KPMG

Delivering long-term value in E&P

The next wave of opportunity for the new economic reality

Realizing value series

Structural economic pressures have transformed upstream into a margin business. The urgent search for further sources of long-term value is revealing a number of exciting opportunities with the potential to reduce unit costs by a further 30 percent. This is not about another transformation program – those leadership teams that move fastest are likely to gain competitive advantage.

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The quest for long-term value

Adapting to the new economic reality.

Exploration & Production (E&P) has become a margin business, with relentless pressure on unit cost performance and global competition for capital. Recent tactical responses to the downturn, such as reductions in headcount and supplier rates, are unlikely to go far enough and risk being non-sustainable. Instead, we believe that to survive in this new economic reality, companies will have to go further and for those that deliver, an opportunity exists to potentially reduce unit operating costs by another 30 percent.

Yet tapping into these new sources of long-term value requires more than a series of continuous improvement initiatives, nor is it another 'transformation program'. Delivering the change requires industry players to head into unfamiliar territories and adopt a far more commercial mindset. Players need to be prepared to challenge conventional perceptions of 'best-in-class' for E&P, and look outside the sector for inspiration, bringing new technologies to the fore.

The call to action is urgent. If assets cannot deliver and sustain further unit cost improvements, capital will flow elsewhere; for late-life assets that means a greater chance of early cessation of production. Delivering the prize in E&P calls for targeted execution of high-value opportunities to complement continuous improvement efforts, along with a new entrepreneurial approach of 'start small, fail fast, scale fast'.

In this paper we set out our view on the changing economic landscape, what we believe are the five key sources of long-term value and how to deliver this exciting opportunity. In a nutshell we believe that:

- **Zero-based asset costs:** Engineering excellence is no longer an end in itself – standards and processes need to be stripped right back to what is affordable for individual assets, to take out up to 25 percent of operating costs
- **Value-based prioritization:** With reduced staff and budgets, a far deeper level of commercial thinking needs to inform the prioritization of activities, only performing work that adds value and constantly assessing costs versus benefits
- **Using machines to make decisions:** By starting with performance rather than 'big data', there is an opportunity to use new technology to improve performance outcomes in high-value day-to-day operational decisions
- **Agile supply chains:** The industry needs to move beyond traditional 'zero-sum game' behaviors by thinking more like a manufacturing business – with far deeper integration and collaboration through the supply chain, to reduce third party costs by more than 10 percent
- **Intelligent process automation:** New automation technologies are helping to reduce transactional back-office support costs by up to 30 percent, whilst simultaneously reducing error rates.

About this paper

When compiling this paper, KPMG professionals conducted a wide range of interviews with senior E&P executives to identify the latest industry efforts in these areas and supplement the extensive work conducted in this field by KPMG members firms worldwide. The interviews included representatives across the spectrum of players, including supermajors, independents, small players and National Oil Companies (NOCs). Throughout the paper we share a series of case study examples of how our clients from around the world are tackling these issues and delivering in line with this new commercial mindset.

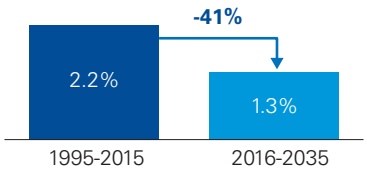
E&P: Now a margin business

An urgent need for new sources of value.

The underlying economics of the upstream exploration and production (E&P) industry have fundamentally altered (Figure 1), turning it into a margin business.

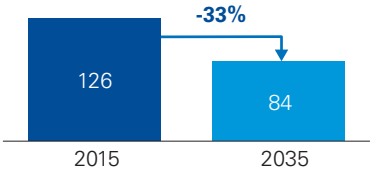
Figure 1: A seismic shift in the underlying economics

Global growth in energy consumption p.a.[1]



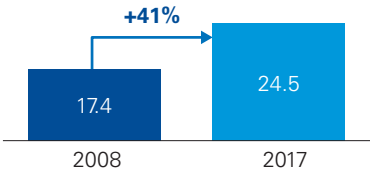
Global energy intensity (TOE/US$m)[2]

Tonne of oil equivalent (TOE) per million dollars



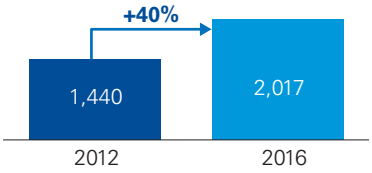
Total US oil and gas production (MMBOED)[3]

Million barrels of oil equivalent per day



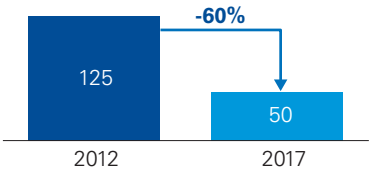
Global renewable energy capacity (GW)[4]

Giga Watts

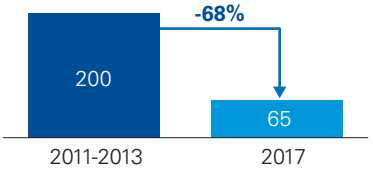


Cost of utility-scale solar power (US$/MwH)[5]

Mean levelized cost of energy (LCOE) per Mega Watt Hour (MWHh)



Global Greenfield E&P Capex (US$bn p.a.)[6]



Whilst oil and gas consumption is forecast to grow by 25 percent between 2015 and 2035[7], the growth rate is slowing significantly, with a further drag from decreasing energy intensity. Significant US unconventional capacity continues to be brought on stream at constantly falling unit costs, while new renewable energy capacity is being added at pace, with spectacular improvements in cost-efficiency. In addition, increased regulation in Europe and elsewhere is speeding the transition to non-hydrocarbon fuel sources. These are long-term pressures that are likely to carry on squeezing E&P firms.

At the same time, greenfield capital expenditure (Capex) has reduced dramatically, from US$200bn per annum (p.a.) between 2011 and 2013 to US$65bn in 2017[8]. The majority of production-adding projects approved in 2016 were either brownfield expansions or tiebacks that made use of existing infrastructure. As a result, many E&P capex portfolios have shifted emphasis from high-risk, high-cost mega-projects towards a longer tail of smaller, incremental development opportunities, driving complexity into many business units.

As reduced investment translates into lower production, many conventional E&P business units are likely to experience additional pressure from rising unit costs. In order to offset declining returns, companies increasingly need to drive efficiencies from complex portfolios of smaller, more diverse assets and maintain a relentless focus on break-even costs.

To date, most responses have revolved around short-term initiatives, such as aggressive supplier rate reductions, organizational downsizing and deferral of project and maintenance spend. KPMG member firms have also observed a second wave of improvements, focused on operational efficiencies such as reliability and turnaround performance. We believe these efforts do not go far enough and will be difficult to maintain. This is consistent with a recent Wood Mackenzie survey in the North Sea which suggests that only 14 percent of the cost reductions achieved between 2015 and 2017 are sustainable[9].

Five ways to drive longer-term value in E&P

The 'third wave' of opportunity: An outward-looking commercial mindset.

KPMG professionals have identified five potential sources of longer-term value that every E&P management team should be tackling in earnest. It is about a 'third wave' of improvement, with the potential for a longer-lasting step-change in performance. Indeed, through KPMG member firms' work with E&P firms worldwide we see that some of the leading players are already targeting unit cost improvements of approximately 30 percent by making changes across some of the following five areas (Figure 2).

Running through each of these value opportunities are two common themes: the need for a far more commercial approach to decision-making that moves beyond the traditional engineering-led approach; and the need to look beyond E&P for best practices.

Zero-based asset costs

Reduce operating costs by 25 percent across the portfolio by tailoring processes, standards and service levels to the needs of different operations

Value-based prioritization

Only perform work that adds value, and constantly assess costs versus benefits – including the value of risk mitigated

Using machines to make decisions

Utilize advanced data and analytics to achieve a step-change in the speed and performance outcomes of complex, high-stakes operational decisions

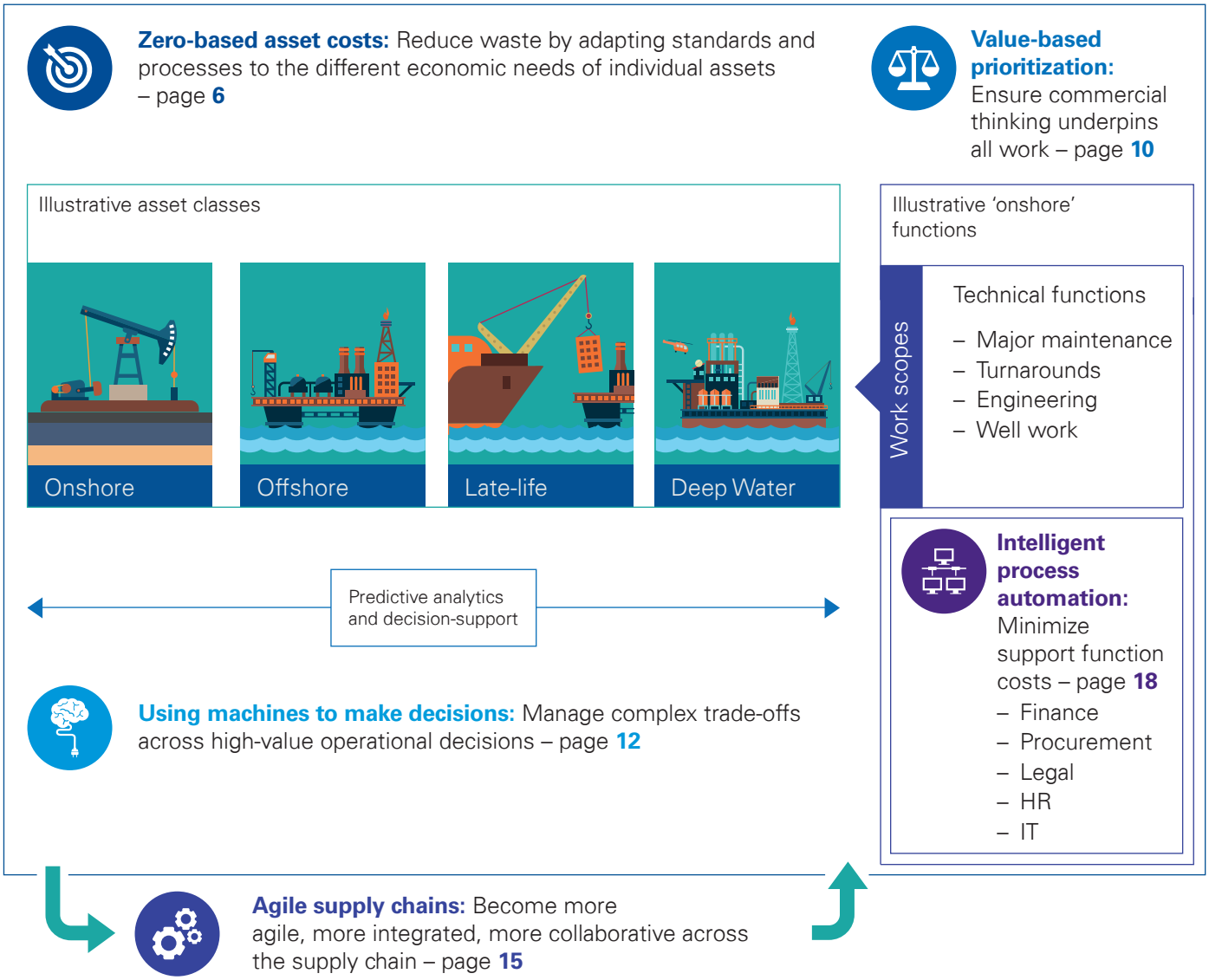
Agile supply chains

Reduce third party costs by more than 10 percent by thinking like a manufacturing business, with targeted integration and collaboration through the supply chain

Intelligent process automation

Leverage automation advances to achieve as much as 30 percent reduction in support function costs, and increase accuracy of transactional processes.

Figure 2: Five key sources of long-term value across the E&P operating model



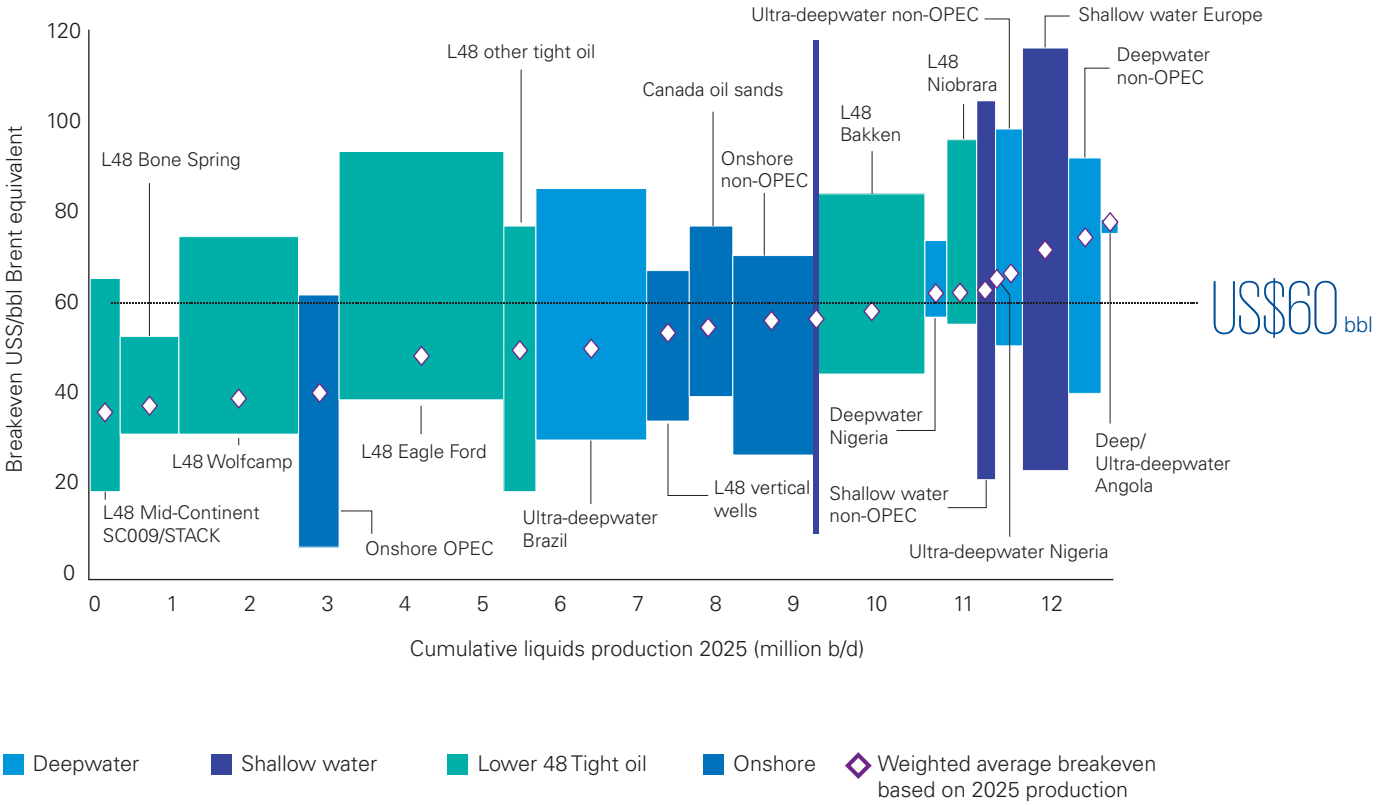
Zero-based asset costs

Tailoring asset strategies is not enough to take out unnecessary costs. E&P companies should clearly differentiate between underlying standards and processes.

Shifts in E&P portfolios following divestments, along with a renewed focus on break-even prices, have brought different economic constraints across portfolios into sharp relief. Individual asset characteristics mean that break-even prices may vary significantly, even within business units, while 'base case' operating costs can make or break an asset's performance and its ability to attract capital (Figure 3).

Centralized E&P standards and processes aim to achieve safety and engineering excellence. But standardization comes at a cost for assets with marginal economics – a cost that is not always visible. Spend on technical functions and front line operations results from a long tail of individual standards that may cumulatively result in waste when applied indiscriminately.

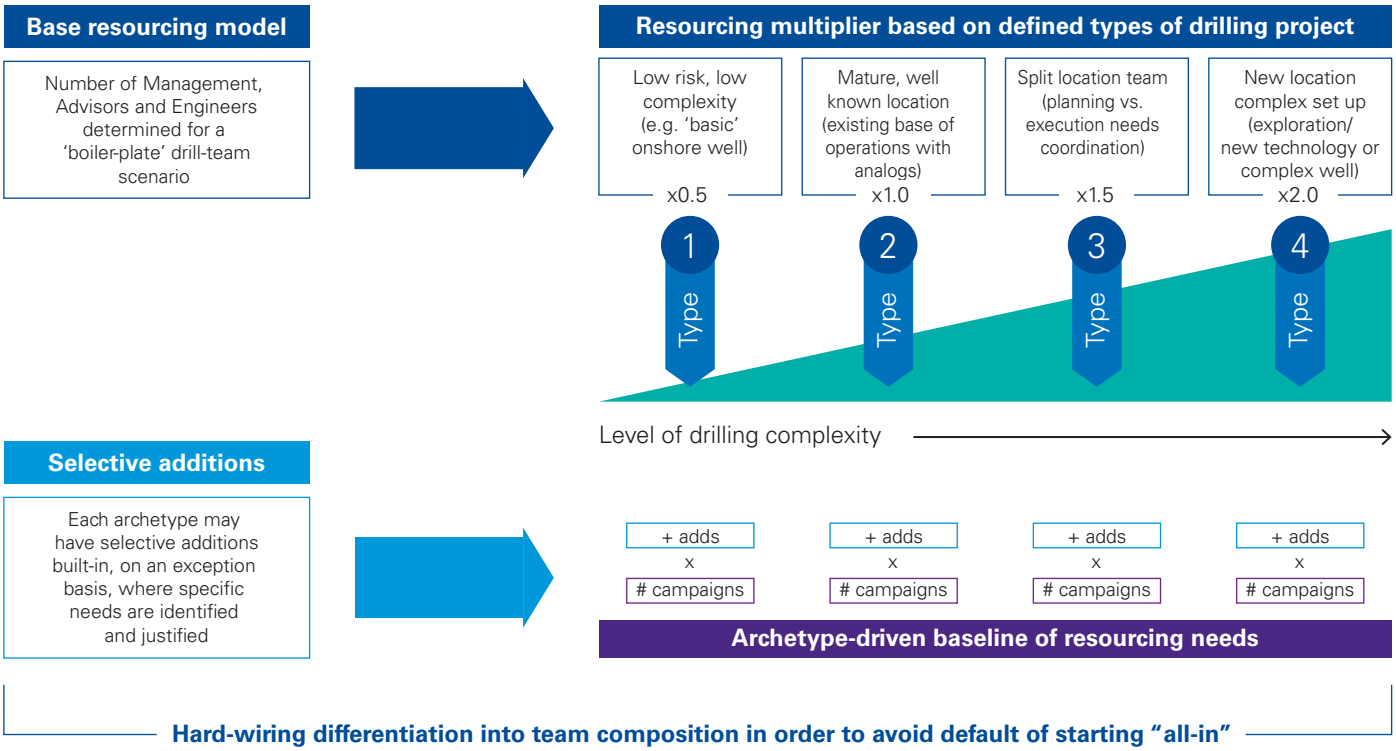
Figure 3: Break-even prices for different asset classes[10]



As an example, one major realized that, across a set of assets in the same basin with the same number of well slots, some had topsides four times the weight of others. This was the direct result of an accumulation of engineering standards, progressively added over the years, which was making newer assets uneconomic by driving substantial cost into both projects and operations.

A similar challenge was observed in well design, which had been standardized for engineering excellence. The drilling organization had evolved practices to optimize time and cost to drill, yet the well designs remained unchanged and gold-plated. In response, the company developed a tailored set of drilling archetypes, to optimize costs and resources across different campaign needs (Figure 4).

Figure 4: Example of differentiation between archetypes based on KPMG member firm experience: drilling



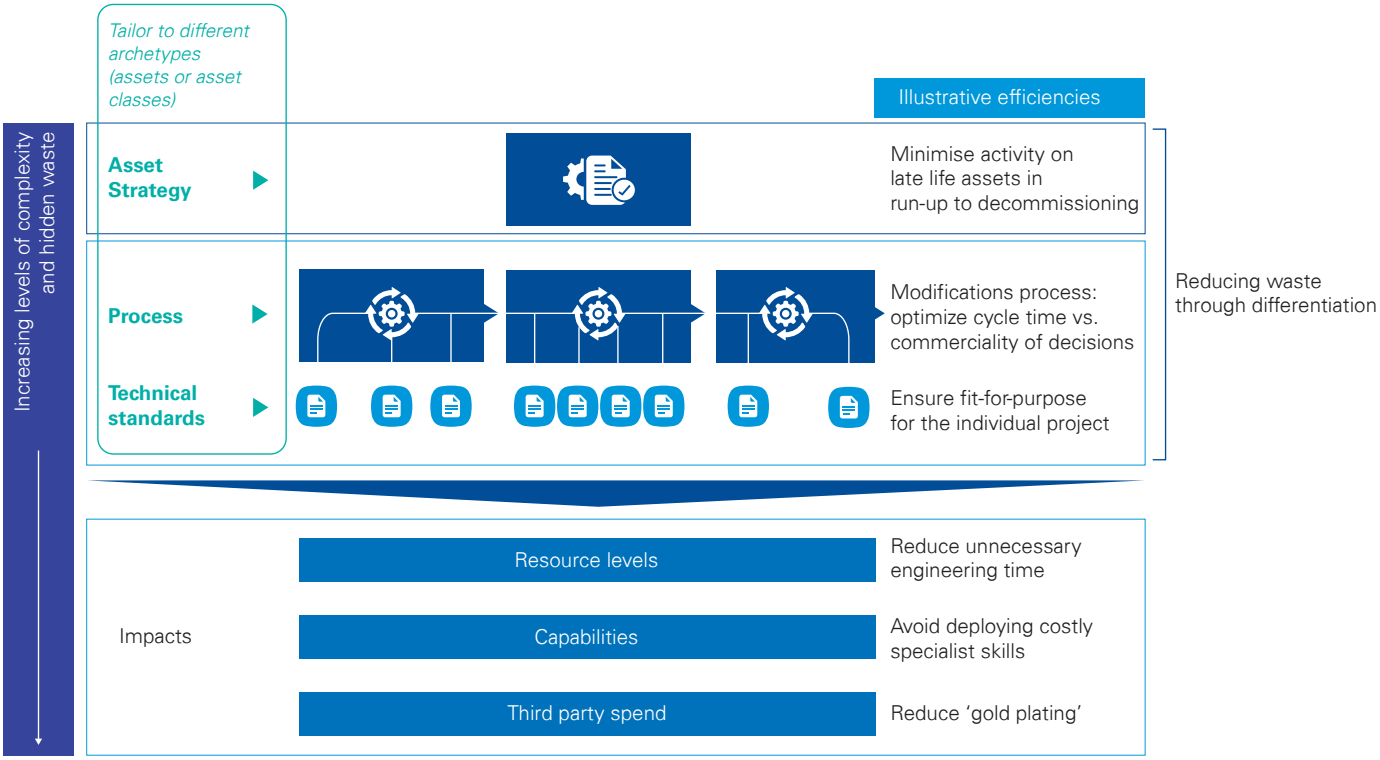
Many E&P firms have told KPMG professionals about tailoring high-level strategies to different asset classes; for example, by stripping back project costs to a basic design concept for new-build projects, or by setting out broad-brush maintenance strategies for late-life assets versus those on plateau. Yet these efforts have yet to tackle the deeper, underlying drivers of complexity and cost (Figure 5).

For example, a major US onshore operator had developed its original technical standards for offshore assets, prescribing that all topside gas tanks had to be treated with anti-corrosion paint, despite the fact that the equipment in the US was operating onshore, a long distance from the sea.

Whilst this may seem obvious, unlocking this value involves targeting high-value opportunity areas and then going deep into the individual standards and processes. It is about stripping things back to the absolute minimum for safe, compliant operations, and then adding back only what is needed for specific archetypes – by constantly asking the question: 'what can we afford, whilst not compromising on safety?'

Further examples of tailoring at this deeper level could include: work-overs and decommissioning (tailoring the traditional capital project process for the much simpler needs of these types of projects); operations (e.g. permit processes, which are typically applied indiscriminately and involve significant levels of duplicated paperwork); and modifications (e.g. equipment standards). Similarly, standardized back-office service levels may be affordable by a young, low-complexity asset, yet be punitively expensive for a late-life deep-water asset.

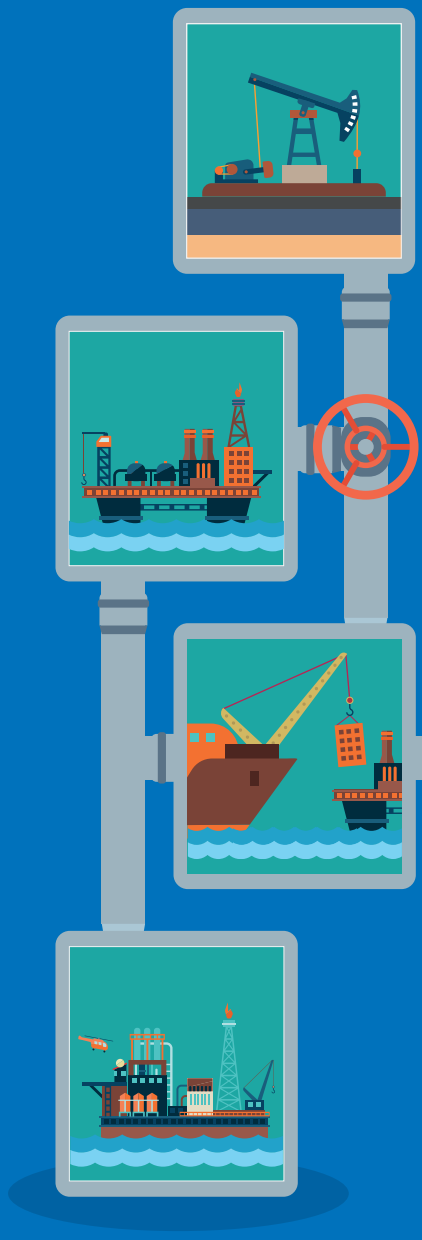
Figure 5: Different levels of differentiation between asset archetypes



The latent value from tailoring standards – reducing activity, releasing capacity, cutting third-party spend – is significant but requires effort to access. One major achieved a 25 percent cost reduction across assets, largely through initial efforts in this area. It is not about shifting the balance of power between the center and the assets; it is about challenging where and how standards need to be applied in specific situations ('archetypes'). It is about empowering the workforce to take a pragmatic approach.

Companies that have successfully tailored individual standards and processes to different assets often adopt a 'zero-based' approach. Beyond mandatory legal and regulatory requirements, additional activities and standards are only accepted where they are shown to add value to the asset. The total cost for the asset is tested for affordability, based on financial targets.

One supermajor tailored the approach for planning and executing work overs on its late-life assets, reducing the cycle time from 9 months to 5 months. It conducted a detailed review of the end-to-end process to strip out unnecessary activity, challenging all the paperwork required for approvals and driving a far leaner preparation process.



Value-based prioritization

Economic pressures are driving a new commercial mindset across functions where engineering excellence was traditionally the priority.

In the past, high oil prices meant that production increases from mega-projects masked cost inefficiencies in E&P that would be unaffordable in other sectors, such as time-on-tools averaging 3 hours per shift, gold-plated engineering solutions, low-impact maintenance interventions, and a range of support function inefficiencies. As unit costs became unsustainable, E&P firms experienced a tough awakening and now, following significant headcount reductions and budget cuts, have to 'do more with less'. Portfolio changes, coupled with economic challenges, have increased the level of intervention from joint venture (JV) partners, particularly in relation to costs – such as central charges for personnel that are not visibly adding value to the asset.

These pressures make it crucial to prioritize resources carefully. KPMG professionals see significant opportunity to take a more commercial and economic approach to decision-making, moving beyond traditional, engineering-led methods, or the use of simplistic metrics and 'rules of thumb' to assess value. A value-based approach can enable appropriate prioritization of work-scopes (e.g. major maintenance, modifications and production optimization) and determine affordable support function service levels.

For example, the traditional corporate risk matrix is often applied inconsistently in upstream, with operators using unmitigated risks alone to rank activities. A number of organizations are now recognizing that this approach may be inadequate, given the large proportion of jobs that tend towards the higher end of the risk spectrum. Put simply, the traditional ranking process does not adequately balance 'value of risk mitigated' versus 'activity cost'. Increasingly, E&P firms are now starting to think more like downstream operators (Figure 6) and assess work-scopes based on relative benefit-cost ratio (BCR) – a practice long embedded in refining operations.

When looking at one of its core asset hubs, one North Sea operator discovered that 75 percent of discretionary jobs approved in an annual budgeting plan had BCRs of less than one, while one safety item costing in excess of US$6 million had a risk reduction value of less than US$1 million (BCR less than 0.2). In response to these findings, the operator undertook a complete review of all engineering and major work-scopes, to re-evaluate the prioritization and ensure that limited resources are focused on activities that either drive business value or reduce the risk profile of the business. Based on KPMG professionals' experience in downstream, applying full BCR prioritization in upstream would be likely to 'shake out' around one-third of discretionary work-scopes by value.

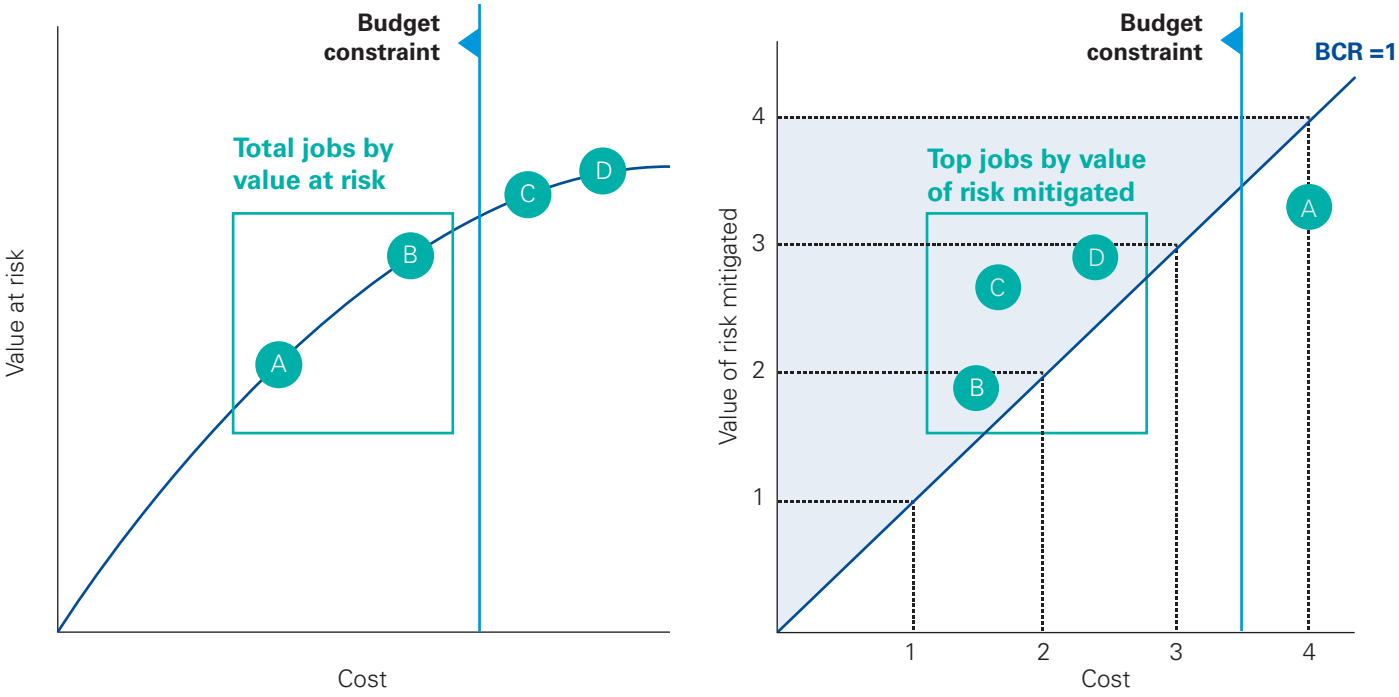
What does it take to achieve a cultural change in commercial awareness? Simply asking the management team to preach value is unlikely to get you there. The key is to understand where the biggest cost/benefit trade-offs are in the organization. Companies should regularly undertake a line-by-line review of all major maintenance, turnaround, engineering and well-work scopes, rigorously applying cost/benefit analyses to flush out low-value items, and identifying alternative engineering solutions that are either more effective in reducing risk or more cost-efficient.

There is potential to apply this approach across all value decisions in the organization, as crucially it allows companies to compare the economics of different activities (e.g. safety versus production-adding) and avoid spending significant amounts on work that does not materially alter the risk profile.

Figure 6: Illustrative example of prioritization using benefit-cost ratio (BCR)

Fig. 6a (Traditional approach): select jobs A and B as biggest value at risk; run out of budget for C and D

Fig. 6b (Correct approach): select jobs B, C and D based on value of risk mitigated; A is uneconomic (BCR <1) so investigate alternative solution



A junior process engineer at one supermajor maximized production from an ultra-late-life asset by proactively identifying and delivering production optimization opportunities, despite the fact that the asset was due to start decommissioning in less than 12 months. He put together a small investment case for scale squeezes and foam stimulation, which delivered short-term production benefits with a strong return on investment (ROI). He also reduced topsides maintenance activities on non-producing wells by early plugging and lubrication – instead of deprioritizing improvements on ultra-late-life operations. This is a great example of a shift in commercial mindset from engineers determined to squeeze the last drop of value from their assets.

Using machines to make decisions

New data and analytics solutions to improve decision-making and optimize high-stakes trade-offs.

The highest-risk and highest-value operational decisions in E&P, such as when to trip during drilling or when to choke back a well, are typically the preserve of the most experienced engineers or longest-serving operators. This limits decisions to specific locations and hierarchies, and leaves greater room for personal biases. Arguably, these decisions may be better taken by those with access to the right data. Even though such individuals may not necessarily be close to the asset, nor have the longest tenure, they typically possess the insight and decision support needed to make objective, complex trade-offs, and predict the outcomes associated with different potential courses of action.

Increasingly, technology is enabling key decisions to be taken in this way. Predictive decision-making is driving exponential improvement in performance and efficiency levels, and enabling scarce resources to be directed towards the most valuable opportunities. Despite the downturn, more and more E&P firms are investing in such technology, recognizing its importance for future competitiveness.

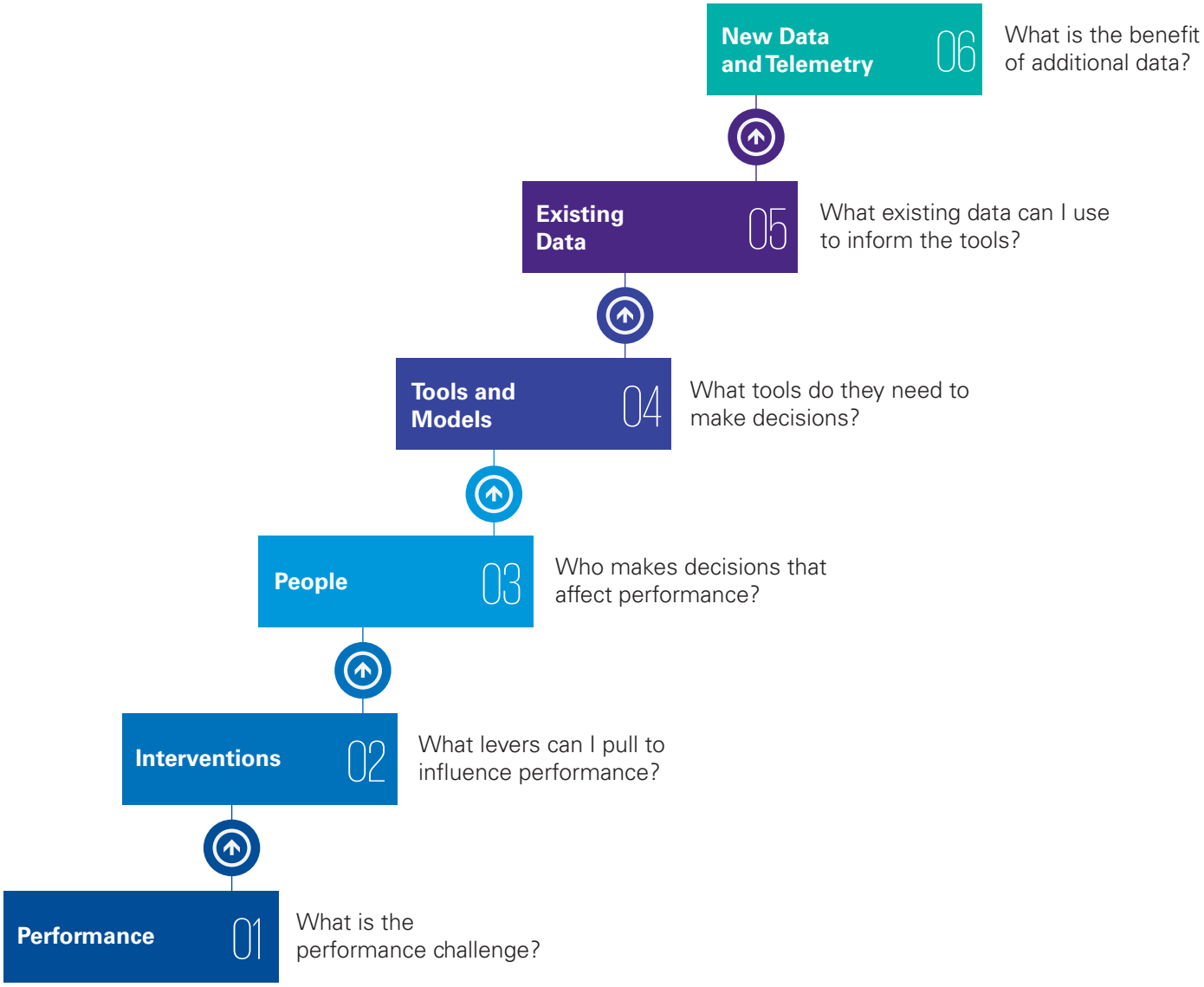
For example, one supermajor has built a predictive decision-support tool (DST) that enables technical teams in a remote drilling operations center to take key well execution decisions with an informed view of the likely impact on performance. With intense end-user engagement, and investment in a tailored user interface, adoption of the tool is strong and should improve the central team's ability to optimize day-to-day decisions. Engineers focus on total life-of-well value rather than short-term cost efficiencies, i.e. considering the impacts on future reliability and productivity when taking decisions. The underpinning predictive algorithms are an early step towards the goal of remote drilling operations.

This performance-led approach to technology development (Figure 7) has broader implications, as large amounts of data and sophisticated technology alone are unlikely to be enough to shift performance – knock-on changes will be required to the performance metrics, roles and responsibilities, and locations of the teams involved. For example, as a result of implementing the drilling DST, the operator in question is completely revising its performance management framework, as it recognizes existing metrics, responsibilities and corresponding incentives are not fit-for-purpose.

Similarly, engrained decision-making cultures can be one of the hardest obstacles to overcome. Whilst there has been an increase in the implementation of onshore operations centers, in many cases they are no more than remote monitoring centers. Even though engineers monitor and track real-time trends, key execution decisions continue to be made on the asset.

Although companies are investing heavily in gathering petabytes of data in expensive 'data lakes', there is not always a clear understanding of how this data can be used to drive improvements in business performance. Advancements in technology are finally helping to leverage this data and move to a more predictive, action-oriented approach.

Figure 7: Delivering decision-support technology solutions by starting with performance outcomes

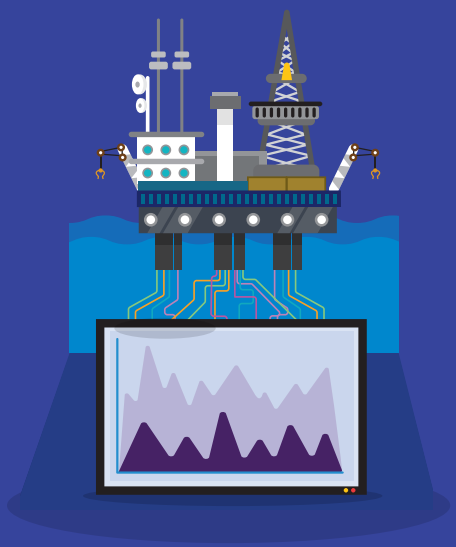


There are many potential applications, particularly for high-stakes decisions made over short timeframes, involving complex trade-offs and a proliferation of data across dispersed systems – for example equipment reliability and production optimization. Management and effective ownership of this data should become increasingly important.

Those companies that are already succeeding in driving value in this area (see case study 3) are constantly focused on what it will take to reach the 'tipping point' – the moment when engineers trust the machine. However, proving the accuracy of the machine's predictions in a test environment is not the same as relying on the machine to actually make the decisions. Companies should try to ensure that their engineers are fully committed to achieving such an outcome. Winning hearts and minds means involving engineers from the outset, empowering them to come up with ideas of where to apply the technology, and working very closely with them throughout the development process.

Case study 3: Maximum planned production model

An Asia-Pacific operator has built a 'maximum planned production model' that records thousands of data-points per second on the current operating configuration of the asset, telling a DST how the plant is being operated, and recording the production results. The current configuration is constantly compared to past configurations, to determine the best results achieved for identical configurations. The DST then advises what production should be achievable and recommends actions to achieve these targets – and predicts outcomes. The same operator is currently trialing similar DST approaches to predict valve failures and advise on interventions for corrosion prediction, and even for health and safety incidents.



Agile supply chains

Companies should think like manufacturing businesses, working closely with suppliers to become more agile and efficient.

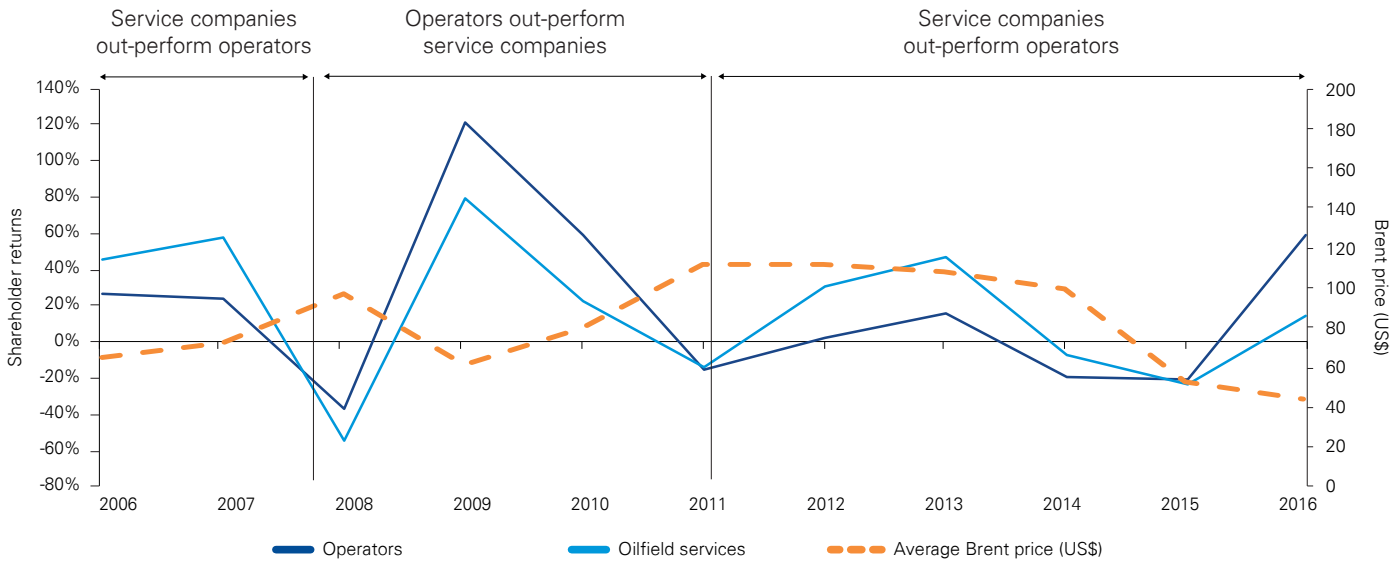
The experience of KPMG professionals suggests that third parties typically represent more than 50 percent of total E&P labor and spend, and so a key source of value is found through the supply chain. Whilst easy wins from reduced supplier rates have been quickly achieved, experience from other sectors suggests that significant value remains untapped.

In contrast to sectors such as automotive, where manufacturers are even more dependent on Tier 1 and 2 suppliers, E&P operators and service companies have traditionally played a zero-sum game across the commodity price cycle (Figure 8), with each group benefiting at the other's expense at alternating points.

Integration has historically been limited, with reluctance to share datasets and limited appetite for collaboration. E&P has been slow to adopt leading contracting strategies, such as risk and reward or alliancing. Consequently, traditional E&P supply chains can be slow and inefficient.

E&P firms should think more like manufacturing businesses and aim to achieve far more integrated, collaborative and agile supply chains. Sectors such as automotive have achieved supplier cost savings of more than 10 percent through providing timely, accurate demand signals into the supplier base and collaborating on continuous improvement activities across the demand-supply interface, to identify and eliminate inefficiencies.

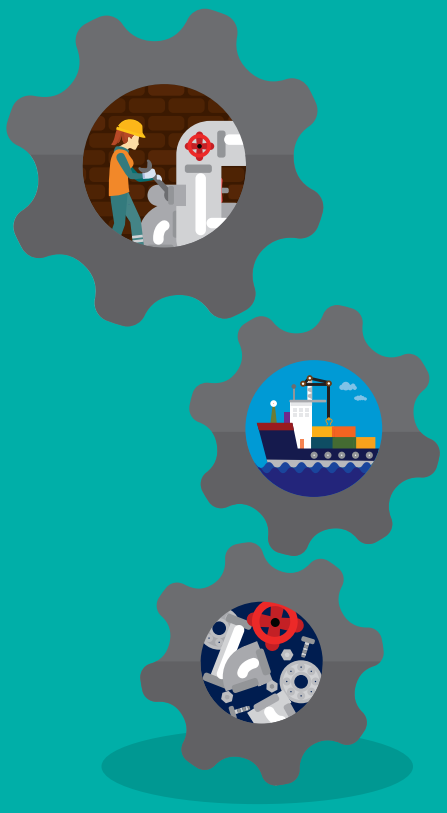
Figure 8: A 'zero-sum game': Upstream total shareholder returns, 2006-2016[11,12]



Centralized demand planning, and integration of planning and inventory management systems, can enable reductions in inventory and holding costs while improving service reliability. Dramatic inventory reductions have been seen in automotive, industrial manufacturing, consumer packaged goods (CPG) and retail sectors – sometimes over 20 percent across the supply chain – through clear rules on replenishment, accurate data with centralized visibility, and optimization of stock levels through the supply chain.

Such ways of working also reduce the costs of handling and storing materials in the chain, reducing logistics and warehouse requirements. More efficient materials management processes can also improve 'on time in full' delivery of materials to assets, reducing time spent by front-line Operations and Maintenance staff looking for parts – a recurring theme in 'day-in-the-life' studies.

These gains depend on deeper collaboration between operators and service companies, which demands a fundamental shift in attitudes. Both parties need to be far quicker to reach data-sharing agreements, be more collaborative in working together to drive efficiencies, and be more open to sharing the mutual benefits of success.

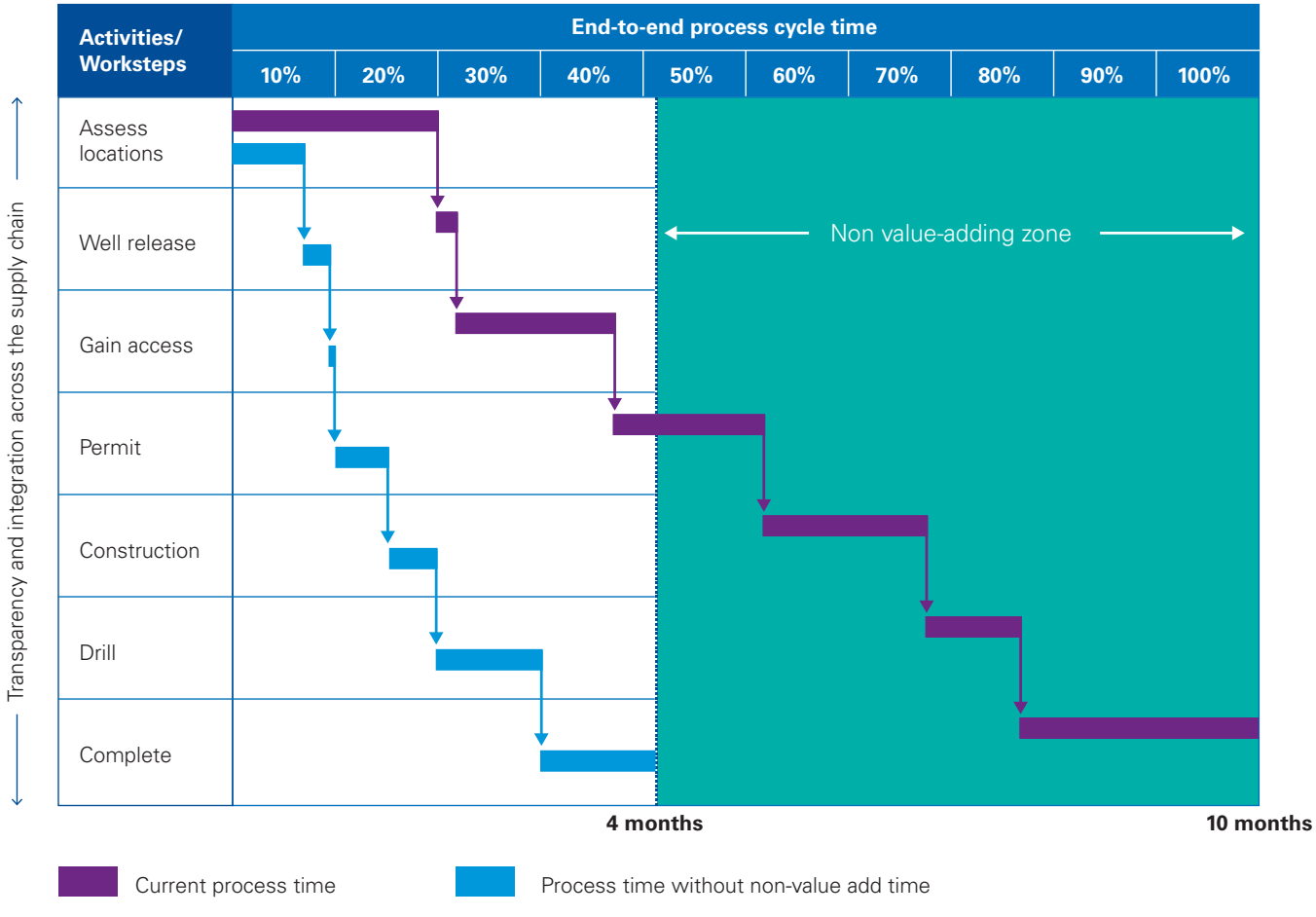


There are signs that practices are beginning to change. In North Western Australia there is an arrangement in place to share offshore supply vessels between operators, with logistics suppliers and operators sharing the benefits of increased vessel utilization – something long-resisted in more mature basins. Also in Australia, a group of operators are looking at sharing turnaround plans between each other and with key service companies, to optimize the schedule, reduce over-runs, and avoid competing for the best resources during peak-activity periods.

In US unconventional operations, productivity (measured in new well production per rig) increased 40 percent p.a. in both 2015 and 2016[13] – largely through collaboration with suppliers to drive out inefficiency and reduce cycle times. Based on the authors' experience with these businesses, who are increasingly organizing their drilling programs like manufacturing operations (see case study 4), operators can expect to achieve cycle time reductions of around 20 percent and cost reductions of 10-15 percent p.a.

E&P firms moving into unconventionals in the mid-2000s discovered that traditional capital allocation processes (developed for mega-projects to optimize a smaller number of higher-risk decisions tied to annual budget cycles) were ill-suited to drilling decisions that needed to be made in weeks. As operators have matured, they have tailored these processes to achieve shorter cycle times, incorporating far greater agility. They have achieved this by working collaboratively across the supply chain to take out non value-adding activity (Figure 9). Instead of individual authority for expenditures (AFEs) for individual wells, approved by senior committees, one player lowered delegations of authority and established a quarterly expenditure memorandum based on high-level assumptions. This enabled capital to be more efficiently shifted between assets, so that the drilling and construction programs can be constantly adjusted in response to learnings from the field.

Figure 9: Onshore drilling: cycle time compression across an integrated supply chain



Intelligent process automation

New automation technologies are helping to reduce transactional back office support costs by up to 30 percent, whilst simultaneously reducing error rates.

Support functions typically represent a relatively small but nonetheless important cost for E&P firms and, despite recent cost reduction initiatives, such costs remain stubbornly high. Many organizations have reduced headcount but made limited progress in cutting back activity and service levels.

If E&P organizations are to become truly competitive, they should address the cost and complexity built into traditional service models. Fortunately, many of the transactional processes in the back office are ripe for intelligent automation (IA). This is not some mysterious 'black-box' technology of the future; it is real and is already being applied by forward-thinking organizations across many sectors.

The approach to automation is very simple and the technology required to deliver it is straightforward, meaning benefits can be delivered cheaply and at pace – often in a matter of weeks. The advantages are significant: human time, effort and costs can be reduced and processing accuracy increased.

The IA market is forecast to grow by at a 60.5 percent compound annual growth rate (CAGR) from 2017 to 2020[14] and 55 percent of global corporations are currently exploring new automation opportunities[15]. Transactional processes, for example: journal entries, management information (MI) reporting, reconciliation activities, ordering and billing, and even legal services (such as contract compliance) are common opportunity areas already delivering significant efficiencies.

Support functions are also using advanced data and analytics algorithms to identify value opportunities. The back office is supporting the front office with financial analysis using sophisticated internal data, augmented with publicly available insights, to drive recommendations, decisions and action plans.

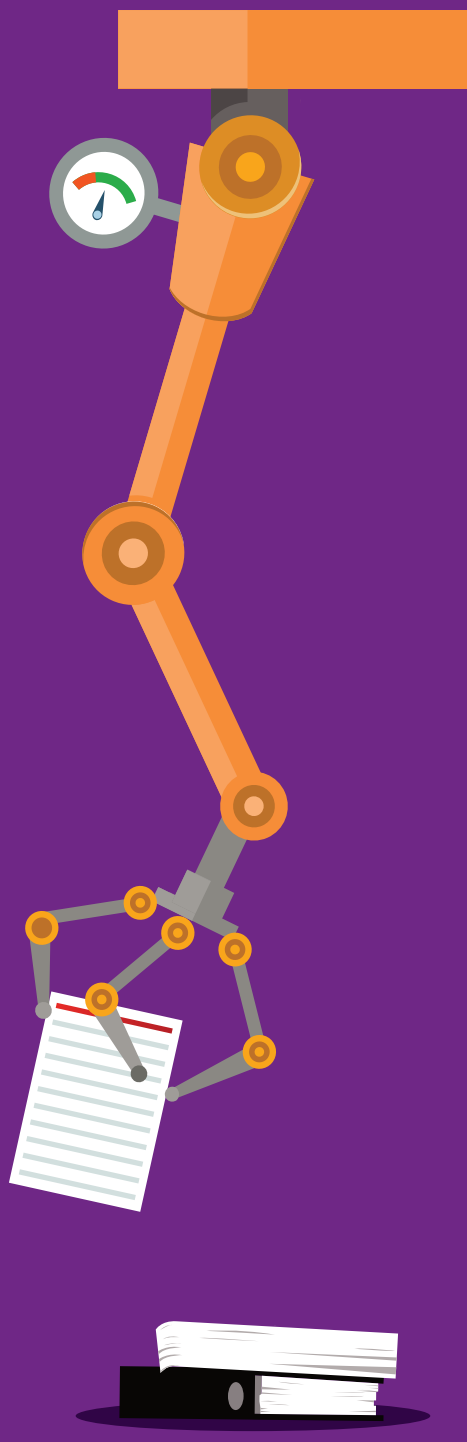
Industries such as financial services, telecoms, pharma and fast-moving consumer goods (FMCG) are leading the development of IA, as they did for outsourcing and shared service centers. However, executives in these sectors now recognize that IA allows them to push these services back into the business at far lower cost. Leading companies are planning to close shared service centers over the coming years, as they develop IA capabilities that remove much of the human effort from these processes.

In a cash-constrained world, where access to investment capital is limited, E&P firms can use IA to drive significant short-term benefits at minimal cost. One operator is rolling out a portfolio of 'bots' across transactional back office processes, with an ROI of up to 3:1 in Year 1. As cognitive technology improves over time, IA should move up the value chain to more complex, higher-value processes in the front office, such as 'management of change'. However, these improvements need to be planned within the context of a long-term technology strategy and roadmap that builds the foundations to capitalize on future developments in cognitive and artificial intelligence (AI).

Case study 5: Bots in US unconventionals

One US unconventionals business unit has implemented a series of bots across its back office functions, using a more agile and flexible approach to delivery of the technology. Instead of a large, costly and inflexible system implementation, the bots are rapidly trialed, assessed and rolled out (or discarded) through a series of 'sprints'. This approach is characterized as 'start small, fail fast, scale fast'.

Typical time to proof of concept (POC) is just 6 weeks, and implementation costs are small. Middle office processes, such as land procurement and approval for expenditure (AFE), are also being targeted for automation. Capability is being developed in-house, using a center of excellence (CoE) model, enabling the organization to quickly learn and scale up, with minimal up-front investment and reduced reliance on third party providers.



Delivering the prize

Delivering the opportunity requires a fundamentally different approach: 'start small, fail fast, scale fast'.

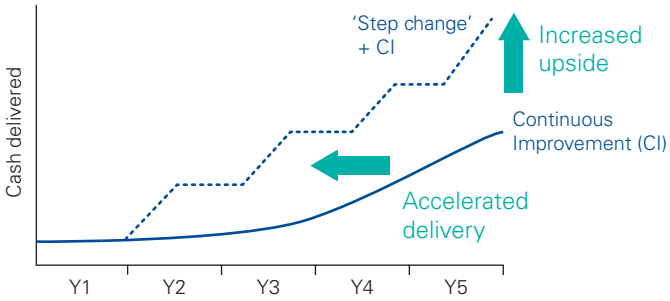
The call to action is urgent. If assets cannot deliver and sustain further unit cost improvements, capital is likely to flow elsewhere; for late-life assets that means a greater chance of early cessation of production. In our view, another 'transformation' is not the right answer. Organizations are resource-constrained, with some having already reduced staff by 30-50 percent, and rightly cautious over additional investments in large change programs.

A continuous improvement (CI) approach is increasingly common amongst operators, with many hopeful that this can deliver the next wave of value, using techniques such as Lean Six Sigma. Whilst CI has a crucial role to play in driving behavioral change and workforce engagement, improvements are usually incremental and slow to deliver. Furthermore, CI opportunities often become focused on individual functions, whilst greater value is usually found in processes that cut across functions. In addition, although they are typically delivered as part of 'business as usual', a long tail of individual CI projects can quickly become resource-intensive.

The scale of value afforded by this next wave of opportunity is far greater and demands a more focused approach. Management's attention should be directed to a small set of material, step-change initiatives that can really shift performance. Due to their cross-functional nature, these opportunities can be more complex to deliver; but on the plus side, they can be delivered individually. Arguably, they provide a better balance between scale and value on the one-hand, and pace of change on the other. And they should act as accelerators to super-charge existing CI efforts (Figure 10).

This requires a fundamentally different, more

Figure 10: 'Step change' opportunities act as accelerators to super-charge existing CI efforts



entrepreneurial approach to execution; something that a number of industry players are already adopting by embracing a 'start small, fail fast, scale fast' approach (see case study 5). It implies a greater willingness to experiment and adapt, and a relentless prioritization of effort to maximize benefit. In order to rapidly deliver the value, companies should create a clear and compelling story for the organization, setting out the case for change, the full value potential, and the specific levers to deliver such change.

Small teams of dedicated resources should be assigned, with appropriate representation from across functions. This does not necessarily mean the most experienced veterans, but potentially the younger engineers with fresh ideas, unencumbered by traditional ways of working.

Forward-looking E&P leadership teams may need to evaluate what kind of organizational construct is required to deliver this change. The resulting business processes, roles and responsibilities, metrics, capabilities and supporting technologies are likely to be very different from existing ones, and are highly interdependent. Careful consideration of these dimensions is likely to be key to sustaining the change.

Implications for E&P executives

Leadership teams need to challenge the breadth and depth of existing efforts.

Looking at the five sources of long-term value explored in this paper, executives should be asking a number of questions:

Zero-based asset costs

a) For each of your assets, are activities, service levels and resourcing truly optimized?

b) What would change if you introduced zero-based spending and only added back activities and costs that genuinely add value?

Value-based prioritization

a) Have you gone as far as you should in ensuring that all scoping decisions for projects and activities are fully commercial?

b) What confidence do you have that all technical work-scopes have a benefit-cost ratio greater than 1?

Using machines to make decisions

a) Who makes your highest-value operational decisions and how do you know they are right?

b) Which of these decisions would most benefit from being made by a machine, where possible?

Agile supply chains

a) Are your supplier costs likely to come under renewed pressure as capacity tightens and demand grows?

b) What would you and your suppliers need to change if you really want to break the 'zero-sum' approaches of the past?

Intelligent process automation

a) Are your back office staff still delivering simple transactional activities?

b) Do you understand the magnitude of potential savings and efficiency gains from automating – rather than outsourcing – transactional activities?

Delivering the prize: What are the top five opportunities in your business to improve unit cost? And how will you 'cash the check'? How will you bring in fresh ideas to challenge your staff and maximize value?

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