Scaling Digital Operations in Energy and Natural Resources

By designing initiatives to scale quickly, companies
can improve their chances of success.

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At a Glance

▶ Scaling up is a natural feature of energy and natural resources companies, a capability necessary for success. But scaling digital initiatives has proven more challenging than replicating industrial equipment or processes at mines, drilling platforms, utility grids or chemical plants.

▶ Digital efforts are inherently cross functional, so they require changes in the operational model and new behaviors. They can also be more complex and varied across sites, and the pace of change is much faster.

▶ Companies that succeed in scaling their digital initiatives plan for scale from the beginning, and they orchestrate the rollouts in ways that enable speed.

▶ Successful companies also focus relentlessly on value, redirecting energy to the most promising initiatives and operationalizing them to sustain value. Finally, they prepare to disrupt their own organizations by investing in new capabilities and fostering a culture that encourages innovation and risk taking.

Executives in the energy and natural resources sectors understand the potential for digital technologies (including the Internet of Things, artificial intelligence, machine learning, robotic process automation and many more) to change the way their organizations work and to create significant new value. Most of these companies have digital transformation programs underway, but as they reach the 12- to 18-month milestones, they often are found wanting, failing to reach liftoff to the scale that would deliver on promises and expectations.

To people familiar with the track records of these companies, this failure may come as a surprise. The senior executive teams are no strangers to scaling new initiatives from pilot to production—indeed, the very concept of an industrial company always has depended on scaling.

75%   Companies that say their digital initiatives fail to scale as anticipated

Yet when it comes to digital tools and new ways of working, many industry veterans in chemicals, oil and gas, mining, and utilities struggle to extend their pilot initiatives into full-blown programs. Bain research finds that only 25% of companies are getting beyond pilots to broader adoption, and far fewer are getting the full value that digital promised. Many executives already have tried and failed to scale digital programs, and now, they are growing disillusioned and wary—just when the recovery from the Covid-19 pandemic likely would make the embrace of digital more important than ever.

What's different about digital?

One reason for the failure to scale is that digital transformations are more cross functional than traditional initiatives. You don't just buy more of something and roll it out across the organization. Companies have to change the way multiple departments work together, and that involves understanding how to change the operating model. For many executives who excel at capital and risk management, it is a more challenging endeavor to bring together, for example, operations, finance, marketing and IT to build a solution. They can't solve it by simply paying more; they have to foster behavioral changes and a level of cooperation that may be radical in some organizations.

Another reason is that the terrain is more complicated, with the nature of assets more varied. Scaling a process in the energy and natural resources sector usually involves buying lots of common equipment and deploying it across many locations, sometimes with varying conditions but generally in pursuit of a similar objective. Scaling digital can be much more complex: The capabilities empowered by the technology may be universal, but the objectives can vary widely from one use case to another.

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Finally, as with so many things, the time scale continues to shorten. Teams working to achieve operational excellence in energy and natural resources measured their progress in years, sometimes decades. Capturing the value in digital and using it to gain a competitive edge may be measured in quarters or months. Winners will be those who can cut that time in half, or less.

Bain looked at energy and natural resources companies across sectors and regions to develop a better understanding of why so many digital initiatives failed to scale. We also identified the actions that made a difference at companies that have beaten the odds and successfully deployed digital initiatives across their organizations to capture the full potential, whether that's short-term profit, sustainability, or operating and supply chain flexibility. Every situation differs, but the insights can help energy and natural resources executives think strategically about how to position their digital transformation for success.

What are the most common modes of failure?

When executives investigate the reasons for failure of digital initiatives, they often hear a limited set of explanations from the teams leading the transformation.
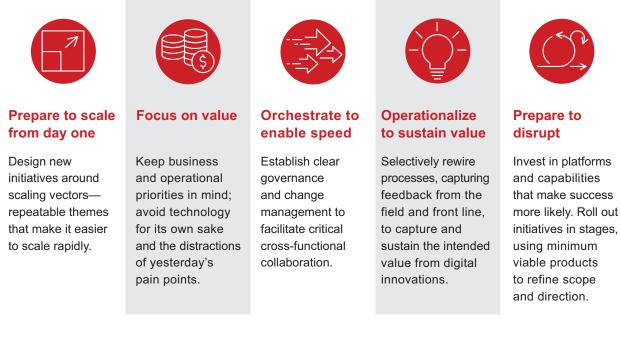
- **No value generated:** Although the technology is working and process metrics improve, key outcome metrics don't change—so there's no effect on the bottom line.

- **Not able to scale:** Technology and solution designs fail to gain broad adoption, and they are not built to take advantage of similarities in infrastructure, problem type, data or capabilities.

- **Unclear accountabilities and governance:** The strategy and roadmap are clear. But the leadership of operations hasn't bought in, and there is little follow-through.

- **Unable to survive in the wild:** Pilots succeeded in controlled environments, but the solutions are too fragile to accommodate real-world conditions in the field, such as noisy data and variability in equipment performance.

- **Difficult to sustain:** After a couple months, the impact deteriorates, and sometimes the operations teams go back to old ways of working.

- **Too risky to try:** It's difficult to experiment if the cost of failure seems too high.

The details may differ, but the themes are consistent: not enough buy-in from the front line, disagreement on digital priorities, failure to scale and, ultimately, results that don't flow to the bottom line.

Making business transformation the goal

By contrast, teams that successfully have scaled their digital initiatives found ways to beat these common failures. Five actions made a significant difference regarding a company's ability to scale successfully *(see Figure 1).*

Figure 1: Successful digital initiatives follow five simple principles

Prepare to scale from day one	Focus on value	Orchestrate to enable speed	Operationalize to sustain value	Prepare to disrupt
Design new initiatives around scaling vectors—repeatable themes that make it easier to scale rapidly.	Keep business and operational priorities in mind; avoid technology for its own sake and the distractions of yesterday's pain points.	Establish clear governance and change management to facilitate critical cross-functional collaboration.	Selectively rewire processes, capturing feedback from the field and front line, to capture and sustain the intended value from digital innovations.	Invest in platforms and capabilities that make success more likely. Roll out initiatives in stages, using minimum viable products to refine scope and direction.

Source: Bain analysis

Prepare to scale from day one. Initiatives are more likely to scale across the company when designed with that goal in mind. For example, a mining company embarking on an operations transformation began by looking for similarities in technology infrastructure, capabilities and the constraints and pain points in their production processes that could unlock material value. This helped the company identify a set of *scaling vectors*—that is, repeatable themes that it could scale rapidly, allowing the company to gain valuable experience and climb the learning curve quickly. Some of these scaling vectors are along specific production assets, a process or a piece of equipment that can be repeated at multiple sites across the organization. Other vectors have more to do with creating a repeatable approach or capability for solving problems.

An example of the first type was a set of technologies for improving the movement of mining materials along conveyor belts, alleviating bottlenecks and reducing unplanned downtime, with applicability across other, similarly constrained operations. An example of the second type involved building advanced analytics capabilities that allowed the company to establish new process metrics and new set points on performance for situations in which each analytical model was unique to a site, and the repeatable aspects focused on the approach. (For more on how to identify which units of transformation are most important to scale, read about micro-battles on Bain.com.)

Focus on value. It may seem obvious to focus on problems that deliver results, but in practice, transformations often gravitate toward the ones that the technology on hand *can* solve rather than what the company *should* solve. Since these are really business transformations, they need to focus on operational priorities and avoid becoming distracted by opportunities that don't create new value or that are too complex to deliver results in good time. Better to choose initial projects that combine medium value with ease of deployment to build momentum and then graduate to more complex use cases. This demonstrates the value of implementation and scaling, and begins to build a track record.

One oil and gas company discovered this after several cool pilots yielded little return on investment. After conducting a solution-agnostic assessment, the company identified boiler reliability as critical to effectiveness and efficiency. While there was pressure to chase the temptation of predictive maintenance, the team instead deconstructed the problem down to root causes and quickly launched pilots that mixed traditional condition monitoring with advanced analytics. Within three months, this initiative identified several subcomponents that were on the brink of failure, failure that they avoided through preventative maintenance, saving enough to cover the cost of the project up to that point. It then went on to target benefits equivalent to 13% of the addressable cost associated with the asset group.

Orchestrate to enable speed. Digital transformations are more cross functional than other improvement efforts, and they often demand new capabilities. So it's critical to update the operating model in ways that provide transparency, alignment and clarity on decision making for a range of issues, including priorities, funding, partnerships and resource deployment. If possible, go with the grain of the organization's existing operating model. It helps to stand up a team that can design pilots in ways that allow them to scale up rather than having to be retrofitted once they're in motion.

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One chemical company that had been on a digital transformation for more than a year found it difficult to scale up from low-impact pilots to significant results. Each plant had unique challenges and preferred customized solutions, which led to complex decisions on resources and funding between the center and operations. To move things forward, senior leadership updated the digital operating model with clearer guidelines that helped focus teams on priorities. Since pain points differed from one plant to another, the model focused on developing cross-functional catalyst teams that propagate knowledge

about digital tools and approaches from one place to another rather than offering prebuilt solutions. The company saved more than 30 million euros over the first six months (50% above target savings) following the model's implementation, and it's on track to save three times that amount over the next three years.

Design for and selectively rewire processes to take advantage of the digital innovation—namely, operationalize it to create closed feedback loops from the field and capture all the intended value.

Operationalize to sustain value. A common point of failure is when new technologies or processes don't fit into the existing ways that work gets done so that the innovation lies unused by the front line. Successful transformations preempt this problem by designing for and selectively rewiring processes to take advantage of the digital innovation—namely, *operationalizing* it to create closed feedback loops from the field and capture all the intended value.

A mining company had been developing and experimenting with automation technology for years, but it never achieved scale. And frankly, it just wasn't getting better results with automation. The technology worked, but its ownership never seemed to leave the R&D team, which deteriorated the trust of the production and maintenance crews. After shifting focus from the technology itself and revisiting the full set of requirements necessary to make the automation a "business as usual" capability, the company identified a long list of deliverables that had never been completed. These included effective operator guidelines, updated maintenance task lists, critical spare parts on hand, training and certification, and updating its approach to planning and scheduling to take full advantage of the new capability. To cut through, the company established a cross-functional team running in Agile fashion—a first for the organization. The short sprints, dedicated focus and access to cross-functional specialists allowed the company to work through its backlog in three short months, after which it began seeing production increases of 10% to 20%. These production gains mostly were attributable to more consistent and reliable processes, which reduced variability in flow rates, rather than simply running assets harder.

Prepare to disrupt. Just as fortune favors the prepared, so does disruption more often occur within companies that have invested in the foundation for it. Preparing for disruption requires making investments in capabilities that will allow a company to take advantage of opportunity when it arrives,

whether that's hiring the right talent or fostering a culture that encourages innovation and risk taking. These investments should be rolled out in discrete modules, allowing the company to progress in stages, then using minimum viable products to refine the scope and direction as they learn more and home in on the right solutions. With these enablers in place, companies can more confidently invest in disruption, whether that's new technology to improve existing processes, a new line of business or an entirely new business model.

One petrochemical company embarking on its digital transformation realized that its IT function and legacy systems were outdated and couldn't support the effort. They lacked critical skills and modern delivery capabilities, such as Agile and DevOps, and the engagement model with the business was slow and complex. To address this, the company focused on IT modernization in parallel to its digital deployment, restructuring IT, adopting an Agile and DevOps engagement model, embedding critical capabilities, and restructuring the technology roadmap to support and accelerate the pace of the digital transformation.

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Underlying all of these actions should be the basic understanding (perhaps well understood by most business leaders by now) that the real goal is not merely a *digital* transformation but rather a *business* transformation that takes advantage of digital technology. When leaders reinforce this view, they are more likely to garner wide support from across the company, making it easier to secure funding, resources and participation.

For executives who have failed digital initiatives in their closet, a few questions might help reveal weaknesses to avoid next time.

- Were the business goals of the transformation clear, with digital playing a supporting role?

- Were you able to articulate clearly how the new technology or processes would translate to the target goals, or did it require a leap of faith?

- Did operational leaders and frontline operators pull the initiatives toward them for the potential gains, or did they need to be pushed from the center?

In the months ahead, as the world's economies work together to climb out of the sudden economic downturn brought on by the pandemic, executives across industries, and particularly in the energy and natural resource sectors, will look for ways to reduce costs and raise efficiency. The case for investment in digitalization has never been stronger. But to avoid repeating the many failed initiatives of the past, a powerful case for this investment must include a solid plan for scaling.

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