

Oil & Gas Practice

# Giants can dance: Agile organizations in asset-heavy industries

The agile revolution is sweeping across industries, and asset-heavy companies are taking note. We explore how and where they can capture the benefits of agility while preserving safety and assurance.

*by Christopher Handscomb, Christiaan Heyning, and Jannik Woxholth*



**Agility is neither** a new concept nor one exclusive to tech industries. Lockheed Martin, for example, established its “skunkworks” teams back in 1943 to drive a radically new approach to the development and manufacture of aircraft. Engineers, technicians, and aviators were brought together in a shed in the California desert, united by clarity of purpose and empowered to get stuff done. And they did, designing and building the XP-80, the first jet fighter in the United States Army Air Forces, from a standing start to a flying production model in just 143 days.<sup>1</sup>

Yet asset-heavy industries have largely held back from the ongoing agile revolution: sectors such as energy, chemicals, metals, and mining are still at an early pilot stage when many other industries are already implementing agile operating models at scale. This lack of movement is not for lack of potential, because many of the pilots suggest substantial benefits. The reluctance to scale agile stems instead from the fear of compromising safety, technical quality, and the management of risk.

Organizations are right to be cautious. A coding error at a software company may raise costs or delay development, but the thought of an oil spill or a mine collapse should lead any sensible leader to think twice about profound operating-model innovations.

Still, it's time to take a fresh look. Agile is no longer an unproven concept. Done right, it could reduce risk and improve decision making. Some asset-heavy companies have taken the first steps to expand beyond agile pilots and are organizing for agility across entire mines, oil fields, refineries, and production lines.

## Why agile?

Agility reimagines how and where work gets done. It is about working across functions, with less hierarchy, and focusing on real business problems. Agility is no free-for-all; agile ways of working are

built on structure, rigor, and transparency, which enable flexibility and faster decision making. Agility could be a game changer in productivity, quality, speed, and the employee experience.

The benefits of agility are not theoretical. Most asset-heavy companies are naturally agile in times of crisis. Response teams display all five trademarks of an agile organization: a very clear, focused mission, or “north star”; an empowered team, with clear accountability; rapid decision cycles, when every hour counts; supportive leadership; and an enabling infrastructure in the form of crisis-management rooms with all the necessary technology.<sup>2</sup>

But agility isn't useful only during a crisis; many asset-heavy companies already get real value from agile pilots in their core businesses. Some organizations have implemented just a few pilots, while others have more than 100 under way. A look at the early evidence shows compelling results such as these:

- BP cut \$60 million from its logistics costs in Azerbaijan by establishing a cross-disciplinary team to work out how to optimize vessel surveys quickly. A similar team cut the capital costs from a new project in the pre-final investment-decision (FID) stage by \$1 billion. The company has now trained more than 3,000 employees in scrum techniques.<sup>3</sup>
- Another oil and gas major turned its discipline-based frontline organization at one asset into a number of cross-functional agile teams, which helped to cut maintenance costs by 40 percent.
- At a metal company, agile teams used advanced analytics and digital technologies to improve throughput, yield, costs, and quality, contributing to an expected \$100 million improvement in earnings before interest, taxes, depreciation, and amortization (EBITDA).

<sup>1</sup> James Felton, “Shooting star,” *Life*, August 13, 1945.

<sup>2</sup> Wouter Aghina, Aaron De Smet, Gerald Lackey, Michael Lurie, and Monica Murarka, “The five trademarks of agile organizations,” January 2018, McKinsey.com.

<sup>3</sup> Mark Venables, “Change of culture reaps rewards for BP's digital transformation,” *Forbes*, January 2019, forbes.com.

# Agility reimagines how and where work gets done.

- Agile R&D teams at a chemical company identified process improvements that could improve its EBITDA by more than \$300 million.
- Agile teams at a utility redesigned and automated 70 to 90 percent of human-resource processes, reducing costs in the selected areas by 15 to 20 percent.

Beyond such performance benefits, agile ways of working have tremendous potential to improve the employee experience. Asset-heavy industries are no longer top of mind for young talent. When graduates from the best universities flock to tech companies and start-ups, they are inspired by not only software technology but also new ways of working. By promoting flatter hierarchies, faster learning cycles, and full ownership of end products, agile may provide a key for reigniting a passion for traditional industries among the younger generation.

## How and where to implement agility

Does agile apply everywhere? Not in the same form. Agile teams and methodologies vary by the nature of the activity (exhibit). The source of value from agile ways of working also varies. Companies may limit implementation to activities with the most value to be unlocked from increased speed, innovation, and customer focus.

We will now explore what team-level agility could look like in different parts of a typical asset-heavy industrial organization.

## Digital organization

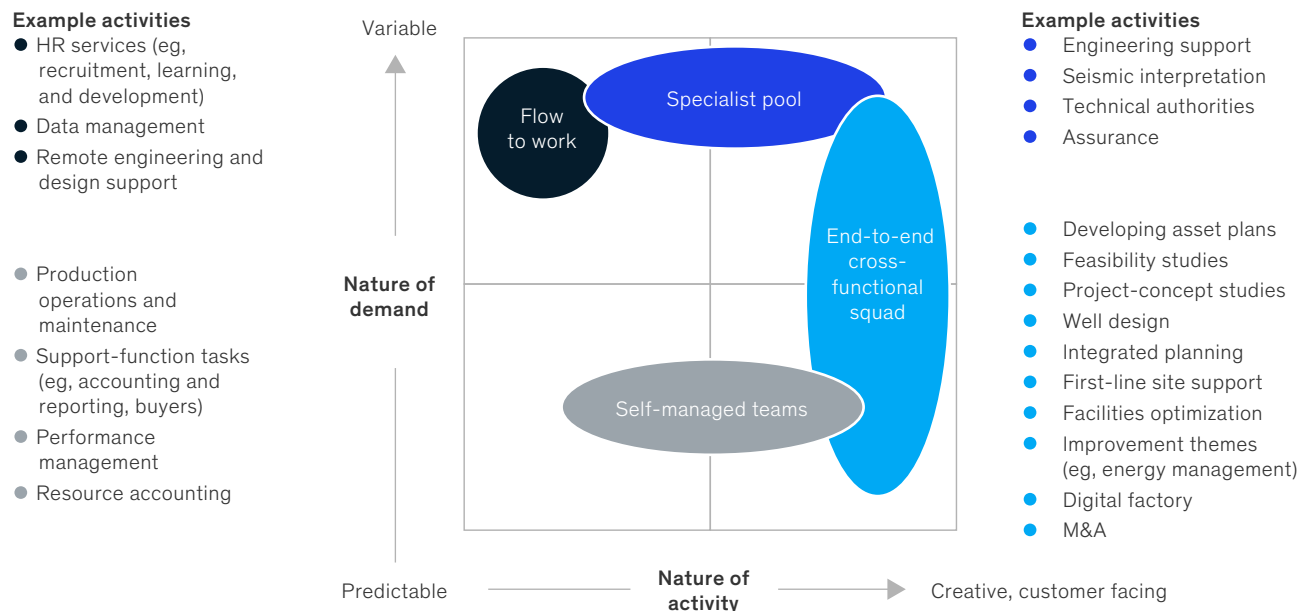
Many leaders in asset-heavy companies first hear about agility through their internal digital transformations. Digital and agility go hand in hand, and digital efforts that don't embrace agile delivery models will struggle to sustain themselves and scale up later. Companies often establish special units—digital factories, garages, accelerators, incubators, studios, labs—to execute at speed. In some companies, these are part of the mainland; in others they are islands. Invariably, they include cross-functional business and IT teams (often called squads), using some variant of the scrum methodology to deliver their work. In almost all examples, the speed of delivery and usability of solutions improve dramatically.

Aker-BP, a midsize European oil and gas company, for example, has fully embraced an agile way of working to drive its digital transformation. Following a highly successful ten-person pilot in mid-2018, the company scaled this effort into a large-scale program called Eureka, which spans five business themes and can call upon 180 full-time staffers located together in an agile “factory.” The task of these employees is to develop digitally enabled solutions and new ways of working. The immediate effects on the rate of innovation are clearly visible: the agile factory is churning out dashboards, optimization algorithms, changes to procedures, and operational set-points at a pace the chief digital officer called “massively faster than before.” The program may well now realize several hundred million dollars in bottom-line effects and, while

Exhibit

## Different agile teams can handle different activities.

Agile team models, compared



still in its early days, can already celebrate several examples of real bottom-line gains.

### Project and improvement activities

End to end, cross-functional squads are the most widespread agile archetype, applicable wherever teams solve problems together to deliver products, projects, or other activities requiring creativity. These teams should have the knowledge and skills to deliver desired outcomes and, as far as possible, a mission representing the end-to-end delivery of the associated value stream. We have seen this model applied successfully to activities as diverse as front-end capital projects,<sup>4</sup> the improvement of operational performance (such as throughput, sand management, and energy efficiency), asset planning, and M&A.

Examples across industries indicate that cross-functional agile squads working in sprints with rapid learning cycles can increase productivity by more than 40 percent. By bringing completions, drilling, and petroleum engineers together with supply-chain and commercial specialists in one full-time scrum team at a single location, an oil and gas company managed to halve the time needed to design new wells.

Working in cross-functional squads can also reduce the time needed to develop and implement new ideas. One chemical company established agile innovation teams that achieved in weeks what was initially expected to take several months. Now the same approach has been deployed to develop and engineer the identified solutions. This methodology

<sup>4</sup> Alastair Hamilton, Jan Koeleman, and Koen Vermeltfoort, "How the oil and gas industry can improve capital-project performance," March 2019, McKinsey.com.

massively improves the net present value from individual innovations. Eventually, it may well determine the winners and losers in asset-heavy industries as they embrace digitalization and develop climate-neutral technologies. Much as agile teams have fueled innovation in Silicon Valley, they may take on similar roles in other industries.

### **Business and technical supporting activities**

Not every activity supports full-time teams, nor can a company necessarily dedicate scarce expertise exclusively to only one of them. Flow-to-work pools (operated as a “ticket” system that allocates resources to incoming tasks) and specialist pools make it possible to assign employees to different teams full-time, depending on the priority of the need. These kinds of agile teams can enhance efficiency, enable people to build broader skill sets, and ensure that business priorities are adequately resourced. Functional teams (such as HR) or scarce resources (such as engineering subject-matter experts) are often seen as pool resources.

One variant of the pool archetype is the platform model: algorithms allocate tasks to employees, much as the Uber app does for drivers. A utility company applied this approach to the inspection of assets: customers report power outages online, and an algorithm automatically routes the closest technician to the right place, with the right instructions and contact details for the right customer. How did the utility develop this solution? With a cross-functional, agile team consisting of technicians, software developers, and customer-journey designers.

### **The front line**

The benefits of agility are not confined to the office. We see agile delivering productivity gains of up to 30 percent, in both white- and blue-collar environments, through clear key performance indicators (KPIs), fully transparent results, and the elimination of rework through rapid feedback cycles. At the front line, agile complements the lean

methodologies that many asset-heavy companies have already adopted. It can improve existing lean initiatives and extend them into new areas—notably creative teamwork, which occupies a large and growing share of the workforce as repetitive tasks are increasingly automated.

One mining company integrated elements of the lean and agile tool kits at the front line to make “everyone an improver.” Drawing inspiration from agile sprints, at the start of each four-week rotation, the company introduced sprint-planning sessions: teams agreed on three to four focus themes or improvement areas for that rotation. Existing lean practices were reemphasized in day-to-day work, including daily huddles using KPIs and visual performance management, as well as root-cause problem solving using value-stream mapping, Kaizen events, and five Whys (in which iterative questioning helps to identify an issue’s cause). Agile retrospectives introduced at the end of each rotation collected feedback, eliminated barriers, and identified better ways to work. This integrated approach generated 130 process improvements and, in parallel, a significant increase in frontline engagement. Six months in, more than 90 percent of frontline employees actively owned improvement initiatives.

Some companies go further and reorient their frontline operating model around self-managed teams. Operations, a number of engineering disciplines, and maintenance all work to maximize uptime and throughput, whether for oil platforms, crushers in mining, or equipment in chemical plants. Yet the members of these teams tend to point fingers when something goes wrong—their allegiance lies more with their specialty than with operations as a whole. They also have different KPIs: maintenance planning has incentives to plan well, maintenance technicians to execute those plans, and so on. Why not put all of these employees on one team for one piece of equipment and give them incentives to increase production, reduce costs, and eliminate safety incidents?

## Putting it all together

Is agile a fad? No, but even the most successful agile experiments will not endure unless the agile operating model is scaled as it is in other industries. It is fine to run pilots, which do create substantial value. But making change stick requires a real transformation.

What could a fully agile operating model look like in asset-heavy industries? Agile teams like those described above, defined by outcomes or missions rather than input actions or capabilities, will form the basis. These teams are then grouped together by their contribution to a common value-stream activity. An oil and gas company, for example, has created an end-to-end production-delivery grouping with teams that have missions such as optimizing the production output of a specific asset.

But agility is not just about these dynamic cells. A stable backbone is essential to provide governance and coordination.<sup>5</sup> Typically, these backbone elements include core processes (for instance, talent management, budgeting, planning, performance management, assurance, and risk), people elements (like core values and expected leadership behavior), and technology components (such as architecture evolution to microservices/API and IT infrastructure).

People get their day-to-day priorities and direction from their teams and groupings, but their longer-term development is the responsibility of a separate capability line.<sup>6</sup> For example, agile organizations often decide to introduce the idea of a chapter or a discipline to maintain functional health over time and to oversee the development and deployment of people with a given capability. This idea is especially important in asset-heavy industries as a way to maintain technical quality and manage risk.

One metal refinery is now considering changing over from a traditional, functional organization into an

agile one. Instead of putting production, mechanical maintenance, electrical maintenance, maintenance planning, and different kinds of engineers in functional silos, they are setting up cross-functional teams for each part of the refinery—milling, leaching, reduction, and so on—in addition to enabling teams such as capital-expenditure engineering and shutdown planning.

The team (also called a squad) becomes the primary home of most employees. A team that operates a crusher at a mining asset, for example, might consist of employees from plant production, mining production, maintenance, planning, and supply chain, jointly accountable for volume and cost targets. These teams may not have a full-time leader, but one member receives certain management responsibilities. There are also part-time roles for discipline leaders who, besides their role on the team, are responsible for people development, for sharing best practices across teams, and for assuring compliance with their functional discipline's standards. Decisions are pushed down to the front line, reducing the need for full-time managers and hierarchy.

How does this work? You need small teams, typically no larger than five to ten people, for self-management. These teams must have a clear mission, with end-to-end responsibility for a business outcome. The refinery described above has designed teams of ten people (four during night and weekend shifts) around each part of the process flow. Every team has end-to-end responsibility for delivering a quality intermediate product to the internal customers one step down the production process, at target volume, availability, and unit cost. This arrangement requires senior leadership to set the direction and build a strong meritocratic culture. It also requires middle management and frontline employees to take greater ownership of their work. In fact, the refinery reimagined operational leadership as a set

---

<sup>5</sup> Wouter Aghina, Aaron De Smet, Kirsten Weerda, "Agility: It rhymes with stability," *McKinsey Quarterly*, December 2015, McKinsey.com.

<sup>6</sup> Aaron De Smet, "The agile manager," *McKinsey Quarterly*, July 2018, McKinsey.com.

of responsibilities and skills held by many people rather than as a role for the few.

To make sound business decisions, teams also need information, ideally acquired through real-time digital data access. Just as digital transformations require agile delivery, so agile transformations require next-generation digital solutions to enable transparency and collaboration. In the refinery, a program is underway to standardize data collection and adopt real-time dashboards as part of the agile operating model.

A group of teams forms a tribe, enabling coordination across an asset, for example. Companies don't want tribes to become bureaucratic, so they typically consist of no more than 150 or so people. In the words of Greg Lalicker, CEO of Hilcorp Oil & Gas, "We have a firm rule that an asset can't get so big or so complicated as to require more layers of management—if it does, then we split the asset."<sup>7</sup> The system is also dynamic: as priorities change, the number and missions of teams in a tribe can scale up and down accordingly. This promotes full transparency of tasks and the rapid redeployment of people, from the typical three years in a position down to months, weeks, or even days. When activities are automated or priorities change, individuals or entire teams can be redeployed.

The tribe structure provides for reporting all the way up to the CEO, so the top layers of the organization don't necessarily have to change. The big change is where it matters: empowering the people who do the work. This is what makes an agile transformation, which unlocks the potential of teams to focus on creating value, closer to a lean program than to a reorganization.

Fully agile operating models emerge when companies combine different types of agile teams and methodologies. No one size fits all, but various parts of the organization, anchored by a common set of backbone processes, behavior, and technologies, must work together at the same pace. Individual

agile pilots won't create lasting change; companies must ultimately transform entire operating models to sustain the benefits of agile. That is now happening at scale in other industries, and we already see the first bold moves in oil and gas, chemicals, metals, and mining.

## What about risk?

Agile technology companies celebrate a "fail fast" approach, but in asset-heavy industries failure isn't an option in many decisions and activities. Similarly, the Agile Manifesto<sup>8</sup> emphasizes "Individuals and interactions over processes and tools" and "responding to change over following a plan." But processes and planning are undoubtedly essential if lives and major capital investments are at stake. How then to square these circles?

In fact, concerns about agility often derive from basic misunderstandings.

- **Agility celebrates learning, not failure.** The agile mind-set involves a constant desire to learn and become more effective. In software development, this is often summarized as fail fast, but in asset-heavy industries it is more accurately positioned as learn fast. How can these organizations design ways of working to raise productivity in every rotation, to lower development costs on every project, and to improve the team experience in sprints?
- **Agility is not a free-for-all.** Agile ways of working—for instance, scrums—are highly structured, promoting greater speed through clearly defined, transparent day-to-day work practices. One side effect is a great increase in the visibility of the performance of both teams and individuals.
- **Agility does not mean 'not having a plan.'** Agile ways of working promote the clear identification and prioritization of work to be done, often called the backlog, and are driven by a clear rhythm—for

<sup>7</sup> "Digging deep for organizational innovation," *McKinsey Quarterly*, April 2018, McKinsey.com.

<sup>8</sup> Kent Beck et al., "Manifesto for agile software development," 2001, agilemanifesto.org.

example, sprints. In addition, agile organizations acknowledge that conditions and needs often evolve and therefore design plans adaptable to change so they can deliver better outcomes.

There is no inherent conflict between agile ways of working and stable, safe, and reliable operations. Quite the contrary, agile models, when correctly implemented, can reduce risk and improve safety. An oil company, for example, found that miscommunication during handovers between functions was the root cause of many quality issues and near misses. Bringing together people from all the functions required to deliver an end-to-end work flow eliminated these interfaces and the associated risks. Another company suffered from passive compliance and a high degree of reliance on procedural risk-management controls. Part of the company's agile mind-set program for leaders focused on smarter risk management through greater situational awareness and action orientation, as well as better human performance.

Agility comes when top leaders empower teams, but even this may seem risky—just as many people feel safer driving a car than sitting in the passenger seat, managers may believe that safety will suffer if they aren't directly involved. Successful agile teams therefore require a stable backbone of clear processes, culture, and rules. Traditional hierarchies often provide the illusion of control, whereas agile ways of working should ensure greater transparency for what is really going on, day-to-day, at the front line.

Our work across industries points toward five critical elements for combining agile with best-practice risk management:

**1. Distinguish among different parts of the organization when you implement agile.** This might mean starting the agile journey in lower-risk environments, such as R&D (common enough now), early-phase engineering, and improvement programs. By experimenting in these areas,

companies can develop their own playbooks to help agile teams work with appropriate structure and rigor. Naturally, as you scale agile into your core operations, a variety of risk-management measures must follow.

**2. Equip agile teams to make sound decisions.**

With liberty comes responsibility, and with responsibility comes a need for the right tools and capabilities. First, agile teams must have access to the information they need to make decisions; for example, the US army in Iraq greatly increased access to classified information for frontline teams.<sup>9</sup> Second, people in agile teams, like those in traditional organizations, need to understand their delegations of authority and their accountabilities clearly. Third, teams must have easy and rapid access to subject-matter experts or technical authorities, either as temporary members or on call through a global technology-enabled platform.

**3. Strengthen your disciplines (often called chapters when agile is implemented in other industries) to play a core role in ongoing risk management.**

Disciplines, defined by common technical or nontechnical skills, form part of an agile organization's stable backbone, responsible both for people and standards—in particular, for managing competence and for developing and deploying talent. Part-time local discipline leaders, responsible for ten to 15 discipline members, ensure consistency, share best practices, and are the leaders' "eyes and ears" on the ground. Regional and group discipline leaders own standards and tool kits and hold appropriate authority for risk. Disciplines may also form risk and assurance teams, which should work in agile ways to match the front line's new speed. One oil and gas company, for example, replaced its mandatory box-ticking assurance process with an empowered assurance team mandated to conduct proactive and fit-for-purpose reviews.

**4. Maintain many of your existing risk and governance processes.** Agile doesn't change

---

<sup>9</sup> Stanley McChrystal, *Team of Teams: New Rules of Engagement for a Complex World*, New York: Penguin, 2015.



proven fundamentals, such as managing risks and barriers, operating discipline, and long-term asset stewardship. These successful basics may also work well in an agile context, with some adaptations. Stage gates, for example, are essential for large capital investments, but the active involvement of decision makers through regular sprint reviews would mean faster, incremental decision making that leads up to the formal decision gates. Another example: annual financial-planning cycles may still set boundary conditions, while quarterly business reviews provide for in-year reprioritization.

**5. Engage your employees and build a strong safety culture, which has always been—and should continue to be—at the heart of asset-**

**heavy companies.** Combined with greater empowerment, that culture could forge real safety ownership in the front line, led by strong role modeling from top management down.

---

For every company, the road to agility is full of twists and turns. There's no one-size-fits-all solution, so asset-heavy companies must experiment and adapt until they find solutions that fit their needs. Still, they have much to learn from other sectors further along the agile adoption curve. Agile is now a proven concept, and there are ways to develop your own company's version of agility while preserving and strengthening safe, reliable operations.

**Christopher Handscomb** is a partner in McKinsey's London office, **Christiaan Heyning** is a partner in the Perth office, and **Jannik Woxholth** is an associate partner in the Oslo office.

Designed by Global Editorial Services  
Copyright © 2019 McKinsey & Company. All rights reserved.