observed for the better part of a decade—exploding capital investment costs eviscerating value.

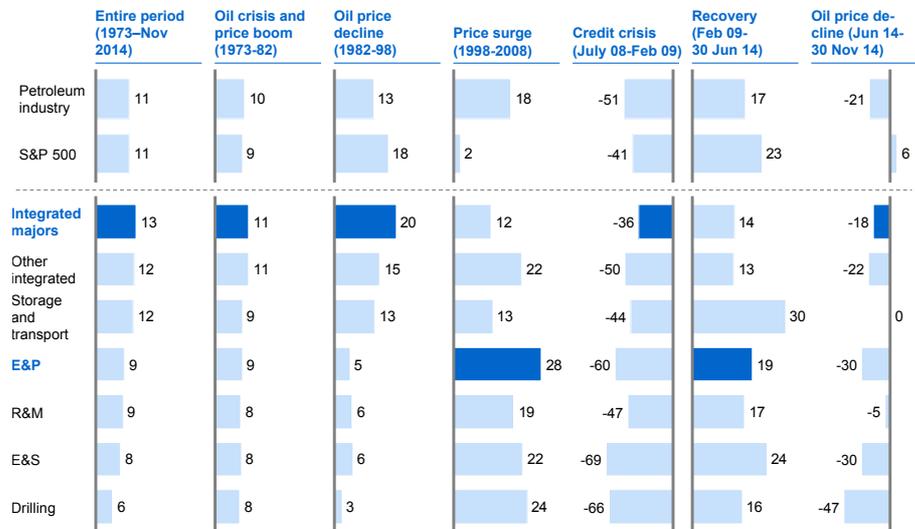
Getting the organization's arms around its operations and improving asset efficiency to generate cash in the short term is necessary for survival. A true reassessment of value creation rather than cost-cutting exercises is critical. Traditional cost reductions jeopardize medium-term production and growth.

Finally, finding growth (organically or through M&A) is a start, but may not be sufficient. Value from production, projects, and reserves still needs to be delivered. In a lower oil price environment, great performance management becomes a competitive differentiator. And a culture focused on driving value is table stakes.

Figure 7

**Different cycles have had different winners:  
majors vs. E&P independents**

Total returns to shareholders, CAGR, percent



SOURCE: McKinsey's corporate performance analysis toolkit

#### About the authors

Pat Graham – Principal from McKinsey's London office, Natalya Katsap – Engagement Manager, Occo Roelofsen – Director, and Namit Sharma – Principal, all from the Amsterdam office.

The authors wish to acknowledge the valuable contributions of Scott Nyquist, Director in the Houston office, and Svein Harald Øygard, Director in the Rio De Janeiro office, to the thinking behind this article.