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Embracing Disruptive Technologies Trims Costs

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The archaic thinking that dominates minds throughout the oil industry needs an urgent revamp to make sure that the innovative technologies oft detailed on paper are finally deployed. The energy industry faces an unforgiving mix of lower oil prices, increasingly challenging oil fields and a shrinking talent pool.

Companies have little choice but to focus on how to apply the vast amount of data at their fingertips whilst navigating the inevitable corporate roadblocks. Oil companies already have had access to multiple disruptive technologies – innovations with the potential to replace traditional technologies – so far, many have veered away from using it.

Their reluctance to upset the status quo was perhaps justified by higher oil prices but the majority of oil and gas executives believe prices will sit between \$50-\$70 per barrel (bbl) in the next year, according to survey respondents in the latest report from Lloyd's Register Energy's Oil and Gas Technology Radar research series, which canvassed over 450 oil and gas professionals. Their expectations fall within the range set by the US' Energy Information Administration (EIA), which sees an average price of \$54/bbl in 2015 and \$56/bbl in 2016.

Tightened budgets are dictating a particularly challenging chapter for the oil industry and global competition is growing, as illustrated by the US' shale boom. Pressure on energy companies to maintain robust profit margins that keep shareholders satisfied is rapidly building – the relief valves they need are the operational efficiencies offered by disruptive technologies.

Companies that aspire to build a cohesive and efficient pipeline of innovations must first unravel a deep-seated challenge: 46% of survey respondents from the Lloyds Register report survey say their firms need to establish a "culture of innovation". But companies cannot just switch back to traditional and energy-intensive technologies once oil prices climb. Creating an innovative culture is a long-term endeavour and encompasses all aspects of society, starting with improving science, technology, engineering and mathematics (STEM) learning in schools.



Taking The Next Step

Transforming thinking across an industry so deeply entrenched in its ways will take time. But there is a growing appetite to integrate innovative technologies into companies' day-to-day business strategies and the lingo of new technologies increasingly pepper management, operations and engineering teams' conversations.

In the GCC, Oman has embraced enhanced oil recovery (EOR) technologies as it faces challenging and ageing oil fields, while Saudi Arabia, Qatar and the UAE are also making inroads in EOR, automatic processes and 3D imagery. International oil companies are becoming more eager to use remote-controlled aerial drones with high-resolution cameras to monitor offshore oil rigs, which means human resources can be used for less dangerous roles. Drones can also slip into risky spaces, such as tanks that separate oil and gas,



underwater drilling and recovery. Total, for example, has called on innovators to design an autonomous robot to work at oilrigs with the winner expected to be announced in 2017.

Still, widespread progress throughout the private and public sector has generally been sluggish; countries in the GCC and beyond are largely dancing around the subject of actually applying technologies, rather than outlining clear objectives with firm timelines. Nearly half of oil and gas executives in the Lloyds Register survey say they have fallen short of their innovation goals in 2015 – a twofold increase since early 2014.

Collaboration is Key

Transparency and collaboration between the oil and services industry and governments must climb to the top of the agenda – without clearer communication channels that are aimed at solving common obstacles, energy companies cannot be proactive effectively. There is a divisive debate within the industry on how collaboration to explore and deploy disruptive technologies could jeopardise companies' Intellectual Property (IP). The oil industry is arguably more paranoid about such guidelines than industries that regularly welcome new practices, such as electronics

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and aviation. The latter regularly integrate innovative technologies into day-to-day operations within a year, while adoption in the oil sector can slip into decades.

Establishing a transparent network of technology benchmarks for the energy sector by pinpointing common obstacles and regularly monitoring the effectiveness of solutions would help calm companies' fears that their IP was vulnerable. Establishing benchmarks also removes the first-mover advantage or disadvantage for oil companies. Technology is an invaluable tool for growth, but it can also wreak catastrophic damage to operational balance sheets when it fails. Providing an industry-wide framework that facilitates an equal playing field may help persuade shareholders who are wary of diverging from the status quo.

A widely accessible data set –displayed on a subscriber-only website, perhaps – could be a

springboard for companies' research teams who would otherwise have started from scratch. A research team in the GCC would not need to trudge through methodologies to reach the same conclusion reached by a shale company in the US years before, for example.

It is unrealistic to expect companies to divulge data that is fundamentally important to the company's strategy, as it is to expect a solution for an offshore oil field in the UAE to be applicable in the North Sea. But considerable value and savings in both economies and time, could be harnessed through collaboration.

Speed is of the essence, as boardrooms in oil companies worldwide reel at how quickly lower oil prices are depressing profit margins. A united front by industry leaders will also help reverse shareholders' tendency to call off project investments when energy prices slide. Over two thirds of the oil and gas companies in LR Energy's survey said that turbulent oil prices have slowed, or halted most of their innovation initiatives.

Fresh Thinking

Companies are yearning for a new breed of influential and inspired engineers who will form the backbone of the industry's new digital era. The shrinking pool of talent is being exacerbated by a wave of retirees in the oil and gas sector; up to 50% of petroleum engineers will hit retirement age in the next decade.

Off-beat thinking is the cornerstone of innovation, with budding minds envisaging data in ways never considered before. The traditional view of data – one that is still deeply engrained in the industry – sees analysts deciphering information using time-consuming methodologies. Younger minds, many nurtured by the novel thinking in Silicon Valley, prefer to fine tune the way data is stored and for example, look to quickly compress it into a handful of algorithms that can be applied widely and immediately to monitor and streamline day-to-day processes, curbing costs and increasing production.

As global energy production continues to increase to meet forecasted long-term demand, data management will be even more imperative to prevent oil companies drowning in information that they do not know how to use.

The oil industry has experienced a number of 'boom and bust' cycles since the 1970s. Staff cuts have followed each crash, including when prices dropped to the \$10/bbl range in the late nineties. Recruitment and training froze, resulting in a drought of graduates by 2005. The scarcity was worsened when technical graduates flowed into the booming dot-com businesses that were largely based outside of the Middle East. Academia must try to boost STEM learning in schools, while industry must provide career guidance and exposure for youngsters and university graduates.



Establishing a strong STEM education means that young professionals will be better equipped to both deploy current innovations and create fresh ideas of their own.

Still, the industry needs some persuading. Some survey responders were enthusiastic about signing partnerships to drive innovations forward (16%), with a third being slightly more cautious and nearly half treading very carefully and only willing to work with a small number of third parties.

Welcoming more innovation in the oil sector will also help transform its often poor public image; one of fat cats wreaking environmental damage. Brightening the reputation of the oil sector will inevitably encourage more talented graduates into the field. An industry that mirrors Silicon Valley's fresh thinking rather than Texas' old-fashioned approach is key.

Crossover Technologies

Eyeing other industries to glean lessons on quick deployment of innovative technologies would help the oil community. The growing acknowledgement for crossover technologies is clear, with 60% of survey respondents saying they are encouraged to reach outside the sector. The brightest minds in the oil sector have had some successes so far. A crossover technology that particularly stands out is the visualization of well flow through a gravel pack from a 3D model generated by an MRI machine of Houston's Methodist DeBakey Heart and Vascular Center. Aerospace is also of particular interest to oil and gas firms because both industries require equipment that can withstand huge pressure and extreme climatic conditions.

The pertinent question is whether oil companies' zest for innovation – and eventually its wider application – will ease when oil prices start to climb. Have the tightened budgets this year triggered a permanent shift, or will the pendulum swing away from innovation as soon as prices rise? ■