UNCONVENTIONALS

FUELING THE NEXT SHALE REVOLUTION

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From August 2015 to January 2016, crude oil prices plummeted to less than $30 a barrel. This five-month slide marked the end of a three and a half year period in which the price per barrel (bbl) had exceeded $100.¹ Since the downturn, prices have rebounded a bit. A number of unconventional oil and gas operators, also known as shale companies, have been able to step back from the brink of ruin.

But that hardly means they are safe.
When oil sold for $100/bbl, shale companies were among the most profitable in the industry. They had little incentive to improve operational efficiencies. When prices crashed, however, everything changed.

Unconventional operators responded with traditional cost cutting measures such as cutting rigs and tightening operating expenditures. In effect, they did everything an operator should do to ride out a temporary price drop.

Yet for many this was not enough. Since the beginning of 2015, more than 120 North American oil and gas producers have filed for bankruptcy. Nine have done so since January 2017. The trend will likely continue. In the past year alone, more than 80 percent of quarterly operating earnings across a pool of unconventional operators have been negative.

The problem is that the downturn has been much more prolonged than anyone had predicted. And even though oil prices have rebounded a bit, they are nowhere near their former highs. Accenture Strategy believes oil prices will remain in the $40 to $60/bbl range for the foreseeable future. Our analysis confirms that today’s breakeven prices for unconventional producers are unsustainable. While operators have developed wells with breakevens below current market prices, the overall estimated shale breakeven price (~$55) remains above market prices.
In this environment, operators need to achieve pervasive performance visibility, which allows them to make better, more precise investment decisions by understanding the breakeven cost of each well, asset or pad in their portfolio. They need to fundamentally rethink operations—from the day the geology of a new basin is being assessed to the day the well is turned off. And they need to embrace innovation and ask out-of-the-box questions. What if they based their production operations on data, not instinct? What if the well became the customer?

**AN UNCONVENTIONAL TAKE**

**ON “CUSTOMER” SERVICE**

**What if**
the wells of unconventional operators were no longer static assets, but active participants in oil field optimization?

**What if**
the wells reported on their health in real-time?

**What if**
the wells called for service when they needed it?

**What if**
the wells rated the services technicians provide?

This will be the new reality for unconventional operators in the years ahead. In fact, this future is closer than you think.
Despite all the talk of “management by exception,” production operations of most unconventional basins today are still characterized by manual, time-consuming tasks such as in-person visual inspections.

Operators have not been quick enough to embrace digital technologies and analytically derived insights to work smarter, faster and in a more automated fashion. They have no choice but to make the digital shift now.

Opportunities abound for shale companies to integrate digital solutions and analytics to underpin an entirely new way of working. Figure 1 presents four examples.
## New Capabilities Will Drive Efficiency Gains and Unlock Innovation

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<th>Traditional Ways of Working</th>
<th>New Ways of Working</th>
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<td><strong>Well Surveillance</strong></td>
<td>• Dashboards provide real-time visibility into production, cost and well value</td>
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<td>• Daily visits to all wells</td>
<td>• Remote surveillance via drones, robots and self-reporting sensors</td>
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<td>• Going well by well to check performance</td>
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<td>• Proactive and automated</td>
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<td>• Reactive and manual</td>
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<td>• Based on instinct and experience</td>
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Accenture Strategy has found that when unconventional operators embrace digitally enabled operating models, they can reduce capital and operating expenses by **up to 20 percent**. Equally important, they can boost base production by up to **7 percent**.⁶

Connected data, smart devices and an adaptive workforce all work together in a holistic, integrated and collaborative way to optimize field performance and help enable better, faster and more automated decisions. In this model, the well is more than an asset to be utilized. The well is a customer to be heard, served and satisfied. Figure 2 illustrates a possible model in the area of production operations.

The most important component of this model is a central “brain,” a real-time hub of operations that is powered by analytics and AI. By leveraging advanced algorithms to continuously monitor performance of each well, the brain can perform a number of tasks, such as assessing production and costs, that previously fell to the petrotechnical workforce—and do so at lightning speed and with greater accuracy. This frees engineers and geoscientists to focus on higher-value activities such linking fracking and artificial lift strategies to actual production results and feeding learnings into future well designs.

As the brain detects or predicts issues, it automatically determines which ones can be addressed remotely and which require a resource to be sent to investigate and resolve. It bases every decision and action on the economic impact to the well. A remote hub of operations, fueled by the brain’s analytics, oversees field performance across all assets.
AN UNCONVENTIONAL OPERATING MODEL FOR UNCONVENTIONAL OPERATORS

MULTI-SKILLED TECHNICIANS

Summons help for artificial lift failure

Dispatches technician

Virtual reality assists with instructions

VR assists with instructions

THE WELLS AKA The Customers

Well rates tech to improve next repair

• Auto artificial lift optimization
• Update algorithm

Call maintenance technician if issue is found

THE BRAIN

AI-based hub of operations

• Change settings
• Prevent failure

REMOTE MULTI-ASSET HUB OF OPERATIONS

Cross-asset analytics/Dispatch of robots

VENDOR POOL

Hauling/Roustabout/Workovers

VIRTUAL LEARNING

Mobility/Smart Glasses/VR

Call maintenance technician if issue is found

DRONE SURVEILLANCE

• Potential leak
• Visual inspection

SALTWATER DISPOSAL
During the downturn, oil and gas companies, including unconventional operators, downsized their workforces considerably. Petrotechnical professionals (PTPs) were particularly hard-hit. When the rebound comes, the lack of PTP skills will pose a problem. In fact, Accenture Strategy estimates that the industry will face a PTP deficit of 10,000–40,000 by 2025. AI can help bridge the coming PTP deficit. By adopting new operating models that rely on AI and machine learning to assume many of the analytical tasks that PTPs traditionally managed.

With this unconventional operating model, wells work hand-in-hand with the brain. All are equipped with sensors that help enable them to constantly evaluate their health and notify the brain if anything is amiss. This begins the process of addressing the issue, either remotely or onsite. Importantly, digital technologies make it possible for the well—much like a customer—to rate the level of service the automated system or technician delivers. Over time, the brain assesses how the actions taken improved well reliability. Further, the AI engine continually updates a database of technician skills and outcomes. In this regard, the brain functions much like a central customer support function—listening to customer concerns and dispatching the best technician with the right skills for the right issue in the future.

In addition to the brain, remote hub and the wells, the new analytics-based model depends on a digitally enabled field force of technicians who are dispatched by the brain as necessary. Their conventional tool belts are augmented with smart devices such as virtual reality glasses and mobile apps that enable them to carry out an inspection, perform a fix and even place an order for a drone-delivered replacement part. Once technicians complete their assignments, they log lessons learned into the AI engine, which then uses its machine learning algorithms to improve asset reliability.

THE BRAIN

VS. BRAIN DRAIN

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To establish the unconventional operating model outlined above, shale producers will need to take four actions:

**CAPTURE DATA.** Shale fields can comprise tens of thousands of wells, producing terabytes of performance data. To date, unconventional operators capture this data in various ways, in various systems. The first step to cutting their breakeven costs involves capturing data from fragmented assets and systems and storing it in a single repository. This data centralization effort is what ultimately helps enable advanced analytics.

**GENERATE INSIGHTS.** The leading operating models leverage real-time insights to continually improve operational performance. To generate those insights, operators must develop machine-based analytics capabilities that can perform calculations on thousands of wells more accurately than workers, and in a fraction of the time. Armed with the analytical findings, the brain can immediately identify potential problems for engineers and technicians to review and resolve. Predictive and prescriptive analytics, honed over time, are particularly important to driving better and faster decisions.
EQUIP A MORE “INTELLIGENT” WORKFORCE. The key to success lies not in simply applying new digital field technologies, but in integrating them to ensure all workers, systems, equipment, sensors and data are communicating and learning across the organization. Self-diagnosing/self-correcting components, drones, mobile apps, wearable technologies and AI solutions, coupled with real-time well-performance data, deliver the level of business intelligence now required.

EVANGELIZE CHANGE. Leaders will not only need to instill an organization-wide appreciation of digitally enabled change, but also challenge the workforce to adopt new roles and work practices. Automation of routine activities and machine-based analytics will be particularly important for driving the efficiencies that are now needed. But to take full advantage of these new ways of working, leaders will need to ensure that workers trust the machines’ analytical findings and automated processes. If they don’t, they will never change their ways. And the company will never achieve its potential.

DIGITAL TRUST

Accenture Strategy research shows that workers are more likely to trust machine-based analytics and advice if:

- They have a solid understanding of how the system works and generates advice.
- The system has a proven track record.
- The system can explain its logic.
Unconventional operators are coming around to the notion that advances in analytics and digital technologies can help shape new, game-changing operating models. But digitally enabled operating models aren’t all created equal. The most successful will be those that are based on a bold digital strategy—one that continuously links decisions, actions and results. One that places real-time analytics at the center of operations. And one that treats every well, not as an asset to be managed, but as a digital customer deserving an exceptional experience.

Operators that adopt such unconventional strategies and embrace a wholesale commitment to change will leapfrog the competition in terms of efficiency gains and performance improvements.

They will be the ones best positioned to thrive—not just in good times, but also in bad.
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NOTES
4. Ibid.
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