

Oil & Gas Practice

An operator's guide to transforming E&P

Exploration and production companies born during the shale boom are struggling in the era of cash. Lessons from other heavy industries can help them transform their operations from end to end.

by Jeremy Brown, Florian Christ, and Tom Grace



This article was written before the outbreak of the COVID-19 pandemic and the collapse in oil prices, but during booms and busts alike, our message to operators remains the same: achieving profitability will require end-to-end transformation.

US shale producers have entered a new era focused on cash generation. A previous article explored how they responded to investor demand by prioritizing volume growth over profitability during the recent boom.¹ But now that the metric of success has switched to free cash flow, operators will struggle to deliver even after prices recover.

Low commodity prices are not the only challenge to cash generation; others include high entry costs resulting from steep royalty rates and debt hangover from acquisitions at the top of the cycle. These facts of life will require operators to do more with less by squeezing every dollar from their assets while simultaneously retooling for the new era. Such a dual challenge is familiar in other heavy industries, where companies have learned that when the ground shifts beneath your feet, you must transform.

What does it take to transform?

Many companies believe that they *have* transformed—in fact, they think they are constantly transforming by installing new SCADA² systems, reorganizing, and restructuring their debt. Though important, these improvements don't amount to the kind of holistic, bottom-up change needed today. Shale producers must not only unlock cash flow but also rethink their way of working, a two-pronged effort that will require energy and focus from executives and employees alike.

An effective transformation will mean attacking the flaws in operating models that took root during the growth era. We've identified six areas to focus on in driving value: well design and development

planning,³ base production,⁴ drilling and completion, corporate functions, portfolio and balance-sheet strategy, and organizational agility (Exhibit 1). Common to them all is the fact that unlocking life-cycle value will take more than acreage positions and large initial rates. It will also involve rethinking capital deployment and creating long-term value from both technical functions such as drilling and organizational functions such as logistics.

Unfortunately, all too many transformations in heavy industries fail. For a host of reasons, they miss their targets, take too long, prove unsustainable, or never even get off the ground. Change of any sort is hard, and few companies have the skills or commitment to pull off something big.

That's the bad news. The good news is that US shale operators are well positioned for transformation. Most of them, even at majors, have been in place for only a few years, so problems aren't usually entrenched—unlike the deep-rooted issues typical of more mature sectors, which make change difficult. In addition, operators have had to stay nimble and open to new ideas simply to survive the wrenching price cycles characteristic of this industry.

As a result, most exploration and production (E&P) companies are already in tune with transformation mantras: no Band-Aids, no sacred cows, no stones left unturned. Effective transformations are “all in” and relentless in the quest for value. We think leaders are ready to take the plunge.

The basics of a transformation playbook

The biggest challenge of a change program comes in implementation. Drawing on our experience with other heavy industries, we've developed and tested a playbook that is easily customized for oil and gas. It sets out how to drive large-scale change while

¹ See Jeremy Brown, Florian Christ, Tom Grace, and Sehrish Saud, “Paths to profitability in US unconventional,” August 2019, McKinsey.com.

² Supervisory control and data acquisition.

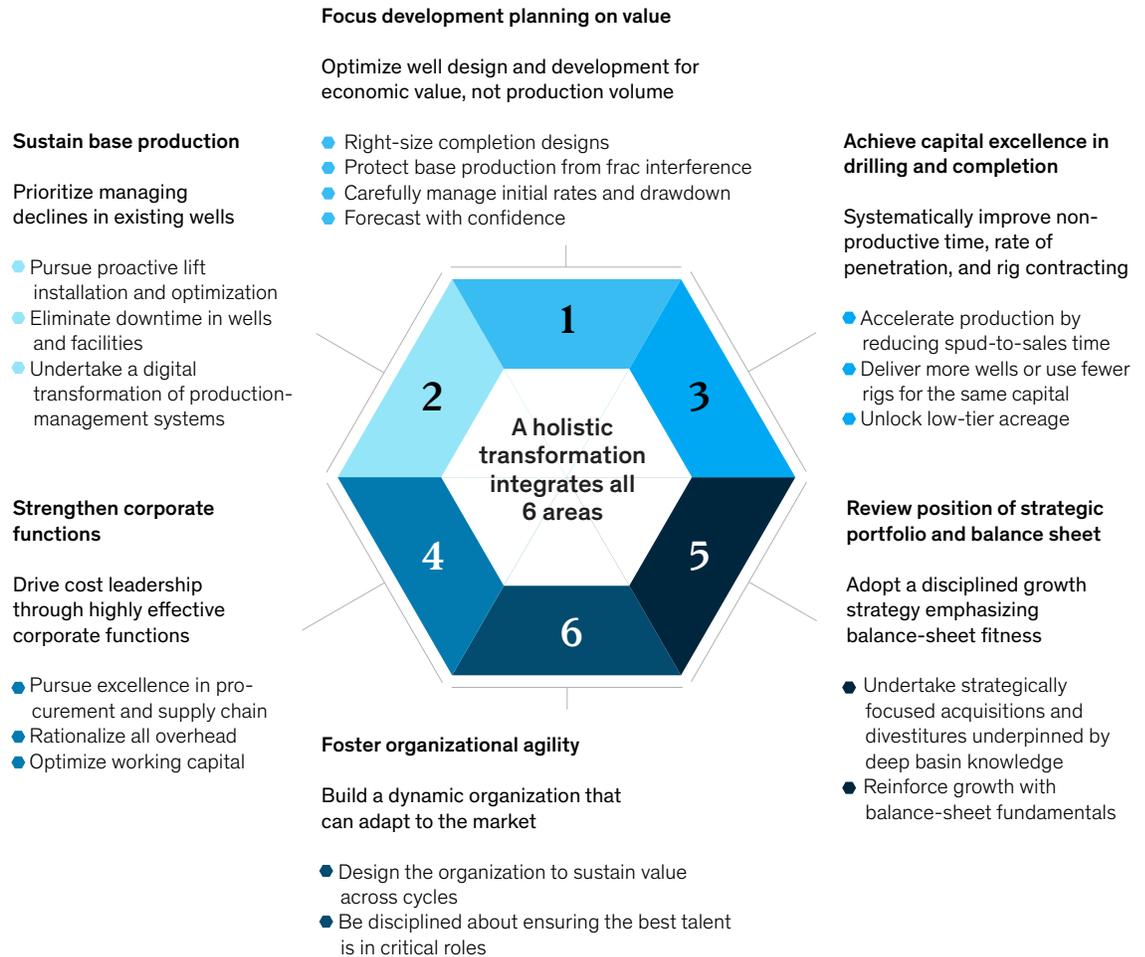
³ See Jeremy Brown, Florian Christ, and Tom Grace, “Value over volume: Shale development in the era of cash,” October 2019, McKinsey.com.

⁴ See Jeremy Brown, Florian Christ, and Tom Grace, “Sustaining the base: A new focus in shale's quest for cash,” October 2019, McKinsey.com.

Exhibit 1

An effective transformation will mean mounting a head-on attack on the flaws in operating models that took root during the growth era.

6 areas where independents must drive value



also pushing through a pipeline of discrete initiatives that add up to major impact.

As US shale has always been about big moves, operators have much to learn from older industries accustomed to incremental yet comprehensive approaches to value creation. For example, an oil refinery might go after cost savings of just 1 percent in a key category—an amount that acquisition-minded shale producers might consider barely worth pursuing. Yet for an operator with thousands of wells, the cumulative effect of marginal savings can make an enormous difference to cash flow. Another lesson for shale producers is to adopt the kind of owner's mindset typical of private-equity

turnarounds, in which every step of the value chain from rig site to back office is scrutinized for potential opportunities.

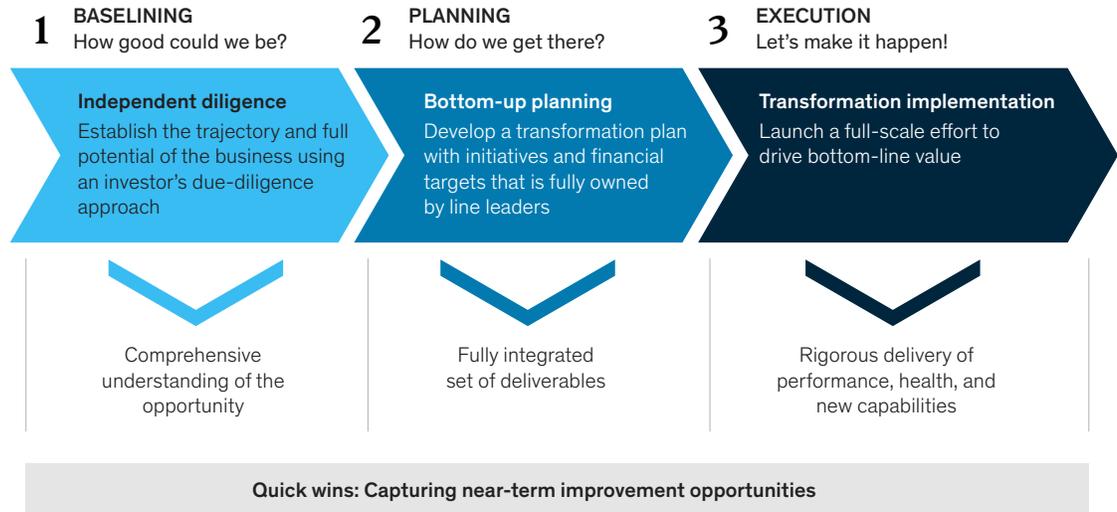
The playbook as customized for oil and gas comprises three core elements: a phased approach built on a deep understanding of the organization's potential, a well-defined performance infrastructure, and an emphasis on field development and production management.

A phased approach to baselining, planning, and execution

The three phases of a transformation are shown schematically in Exhibit 2. Phase one, independent

The three phases of a typical transformation consist of baselining, planning, and execution.

3 phases of transformation



diligence, establishes an objective perspective on the trajectory of the business in terms of production, spend, and cash flow. In this phase, the company also probes the causes of underperformance and explores the scale of the potential that could be captured. During phase two, the organization creates bottom-up plans to capture value, developing discrete initiatives, making careful plans to pursue them, and charging execution teams with setting milestones and targets. In phase three, the company implements these initiatives and oversees the delivery of value.

A critical part of diligence is to establish production baselines for both wedge and base wells. These underpin the trajectory of the business, shed light on the causes of underperformance, and provide a reference point for evaluating initiatives to improve production. In creating baselines, operators should recalculate type curves and base declines for up-to-date production, irrespective of the forecasts used for reserves. The focus should be on accuracy not in terms of initial production (IP) rate or estimated ultimate recovery (EUR), but instead on accuracy during the first two years of production, when gains from initiatives should be rigorously tracked.

A well-defined performance infrastructure

To oversee the execution of a flow of incremental initiatives, operators need dedicated resources, predefined structures and workflows, and project-management tools. Shale producers with lean operating models may have little experience of such things. But companies in other heavy industries have seen investments in performance infrastructure pay off in improved cash flow and organizational capabilities.

An effective performance infrastructure ensures that all value-generating ideas are included in a transformation, that the best ideas are accelerated or debottlenecked, and that all activities have clear ownership, accountability, and timelines. Tracking progress by the inch enables companies to scope their resource needs, celebrate successes, and pull the plug when necessary. Exhibit 3 illustrates how incremental opportunities progress toward target outcomes in a typical delivery process.

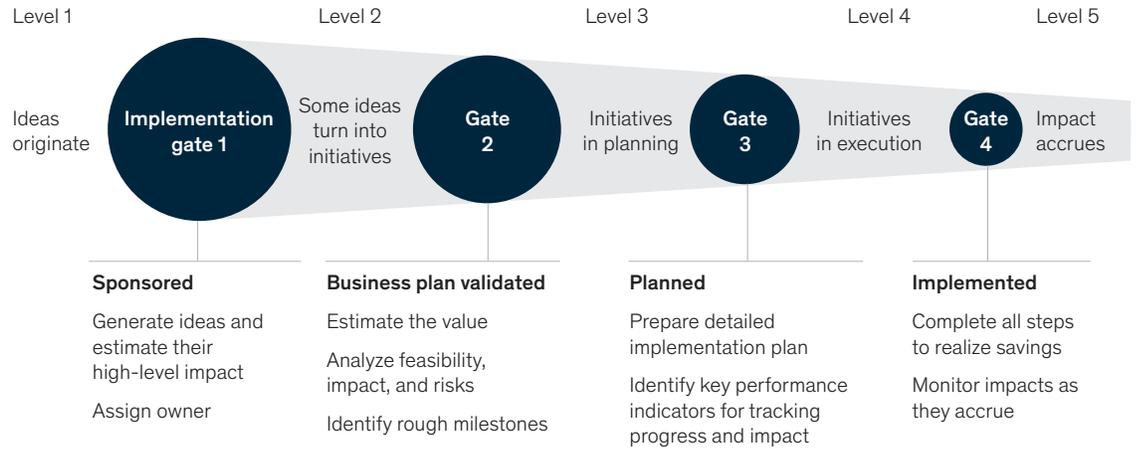
An emphasis on development and production management

Given the industry-wide shift from maximizing production volumes to optimizing economic value,

Exhibit 3

Implementation should follow a strict stage-gate process.

Stages of implementation



transformations need to pay special attention to development plans and base production management. From our experience with operators, we've identified the following three keys to success:

- *Optimize developments through experimentation*, with appropriate evaluation periods. Resetting developments to focus on value requires operators to experiment with new recipes for well design, spacing, and other elements. Tests should be conducted under controlled conditions following principles of experimental design. Target parameters should be isolated as far as possible, bearing in mind that formation properties will not be constant even for wells in the same pad. Tests should also allow sufficient time for assessment, since success is gauged by economic value, not IP. Preliminary results usually take three months to materialize and conclusive results at least six months, depending on the development phase, as shown in Exhibit 4. Testing regimes should be baked into the design of initiatives and tracked throughout delivery, with milestones—and decisions that depend on them—staged at appropriate points.
- *Challenge capital allocation rigorously*. Upcoming capital spend should be optimized

in line with the findings of the diligence phase. After reforecasting type curves, for instance, operators may need to reprioritize inventory within the constraints of lease agreements, permits, and logistics. Similarly, if a base-production diagnosis reveals that the best use of capital lies in mitigating well declines or reducing lease operating expense (LOE), operators should be prepared to reallocate funding accordingly.

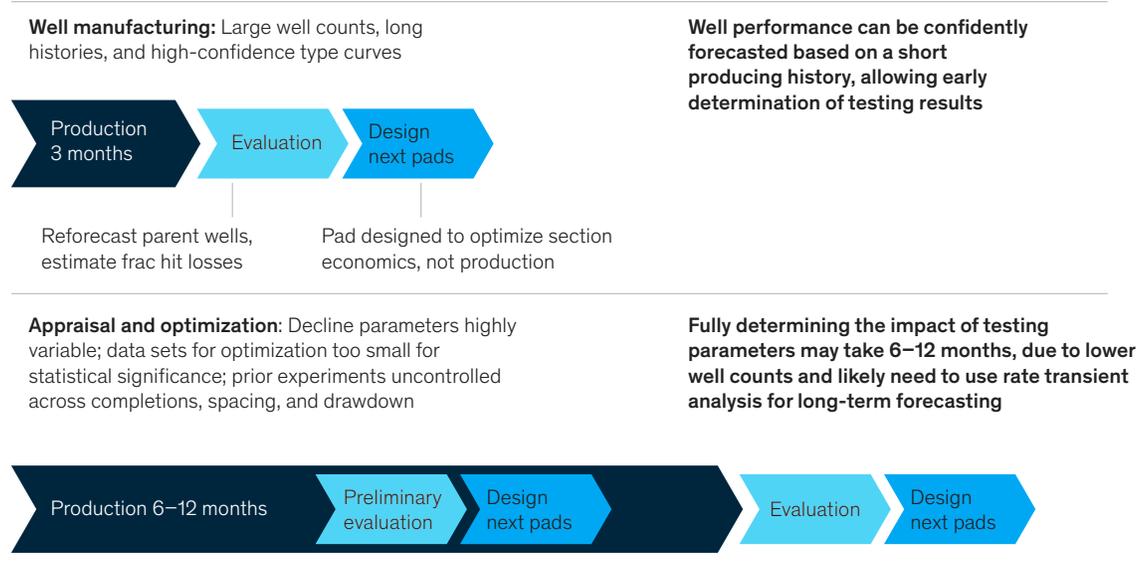
- *Secure strong technical input*. The greatest potential for improvement often comes from engineering levers, and successful transformations are technically driven. In this spirit, operators should get technical managers, engineers, geoscientists, and other staff involved in identifying, vetting, and tackling opportunities for transformation. Involving field personnel is also crucial in identifying tangible improvements that can be quickly captured.

Where companies stumble—and how they can prepare

Lean shale operators find some aspects of transformation challenging. Professionals who have to wear several hats and spend much of their day firefighting have little time to spend on strategic

The optimization timeline and process varies by development phase.

Example testing routines



priorities. Though multitasking can reduce direct overhead, it can also mean operators struggle to determine the causes of underperformance and how best to tackle them. The following four actions can help:

- *Define an inspiring top-down vision.* Unpredictable commodity prices, high subsurface uncertainty, and a tendency for initiatives to be canceled can lead to a sense of fatalism in E&P organizations. Change programs are often seen as management fads that come and go to no lasting effect. To combat this mindset, smart leaders develop a change story that describes the urgency of the challenge they face and stresses that the transformation is a top priority for both themselves and the board. They take care to ensure that change is sustainable by improving organizational health as well as capturing opportunities to create value.
- *Identify what drives underperformance.* Ultra-lean organizations seldom spend much time

on look-back analyses and other performance assessments. Companies may not know how far production shortfalls are driven by rock, execution, or overoptimistic forecasting; commercial teams may not be aware that overpayments are baked into their contracts. To shed light on such issues, companies should rapidly diagnose the causes of shortfalls as part of the diligence phase, either by reassigning personnel temporarily or deploying SWAT teams. They should also compare key metrics in each department with industry benchmarks to help teams identify the root causes of underperformance.

- *Set targets that are aspirational and achievable.* Companies that struggle to understand underperformance also have trouble knowing what they could realistically achieve. Confidence in a change program is undermined as much by sandbagging as by wishful target setting. Understanding the real potential starts with a thorough bottom-up diagnostic of

what's possible, combined with competitor benchmarking and the adoption of best-of-best practices from other sectors.

- *Institute performance management.* Many E&P companies, especially independents, are suspicious of structured processes with stage gates, seeing them as contrary to their lean ethos. Leaders need to stress that new processes are vital for steering the business. They should provide staff with adequate resources to minimize time spent documenting progress, and create simple tools to provide visibility and establish a common source of truth.

Capturing the value

Any successful transformation delivers not only long-term value creation but also quick wins to generate momentum and build confidence in the change effort—a critical factor for shale producers used to moving fast.

One shale producer had basin-leading performance in drilling and completion (D&C), plus highly effective development recipes in its core acreage, yet free cash flow stayed stubbornly negative. During the diligence phase of its transformation, it found that oversize completions, aggressive drawdown, and accelerating declines in midlife were harming well economics, and widespread frac interference was making matters worse.

Alongside these issues, the company also identified significant opportunities to create value, including reducing spud-to-sales time through a sustained engineering push, tapping into procurement

economies across the well-delivery process, and improving the reuse and disposal of water. As it worked to tackle these issues and opportunities, the company also pursued quick wins: renegotiating service contracts at a lower rate, securing long-term sand contracts to reduce its dependence on spot markets, restoring production from a backlog of offline wells, and deferring low-tier obligation wells in the development plan for future drilling.

After six months, the transformation had delivered impressive results. Base production was 5 percent higher than forecasted declines thanks to proactive artificial lift installation and optimization, the maximizing of well and compressor uptime, and better defense of parent wells from frac hits. Multiple other initiatives had delivered benefits on a similar scale, with rig days per well down by 22 percent and spending in key categories cut by 30 percent. The company is continuing to implement new measures, with a view to raising production by 8 percent with the same capital expense and increasing earnings before interest, taxes, depreciation, and amortization by 80 percent.

By building some of the world's leanest and best technical teams, shale producers have survived downturns in ways few analysts could have predicted. But they face a tough new challenge as the industry refocuses on cash flow. Transformation may be an unfamiliar concept for them, but other industries provide success stories to light their path.

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