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Discover innovation.
Unlock transformation.

INNOVATION FORECAST 2021: OIL & GAS

SECTION 1

How will digital determine the future of oil and gas?

As the oil and gas sector emerges from price wars, cybersecurity attacks and the COVID-19 pandemic, the importance of digital transformation has never been more apparent. Traditionally reluctant to embrace digital technologies, the industry has recently undergone a perception shift. Companies have come to see transformation as crucial to their survival, and they've devoted more revenue to it in turn. So how can these organisations overcome remaining obstacles to implementation and harness the full potential of digital transformation?

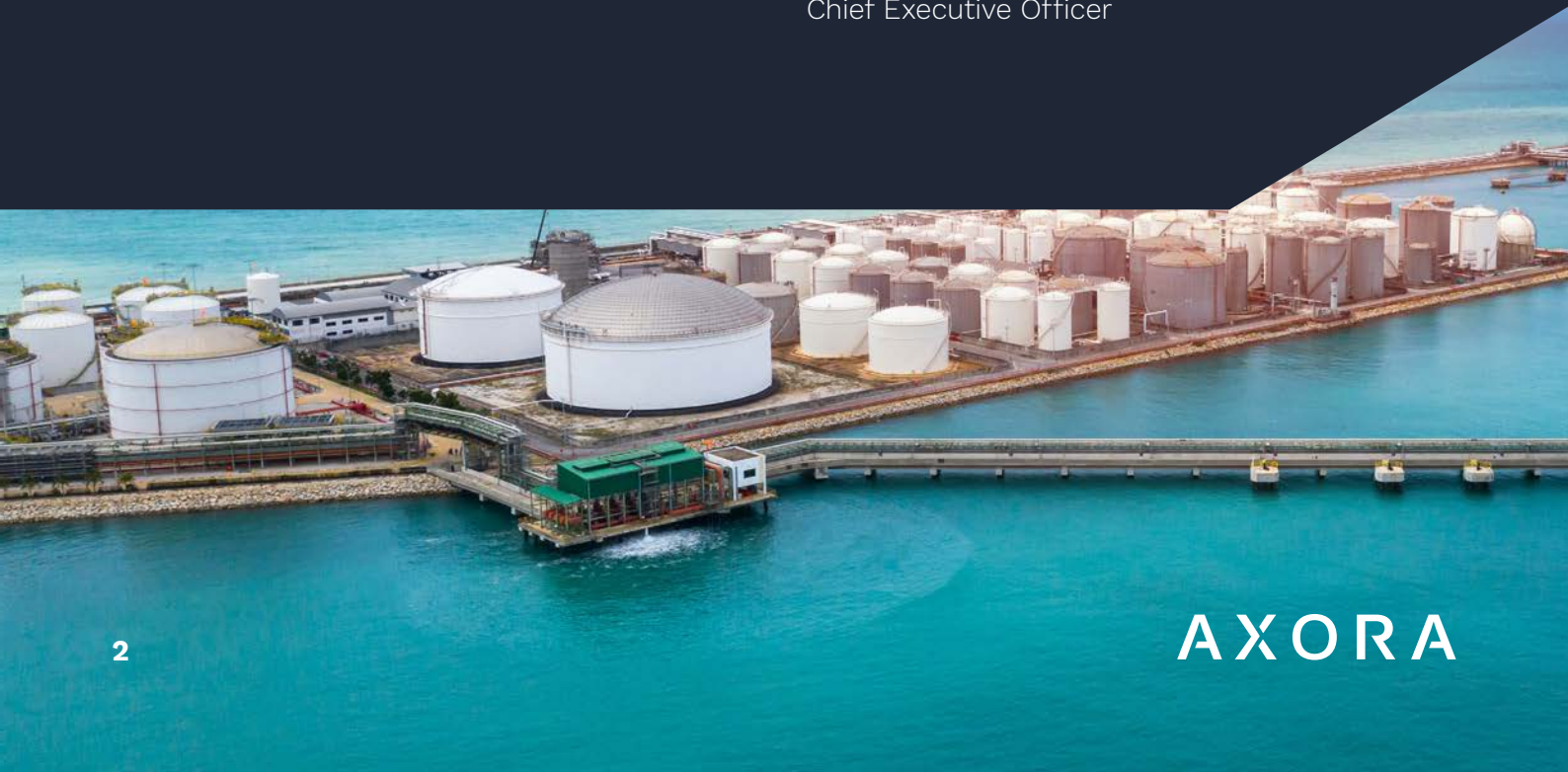
Let this report be your guide. The Axora Innovation Forecast: Oil and Gas is based on a survey of 150 decision makers worldwide, as well as interviews with small and large operators alike. The report shines a light on the experiences of small, medium and large-sized oil and gas companies, revealing trends that will enable you to focus your efforts ahead of the upcoming hydrocarbon boom.

Axora's oil and gas team also shares insights that will help you:

- **Identify technology solutions** by highlighting where other companies are succeeding (scan pages eight and nine for more on this)
- **Build a business case** that justifies technology investments (go to page six to see more)
- **Overcome cultural inertia** (see the main barriers on page four)

Not only will the report inform short-term thinking, but it will also facilitate medium-term planning. With the energy transition on its way, it's never been more important to prepare for the future. The Axora Innovation Forecast will help you do just that.

Ritz Steytler
Chief Executive Officer



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SECTION 1

Who we surveyed

Senior decision makers from 150 oil and gas companies

Departments: IT, Operations, Engineering & Technical Services, Senior Site Management

Company size:

50 → 5,000+

employees

* Survey conducted March-April 2021

Locations:

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SECTION 2

It's no longer about formulating digital transformation strategies, it's about executing them

The oil and gas industry recognises that digital transformation is business critical. But how much are organisations prepared to invest? And how are issues like cybersecurity and data management affecting implementations?

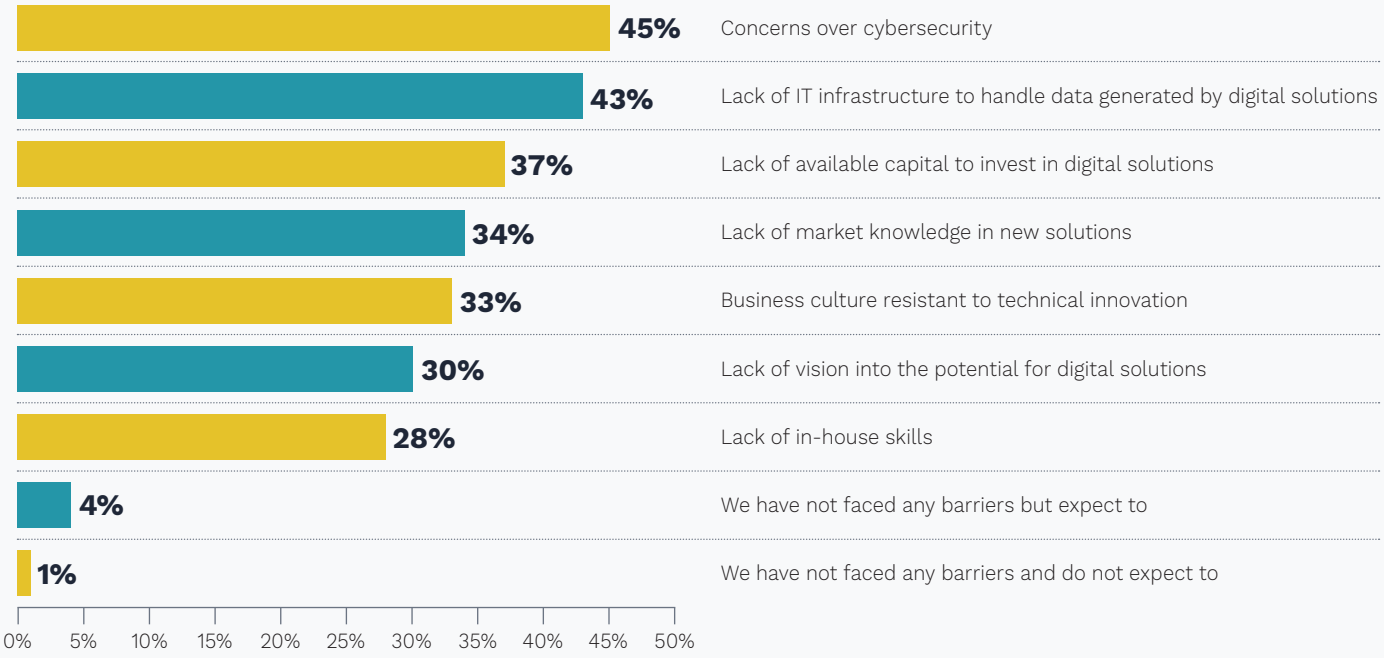
On paper, the digital transformation argument is already won

The sector has come a long way in its perception of digital transformation: 99 percent of survey respondents said technology and innovation were critical to their organisation's survival.

The results reflect a positive view of how companies' digital transformation strategies were being implemented. The majority of respondents (55 percent) said they were at an advanced stage of implementation. Decision makers in Brazil were most likely to see themselves as advanced, followed by those in North America. Respondents in the Middle East and Europe saw their companies as lagging – they were most likely to say their company had a strategy but hadn't yet started implementing it.

The biggest individual barriers to execution were cybersecurity concerns (45 percent of respondents) and a lack of IT infrastructure to handle data generated by digital solutions (43 percent). However, 61 percent of respondents reported facing issues due to either a lack of in-house skills or a company culture resistant to technical innovation. These skill shortages and cultural barriers were most prevalent among European companies.

Barriers to developing and deploying digital solutions



* Percentage of respondents citing each barrier; respondents could select as many barriers as were relevant to their experience.

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99% of people said technology and innovation were **critical to their organisation's survival**

Companies are prepared to increase digital investment, but in a considered way

89 percent of respondents said there was an increase in the percentage of their company's annual global revenue dedicated to digital transformation over the past year. Despite the rise, digital investment still doesn't represent a significant proportion of annual global revenue overall. Currently, the most common percentage of annual revenue dedicated to transformation is one to five percent. North America is the only region reported to be spending more than 20 percent.

However, respondents anticipate the proportion of revenue invested will increase in the next two years. South African respondents predicted the biggest increase in this time. Currently, no South African respondents reported spending more than 20 percent of annual global revenues on transformation. In two years, this jumps to 12 percent, matching North American levels.

In three to five years, European respondents predict they will catch up. None currently said they were spending more than 20 percent of annual global revenues on transformation, and none anticipated reaching this level within the next two years. However, in three to five years, 12 percent of European respondents anticipated spending more than 20 percent. In fact, by that time, European companies expect to spend more overall on transformation (16 to 20+ percent of annual revenue) than any other region.

89% **89% of respondents said the percentage of their company's annual global revenue dedicated to digital transformation had increased in the past year**

Food for thought

- Brazil sees itself as being most evolved in digital transformation strategy implementation, but North America is spending a greater percentage of global annual revenues on technology investments
- South Africa predicts a steep rise in digital investment in the next two years. Currently, no South African respondents reported spending more than 20 percent of annual global revenues on transformation; within two years, 12 percent of South African respondents anticipate reaching this level
- Europe is on a slower trajectory in terms of digital investment – but in the next three to five years, they anticipate being the biggest digital transformation spenders in terms of proportion of annual global revenue

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SECTION 3

A digital foundation must be established so it can deliver value as the energy transition gathers momentum

Digital transformation will play a role in the post-pandemic recovery, helping boost productivity and deliver more value from machinery. But its key role will be in enabling the energy transition – providing the technological foundation needed to underpin long-term success.

Digital technology investment is an important medium-term priority as companies prepare for the energy transition

Business sustainability is seen as the most important concern over the next three years, with 39 percent of respondents ranking it as a top-three priority. This is unsurprising when we consider pandemic-related economic upheaval and how it has shone the spotlight on business continuity issues.

Digital technology investment came a close second, with 38 percent of respondents citing it as a top-three priority for their organisation over the next three years. This highlights the perception challenge in getting the wider business on board with transformation. Although respondents had a positive view of their digital transformation strategy implementation and predict investment to increase in the short term, less than two-fifths cited it as a major priority.

In three to five years, investing in digital technology is forecast to become the most popular priority, overtaking business sustainability. Investing in renewable energy climbs to third place. This shows the perceived increase in technology's importance as the energy transition approaches.

SECTION 3

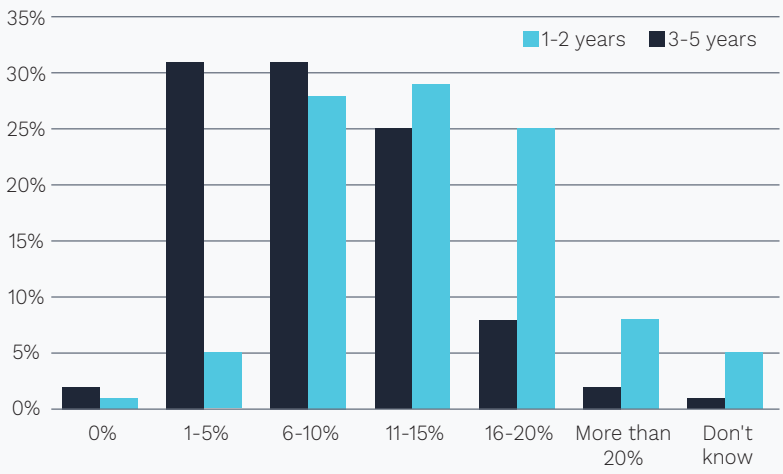
38% **of respondents said digital technology investment was a top 3 priority for their organisation over the next 3 years**

Companies anticipate that digital transformation will deliver a range of benefits to people and operations – with cost savings building over time

Respondents cited a range of reasons for deploying digital solutions. There were three clear drivers from a people perspective: increasing productivity (59 percent of respondents), boosting labour effectiveness (55 percent) and providing a better working environment (55 percent). From a machinery and operations perspective, the most popular drivers were increasing productivity and improving return on investment in equipment (both cited by 43 percent of respondents).

Respondents anticipate achieving more significant cost savings from digital technology over time. In the next two years, just eight percent of respondents anticipated achieving 16 to 20 percent savings, with 31 percent anticipating saving one to five percent. However, by 2026, 25 percent of respondents predict a 16 to 20 percent cost-saving.

Anticipated percentage cost savings from digital technology investment



Food for thought

- Over the next three to five years, creating digital oilfields, boosting acquisition and use of renewable energy, and reducing greenhouse gas emissions become increasingly important priorities for oil and gas companies
- There's currently scepticism about short-term cost savings from digital technology. In the next two years, 31 percent of respondents anticipate achieving just one to five percent savings. However, people are more optimistic for the next three to five years. By then, only five percent of respondents predict saving one to five percent, with people largely anticipating saving 16 to 20 percent

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SECTION 4

There's a favourable view of digital deployments to date

Our survey showed an eagerness to implement different technologies – from cloud-based platforms and data architectures to IIoT and AI. And companies are reaping benefits in applications ranging from production to repair and maintenance.

76%

of organisations have deployed cloud-based platforms to some extent

"The data from robots is often 10 times better, but comes at a premium. Not all plants are ready to put the extra data into action and may balk at the higher price tag. So it's about bringing the price point down so it's within a typical budget, but they're getting all this extra data."

Mike Currie,
VP of Marketing and RevOps, Gecko Robotics

Technology-wise, companies have focused on deploying cloud-based platforms and Industrial Internet of Things (IIoT)

Deployment rates were relatively high across all 10 technologies we asked about[1]. Cloud-based platforms and IIoT were the most popular digital technologies deployed to date – 76 percent of respondents have deployed cloud-based platforms to some extent, followed by IIoT (75 percent). Cloud-based platforms, modern data architectures and artificial intelligence (AI) were seen as bringing the biggest benefits to the business.

We also asked decision makers about the degree to which technologies were implemented across their organisation. IIoT was most commonly cited as having been 100 percent deployed (19 percent of respondents), followed by AI (18 percent).

Interestingly, when asked about technologies their organisation was not going to trial or deploy, robotics was the most common answer (although only five percent of respondents selected this option).

[1] We asked survey respondents about 10 technologies: cloud-based platforms, modern data architecture, artificial intelligence, Industrial Internet of Things, advanced analytics and sensors, machine learning, semi-autonomous equipment, digital twins, autonomous haulage technology and robotics.

SECTION 4

Application-wise, companies have focused on solutions for monitoring upstream oil production and conducting remote installation inspections

We asked respondents about 10 different technology applications[2]. All were popular – at least 65 percent of respondents said each was being deployed at their organisation. The most popular application was monitoring upstream oil production, with 81 percent of respondents saying they were at some stage of deployment. Inspecting installations remotely came in second place (78 percent).

As with the technologies, we asked about the degree to which each application was deployed across the business. Gas leak monitoring had the greatest penetration, with 29 percent of respondents saying they'd achieved 100 percent deployment within the organisation. This was followed by upstream production monitoring (25 percent).

Interestingly, internal corrosion monitoring had the lowest deployment. However, for those that have implemented it, it's seen as the application delivering the greatest benefits to the organisation.

81%

of organisations have deployed technology for monitoring upstream oil production

> "Compared to external corrosion monitoring, deployment of internal corrosion monitoring solutions tends to be more time consuming and involves higher risk. Therefore, [operators] are still very reliant on conventional monitoring methods."
>
> **Kim Ironside,**
> Account Manager, Inductosense

Food for thought

- There's substantial appetite to deploy all technologies included in the survey. Overall, companies are 50 to 99 percent of the way through deploying technologies across their organisation
- Cloud-based platforms, modern data architectures and AI are the technologies seen to bring the biggest benefits
- Internal corrosion monitoring and gas leak monitoring are the applications seen to bring the biggest benefits

[2] We asked survey respondents about 10 applications: remote well monitoring and optimisation, offshore monitoring and inspection, remote inspection of installations, monitoring upstream oil production, smart lubricant monitoring, monitoring reserve volumes, automated production monitoring, predictive analytics for corrosion impact, monitoring internal corrosion and erosion, and monitoring gas leaks.

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SECTION 5

Mid-size companies are excelling at digital transformation, but small players have time to catch up

Our data shows that mid-size companies are leading the digital transformation race, but there's still plenty of opportunity for competitors of all sizes to make up ground.

Currently, mid-size companies are experiencing the greatest benefits from digital technology

We asked respondents what percentage of their workforce was experiencing benefits from the different technologies and from the various applications. The results showed that, on average, companies with 250 to 999 employees are seeing the most widespread benefits from technology.

Companies with 1,000 to 2,999 employees reported the lowest percentage of the workforce seeing benefits from all technologies and from every application.

The smallest companies we surveyed have 50 to 249 employees. Compared with their mid-size and larger peers, they're experiencing more widespread benefits from digital solutions used to monitor gas leaks and reserve volumes in particular.

38%

of the workforce has started seeing benefits from digital technologies, on average, at companies with 250 to 999 employees

"Mid-sized companies, by definition, are more agile and nimble. There aren't multiple layers of approvals to go through, and they don't have legacy tech systems and architecture to deal with, so they're not constrained by many things large companies have."

Sergey Sushentsev,
Managing Director and Partner,
BCG Digital Ventures

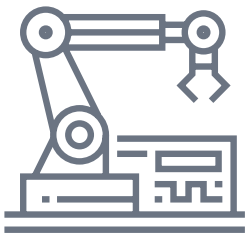
SECTION 5

AI is viewed as the greatest growth opportunity for oil and gas companies

AI is seen to provide the biggest growth opportunity in the next five years. This is interesting given that AI was in fourth place when we asked about the different technologies companies have deployed[3]. However, those that have implemented AI are pushing it through; AI was in second place when we asked about technologies that were 100 percent deployed across the organisation.

Companies with 250 to 499 employees are most likely to see strong potential from AI over the coming year – 70 percent of respondents from businesses of that size predicted it would offer the greatest growth opportunities. There was a major drop in perceived growth value among decision makers from larger and smaller companies for the next 12 months.

Over the next three to five years, companies with 500 to 999 employees anticipate AI driving more growth (75 percent of respondents from those companies ranked it as the top growth driver). However, in that period, smaller companies predict a major decline in AI's value – 35 percent of respondents cited it as the biggest growth driver in the coming year, compared with just 15 percent in three to five years.



55%

of respondents said AI would provide the biggest growth opportunities in the coming year

> "Even if oil and gas companies say they're doing AI projects, they're still not fully understanding where they're standing... Now you need to optimise value streams across your company, and proper data science and AI is the only way to bring them together."
>
> **Charles Lewis,**
> Director of Technology, global energy company

Food for thought

- Companies with 250 to 999 employees are experiencing the greatest benefits from digital technologies across applications
- Companies with 1,000 to 2,999 employees perceive the least benefit from every technology and in every application
- Companies that have deployed AI are quickly pushing it throughout the organisation – it's penetrating faster than other technologies
- AI is seen to provide the biggest growth opportunity in the short and medium term

[3] After cloud-based platforms, IIoT, and advanced analytics and sensors.

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SECTION 6

You can't go it alone to achieve digital transformation success

Across the sector, there's widespread recognition that organisations need specialist expertise to guide them through their digital transformation journeys. There are recognised benefits from engaging with partners, internal consultancies and government bodies, but industry professionals also need opportunities to speak with peers and to learn from others' experiences.

Technology and innovation partners are having a big influence on digital transformation strategies

73 percent of respondents said a partner – either generic or industry-specific – had the biggest influence on their organisation's digital technology adoption. Working with an industry-specific partner is most popular among companies with 500 to 999 employees, but other organisations prefer to work with a generic one.

Internal consultancies have substantial influence among businesses with more than 1,000 employees, but this option is rarely used at smaller businesses.

Just 14 percent of respondents said government bodies had the greatest influence on their digital technology adoption. These were mainly from businesses with 1,000 to 2,999 employees.

73%

of respondents said a partner had the biggest influence on their organisation's digital technology adoption

People need ways to learn from their peers

Although organisations are relying on different partners, internal stakeholders and government agencies to inform their digital transformation strategies, there's still a perceived lack of meaningful guidance. 61 percent of respondents said they wanted access to more information on digital transformation.

But although the internet, media and conferences are full of discussion on technology and digitisation, people are finding it hard to access relevant nuggets. In fact, 25 percent of respondents said they were overwhelmed with the amount of information available. And 99 percent said they'd benefit from a digital transformation community where they could engage with peers in frank discussions about technologies, applications, experiences and benefits.

61%

of respondents said they wanted access to more information on digital transformation

> "A clearly articulated, well-thought-out digital strategy is clearly key to leaders at oil and gas organisations. Now, working together as a sector is critical when it comes to realising digital's full potential and supporting the energy transition."
>
> **Jack Ingram,**
> VP Corporate Development, Energy Council

Food for thought

- 73 percent of people said a partner had the biggest influence on their digital technology adoption
- 99 percent of respondents said they'd benefit from a digital transformation community

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SECTION 7

So you've read this report – here's what to do next

The oil and gas sector has a unique opportunity as we emerge from the pandemic. The hydrocarbon boom in the coming years will provide the capital and the time to deploy digital technologies strategically, so companies can position themselves for the energy transition on their own terms.

It's clear from this research that partnership and information sharing are critical to de-risking digital transformation. What's the best way to facilitate this now, so you're in a strong position as the organisation's technology investments necessarily increase?

Here are five questions to help you refine your approach and access insight that will drive value

- **Can you afford to ignore the competitive shift due to digitalisation?** Because your competitors won't.
- **Do you develop internally and deploy, or adopt externally?** Or is your business best suited to a hybrid delivery model?
- **Do you understand the current situation in your organisation?** If not, evaluate the specific business outputs you need from digital transformation.
- **Are you trying to improve internal transactions, speed of delivery to your customers, or both?** Adopting digital without tangible outputs will negatively influence your business culture.
- **Do you understand what you're trying to improve and why?** This level of clarity brings your digital adoption strategy to life.

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About this study

Axora partnered with market research company Vanson Bourne to survey 150 oil and gas decision makers, evenly split across Australia, Brazil, Europe, the Middle East, North America and South Africa. Job roles included Chief Executive Officer, Chief Technology Officer, Chief Operations Officer, Chief Information Officer, Chief Information Security Officer, Head of Operations, Head of Strategy, Head of Engineering and Head of Innovation. The research was conducted in March and April 2021.

We also conducted qualitative interviews with 12 industry stakeholders, some of whom are featured as case studies in this report.

About Axora

Axora is the digital solutions marketplace for industrial innovators. We make it simple for industrial companies to discover, buy and sell digital innovation, driving safety, sustainability and efficiency across their entire operations.

Beyond our marketplace, we empower our community of industrials, technology companies, industry experts, universities and professional services with the latest digital innovation reports, insights and curated events.

Coming soon: an exclusive community for oil and gas professionals

Email nicole.lyons@axora.com
to learn more and join the waitlist.