RELEASING THE ANALYTICAL POWER OF OIL AND GAS WORKERS
Analytics and artificial intelligence (AI) will disrupt the oil and gas (O&G) industry—the only questions are when, by whom and how much. As new sources of competitive advantage replace current ones, the one constant a company can rely on is the strength of its talent. Consequently, in this digital age, upskilling the workforce’s analytics capabilities should be a top priority.

Unfortunately, analytics talent shortages represent key bottlenecks for the O&G industry. In our view, the long-term sustainable talent model has two-prongs: First, hiring newly minted data scientists and second, arming current functional experts such as engineers with the new analytics skills they need. Since much of the O&G workforce comes from quantitively-oriented STEM fields, upskilling them on analytics is likely a more pragmatic option with a quicker payback.

To make this real, companies need a clear strategy, plan and the sponsorship of leadership, along with employee enthusiasm and willingness to learn.
Analytics hold the key to future O&G success

The industry’s best-kept secret may be that O&G players are perfectly positioned to take advantage of AI and machine learning (ML).

The potential to unlock trapped value is significant across the exploration and production (E&P) value chain for three key reasons:

The industry collects incredible amounts of sub-surface and surface data every minute but uses only a small fraction of that information to drive integrated E&P decisions.

O&G players were among the first to use supercomputers, mainly to tackle highly complex subsurface problems. Today, they are starting to generate tremendous value by connecting surface and commercial considerations with subsurface reservoir variables.

The industry has many disparate and disjointed databases that capture information concerning rock-properties, well costs, supply chain, operations, maintenance, finance and human resources (HR). When connected, these granular data can enable prompt and reliable decision making.
Since the 2014 downturn, the O&G industry has struggled to lower supply costs and reduce the long cycle times (latency) that have characterized E&P projects. AI/ML has the potential to resolve both these problems. Our analysis shows the industry can reduce the cost of supply 30 to 50 percent and cut cycle times by multiple years when it employs advanced analytics in E&P decision making. Figure 1 shows the key capabilities analytics can enable.

**Figure 1: Untapped value potential from analytics**

<table>
<thead>
<tr>
<th>Capability Enabled</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time Visibility</td>
<td>Real-time visibility into changes in the Market, Trading/Commercial arrangements and Operations in a connected and integrated way.</td>
</tr>
<tr>
<td>Resource Planning</td>
<td>Resource planning over a range of scenarios, not just one deterministic state of the world.</td>
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<tr>
<td>Process Efficiency</td>
<td>Process efficiency to account for operational constraints and asset integrity targeting quantification of optionality in the system.</td>
</tr>
<tr>
<td>Network Optimization</td>
<td>Network optimization of geographically disparate and currently disjointed asset base.</td>
</tr>
<tr>
<td>System Approach</td>
<td>Systems approach which looks at the business comprehensively and optimizes the entire business.</td>
</tr>
</tbody>
</table>

Source: 1. Accenture analysis and 2. “Oil and Gas: How Do You Compete with Free?” June 18, 2018, Accenture
Employing analytics and AI/ML, this new operating model will not only help in automating and digitally enhancing significant amounts of work, but it can also make these enhancements and activities more targeted and impactful. For example, a new operating model can automate or analytically augment the high-level activities of a production engineer. Accenture research shows how current intelligent technologies can augment 50 percent of a worker’s time and automate 20 percent of core processes. Operators can redistribute work to improve productivity, reduce non-value-adding activities and create more appealing jobs for today’s graduates.

In particular, production engineers collect vast amounts of data for each well (related to both cost and productivity) that they must process, analyze and synthesize to derive meaningful insights on well performance. This allows them to focus on producing the most economic barrels. These data range from fixed and variable operating expenditures (OPEX) items to hydrocarbon and water production. Advanced analytics can not only minimize OPEX by optimizing networks for supply chain opportunities like water haulage, for example, but also boost well productivity via proactive well interventions using production chemicals or artificial lift optimization.

Without appropriate AI/ML, these tasks are daunting and usually poorly performed, which leads to suboptimal half-cycle margins for production systems or fields. Using advanced analytics, production engineers can automate much of the data processing and analyses and systematically eliminate negative margin wells and barrels to focus on the highest value barrels. Based on Accenture analysis, this approach can lead to a significant half-cycle margin boost of approximately 15 to 20 percent based on OPEX savings alone.
What a successful analytics transformation looks like

How do O&G companies unleash the full potential of advanced analytics? This challenge has two parts: solving current complexity problems and then scaling the solutions throughout the company. Scaling analytics is inherently a multi-dimensional problem requiring not only the right skill mix but also leadership, culture and governance changes. Organizations that generate value from analytics do so primarily because all elements of the transformation constantly ask the same questions. First, can data help my team make better decisions and improve profitability? And second, what’s holding us back from getting the most from our data and associated analytics? Weaving an analytics mindset into the organizational DNA involves fundamental behavioral changes that address the factors illustrated in Figure 3.

Figure 2: Factors that influence the behavioral change required to adopt an analytics mindset

- Role Specific Learning
- Governance and Decision Rights
- Underlying Mindsets and Assumptions
- Consequence Management and Migration Protocols
- Leadership Role-Modeling and Empowered Accountability
- Incentives, Rewards and Recognition
- Managerial Practices
- Business Scorecards Aligned to Transformational Outcomes
- Performance Management and Leadership Selection
- Team Structure, Practices and Routines
How should players approach analytics upskilling?

Effectively upskilling analytics capabilities requires strong leadership commitment in five critical areas:

**Understand how the work will change**
Analytics programs typically start with two questions: How can we transform the business through analytics? And, as a result, how will the work change for my teams? Aligning on the answers to these question helps companies identify the required skills, and the changes to leadership and culture required to adopt the eventual analytics solutions.

**Define the analytics competencies required to make this vision a reality**
Data analytics cover a wide range of competencies and upskilling talent across all these domains can be time-consuming and expensive. During this step, leaders should quickly decide which competencies the company needs to achieve its vision and which roles it should upskill.

**Use the broader ecosystem to train staff—don’t reinvent the wheel**
O&G operators have a range of internal training capabilities on some of these competencies. Rather than building custom in-house training programs, companies should make use of the wider ecosystem of learning providers—universities, start-ups and companies dedicated to data science training—to deliver cost-effective training while keeping pace with the speed at which technologies and tools change in this area.
Create the environment that allows analytics to flourish

Many analytics initiatives (including upskilling) lose momentum after initial leader sponsorship. For analytics to flourish, leaders need to role model the priority that analytics has within the organization on a continuous basis. Examples of this behavior include traditional communications like town halls, webinars, and sponsoring and participating in company-wide events such as hackathons, reverse-hackathons and communicating success stories and teams. Beyond these actions, and perhaps most challenging, are the simple day-to-day activities like consistently inquiring about how analytics are being applied to improve daily or critical business issues.

Understand if the analytics upskilling strategy is working—if not, pivot effectively

O&G leaders often approach decisions related to analytics and the underlying technology with the same mindset they use for traditional infrastructure decisions. However, this rigid approach usually does not allow them to discover unknowns and opportunities for quick pivots. Digital technologies and analytics have an inherent uncertainty and rapid pace of evolution that makes them unique. Examples of pivots include acknowledging that select analytics use cases are not providing the expected underlying value, changing the emphasis on analytics skills in the training programs or adjusting the underlying technology used to drive the analysis. Acknowledging that these pivots could take place when beginning the program often enables easier adjustments when underway.
Talent management is a key ingredient for adapting and thriving in the new O&G landscape. But it also takes time and a true transformational mindset to build. As with any transformational change, upskilling the workforce for advanced analytics will require deliberate planning and effort from all ranks of organizations, including leadership support and sponsorship.
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