

Oil & Gas Practice

A new mandate for the oil and gas chief information officer

In an increasingly data-dependent sector, oil and gas companies need to scale up their use of technology across the enterprise rapidly. Success will involve reframing the CIO's role in driving not only digital transformation but also business outcomes.

by Aman Dhingra, Sverre Fjeldstad, Natalya Katsap, and Richard Ward



Most oil and gas companies have embarked on a digital transformation in the past few years. Many technology-enabled use cases have been identified, built, and verified. However, successes so far have been confined to small pockets. If the impact of these initiatives is to scale up, so must the underlying technologies.

Pilots can be developed in a “sandbox,” but full-scale implementation requires enterprise IT. Use cases based on automation, robotics, and artificial intelligence require vast amounts of data to be exchanged across traditional silos. Simply connecting systems point to point when required doesn't work, as the complexity and cost are prohibitive.

Instead, technology must be rapidly transformed across the enterprise to handle the transaction volumes, user expectations, and security requirements of the digital age. To do this, oil and gas companies need a strong chief information officer (CIO) with a mandate not only to change the way the business uses technology but also to transform the technology estate itself from disparate systems into scalable platforms.

Set up to fail?

Few oil and gas CIOs are set up for success in today's digital age. IT tends to be measured on stable operations at the lowest possible cost, which translates into a CIO mandate that revolves around supporting the status quo rather than enabling growth or transformation. The oil-price downturn of 2014 intensified the squeeze on IT spending, stripping CIOs of between a third and a half of their capital expenditures (exhibit).

Hamstrung by budget cuts, CIOs are doomed to disappoint an increasingly technology-hungry business. The constraints their IT organizations face are legion:

- **Left out of business planning and decision making.** According to a McKinsey survey, half of the businesses across industries treat IT

as a captive vendor.¹ Confined to the role of order taker, IT can't anticipate and meet the technology needs of a rapidly evolving business, let alone shape them.

- **Stripped of engineering capability.** A typical oil and gas CIO focuses on infrastructure and third-party-licensed software, which represents about 40 percent of IT spending. Internal capabilities claim a much smaller share of the budget, with personnel accounting for only 27 percent of spending—far less than the cross-industry average of 37 percent. The outsourcing of application development increased by 50 percent between 2014 and 2018.²
- **Locked into an unsuitable delivery model.** The standard model for capital projects in the oil and gas industry forces all activities into long planning cycles with sequential development and limited scope for experimentation. Our digital benchmark shows that 55 percent of oil and gas companies take six to 12 months to move from idea to implementation; 33 percent take more than a year. By contrast, a digital leader takes no more than four months to implement an average digital initiative.
- **Unable to control end-to-end data flows.** Data from equipment and sensors—known as operational technology (OT)—is central to many digital initiatives in oil and gas, as most use cases rely on the timely flow of operational data from multiple sources. However, most oil and gas companies manage OT via the asset operating team and lack policies and technology for sharing operational data across the enterprise. If the CIO doesn't control the means to connect central IT to operational assets, it's very hard for the company to make secondary usage of operational data.

In short, IT's mandate is a limited one: keep the business running smoothly. The occasional change happens at the unhurried pace of oil and gas capital projects and touches on only a part of the digital

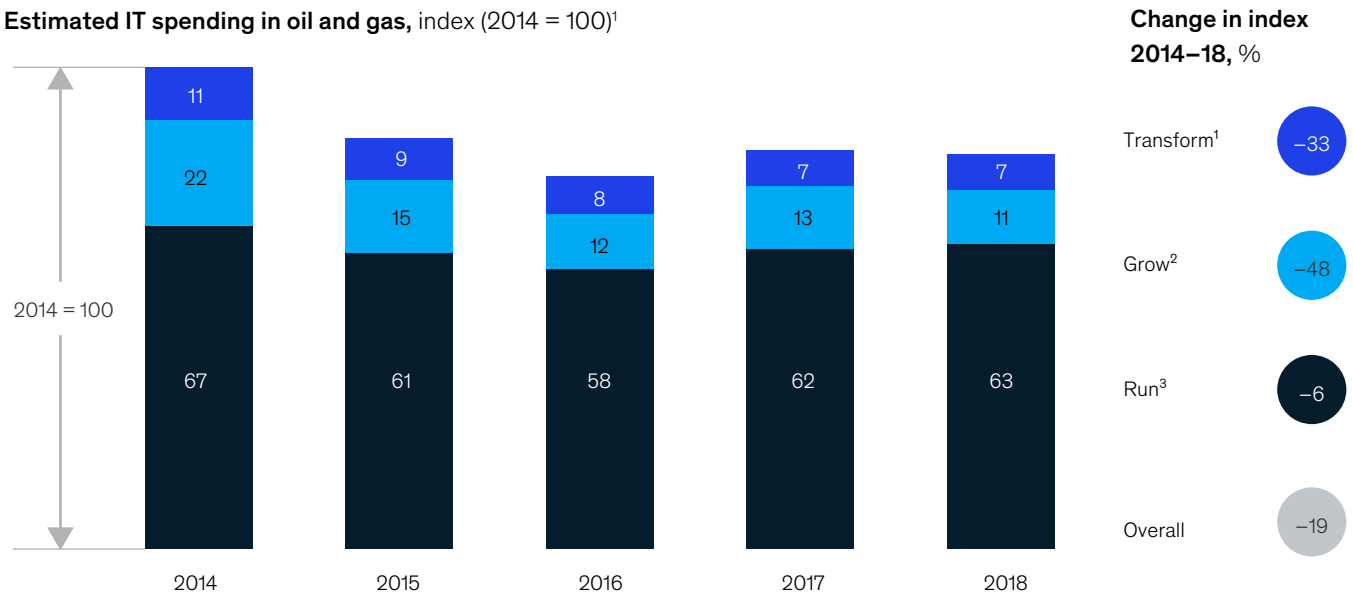
¹ McKinsey Global IT Survey, 2015–16, with 709 respondents across industries globally.

² *IT key metrics data 2019: Key industry measures, energy analysis: multiyear*, Gartner, December 17, 2018, gartner.com.

Exhibit

The squeeze on IT spending is depriving oil and gas chief information officers of resources to grow and transform the business.

Estimated IT spending in oil and gas, index (2014 = 100)¹



¹Spending focused on implementing technology systems that enable the enterprise to implement new business models.

²Spending focused on developing and enhancing IT systems in support of business growth.

³Spending focused on the continuing operation of the business.

Source: *IT key metrics data 2019: Key industry measures, energy analysis: multiyear*, Gartner, December 17, 2018, gartner.com; ServiceCube, Rystad Energy, February 2019, rystadenergy.com; McKinsey analysis

real estate needed to deliver on the promise of performance transformation. We think it's time for oil and gas companies to expect more of their IT—and their CIO.

The CIO's new mandate

In a recent McKinsey survey, 76 percent of respondents agreed that IT should actively collaborate with the business, but only 27 percent felt their IT department played that role most of the time.³ In a digital age, the CIO must be an equal partner in transformation with the business. That calls for a CIO who can wear multiple hats: visionary change agent, technology architect, expert builder, and provider of technology talent to the whole organization. Fulfilling all these roles will involve several actions.

Working with the business to cocreate the digital vision

At many companies, CIOs are simply invited to react to a predefined strategy. Such an approach leaves organizations unable to capture technology synergies among digital use cases and struggling to scale up and contain galloping costs. For better outcomes, the CIO must be deeply involved in driving strategy and building alignment on bold digital transformation themes that go beyond classic technology enablement to process automation, advanced analytics, and robotics. That in turn calls for clear expectation setting. The CIO of one Asian oil and gas company began its digital transformation by identifying the levers he needed to control to enable the organization to deliver on its digital ambition. Working with the business, he then set new IT-measurement metrics that focused on delivering business value as well as lean IT services.

³ McKinsey Global IT Survey, 2015–16, with 709 respondents across industries globally.

Building and running the technology platform

The digital opportunity in an oil and gas company is largely data driven. Our client experience suggests that about half of the value across the value chain is driven by advanced analytics, which requires significant data inputs. This in turn demands a shift in approach.

Under the old model, CIOs procured and maintained bespoke, licensed applications to serve the functional needs of the business. Capturing data-driven opportunities requires a more holistic approach, with the connecting of data sources to form an information architecture that both enables the digital transformation and provides just-in-time functionality and data for specific use cases. The CIO's job is to design, implement, and evolve platforms capable of supporting the company's strategy and responding flexibly to changing demand. That requires IT capabilities to be set up for constant change, with flexible data storage, a tool chain and processes that enable continuous delivery and integration of new code, and a far-sighted but ever-evolving architecture road map. Some industries are further ahead than oil and gas in this respect. The Dutch ING Bank, for instance, invests 20 percent of its annual IT budget in DevOps technology and capabilities.

Companies do not necessarily have to build their platforms themselves. In fact, modern CIOs see themselves as orchestrators of technology ecosystems rather than architects of technology components. Partnering with vendors is a natural part of this process, but the outsourcing paradigm—letting third parties take care of standard processes and project delivery—is no longer appropriate. Instead, vendors both supply and run components within the technology ecosystem. Maintaining an open architecture with connectivity to customers and partners is crucial, and oil and gas companies must also take care of integration across systems to support the provision of end-to-end services.

Partnering with the business to deliver continuous change

The value of a digital transformation comes from changes in the company's operating model, not

from the technology itself. Benefits such as reduced head count, higher barrel throughput, and improved safety outcomes can best be delivered by cross-functional teams. The new breed of software engineers works side by side with the business, gradually obtaining domain knowledge as they solve pain points from day to day. Turf wars vanish when everyone is focused on business outcomes rather than tasks. At one North Sea operator, all digital development is conducted from a single digital factory, with staff split 50-50 between business and IT personnel.

Hiring, developing, and retaining digital talent in the organization

According to a recent survey, even companies with top-quartile IT performance suffer skill gaps and struggle to keep up with the demand for IT talent.⁴ One supermajor recently announced plans to bring most of its software engineering in house with the creation of more than 1,000 new IT positions. However, the fierce competition for digital talent means that most oil and gas companies will continue to use third-party sourcing as part of their personnel strategy. To that extent, a company's ability to integrate external contractors into high-functioning teams will be as critical to its success as its hiring practices.

Bringing about a cultural shift to sustain the impact of the transformation

To help drive adoption and permanently change the operating model, the CIO must educate everyone in the organization, from frontline staff to leaders, about what technology can do. IT can also operate as a change agent in its own right by modeling design thinking, iterative delivery, and cross-functional collaboration—all vital ingredients in the performance of any modern knowledge organization.

What will it take to deliver on this mandate? For one thing, the CIO's focus will shift from process and procurement management to engineering and software development. That will make IT look and feel less like a support function and more like an engineering discipline within an oil and gas operator. Such a shift will have material implications for

⁴ "Can IT rise to the digital challenge?," October 2018, McKinsey.com.

reshaping the IT talent bench, reskilling employees with backgrounds in procurement and infrastructure management, and recruiting scarce data engineers and architects. Similarly, the CIO will need enhanced capabilities and leadership qualities to run the new IT organization and act as a peer to the CEO and chief data officer in driving a digitally enabled performance transformation of the business.

The transformation will also have major implications for the IT operating model. Established project cycles must be jettisoned. A digital transformation at scale may involve developing hundreds of digital solutions simultaneously; the only way to keep pace is to introduce continuous delivery via multiple agile teams. IT must be able to collaborate seamlessly with domain experts and users, and handovers between development and operations must disappear.

Implications for the CEO

The CIO's new mandate represents a fundamental shift in the role of IT from managing vendors to driving business outcomes. For this to happen, the relationship between the CIO and the rest of the organization must be reset. The CEO must not only recognize the CIO as a partner in digital transformation but also provide the mandate and resources needed to execute on this role. In turn, performance contracts will need to be reframed to take account of the strategic and transformational objectives that the CIO is now responsible for driving.

The oil and gas industry has reached an inflection point in its digital journey. To make the leap from individual use cases to digitally enabled performance transformation at scale, it will need to rethink its attitude on IT. The CEO must reframe the CIO's mandate, and the CIO must deliver against it.

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