strategy&

2020 Digital Operations study for energy

Oil and gas

pwc

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FOREWORD

Even before the outbreak of the COVID-19 pandemic, the energy industry had been undergoing profound technological disruption. The "fracking revolution", the rise of renewable energy, improvements in battery storage, a strong push for a hydrogen economy and the electrification of transport represent opportunities for transformation as well as a fundamental competitive threat. These new technologies – combined with digitization – can bring new skill sets and cost efficiencies to the energy, utilities and resources (EU&R) sector, even before they open the door to new competitors. Seen in this context, COVID-19 represents one more challenge in the complex set of issues the EU&R sector has already been grappling with.

We recently explored the building blocks for a successful transformation of the EU&R industries by highlighting resource and material substitution, decarbonization and waste elimination (www.pwc.com/eur-transformation). We identified two major risks for oil and gas (O&G) companies: lower oil prices in the short term and decarbonization over the long term. One consequence of these risks is the accelerating shift to cleaner sources of energy, including gas and renewables. Another is the ongoing quest for more efficient, cost-effective operations. To this we must now add the likely medium to long-term impacts of the COVID-19 pandemic, including a sharp contraction of the global travel industry and changes in our working habits, such as remote working, that may further decrease the demand for oil. For the O&G sector, the pursuit of cost efficiencies has never been more urgent. Digitization, while no magic bullet, is a key enabler in successful transformations.

But as our Digital Operations Study establishes, O&G companies have been rather slow to adopt digital applications and operations so far. In order to deepen their digital transformation, they will need to grasp the full extent of what this entails. It is not just about technology, but also upskilling people, changing the working culture and understanding where digital technologies can significantly boost the sustainability and efficiency of operations. These will be the essential components for making O&G companies more competitive, more efficient, more connected to suppliers and more responsive to the needs of customers, resulting in a broader revenue base and improved profitability.

I thank my colleagues Anil Pandey and David Branson for initiating this study of digital operations for the O&G sector. This report follows the analyses of the advance of digital operations in the power and utilities and the chemicals sectors, and concludes our surveys of the status of digital operations in the EU&R industry.

Norbert Schwieters
Former Global Energy, Utilities and Resources Leader (retired 30 June 2020)

EXECUTIVE SUMMARY

In the five years since the 2014 oil price crash, oil and gas (O&G) companies have cut costs substantially to adjust to a low-price environment. They optimized production, streamlined their organizations and renegotiated contracts with suppliers. Nonetheless, profitability proved elusive as government regulations to combat climate change and the global energy transition to cleaner technologies posed new threats to earnings and even their continued existence.

The COVID-19 pandemic has dealt a further blow to an industry already struggling to find its footing. The collapse in oil demand and renewed price crash have only added to the many challenges confronting the sector. When an industry faces a systemic shock of this magnitude, the temptation is to slash programs that do not immediately contribute to cash flow. However, O&G companies should resist the urge to shelve their digital transformation programs, as these will hold the key to improving efficiency, driving profitability and managing their sustainability and low-carbon agendas. In short, digitization is essential to their survival.

Most oil and gas executives are aware of the gains to be had from digitization. According to Strategy&'s recent Digital Operations Study of O&G companies, industry leaders anticipate digital applications will deliver on average a 10 percent increase in revenue due to increased production and reduced time to project start-up, and an 8.5 percent decrease in costs from improved operational efficiency, over the next five years.

But despite its recognized potential, the digital revolution in oil and gas has not yet fully materialized. Of the 200+ oil and gas companies in our survey, only 7 percent identified themselves as "Digital Champions," defined as companies that have "a clear position in the marketplace with complex and tailored internal, partner and customer solutions offered via multilevel digital interaction" (*see Exhibit 2*). More than 70 percent of respondents saw themselves as being in the early stages of digital maturity.

Our study highlights a number of digital technologies and applications that have the potential to transform operations from back office to plants and production sites. These include manufacturing execution systems (MES), cloud computing, energy analytics, the Internet of Things (IoT) and machine learning. These digital applications are able to integrate real-time data and advanced analytics for better decision-making, and underpin applications that can dramatically improve efficiency and sustainability.

These systems and technologies are already being deployed in other industries. For them to transform the O&G sector successfully, a number of common stumbling blocks need to be overcome: Firstly, senior management need to perceive digitization as an enabling tool that can help address their business priorities. Secondly, companies will have to invest in foundational capabilities, including training staff in the required digital skills, and hiring outside experts where required. Thirdly, they will have to be prepared to adopt a digital operating model with clear governance and accountability guidelines. Lastly, there needs to be an understanding that undertaking a digital transformation goes beyond the application of new technologies: it will change the old ways of working, the business model and the culture of O&G companies. To reap the advantages of digitization to the full, companies should be prepared to embed an agile working culture in order to facilitate designing and implementing innovative solutions. Only by taking a holistic approach that is supported by a long-term vision will oil and gas companies be able to substantially and materially improve their core efficiency, profitability and sustainability.

Industry landscape

For many oil and gas companies, the sharp decline in oil prices in 2014 – when Brent crude dropped to a low of $29/barrel – exposed serious operational inefficiencies. In response, they took drastic action to improve their cost performance: production portfolios have been restructured, organizational and operating models streamlined, and relationships with suppliers renegotiated to manage costs.

These steps led to significant cost improvements (*see Exhibit 1*). Lifting costs (the cost of producing oil and gas) almost halved between 2013 and 2016. Exploration and development costs (expenses incurred in adding new proven reserves to the portfolio, excluding acquisitions) declined by 60 percent from their peak in 2014.

EXHIBIT 1
Oil and gas companies have improved efficiency, but profitability remains depressed
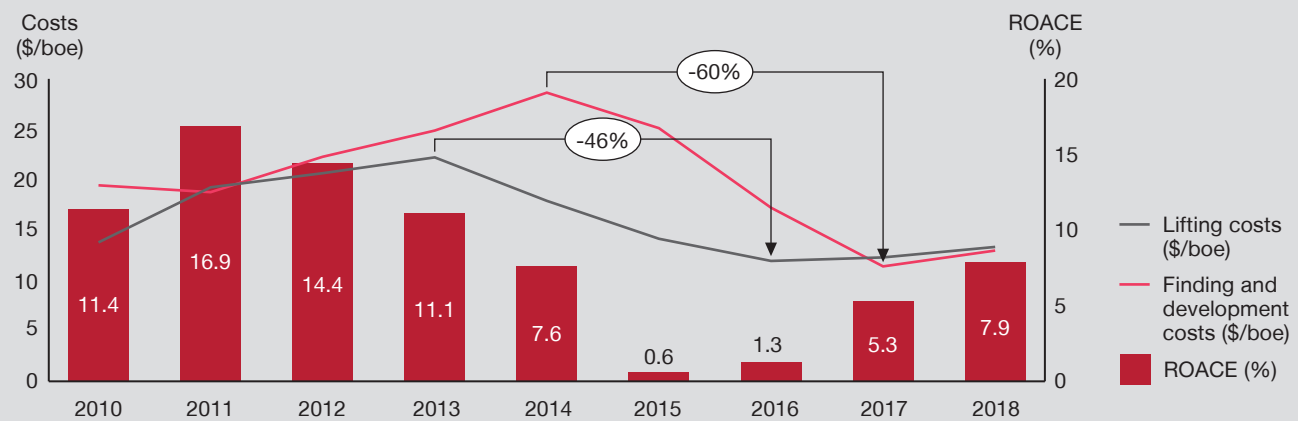
Companies: BP, Chevron, ENI, ExxonMobil, Royal Dutch Shell, Total
Source: IHS Connect, Strategy& analysis

> We need to build up our ability to ride through cycles. Costs are not going to go down, so it is important to create as many efficiencies as are practical using digitization"

Refinery General Manager (Major IOC refinery – Africa)

Despite these improvements, profitability lagged. It took until 2018 for the return on average capital employed (ROACE) to recover to its 2014 level of 7.6 percent. This was significantly below pre-2014 performance and beneath targets set by companies themselves.

Now, O&G companies are facing the double threat of the impact of COVID-19 alongside climate change initiatives and the global energy transition, but without the traditional levers to cut costs, which were pretty much pared to the bone after 2014. The actions taken against the pandemic, which may keep oil prices low for many years, could dramatically reduce global levels of economic activity, including the demand for global travel and, as a result, trigger a systemic change in the demand for fossil fuels.

Pre-COVID-19, environmentalists, policymakers, investors and the public had already been pressuring O&G companies to cut investments in traditional carbon-intensive operations in favor of renewable sources of energy, and to reduce and eventually eliminate greenhouse gas emissions in production and other operations.

The combination of all of these difficult elements emphasizes how vital it is for oil and gas companies to accelerate the adoption of digital technologies and applications, since these are among the most crucial tools they can employ to address efficiency and sustainability challenges and to improve profitability and resilience to future market volatility.

First steps on the digital journey

Implementing new digital technologies was already a core element of most O&G company strategies before the COVID-19 shock. Many companies had appointed Chief Digital Officers to bridge the gap between conventional information technology (IT) programs and more inventive digital applications that can alter the trajectory of the business and help in strategic transformation.

According to Strategy&'s Digital Operations Study of O&G companies, industry leaders expect their investment in digital technology to generate positive returns. The executives in our survey said over the next five years, they expected digital applications to deliver on average a 10 percent increase in revenue due to increased energy production and reduced time to project start-up, and an 8.5 percent decrease in costs from improved operational efficiency.

These forecasts need to be further qualified because the benefits of digital applications are not always easy to quantify. Often, digitization efforts are embedded in a range of improvement initiatives. In other words, the gains from a digitization program are not likely to show up as a direct correlation in operational metrics, such as production volume, operating costs, project

> " Other industries have utilized cloud computing, data platforms, advanced analytics and machine learning/AI more than our industry, so we see untapped potential in using these tools."
>
> **CDO – Major global NOC**

delivery times or health, safety and environmental performance. Rather, digitization acts as an enabler. It can, for instance, support better decision-making with advanced analytics – which feeds into improvements in production and other metrics, but it is difficult to measure its precise contribution. (For a detailed look at digital applications in the O&G industry and the challenges in integrating them, see Strategy&'s "Drilling for Data" series).

> **We are not yet in a position to fully track our ROI (from digitization) because many of the initiatives have only started recently and their benefits are at times embedded and not easily quantified. So our focus at present is around changing the mind set: how many people in our teams are able to derive insights and make decisions using the data being collected?"**
>
> **CDO – Global independent E&P company**

The earliest digital implementations that O&G companies have undertaken are primarily relatively discrete applications, such as digital twins to replicate plant facilities and processes, drones for remote monitoring of field operations, or robots replacing the need for human intervention in challenging situations. Consequently, it is perhaps not surprising that our Digital Operations Study found that only a few O&G companies can yet claim to be digital leaders.

Of more than 200 oil and gas companies surveyed, only 7 percent identified themselves as Digital Champions (for details about how this study was conducted and its results, see sidebar, page 16: Digital Operations Survey for Energy from Strategy&), while more than 70 percent of respondents considered themselves to be in the early stages of digital maturity – that is, either Digital Novices or Digital Followers (*see Exhibit 2*).

Digital Operations maturity

Four levels of digital maturity

Digital Champion	The company has a clear position in the marketplace with complex and tailored internal, partner and customer solutions offered via multilevel digital interaction
Digital Innovator	The company has digitized most internal operations and has taken steps to connect with external partners/customers to exchange information and collaborate
Digital Follower	The company has integrated internal functions such as sales, manufacturing, sourcing and engineering, enabling them to collaborate more closely
Digital Novice	The company has some isolated digital solutions and applications, but these exist at the functional or departmental level within the organisation

Level of digital operations maturity

	Champion	Innovator	Follower	Novice
Utilities	2	15	38	45
Oil and gas	7	22	36	35
Chemicals	16	25	33	26
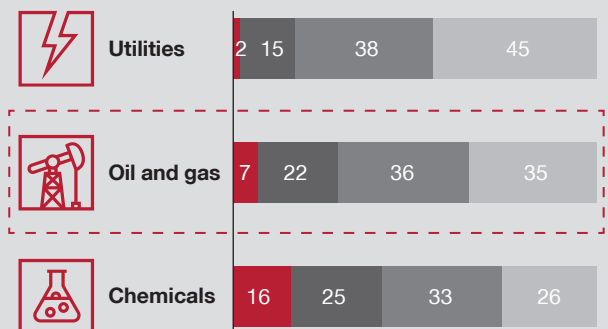
Source: 2020 Digital Operations survey, Strategy& analysis

These results are consistent with our observations of O&G companies during consulting engagements. Most companies are still taking a somewhat conservative approach. They are not yet considering the large-scale deployments of digital technologies that we think are essential for transforming their business and operating models. In short, despite the widely recognized potential of digital, and the efforts of oil and gas companies to date, the anticipated digital revolution in the sector has yet to materialize.

Drivers of the digital transformation

To advance a digital transformation, our study shows that companies need to adopt a holistic approach. This means embracing technologies and applications that have the potential to transform company-wide operations, from the back office to plants and production sites. These digital applications are able to integrate real-time data and advanced analytics for better decision-making, and underpin applications that can dramatically improve efficiency and sustainability.

Interestingly, our survey found that O&G executives see the most potential in precisely those technologies that combine data and analysis (*see Exhibit 3, next page*). The top five technologies or planned technologies they identified include:

- **Manufacturing execution systems** (MES) that link individual pieces of equipment to the company's enterprise resource planning (ERP) system, facilitating coordination of operations

- **Cloud computing** that allows the company to manage large volumes of data generated in operations and improves data quality, data availability and single-source transparency across complex value chains

- **Energy analytics** that support optimization of energy use and costs across company operations

- **Connectivity and Internet of Things (IoT)** in which machines carry sensors that support remote performance monitoring and efficient equipment integration

- **Machine learning** to analyze data and identify operational patterns and shortcomings that can be used to improve efficiency, for example, in predictive maintenance.

"

In digital, the starting line is the same for everybody so this is a field where NOCs are not disadvantaged compared to IOCs. The real potential of digitization is enormous; it could disrupt and transform the way we operate our business."
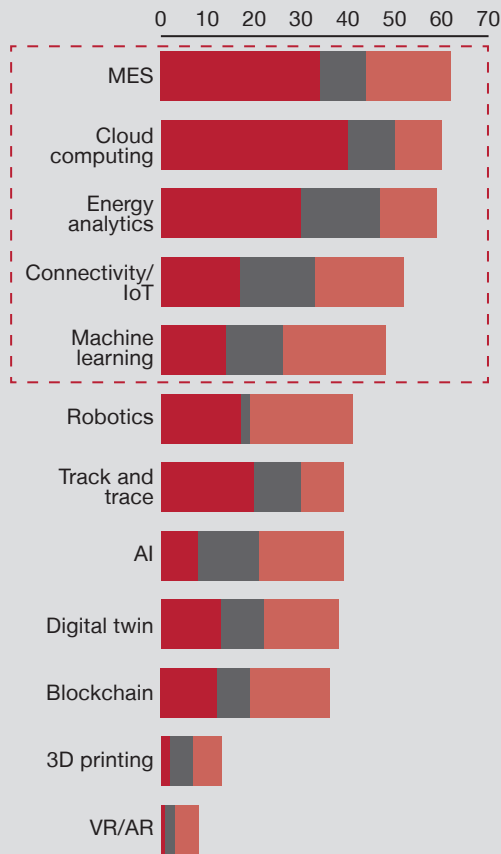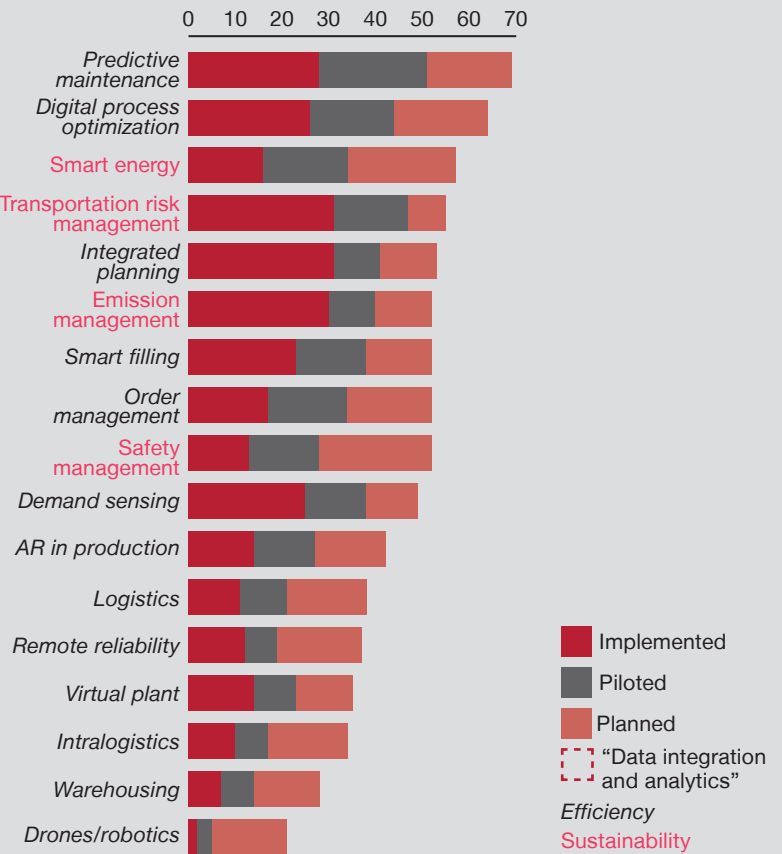
CSO – Major Middle East NOC

EXHIBIT 3

Greatest potential for digital in oil and gas is seen in "data integration and analytics" technologies targeting both efficiency and sustainability

Digital technology implementation in oil and gas by technology

Digital technology implementation in oil and gas by application

Source: 2020 Digital Operations Survey, Strategy& analysis

> " For us, enabling data connectivity, AI and data analytics is a huge focus. All of these separately would have an impact but when you combine them together in our industry, they create a lot of opportunities that we haven't really explored before now."

CDO – Major global NOC

These technologies address the efficiency and sustainability challenges that the O&G sector faces today. Technologies designed to have a direct impact on the efficiency of operations include predictive maintenance, digital process optimization, and integrated planning. Those developed to have a positive impact on the sustainability of operations include smart energy use, emissions and transportation risk management.
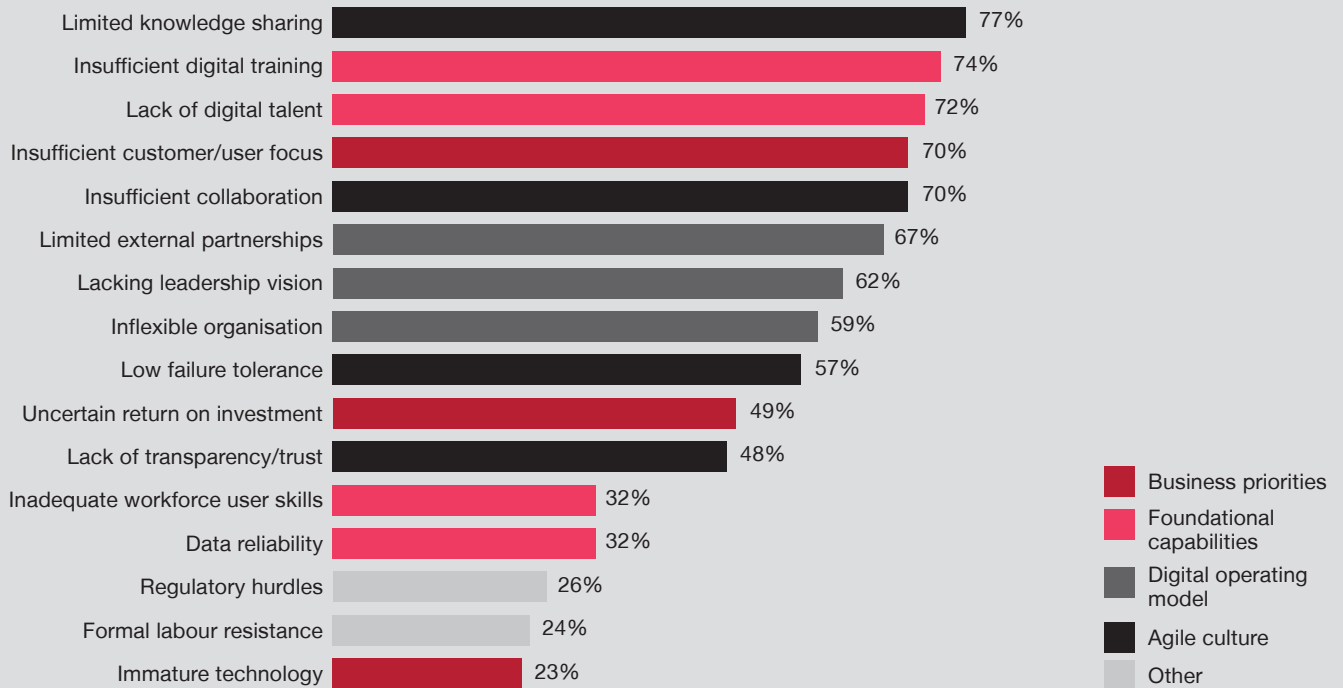
In general, making the most of these data integration and analytical technologies requires significant investment in IT infrastructure and often, collaboration across the company. This will require establishing new ways of working. Moreover, since the benefits of digital applications may be difficult to quantify, company leadership needs to be willing to stand firmly behind these efforts and be confident that their digital transformations are essential to the organization's long-term success, even if tangible benefits are not immediately apparent.

How to be a Digital Champion

The main obstacle to a successful digital transformation is not the technology. Respondents to our Digital Operations Study overwhelmingly pointed to organizational shortcomings as the chief hurdles to be overcome (*see Exhibit 4*). In fact, technology maturity itself was the least of O&G executives' concerns.

EXHIBIT4

Capabilities, operating model and culture are perceived as the main barriers to oil and gas digital transformation

Barrier	Value
Limited knowledge sharing	77%
Insufficient digital training	74%
Lack of digital talent	72%
Insufficient customer/user focus	70%
Insufficient collaboration	70%
Limited external partnerships	67%
Lacking leadership vision	62%
Inflexible organisation	59%
Low failure tolerance	57%
Uncertain return on investment	49%
Lack of transparency/trust	48%
Inadequate workforce user skills	32%
Data reliability	32%
Regulatory hurdles	26%
Formal labour resistance	24%
Immature technology	23%

Legend:
- Business priorities
- Foundational capabilities
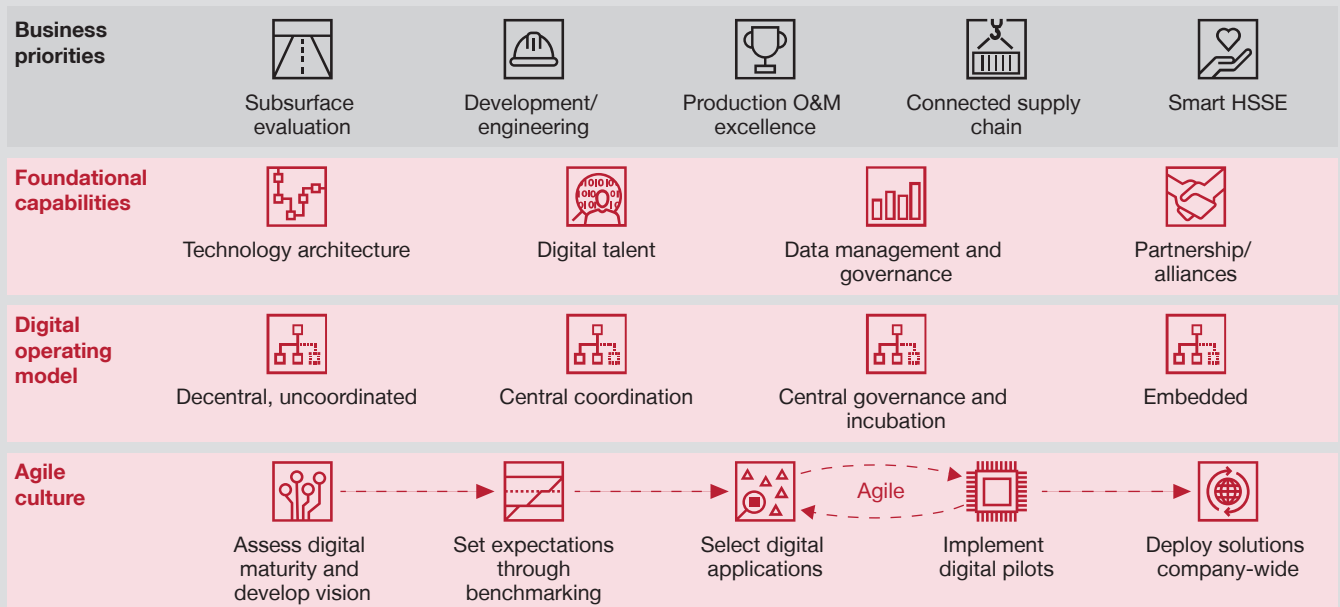- Digital operating model
- Agile culture
- Other

Source: 2020 Digital Operations Survey, Strategy& analysis

Examining these results more closely, we believe the impediments O&G companies are facing in their efforts to become Digital Champions are best divided into four areas (*see Exhibit 5*):

- The inability to identify and focus on **business priorities** that can be addressed through digital applications

- Deficiencies in **foundational capabilities**, particularly those required to develop and deploy digital tools and applications

- Outdated processes and organizational structures and the absence of a **digital operating model** to drive digital transformation across the company

- Lack of an **agile culture** that would promote collaboration, knowledge-sharing and the adoption of new ways of working.

EXHIBIT 5
Strategy& oil and gas digital transformation framework

Business priorities	Subsurface evaluation	Development/ engineering	Production O&M excellence	Connected supply chain	Smart HSSE
Foundational capabilities	Technology architecture	Digital talent	Data management and governance		Partnership/ alliances
Digital operating model	Decentral, uncoordinated	Central coordination	Central governance and incubation		Embedded
Agile culture	Assess digital maturity and develop vision	Set expectations through benchmarking	Select digital applications	Agile — Implement digital pilots	Deploy solutions company-wide

Source: 2020 Digital Operations Survey, Strategy& analysis

" The main challenges are not related to technology but rather to organizational shortcomings, primarily in change management and in technology adoption"

CDO – Global independent E&P company

A deeper dive into these four challenges brings the pathway to becoming a Digital Champion more clearly into view:

1

Business priorities

The Digital Operations Study found that two issues stood in the way of the companies surveyed making digital transformation a business priority. The first was a lack of focus or insufficient understanding of customer and user requirements to sufficiently define the business issue that needs to be addressed. The other was uncertainty about the financial returns from digital investments. This made top executives more reluctant to approve big digital projects. In our view, top business priorities when driving digitization should typically include:

- Enhancing **subsurface evaluation** capabilities to improve the accuracy of pre-drill resource estimates and the probability of success in exploration. This would, in turn, increase reserves and resource recovery in production operations.

  Example: combine artificial intelligence (AI)/machine learning, Big Data analytics, supercomputing power and cloud-based platforms and applications to advance the interpretation of seismic data and reservoir models.

- Adopting cloud-based collaboration platforms and applications in **development/engineering** to accelerate project concept selection and streamline the transition from development project to production operations while reducing risks.

  Example: integrate AI/machine learning, Big Data analytics and a centralized cloud-based data management platform to create digital twins and evergreen building information models (BIM) that can be used to simplify and make more efficient the process of facility design and upgrades, as well as construction planning and execution.

- Improving **production operations and maintenance excellence** through advances in process digitization that drive integrated resource planning, manufacturing scheduling and execution and maintenance planning.

  Example: link manufacturing execution systems (MES) to AI/machine learning, Big Data analytics and cloud-based platforms that run distributed control systems (DCS) and enterprise resource planning (ERP) applications. This holistic system can optimize the value chain and operations and management (O&M) performance across integrated upstream and downstream activities.

- Developing a **connected supply chain** that integrates end-to-end processes and workflows across key suppliers and customers to reduce cycle time and improve inventory management.

  Example: integrate AI/machine learning, smart track-and-trace technologies, Big Data analytics and cloud-based platforms with ERP applications to enhance supplier interactions, warehousing and logistics with advances such as digital category management, smart replenishment and shipment transparency.

- Reducing human exposure to hazardous operations, improving risk management, monitoring of emissions and meeting sustainability targets with **smart health, safety, security and environmental (HSSE)** applications.

  Example: combine AI/machine learning, MES, Big Data analytics, autonomous technologies (for example, robots, drones and digital twins), Internet-of-Things platforms (for smart metering, among other things) and cloud-based applications to advance HSSE management systems. Features could include automated permits to work, real-time unsafe conditions alerts, emergency response, early identification of potentially unsafe or environmentally threatening incidents, and energy efficiency management with reduced human exposure to hazardous conditions.

2

Foundational capabilities

In our Digital Operations Study, respondents identified digital talent and skill shortages as a primary hurdle to digitization. To overcome this problem, O&G companies need to both upskill their employees and hire new talent. Successful upskilling requires first defining the competencies that need to be developed and then creating formal learning programs, including digital academies, boot camps and online learning portals and apps.

O&G companies should also consider recruiting outside talent to bridge the gap between their current digital skills and those needed for digital transformation. These positions include data scientists, software engineers, IT architects and cyber-security experts. Since these specialists typically work in many different industries, O&G companies should look beyond the oil and gas sector to fill these specialized vacancies. They also need to develop value propositions and upgrade talent management practices in order to attract and retain the right talent.

Digital talent is just one in a series of foundational capabilities of a digital transformation. Other critical foundational capabilities include:

- **Technology architecture.** Companies should assess whether their existing IT infrastructure is sufficiently developed to support new digital applications and ways of working. In some cases, companies will need to replace legacy systems entirely. In other cases, new systems and solutions can sit on top of existing hardware.

- **Data management and data governance.** Although the O&G sector has always generated and used large volumes of data in discrete operations, leveraging data of different vintages from multiple sources is a huge challenge. Advances in cloud computing provide a unique opportunity to organize data to ensure that the right people (including suppliers) have the information they need at the right time. However, new security protocols and policies will be needed to govern data rights and manage risks in the cloud environment.

- **Partnerships and alliances.** While oil and gas companies need to upgrade their own digital capabilities, technology alliances and partnerships will help accelerate digitization and build scalable solutions. Such alliances should strike the appropriate balance between the protection of proprietary data and solutions, and the development of open and shared solutions.

> "Our starting point is that our industry is embarking on a digital transformation and we can't participate in it merely by recruiting 1,000 people from the likes of Google or LinkedIn. We will recruit some of them, to be sure, but really we must engage and upskill our current workforce as we already have many technology and technically savvy people in our industry."

CDO – Major global NOC

3

Digital operating model

Our survey found that both organizational dysfunction and lack of leadership are considered to be among the most significant impediments to digitization. Often, a holistic digital transformation is stymied by organizational silos, the absence of cross-functional operating models, disjointed project governance and outdated management rules and structures.

By contrast, Digital Champions have typically embedded digital operating models led by a central governance team – often the Chief Digital Officer (CDO) and a digital steering committee – to oversee the successful execution of large-scale digital initiatives and roadmaps. They also have dedicated digital teams across all functions and business units that are able to fully leverage and scale the technological implementations adopted by the company. To embrace this type of digital operating model, companies need to put in place:

- A central digital think tank led by the CDO, with representation of experts from across the functions and business units to ensure a balance of technical and technology capabilities

- A clear digital governance model, with delineated processes and accountability, including oversight responsibility for execution of the overall digital roadmap

- A process for incubating new digital businesses and initiatives

- A company-wide digital capability upskilling program

- A plan for managing technology partnerships and collaborations

- An extensive knowledge-management program, including ways to share best practices across the organization.

> "I foresee a future in which our company is more team-orientated and cross-functional, organized around data collection, access and analytics. The boxes and lines in the organizational chart will probably matter a bit less."
>
> **CDO – Major global NOC**

4

Agile culture

The final set of obstacles to digitization, according to our study, included insufficient collaboration, a low tolerance for failure (crucial for experimentation with new technologies and applications), limited employee empowerment and inadequate knowledge sharing. In other words, a lack of an "agile" culture. Companies with agile cultures are able to adopt innovative solutions to internal and external challenges more easily, and also have the flexibility to alter direction in mid-stream if conditions change.

When embracing an agile culture, companies need to identify and empower cross-functional teams, brought together to solve specific challenges. They develop "proof of concept" applications to address a problem, and proceed to test their solutions, such as new digital programs, in small, secure environments. Based on user reactions and business performance, these agile teams then embark on the next phase of program development. The ultimate goal is large-scale deployment, but if the idea does not pan out, agile teams can ditch it and start again from scratch.

To enable agile development methods, O&G companies need to have a digital operating model (established governance, organizational roles and accountability) and foundational capabilities (talent and technology enablers) as identified above. (For a detailed discussion of how organizations adopt agile design and development strategies, see Six Dimensions of the Agile Enterprise: What Leading Companies Are Doing).

> "We are bringing an agile way of working to all our digital projects. That means we are allowing up-front investment in digital pilots and bringing cross-functional teams from business, IT and data sciences together to co-create applications and solutions. These teams are empowered to assess the suitability of the solutions to address the needs of the business and to determine whether to stop the software development project or scale it."

CDO – Major Global NOC

Digital Operations survey for energy from Strategy&, PwC's strategy consulting business

The aim of this survey was to determine the digital operations maturity of companies in three energy-related industries: utilities in Europe, the Middle East and Asia (EMEA); chemicals in EMEA; and global oil and gas. More than 500 interviews of C-suite and just below C-suite executives at these companies were conducted.

To calculate digital maturity, Strategy& separated potential digital traits of an organization into three categories (*see Exhibit 1A*): implementation of new technologies; digital ecosystem maturity and digital culture.

EXHIBIT 1A
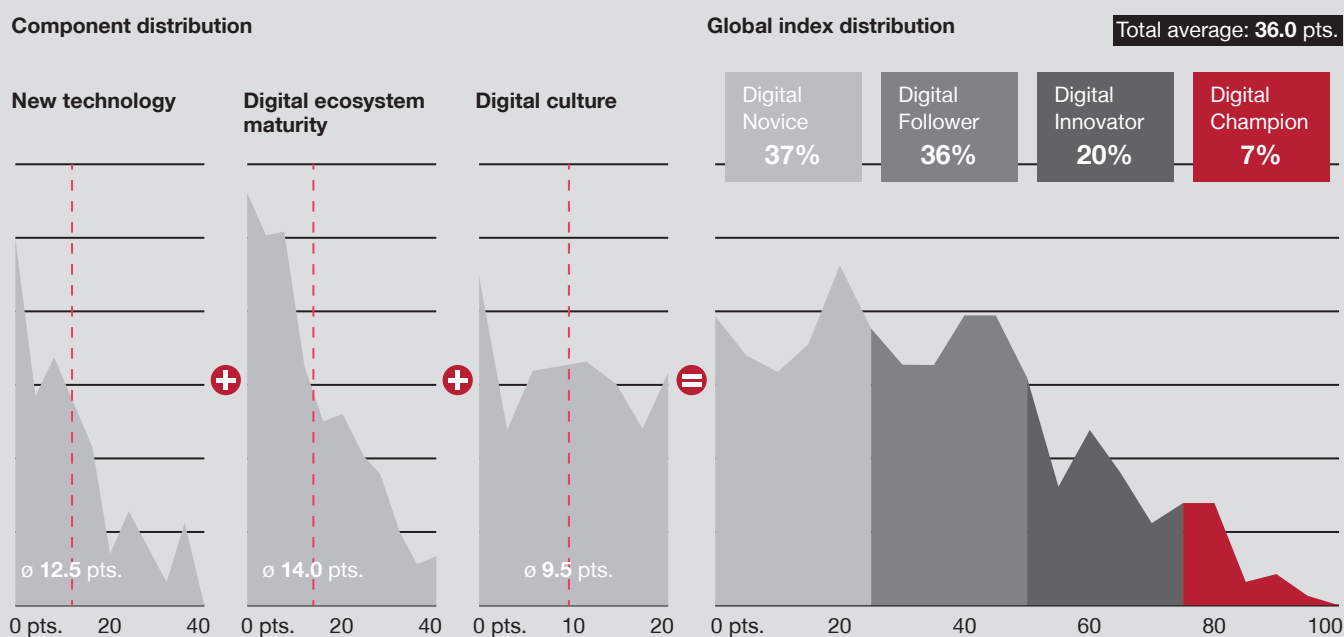**Digital Operations maturity: Construction**

Implementation of new technologies	Digital ecosystem maturity	Digital culture
AI/Machine Learning	Digital revenue share	Leadership vision and role model
Industrial Internet of Things	Digital ecosystem progress	Digital customer experience
Manufacturing execution system	Ecosystem platform	Employee qualifications
Cobots/robotic process automation	Horizontal integration	Training investments
Virtual/augmented reality	Vertical integration	Flat hierarchies and agile working
Digital twin of products		Tandems or learning groups
Energy analytics		Innovation and multi-disciplinary teams
3D printing		Fail fast culture
Blockchain technology		External expert partners
Trackand trace		
Cloud computing		

Source: 2020 Digital Operations survey, Strategy& analysis

Companies could score as high as 40 points towards digital maturity for the first two categories and 20 points for the third category. In order to reach a full score, at least 70 percent of all activities in a category had to be implemented. Digital Champions scored between 75 and 100; Digital Innovators, 50 – 74; Digital Followers, 25 – 49; and Digital Novices, 0 – 24.

In the Strategy& survey, only one in 14 (7 percent) of companies ranked as Digital Champions (*see Exhibit 1B*). The average company scored 36 points (Digital Follower) and the largest group (37 percent) were Digital Novices.

Digital Operations maturity: Construction

Component distribution

Global index distribution

Total average: **36.0** pts.

Digital Novice **37%**	Digital Follower **36%**	Digital Innovator **20%**	Digital Champion **7%**

New technology

Digital ecosystem maturity

Digital culture

➕   ➕   ⚌

ø **12.5** pts.

ø **14.0** pts.

ø **9.5** pts.

0 pts.	20	40

0 pts.	20	40

0 pts.	10	20

0 pts.	20	40	60	80	100

Source: 2020 Digital Operations survey, Strategy& analysis

CONCLUSION

O&G companies had faced formidable challenges to their efficiency, sustainability and profitability before COVID-19. As a result of the pandemic, prices have collapsed so severely that the urgency to tackle these issues has increased dramatically. One of the clearest and most viable responses to these systemic challenges is to accelerate digitization strategies to help improve resilience and remain attractive to investors. This effort should include:

Harnessing data integration and analytics applications to focus on **business priorities**

Investing in **foundational capabilities** related to technology architecture, talent, data management and governance, and partnerships and alliances

Adopting a **digital operating model** with clear governance and accountability guidelines

Embedding an **agile culture** to design and implement innovative solutions

Some O&G companies have already taken their first digitization steps. Some are well on their way to becoming Digital Innovators and even Digital Champions. But for the industry as a whole, achieving digital leadership will require vision, discipline, persistence and substantial changes to existing O&G operating models.

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