APAC Well Intervention Market Dynamics and Opportunities

Jeremy Bowden, on behalf of Offshore Network

In this article, we review the situation and prospects for the offshore well intervention market, with comment on best practice, based on a presentation at OWI APAC 2018 (Kuala Lumpur) by Dan Cole, McKinsey & Company.

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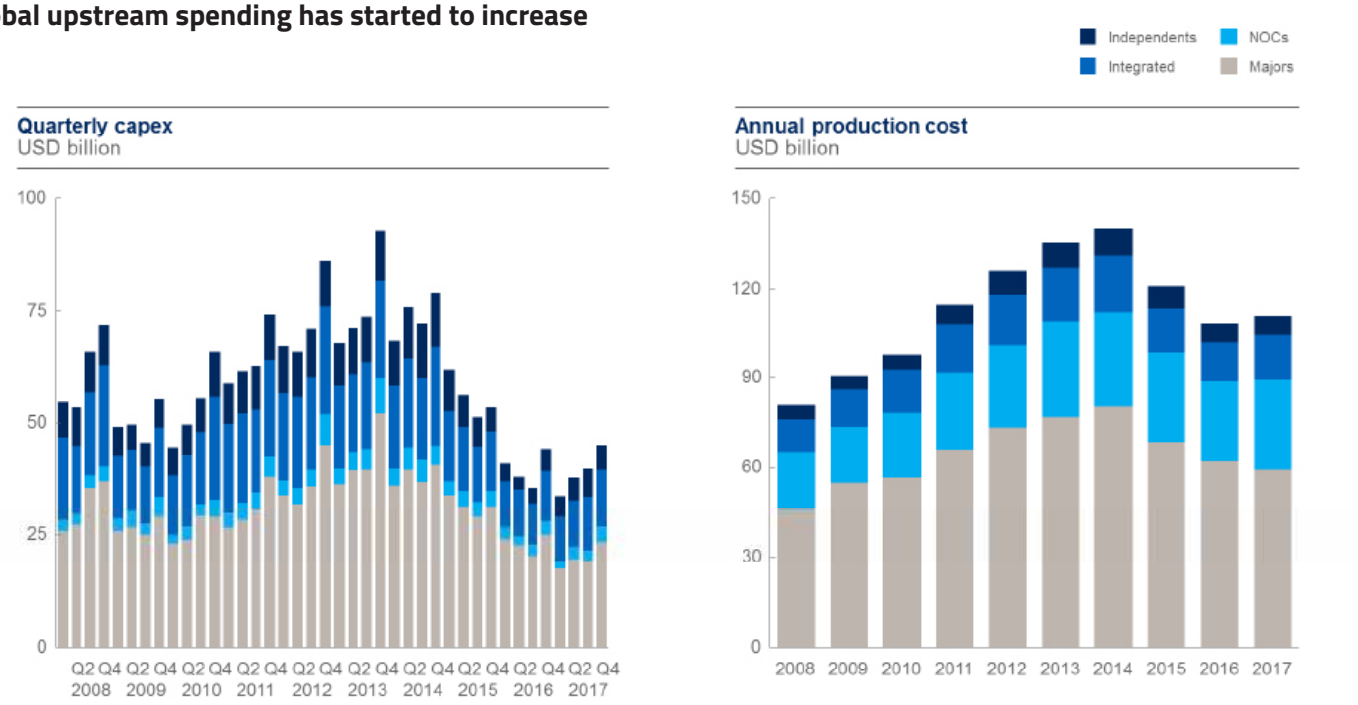
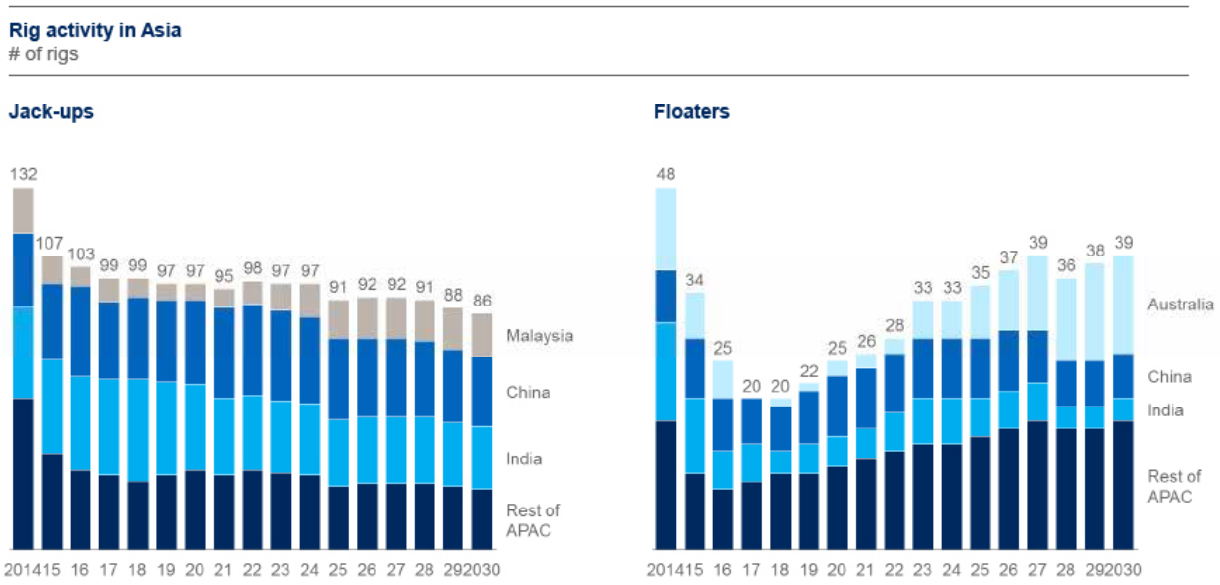
Prospects for well intervention are beginning to improve following a lengthy downturn in the oil sector that began when prices fell in late 2014. Global upstream spending has now been increasing slowly for several quarters and was back over $50 billion in the third quarter of this year. In addition, operational expenditure has also begun to rise, at least among NOCs and integrated companies. Combined, these provide a bigger pie from which funds for well intervention can be drawn.

Global upstream spending has started to increase



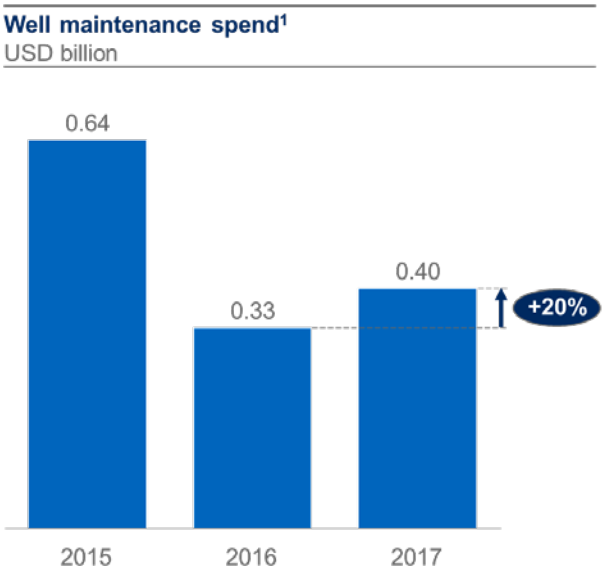
The upturn is slowly being reflected in offshore rig markets, which are beginning to show signs of life. In southeast Asia, for example, the market has seen the jack-up decline flatten out, although numbers are not expected to rebound over coming years and may even gradually edge lower still. Floaters have also seen numbers even out, and here projections for the future suggest a significant increase, with the total almost doubling from 20 in 2018 to 39 by 2027 in this region alone.

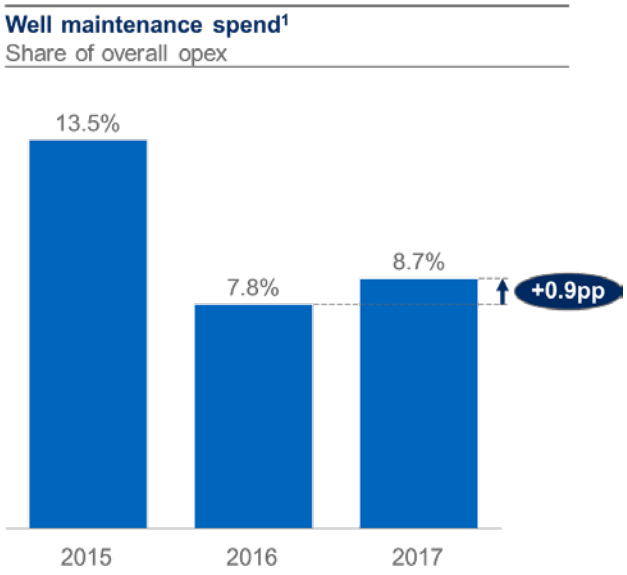
Rig activity in South-East Asia



McKinsey's offshore datasets show that, following the price slump in 2014-15, operators initially suspended all offshore well activity, including well work and turnarounds. Since then, turnaround activity saw an acceleration in 2016 and into 2017, which took a little while to get through, pushing out the well work. Now, over the last year, operators have started spending on well work once again and activity is rising.

Spending on wellwork has also started to increase

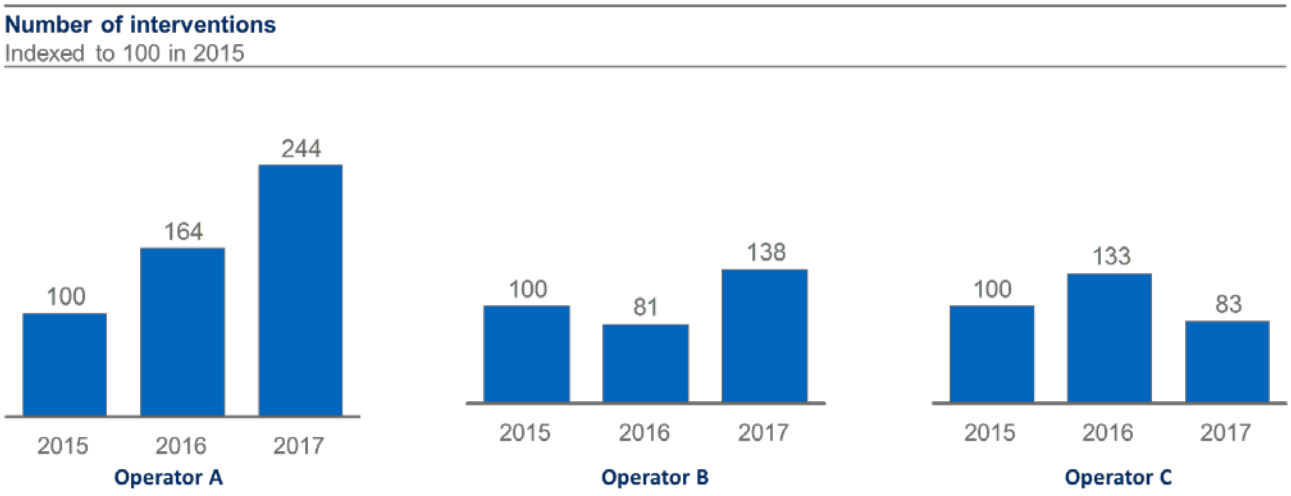




At the granular level, the industry is starting to see an uptick in maintenance spend at the various rigs (across 42 assets) that are monitored, with levels rising by an average of 20% in 2017. There has also been an increase in the proportion of total spend going on well maintenance, although it remains well down on the sort of levels seen in 2015.

Activity in terms of the number of well interventions is also up, with McKinsey's sample of three major operators showing an average increase of 23% between 2016 and 2017. This is a significant improvement, but there is a much bigger opportunity out there: The sector has had little attention for several years and remains relatively neglected, so a large number of potentially lucrative well interventions have accumulated and are not yet receiving attention.

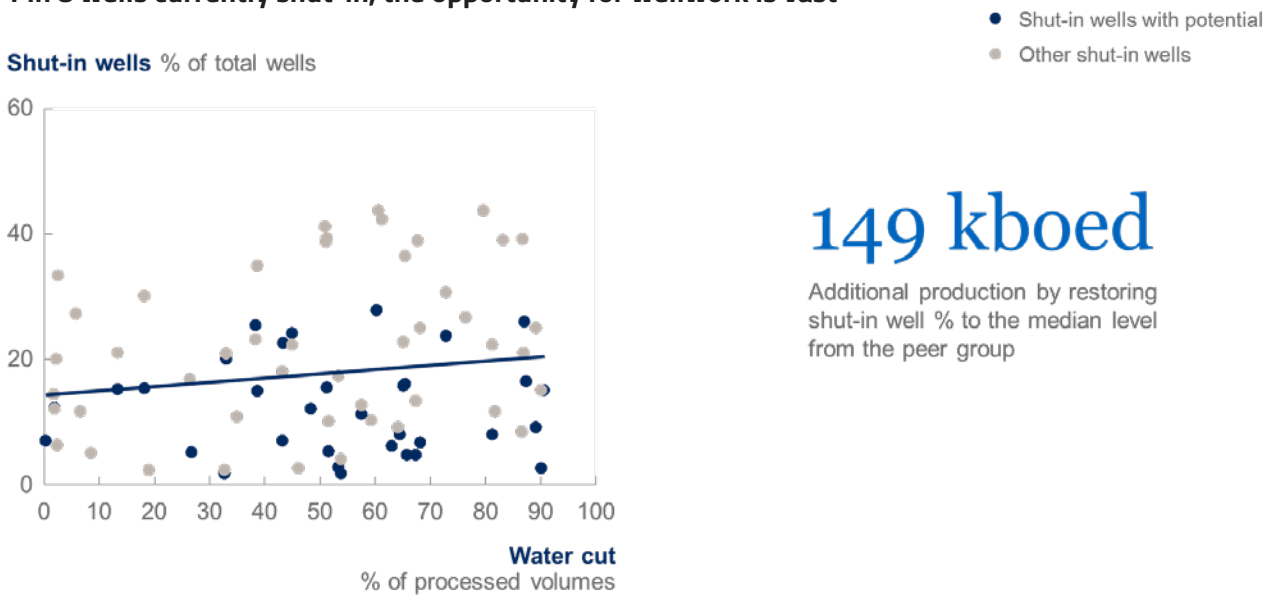
Activity is also up (at least for some operators)



SHUT-IN BACK-LOG

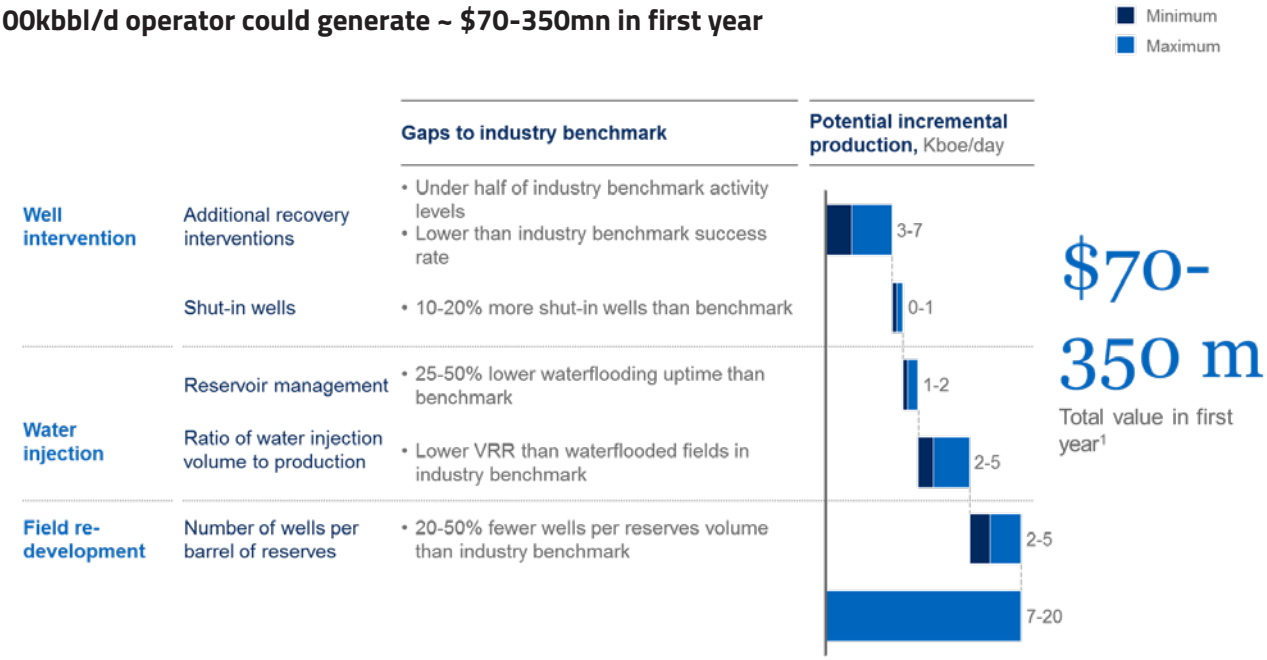
Shut-ins alone now account for 1 in 8 wells due to a lack of spending over recent years, (based on 46 assets spread globally), creating an expanding pool of potential well interventions and vast opportunities for value-adding work. McKinsey estimate that production from these fields could be increased by 149,000 boe/d – the equivalent of a large new field - just by restoring the shut-in well percentage to the median level for the sample group of companies McKinsey have analysed. On top of that, while it is not currently economic to restore some shut-in wells, improving technology could dramatically change that picture – adding another 150,000 boe/d in potential production. The candidates for intervention are not just in older fields with a higher water cut, but also in mid-aged and younger fields. This represents a significant opportunity for the industry.

With 1 in 8 wells currently shut-in, the opportunity for wellwork is vast



At a company level, well intervention can be the best money any operator spends.

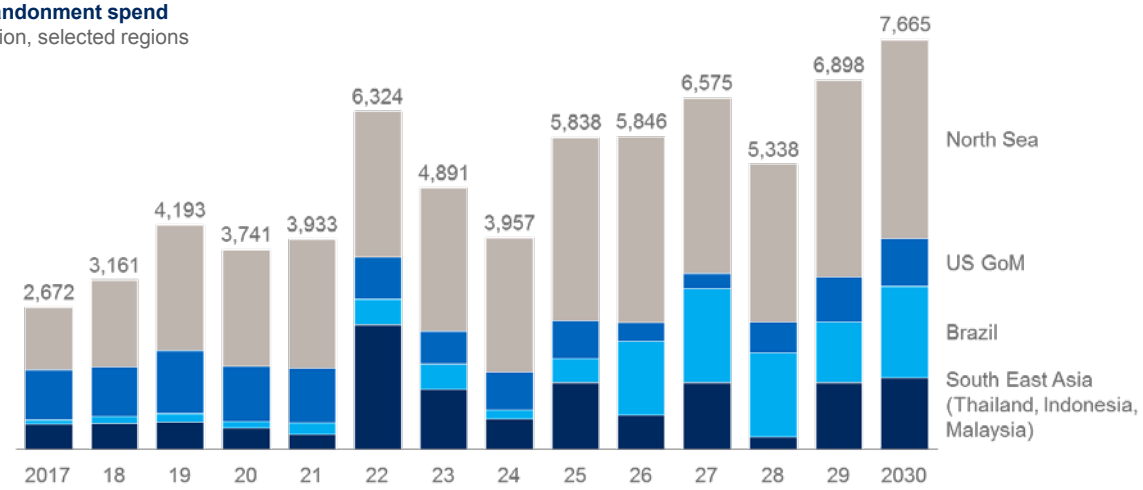
A 100kbbl/d operator could generate ~ $70-350mn in first year



A typical 100,000 b/d producer could generate an additional $70-$350 million in the first year (based on $50/barrel oil) by focusing on well intervention and making sure they rise to the top of industry benchmarks in the field. This represents payback within a year or two, but despite this it often remains an underfunded pursuit.

In addition to interventions, McKinsey also expect to see a rise in well abandonment over coming years. The $3.16 billion spent in 2018 is expected to rise erratically to $5.84 billion by 2025, with the biggest rises seen in the North Sea, followed by Brazil and Southeast Asia.

Well abandonment spend
USD million, selected regions



However, if the industry does spend so much on well abandonment, operators will be doing something wrong, as they will not have been able to defer abandonment through effective well intervention - as they would all like to do. Nor will companies have been able to reduce costs much based on growing abandonment experience – there is very low learning curve cost assumptions in this projection.

THE RIGHT APPROACH

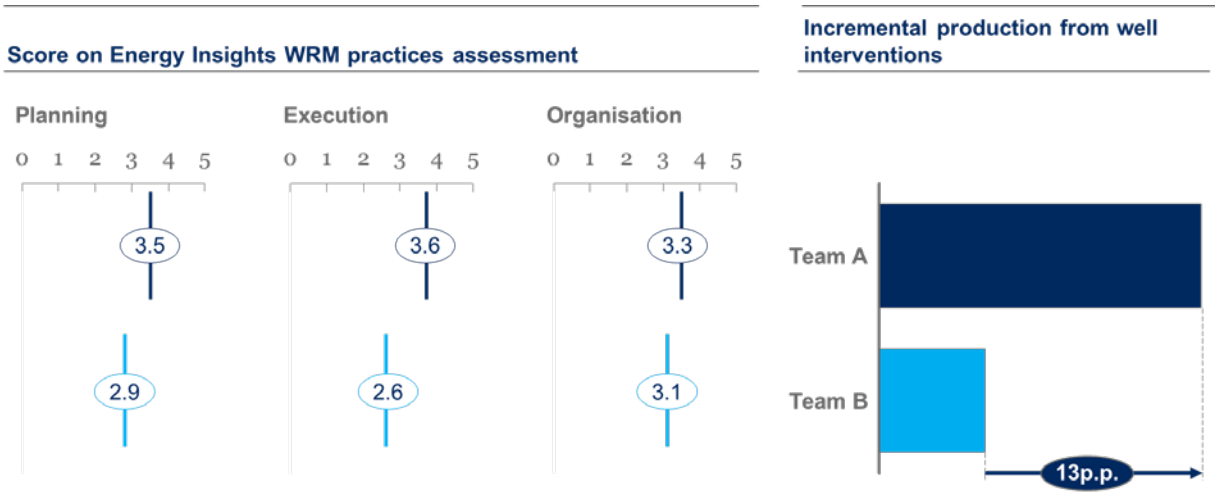
Successful well-work requires an appropriate combination of three key elements – planning, organisation and execution.

Overall, operators rate themselves fairly highly on most aspects of planning, including field development and operations planning, (based on interviews with 16 operators and 4 service companies rating their own work). However, in the organisational sphere, a number of companies suggest they could be doing better in performance management. And, on execution, they also score less well overall, with metering and surveillance, and reservoir management both areas of potential improvement.

By getting operators to rate how they thought they had performed, as well as collecting actual performance data, McKinsey were able to compare the two. As might have been expected, those teams that scored highly were indeed the ones that delivered a bigger increase in production from well-work. For example, Team A with an average score of 3.47 (out of 5) managed to deliver incremental production increases from well interventions that averaged 13 percentage points (pp) higher than Team B, which had an average score of 2.87.

There is a significant potential impact on performance from only small changes in the way a team is organised. McKinsey also noticed a real difference between those companies that saw well intervention as a real opportunity to add value and those that just saw it as a chore associated with maintaining a field.

Teams that perform better on these dimensions deliver higher production from wellwork



PLANNING AND INCORPORATING BEST PRACTICE

In planning, it is important to get the balance right between flexibility and prioritisation, and to prioritise the right projects. The more successful companies have good processes and tools to quickly and clearly identify high-value jobs. They also had flexible budget allocation – which is key as the money needs to go smoothly to where the lowest cost-per-barrel opportunities are. In addition, it is important to be able to transfer best practices effectively between regions and teams.

Well and reservoir management (WRM) teams need to ensure a best practice set of intervention procedures are incorporated into plans, including measurement of success at each stage through planning to execution. Good practice in opportunity identification and management should include a global opportunity register, owned by asset managers and generated by a multidisciplinary team.

Planning begins with data acquisition, well testing surveillance and metering, which is followed by opportunity identification and management (with regular reviews). Good practice in data acquisition has been achieved only when at least 90% of surveillance and 95% of testing programmes are executed to plan, and over 95% of meters are functioning and calibrated.

Good practice in opportunity identification and management should include a global opportunity register, owned by asset managers and generated by a multidisciplinary team.

The opportunities should be used to build a budget, and there should be no shortage of cash positive opportunities.

The next planning stage of internal and partner proposal approvals should be accompanied by effective budgeting and spending control. Best practice here should include guidelines to do all the work at or below a set cost.

Execution planning should then be measured for success, with best practice requiring the alignment of all budgets and plans, long and short term, internally with operations departments and externally, if partners are involved. The plans must be owned by both the well interventions team and operations. Execution itself should be measured against key performance indicators (KPIs) and performance dialogs. Best practice here requires consistent tracking of KPIs at a global level by job type, and a regular rigorous asset health check.

Once up and running, best practice would expect an actual output within -+5% of the target level. On-going performance monitoring should then aim to rigorously track the additional production contribution that has resulted from the well intervention.

ORGANISATIONAL STRUCTURE

The way companies organised themselves internally and with supplier interfaces is also a key indicator of successful well intervention management. Those companies that were more integrated with their supply chain around opportunity identification generally did better, although there were a wide range of outcomes, even within companies.

Good organisation requires responsibility and clear targets, and it should facilitate sharing of KPIs and targets among the whole asset team, as well as providing sufficient resources when needed. It should also attempt to ensure integration of supply chains into opportunity management, as well as making sure there are attractive career opportunities for intervention teams in order to attract the best personnel. Overall, McKinsey found that units with some real local representation, and those regional units that operate with some autonomy perform best.

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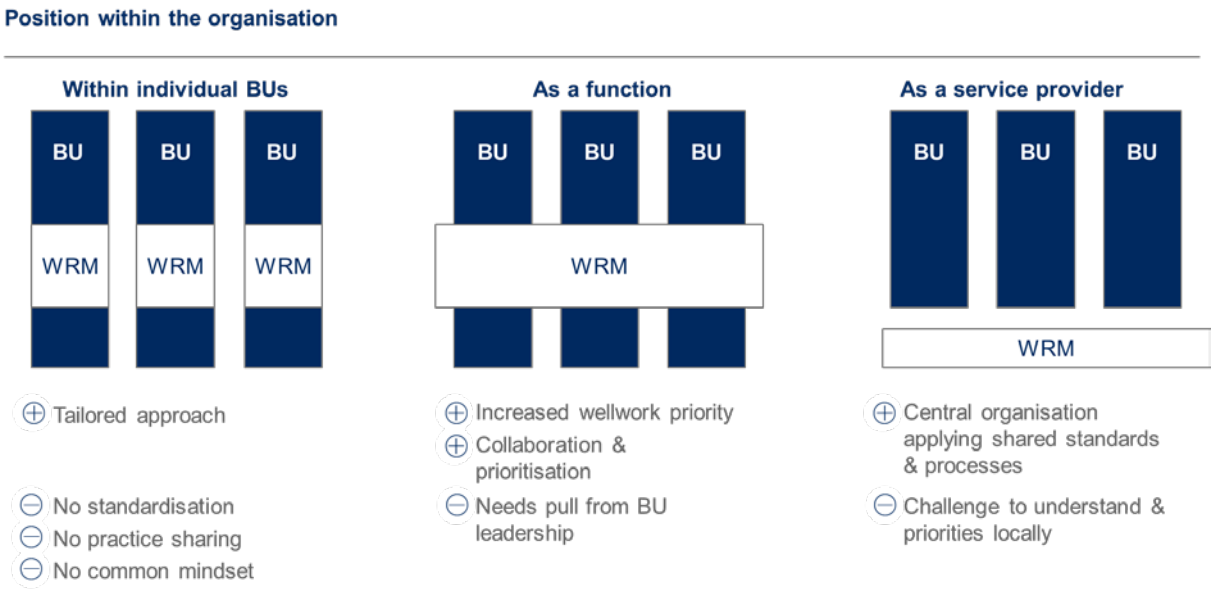
Each organisational set-up has its pros and cons. If WRM is included within individual business units, it suffers from a lack of standardisation, common practices and practice sharing. But, on the positive side, a more tailored approach can be adopted to suit each business unit. Alternatively, by using a services company, you benefit from a central organisation applying common best practice and standards, but such an external centralised approach often has problems getting to grips with local priorities. If well intervention is organised as a function, it can push the priority of well-work within a company and improve prioritisation and collaboration – however, it requires a pull from business unit leadership and cannot operate autonomously.

This could have been any of the organisational structures mentioned above but tended to be within business units. That's why some of the independents can sometimes outperform the majors; because there's greater local control, focus and accountability. Local ownership matters a lot. But there is also a downside to this approach, in that it is harder to cross-learn between assets and it is more difficult to control the process centrally.

Organisation set-up is a choice with pros and cons



EXECUTION

Those that executed projects most effectively had particularly strong 3-12 month planning capabilities. The most successful companies also normally ensured a single project owner from concept to execution and a flexible process allowing speed up of high impact, low risk opportunities. Those that tried a wider variety of intervention approaches performed better, along with those that used more targeted intervention, rather than just a restorative approach.

One company, a major operator, managed to outperform the others on most aspects of well intervention, including cost and the contribution of well intervention to raising output. At the planning stage, this company knew the economics, and had a clear list of interventions which would produce the cheapest barrels, so it was easy to ensure the best opportunities had full management support. When it came to organisation in this company, if the opportunity was significant, then the budget was there. And in execution there are monthly reviews to provide a chance for management intervention.

A case example

120%

boost in production contribution

- More production-enhancing well interventions
- Proactive interventions and reduced failures

50%

less well related production deferments

100%

increase in optimisation wellwork

This approach produced a 120% increase in output from well intervention, along with more production enhancing well interventions, fewer failures and more proactive interventions for the company. The improvement was helped by widening the focus from just restorative intervention to also look at how output from wells could be boosted. This achieved a 50% reduction in well-related production deferments which can often make up 5% of total wells and are often hidden; and a doubling in optimisation well work – based on a rise in the value of commercially attractive intervention opportunities.

Well-work is often the cheapest way to add barrels, beating in-fill or redevelopment. For dry trees, well intervention can be done at a single digit cost per barrel of additional recovery - perhaps a bit higher for subsea wells. Looking ahead, improving techniques and technology, accompanied by rising budgets, could see recovery rates and economics improve still further - provided cyclical costs can be kept under control.