

What to cut and where to invest: developing a “ruthless” approach to R&D management

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It's not a surprise that the tumble of the oil price has had a dramatic impact on innovation within the O&G industry. Staff and capital expenditure have been cut dramatically, large field developments have been deferred, and R&D budgets and new technology initiatives have been reduced through a simple mantra of “reduce your activity until it fits a smaller budget”.

That said, we need to remember that Oil & Gas operators, and by extension the numerous vendors that service their needs, are just as reliant on new technology and innovation as they were prior to the oil price crash in 2015. The need to safely find, develop and operate the fields of the future remains as challenging as ever before.

Although technology and R&D are vital to the industry's growth, the simple truth is that it is hard to justify continued R&D spend against a backdrop of job-cuts and an over-whelming consensus that costs had sky-rocketed to unsustainable levels in the recent past. This is particularly true within the Subsea Industry, where exponential cost increases have been justifiably challenged over the tangible value-add they have actually delivered.

Given the above, it's not surprising that the most apparent change has been the recalibration of cost expectations (“cost reduction” being the latest industry buzz-phrase second only to “Industry Standardisation”), as well as an industry-wide reduction in just about all long-term spend on technology and people.

With all indicators pointing to the current down-turn being one that will continue well into the medium-term future, Senior Technology Managers and Innovation Decision-makers will need to make the most of the reduced funding that they have been left with. This article therefore explores an approach to Technology Management which is based around a relatively stringent interrogation of R&D investments within any company aiming to remain competitive in a cost driven environment.

Tough Environment, Same Challenges, greater competition

As mentioned before, the O&G industry has had to implement painful measures to adapt to the current cost driven environment. It is estimated that more than 250,000 jobs have been axed worldwide since the plunge of the oil price. Also, according to Wood Mackenzie, over 70+ projects have been deferred globally (with a total CAPEX of ~\$380 billion); and major oil companies have also abandoned key projects and initiatives.

To survive the current environment, operators need to either “Reduce costs, borrow cash, or liquidate...” as bluntly outlined by Saudi Arabian Oil Minister Ali Al Naimi during the IHS CERAWEEK in

February 2016. To secure future growth, it's obvious that the era of "easy-and-cheap" oil is a thing of the past and many Operators have squared up to the need to develop more technically challenging resources. Operators are looking at deepwater, HPHT fields and of course, the fast-paced and fragmented Unconventionals arena - which is perhaps the largest contributor to the current over-supply scenario.

On the other hand, Service Companies need to remain technically and commercially competitive as a matter of urgency, if not survival. This means improving operational efficiency and "investing smarter" in ways that enable them to serve the industry at a reduced cost, with new tools & techniques that meet the challenges of today and tomorrow.

"Cut till it fits" Paradigm

Operators and service companies, especially those that believe continued innovation is required to remain competitive, have been forced to balance R&D activity to meet reduced budgets. As a result, industry players have aggressively, and perhaps blindly, cancelled or deferred R&D projects in order to balance the books. This is part of the "Cut till it fits" approach that companies have been implementing to manage sweeping budget reductions; essentially reducing technology and R&D portfolios until they fit a specific budget imposed from the top.

This approach has become the short-term norm across the industry, which is of course fully expected given the dramatic fall in commodity prices. However, continuing to manage R&D and technology initiatives in a similar manner to those employed prior the oil price drop is almost certainly not good enough going forward – especially with \$Billions worth of R&D investments stuck at the end of R&D funnels still awaiting deployment years after their initial development.

"Fail early and fail cheaply" Paradigm

Given the dramatic shake-up within industry, OTM has been surprised to find that many Operators and Vendors are not "ruthless" enough in managing and critically interrogating their remaining activities that have been deemed worthy of surviving the cut.

More specifically, established wisdom dictates that the vast majority of R&D and technology initiatives fail to reach commercial deployment for a myriad of reasons. However, innovators within the Oil and Gas industry are seemingly reluctant to acknowledge this fact. As such, success is often measured as the ability to progress through a technical stage-gating process, with little consideration given to the commercial validity of continuing to invest time and resource. This results in far too many projects tenaciously marching into the so-called "Valley of Death" – the virtual chasm that separates innovation from commercial demonstration.

Whilst this may be somewhat of an over-simplification of a vastly complex industry, the truth is that a more strategic approach is clearly required and as a result, OTM have been working with Operators and Vendors to develop tailor-made Technology Management Strategies which are based upon a mantra of "Fail early and fail cheaply".

Furthermore, a change in paradigm towards "ruthless" R&D management must also include a focus on speed-to-deployment, which theoretically should be a welcome result if companies focus on significantly fewer R&D projects. In tight times, we've always believed speed is the differentiator.

The guiding principles of this approach suggest eliminating, divesting or delaying an R&D or technology initiative as soon as there is any "unacceptable uncertainty" regarding its value, commercial viability

or real-world need. This needs to run alongside, and complement, existing technical stage-gate progression.

Practical implementation

In today’s cost driven environment, a great deal of benefit can be achieved through developing a tool which is unashamedly simple, requiring interrogation against the following 3 metrics.

1. Strong Business Case – What is the true value of the activity when weighed against the cost and effort required to deliver the technological improvement. Lack of an ‘ever-green’ business case, validated by commercial specialists and maintained throughout the lifecycle of a project, is a common failure
2. Commercialisation Plan – How will the value practically be unlocked through a feasible and unambiguous plan based around the stakeholders and supply chain necessary to reach commerciality. This plan needs to be created early, matured, maintained and updated as technologies progress through the stage-gating process
3. End-user buy-in – How much “pull” exists and does end-user need match the technology promise. An attitude (within end-users) needs to be one of “technology is far too important to us to be left solely to the technology development function”. Thus a true partnership needs to eventually develop as technology progresses towards selectability

In its simplest form, implementation of this approach requires the applier to define their own levels of “unacceptable uncertainty” within the three metrics – which are unique to each company and based upon their corporate culture.

Like a three-legged tripod, if any R&D or technology initiative is lacking in any of three metrics, then it should immediately be flagged for managerial review. A process of ‘justify your existence’ comes into play with the end result either being strengthening of the lacking metric or immediate re-allocation of investment and resource to activities deemed to be more worthy.

The impact of the above approach should go some-way in transitioning Oil and Gas innovators to a new paradigm for Technology Management, with the intended benefits of transition described in the table below:

	Historic Technology Management Paradigm	New Technology Management Paradigm (Fail early and fail cheaply) mantra
<i>Strong Business Case</i>	Projects with one-off business case	Projects with ever-green business case throughout the lifecycle of a project
	Business case created by Technologists with limited experience and little end-user input	Business case developed with end-user input, validated by commercial specialists
<i>Commercial Planning</i>	Primarily measure technical success	Primarily measure commercial success
	Progress tracked by technical stage-gating	Progress tracked by speed of development and activities to achieve eventual deployment
	Deployment / commercial planning near end of R&D phase	Deployment / commercial plan created early, matured, maintained and updated as technologies progress
	Commercial staff consulted as needed, often as a result of conformance process	Commercial staff integrated into R&D management team
<i>End-user buy-in</i>	Governance responsibility normally resides within technology function	Shared governance between technical, commercial and end-users
	Hand-overs from technology function to deployment manager to Asset manager	Co-ownership of activity and buy-in across all stakeholders

<i>Speed of deployment</i>	Admin driven R&D management processes based on conformance (tick-a-box)	Lean R&D management based on speed and visibility to stakeholders
	Many projects done slowly	Fewer (but critical) projects done faster

Fit for purpose is the name of the game

In conclusion, the “Fail early and fail cheaply” strategy requires a fit for purpose approach which is tailor-made for each company. For example, to implement this strategy there is little benefit in agonising over how to define value through complex NPV algorithms or return on investment calculations. The objective of this approach is to interrogate a large portfolio of projects and therefore a degree of which requires a certain level of nimbleness and logic in order to serve its purpose. The age old adage of “it’s better to be approximately right than exactly wrong” certainly holds true in this regard.

Ultimately, remaining competitive in a cost driven environment is certainly achievable through a mantra of “Fail early and fail cheaply” enabling companies to focus on significantly fewer R&D projects through a best practice of weighting KPIs not only towards successful deployment, but towards successful FAST deployment that meet end-user timetables.