The successful growth of the energy industry, and in particular the upstream activity related to the exploration and production of hydrocarbons, depends on a constant flow of innovations to respond to the challenges of more complex reservoirs situated in riskier environments such as deep water.

Adopting game-changing innovations in E&P

Software innovation in particular can deliver substantial new capabilities for energy companies, for a comparatively low expenditure in capital and human resources, if it is applied efficiently. With escalating costs associated with data acquisition, drilling and production facilities, such innovations can help reduce risk at many points in the life-cycle of an asset, by providing a better analysis of available data, by accelerating the turn-around of projects that support critical decisions, and by making better use of the human capital that supports the E&P activity.

Getting innovative solutions to the user’s desk
Each company’s culture, compounded with the personalities of the people involved in qualifying an innovation’s fit to their requirements, will define how a proposed innovative software solution will be assessed, validated and made available to end-users. Very few companies can afford to have a dedicated and fully staffed organization permanently assigned to this process, so the task is often performed with a number of co-opted resources that will temporarily dedicate time to this new role before returning to their previous activity. In the current situation of the industry, with a shortage of experienced staff working on increasingly large volumes of data and within very tight time constraints, finding and retaining the necessary skills to monitor and implement innovations seldom gets priority over immediate operational issues. Very often, success stories of innovation deployment are associated with the efforts of individuals or small groups of enthusiastic supporters who took on themselves to become the champions for change in their area of activity or expertise. These are the people who are not only thrilled at the possibilities that have become available, but feel an urge to share their success stories with their colleagues, and to act as mentors and promoters to see their company benefit from new technologies.

Large-scale innovation
This champions-driven process is actually both productive and economical, as long as it applies to innovations that add or substitute small elements within the broad and sophisticated workflows that apply to most E&P activities. Adding some new seismic attributes to an established suite, automating a specific sequence of tasks to increase efficiency or productivity, providing a higher level of analysis or corroboration of an existing set of data (e.g. through new visualization or cross-plotting tools), in all these cases there is nothing fundamentally disruptive about the change, and the general flow of activities is not challenged. Just as importantly, the distribution of tasks and responsibilities, and the organization that supports this distribution, is not affected by the innovation. When we look at a broader innovation, and use the term “game-changing”, the easy path is to limit the “game-change” to relatively simple areas such as productivity or precision. It is more difficult to look at it in a more holistic manner, and objectively assess whether the innovation may also impact the organization within which it will be deployed, the relationship of that organization with other parts of the company, or with outside vendors and stakeholders. It may also affect the allocation of budgets and resources, and many other transformations.

Can the organization get in the way of innovation?
Changing a tool is easy, but changing an organization is akin to moving mountains. If the pace of innovation is slow over a significant period of time (5 years or more), efforts and investments will normally be directed at aligning an organization and its resources to operate in the most efficient manner with the existing technologies at hand. It is not always clear whether during such consolidation phases organizational boundaries evolved to reflect the interface of major software packages, or whether the software footprint gradually changed to adapt to the segmentation patterns of the organizations in which it is used, but the end result is that the organization becomes more rigid and less receptive to broad-sweeping changes.

If the technology suite is changed in such a context, it can be successful as long as it is not a radical change relative to the incumbent solution. The value proposition would be centered on new efficiencies while performing the same established workflows. Such substitutions generate value in terms of coping with workloads and with resource constraints, but they do not foster the introduction of radically innovative science and technology, nor do they challenge the validity of workflows conceived many years ago.

Innovation across organizational barriers
As a hypothetical example, one could envisage a seismic method that, in addition to delivering new capabilities to the geosciences specialists in asset teams, would also provide significant insight into shallow drilling risks...
associated with over-pressured sands. While the evaluation, endorsement and deployment within assets groups would follow usual processes to go from an opportunity to a satisfactory outcome, the task of getting the attention of the drilling department would befall to the supplier. Even if interest were to be drummed up, numerous stumbling blocks would stand in the way of a straightforward cycle of appraisal and adoption. This could go from logistical issues such as different IT platforms, to a lack of know-how regarding seismic technologies.

**A complex proposition**

Beyond the energy company’s own issues in adopting innovations that are radically different and that challenge their organizational compartments, there are substantial barriers to the vendor proposing such a solution. The sales process is going to be orders of magnitude more complex than the one needed for a simple point-product sale. It will not be enough to convince technical experts and end-users that the innovation has merit. Managers and executives will need to buy into the benefits of the new approach, and budget for the changes needed to make it effective. Resistance can come from many stakeholders, whose departments may be reorganized, authority diminished or control transferred to other entities. The issues the vendor will be dealing with will focus on ensuring that the solution gets adopted while keeping the majority of the managerial and executive contacts comfortable that this is not going to have a negative impact on them. Few vendors have the resources and the ability to risk engaging in such a long and emotionally-loaded business development cycle to succeed in selling a broad and complex technology innovation. A substantial proportion of the risk is not associated with the ability of the innovation to deliver value, but with the reality of dealing with individuals within a large organization that is not geared to investigate radical change opportunities.

**Organizing for change**

Other industries have been confronted with this issue before, with notable examples in aerospace (the Skunk Works® at Lockheed Martin, building the first prototype American jet plane in 143 days) or in the computer industry (IBM’s radical approach to Emerging Business Opportunities, initiated in 2000, and which had yielded 22 successful ventures for only 3 failures in the ensuing 5 years). In both these examples, the large organizations realized that their mainstream processes were geared to sustain and improve their current business, not to foster radical change. The success of both these examples is attributed to carving out an independent environment dedicated to innovation, and devising its own rules to achieve its goals. It should be noted that in both cases, although these operations were introducing a form of counter-culture by design, their operation was every bit as rigorous as the parent company. The differences came from shifting emphasis towards performance and delivery-cycle metrics, and through the dynamics of small teams operating outside of complex organizational structures. Project Management was shown to be an essential component of a successful operation in such circumstances.

**Performing innovation-rich change management**

Having shown that a business model exists to handle innovation in other industries, is the model applicable to E&P in oil & gas? The major challenge would most probably be the availability of sufficient resources to sustain such an effort. The demographics of the industry are such that there is a great scarcity of experienced scientists and engineers to populate such a venture. Outsourcing is an alternative, and many of the large business consulting providers offer services to help E&P organizations navigate change in their organization or their business. However, their resources do not include much technological expertise, which potentially negates the ability to analyze the business impact and make pertinent recommendations. Technology vendors and large oilfield service companies do have the technical resources, but because of their position in the technology marketplace energy companies are often reluctant to share information regarding their internal processes and workflows, as they are deemed to be strategic to the company’s business.

**In conclusion: is there a return on investment?**

Like any new venture, the costs, internal and/or external, would need to be justified in order to allocate long-term budgets to dedicated change management activities. With the increasing sense of urgency across the industry that rapid deployment of innovation could be the only way forward as both human and material resources are already stretched to the limit, allocating significant funds to the uptake of innovation makes good business sense. Operators who lead in such ventures have a genuine opportunity to create competitive advantages for their business.

Author: Philip Neri - Paradigm