Research Insights

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Energizing the oil and gas value chain with AI

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By Ole Evensen, Spencer Lin, Dariusz Piotrowski, David Womack, and Ash Zaheer

Key takeaways

AI is essential to optimize the value chain
Artificial intelligence (AI) is important to the enterprise—as attested by nearly six in ten survey respondents. AI assists with the oil and gas industry's most important business objectives of reducing operational cost and introducing greater levels of automation. However, less than half of respondents say they are executing an enterprisewide AI strategy.

AI champions provide a guide
We identified a small group of oil and gas leaders—24% of survey respondents—that have a well-defined enterprise AI strategy. Their enterprises lead in financial performance for revenue growth and profitability. These AI champions are more effective at developing and executing enterprise strategy. Nearly three-quarters of these leaders say they have overachieved expectations for creating value from AI investments over the last three years.

Success with AI requires three elements
AI champions establish a foundation to take advantage of AI. They execute an AI business blueprint. They infuse AI across the value chain.

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The new reality

The oil and gas (O&G) industry is facing incredible challenges amidst the COVID-19 pandemic. The industry's decrease in demand has occurred at the same time as production disputes, resulting in both the oversupply of resources and the subsequent oil price collapse. While challenging external forces are not new to O&G companies, they are finding themselves forced to adapt with greater speed and agility to address the current landscape and prepare for a new market reality.

The current oversupply scenario has filled almost seven billion barrels of global storage. Cargo vessels are being used as crude storage rather than transport. The subcontractor services ecosystems have been casualties of the crisis, with contracts terminated, projects postponed, operations significantly reduced, and rate-cuts demanded. The magnitude and implications of this challenge have motivated political alliances, agreements, and decisions previously considered impossible, such as widespread production cuts.[1]

Supply/demand imbalance has imposed a new economic situation that challenges organizations' ability to maintain production in individual fields, sanction new development, or even explore new areas. Likewise, downstream runs have been curtailed and await an increase from the nominal 30% to 40% decrease in fuels purchases.[2]

The combined demand implications from both the current pandemic and long-term energy demand mix are setting the scene for long-term oversupply. Consequently, operators are focusing on return rather than growth, which puts a premium on assets and organizations with low breakeven cost capabilities.

Even amid all this, O&G companies are planning for their larger transformation that will transition energy beyond hydrocarbons. Society, shareholders, and employees have higher expectations for operational integrity to embed sustainability goals, as well as resilience to the cyclic economic challenges the industry still may face.

Nearly

4 in 5

of “AI champions” are executing an enterprisewide AI strategy

43%

AI return on investment (ROI) has been generated over the past year by “AI champions” compared to a 29% ROI for their peers

95%

of “AI champions” say they have built a data-driven culture

Unprecedented capital and operating spending cuts, as high as 50% have been announced to secure the economic platform required to advance the transition on a very aggressive timeline. ExxonMobil cut its capital budget for 2020 by 30%, or $10 billion and its cash operating expenses by 15%.[3]

Shell has set itself an ambition to be a net-zero emissions energy business by 2050, or sooner, in step with society.[4] The digital transition can help the company progress the energy transition. Shell is approaching the challenges and opportunities that these transformations present along three ways: 1) collaborating with others; (2) building capability; and (3) giving customers choice.[5]

Importance of AI

The new (ab)normal environment requires O&G organizations to digitally enable themselves to be more equipped to respond with agility and drive business performance with new approaches and ideas. As part of this journey, optimizing the value chain with artificial intelligence (AI) is essential. To understand where O&G companies are with their AI efforts, the IBM Institute of Business Value (IBV) and Oxford Economics surveyed 400 O&G executives in 18 countries who are involved in defining or executing AI strategies and/or implementations for their organization (see “Study approach and methodology”).

56% of the O&G executives surveyed tell us that AI is important to the success of their organization today. And that number will likely increase to 84% in just three years. Existing AI investments have generated value for their organizations. Across all respondents, an average 32% return on investment has been generated in the past year. An expense reduction of 3% and a 3% increase in revenues were achieved over the past three years. For an average $10 billion company with a 10% margin, this translates to an additional $570 million in profit. AI investments have also reduced time to market for new products/services by 31 days.

Nearly two-thirds of executives surveyed are focused on reducing operational costs.

AI investment is critical because organizations cannot address their most important business objectives without it (see Figure 1). Nearly two-thirds of executives surveyed tell us they are focused on reducing operational costs. When processes are complex and asset intensive such as those in O&G, AI can have a strong influence on operations.

58% say they want to introduce greater levels of robotics and automation and nearly half want to grow market share organically and launch new products/services/value propositions. Across the O&G segments, the top two objectives are the same.

AI is unlike other exponential technologies. It learns and is guided by algorithms, can adapt, refine and alter its responses and decisions. It can be applied in major business processes or activities. By combining AI with other exponential technologies, O&G companies can fundamentally reimagine the way the business operates and engages with its stakeholders. This could include developing new ways of realizing and monetizing value, redefining customer engagement, and creating compelling experiences for employees and partners.

Figure 1

Most important business objectives by segment

Objective	Oil and Gas (overall)	Upstream	Midstream	Downstream
Reduce operational costs	63%	69%	65%	53%
Introduce greater levels of robotics and automation	58%	57%	57%	61%
Grow market share organically	46%	50%	38%	50%
Launch new products/services/value propositions	44%	37%	49%	44%
Enter new geographic markets	41%	44%	33%	45%
Provide a personalized/seamless customer experience	40%	36%	37%	47%
Pursue mergers and acquisitions	37%	32%	46%	33%
Improve cybersecurity	34%	36%	31%	36%
Increase partnerships/alliances	33%	29%	39%	31%
Pursue disruptive value-creation opportunities across the industry value chain and beyond	25%	24%	23%	27%
	1	2	3	4	5	6	7	8	9	10

Source: Q1. What are the most important business objectives of your organization? n=400

Only 47% of the O&G respondents say they are executing an enterprisewide AI strategy.

State of AI

While respondents stated the importance of AI to the O&G organizations, the application of AI across organizations isn't commonplace. Only 47% of the O&G respondents say they are executing an enterprisewide AI strategy.

The good news is that AI investment is being combined with other exponential technologies. Today's percentage of the technology budget is shared across cloud computing, robotic process automation, Internet of Things, AI, mobile, and other technologies. Of these technologies, AI's percentage is expected to grow the fastest from 14% to 17% of technology budgets in the next three years.

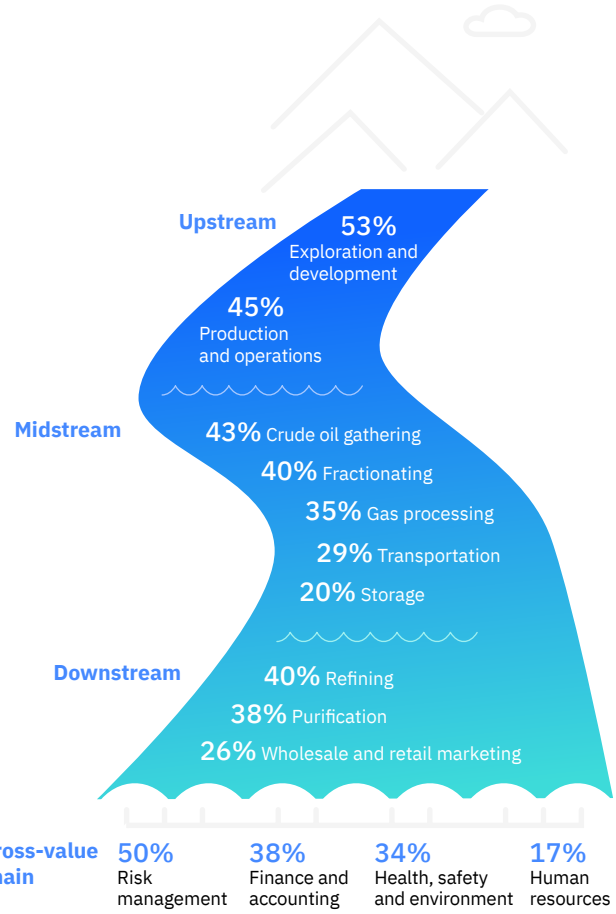
O&G respondents indicated that AI has been implemented in select areas in their value chain (see Figure 2). In particular, the majority are using AI for exploration and development, and risk management.

AI in upstream helps with identifying the "optimal" well locations, improving efficiency and safety of drilling, and improving the performance of oilfields related to recovery strategy and ultimate recovery or "return on field." An AI system using tools such as machine learning, artificial neural networks, expert systems, and fuzzy logic, can analyze as well as help use and better understand data from seismic surveys, geology evaluation, and reservoir simulations. This analytical approach can potentially improve the global average hydrocarbon reserves recovery factor up to 10%, equivalent to unlocking an extra $1 trillion barrel of oil equivalent (BOE).[6] AI initiatives related to subsurface and reservoir understanding can yield production improvements of approximately 15% to 30%.[7]

AI in midstream and downstream assists with managing the process variables and reducing downtime associated with the fractionating, purification, and refining processes by monitoring equipment, pumps, and compressors. With crude oil gathering, AI supports forecasting of product flow, demand, and price to optimize profit.

Figure 2

Areas where AI has been implemented



Source: Q6. Which technologies have you implemented in the following areas? n=400

AI assists with risk management to help manage uncertainty and volatility. For example, in the supply chain, weather impacts the movement of raw materials, finished goods, and products. Storms, flooding, and severe winds can create transportation and delivery nightmares. AI can help by incorporating weather data with operational data to adjust routing, lead times, and capacity.

The ability to leverage AI is challenged without proper data management. Much useful data for O&G companies comes from their sensors, including technologies, assets, services, and equipment. Without an emphasis focused on taking advantage of this data and proper data governance, these companies are missing out on insights to drive operational efficiency, enhance customer engagement, and grow through new products and services. Only 38% of respondents indicated they have enterprisewide information standards. Less than half have common data sourcing and only two in five have consistent definition of metrics.

An IT infrastructure also needs to be in place. Because AI and its decisions are grounded in data, an enterprise IT architecture is mandatory. Yet, only two in five O&G executives indicated their organizations have established a comprehensive and consistent enterprise architecture in alignment with business activities to support their digital initiatives.

Under half of the executives surveyed indicated they have developed a hybrid multicloud environment to support the business strategy. Without this foundation, organizations will likely struggle to develop or maintain data in their business around customer touchpoints and across ecosystems.

Insight: Comparison of survey respondents

The survey of O&G executives included 182 respondents collected in January through March 2020, dubbed “Pre-COVID-19 respondents,” and 218 respondents collected in June and July 2020, named “During Pandemic respondents.” The top business objectives are the same across these two groups with reducing operational costs as the top imperative and introducing greater levels of robotics and automation as the second imperative.

Not surprisingly, the During Pandemic respondents indicate they aren’t as effective against those objectives. The combination of the COVID-19 pandemic and the oil price collapse created an environment these respondents were not necessarily prepared for and exposed the resilience of their operations. This is reflected in lower effectiveness at developing and executing strategy for the During Pandemic respondents compared with the Pre-COVID-19 respondents.

With respect to AI, the importance of AI to future organizational success is similar across the two sets of respondents with 88% for Pre-COVID-19 group and 79% for During Pandemic respondents. These two respondent groups are also consistent in their AI progress with nearly half of both groups having either a fully executed AI strategy or have taken steps to transform against their strategy and execution plan.

AI champions have been able to increase revenues, reduce expenses, maintain staffing, and spend less on capital relative to their peers.

Learning from AI champions

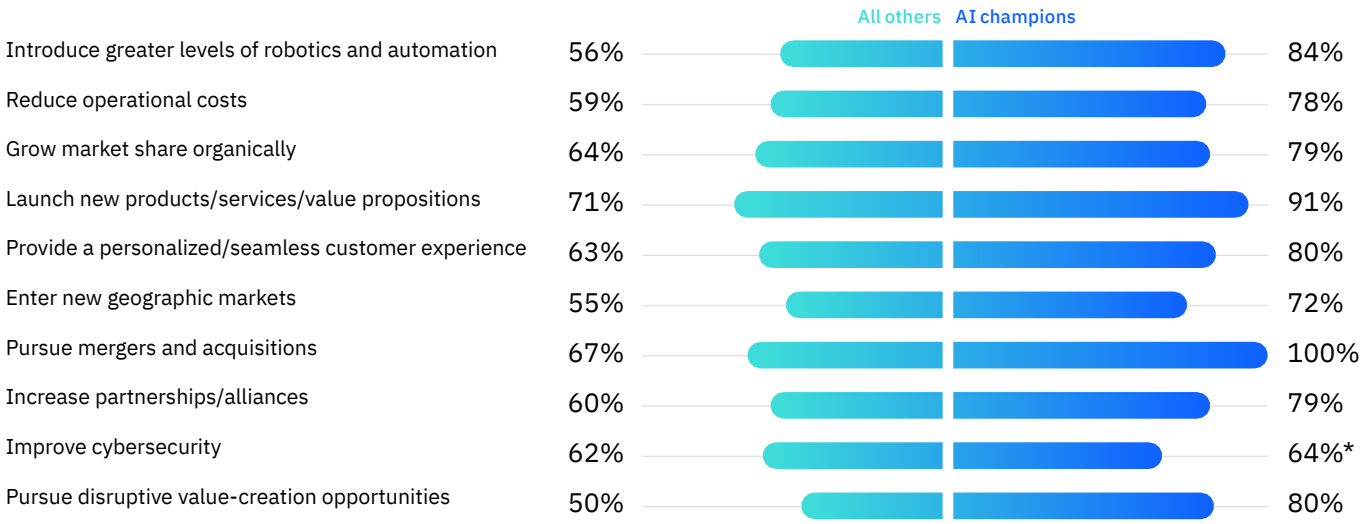
To help organizations identify specific strategies to improve their AI capabilities, we analyzed survey responses and identified a small group of O&G "AI champions," consisting of 24% of our survey sample. These executives self-reported that their organizations had a well-defined enterprisewide AI strategy that their organization understood.

AI champions have generated more value with their AI initiatives than their peers. Nearly three-quarters of these leaders say they have overachieved expectations for creating value from AI initiatives over the last three years versus just 37% of all others. They have achieved a higher ROI on AI investments—43% compared to 29%—while spending roughly the same on AI—$4.5 million per billion in revenue versus $4.2 million per billion in revenue for peers.

These leaders deliver better financial performance than industry peers—77% versus 52% for revenue growth and 77% versus 50% for profitability. These AI champions are more effective at developing (85%) and executing (92%) their enterprise strategy versus peers (58% and 71%, respectively). And their leadership is reflected in being more effective against the most important business objectives (see Figure 3).

Figure 3

AI champions are more effective at addressing business objectives

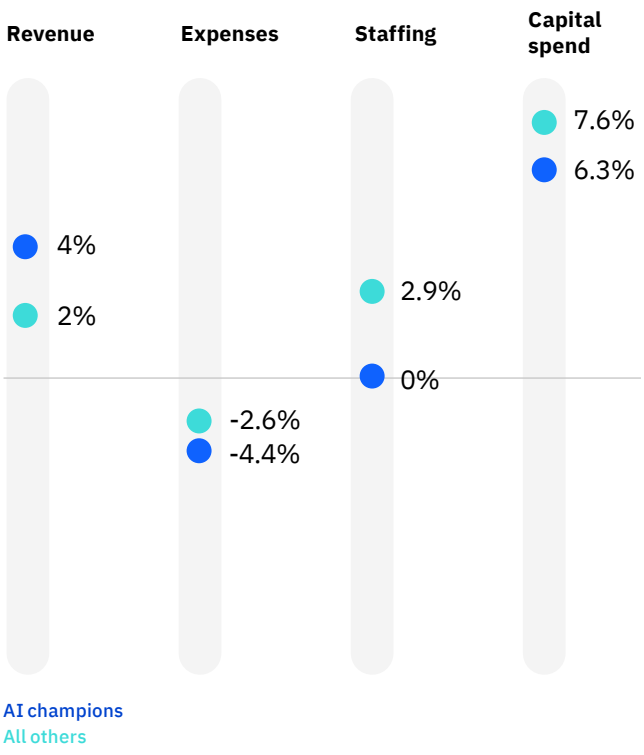


** Results using low counts are statistically unreliable but can be considered directional. Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale. Source: Q2. How effective is your organization at addressing these business objectives? n=99 to 250*

Based on their AI initiatives, AI champions have been able to further increase revenues, reduce expenses, maintain staffing, and spend less on capital relative to their peers (see Figure 4). Using an average $10 billion company with a 10% margin, there's over a $360 million profit advantage for AI champions versus their cohorts.

Figure 4

Value of AI investments



Source: B6. How has your organization's AI investments over the last three years impacted the following? n=400

Eni S.p.A: Boosting geological data interpretation with AI[8]

Eni S.p.A. is an Italian multinational oil and gas company. As part of its digital transformation, the company, with external support, built an augmented intelligence platform based on AI called cognitive discovery to support Eni's decision-making during the initial stages of hydrocarbon exploration, which naturally occur in crude oil.

The exploration of hydrocarbons is a complex and knowledge-intensive business that involves large volumes of data including geological, physical, and geochemical information to assess the likelihood of the presence and potential size of hydrocarbon accumulations. Cognitive discovery uses data from public and proprietary sources and is combined with knowledge derived from numerical simulations as well as the outcome of experimental setups. Geoscientists then use AI to contextualize and present relevant information, which helps them to improve decision making and the identification and verification of possible alternative exploration scenarios.

Succeeding with AI

AI champions emphasize three key actions needed to succeed with AI:

1. Establish the foundation to take advantage of AI

2. Execute an AI business blueprint

3. Infuse AI across the value chain.

Establish the foundation to take advantage of AI

The value of AI is predicated on the ability of the organization to take advantage of data, which is reflected in 95% of AI champions building a data-driven culture, compared with 60% of their peers.

Reduction of data structural complexity becomes a precondition. Our research shows that AI champions outpace their peers in data commonality. Over three-quarters have a standard financial chart of accounts and over two in three have a consistent definition of metrics compared to 45% and 37% of others. Over two-thirds of AI champions have common data definitions compared with over a third of their peers.

Access to data is also critical. 68% of AI champions use common data sourcing compared to just two out of five of their peers. Over two in three have put in place an enterprise data warehouse to manage the deluge of data. This reduces the time needed to prepare, validate, and cleanse data. Nearly two-thirds of these leaders have created a flexible data architecture, versus 43% of their peers. This architecture provides openness and transparency surrounding data.

Insight: Open Subsurface Data Universe[9]

In the spring of 2018, a group of leading O&G companies discussed how cloud technology could be used to transform the current complex data and application environment. The Open Subsurface Data Universe (OSDU) Forum, a Forum of The Open Group, was created with the objective of enabling new cloud-native data-driven applications with seamless access to the full range of subsurface and wells data, as well as supporting existing applications and data frameworks. The core principle of the OSDU solution is to separate data from applications. This can be achieved by developing a common data platform with standard public APIs.

ExxonMobil: Tapping data to fuel an AI journey[10]

ExxonMobil, the largest publicly traded international O&G company, has high aspirations for AI. Yet, the company was facing obstacles along their journey—siloed data, lack of data scientist skills, and adoption issues with new systems. With the company's multi-billion dollar investment in Guyana, a new offshore oil discovery, the company wanted to build a modern data platform that would enable AI and workflows that in turn could speed project development and more quickly achieve a return on the large investment.

For this location, a 12-month collaboration between seismic experts and external resources modernized ExxonMobil's data estates into one easy-to-access repository. Based on open source technologies, experts can access the data from its multicloud environment, helping make decisions on a much faster time scale.

Benefits included an initially shortened planning cycle for the drilling design for new wells—from nine to seven months. The team also saved on data preparation time—an estimated 40%.

Over half of AI champions have put in place a Chief Data Officer (CDO) or an executive in an equivalent position versus a third of their peers.

64% of AI champions are leveraging data visualization/ exploration tools, compared to 36% of peers. Empowered staffs can dive into data, process information faster, and take advantage of insights to improve performance.

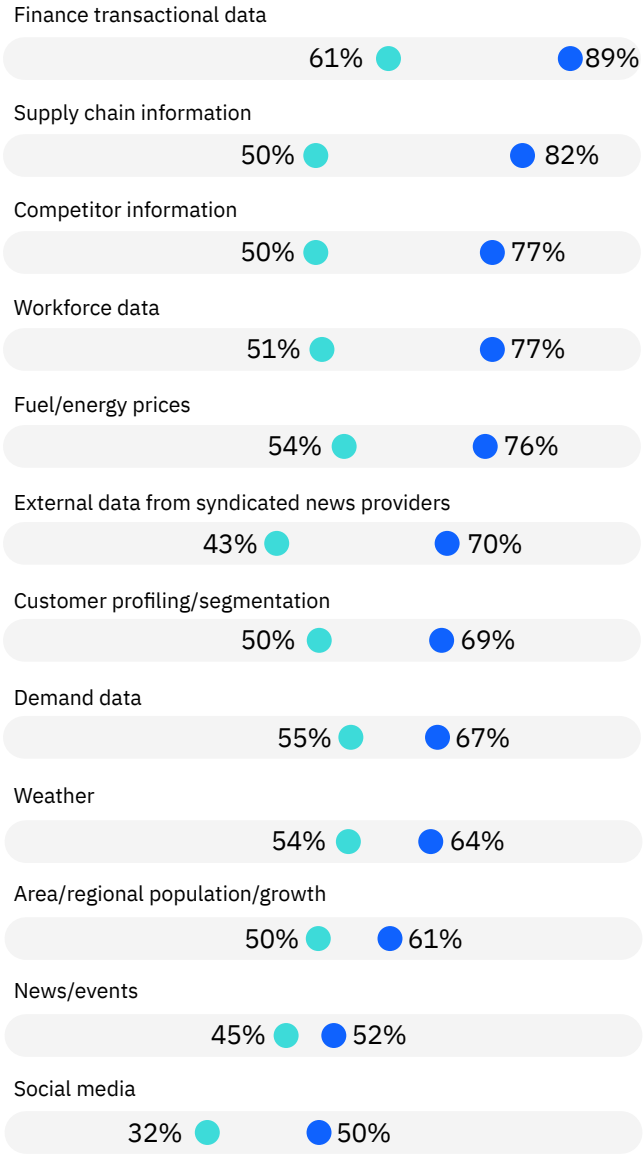
Data commonality and access to data is supported by governance. Over half of AI champions have put in place a Chief Data Officer (CDO) or an executive in an equivalent position versus a third of their peers. The CDO is supplemented by a business-driven information governance committee for nearly two-thirds of AI champions compared to just 43% of others.

Knowledge and insights can be extracted from vast amounts of structured and unstructured data about the business environment and operational conditions (see Figure 5). AI champions take advantage of available data sources to adjust operations, identify workforce needs, adjust competitive responses, and act on emerging trends. For example, market-demand projections influence raw-material sourcing, inventory updates, and energy consumption. This translates to cost savings, improved production processes, and proactive decision making.

AI champions have put in place the necessary enterprise IT architecture (see Figure 6). This foundation allows them to scale, provides openness, and enables a seamless flow of data.

Figure 5

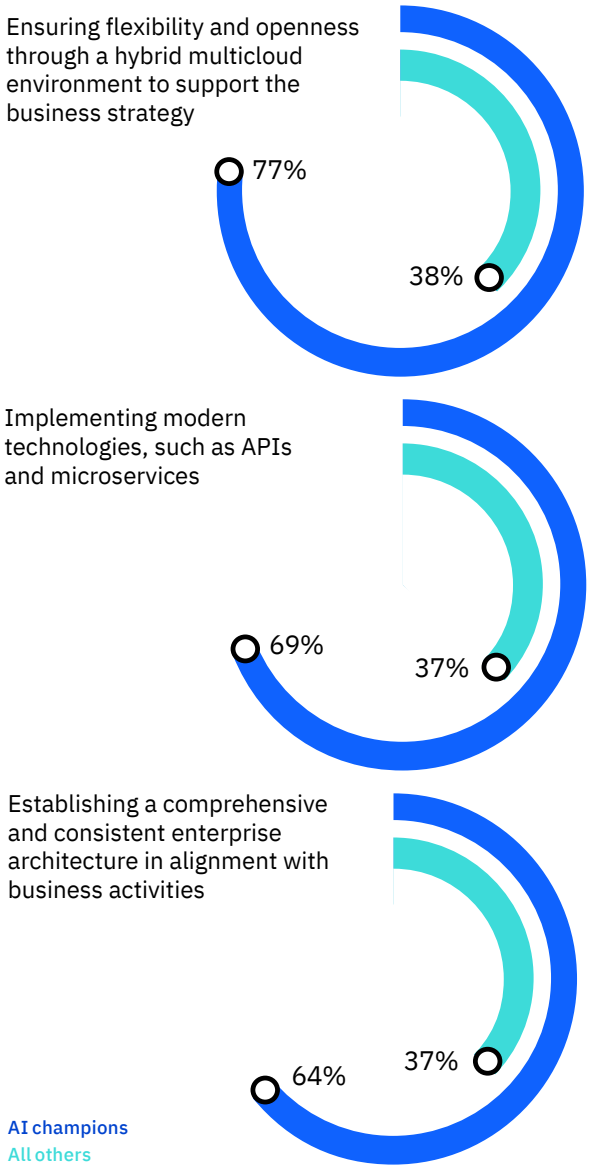
AI champions take advantage of new data sources at a greater rate



Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale. Source: Q19. To what extent are the following data sources used to leverage AI? n=376 to 399

Figure 6

An enterprise IT architecture creates flexibility and openness



Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale. Source: Q16. Thinking about orchestrating your enterprise IT architecture to support AI implementations, to what extent has your organization made progress against each of the following goals? n=400

Suncor: Applying AI to manage complex operations[11]

Suncor Energy is Canada's leading integrated energy company. Its Oil Sands Base plant specializes in the oil sands value chain of mining, extraction, and upgrading. Its operations are highly integrated, complex, and capital intensive. Those operations had been overseen by a Site Wide Lead (SWL)—a role that looks at the end-to-end process and optimizes production.

To manage such complex operations, Suncor uses over 87,000 sensors across 35 plants, tracking more than 900 key metrics. Data readings from those sensors are too voluminous for humans to analyze completely and generate useful insight. So, Suncor tapped the power of AI to make the most of real-time data readings.

Suncor developed an SWL Advisor, powered by more than 100 AI models that analyze the complex data readings and provide useful insights about the operation. The SWL Advisor analyzes data from a variety of sources, including operational data, maintenance plans, and weather data to provide operators with insights on opportunities to optimize production.

The tool also provides real-time anomaly detection, predicting critical events up to an hour before they occur. The SWL Advisor informs operators, who can then respond proactively to reduce risk, maintenance costs, and downtime. The initiative has the potential to generate business value in the order of tens of millions of dollars per year by turning complex and big data into actionable insights.

AI champions recognize that navigating a continually evolving environment requires people who can change course quickly and draw and act on insights from vast amounts of data.

Execute an AI business blueprint

AI champions have the strategy, resources, and talent to succeed with AI. They are further along with executing their enterprisewide AI strategy. Over three-quarters of AI champions have either a fully executed AI strategy or have taken steps to transform against their strategy and execution plan versus 37% of others. These leaders escape from having multiple AI experiments across various functions and run a holistic AI program. An enterprise AI strategy promotes using AI with partners and business ecosystem—in fact, over four in five AI champions do this.

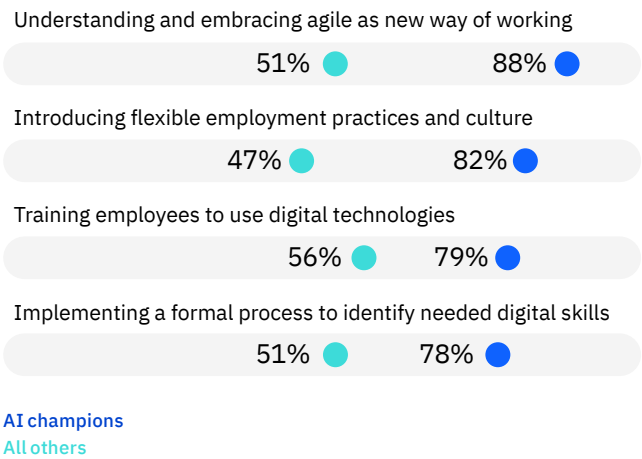
Nearly four in five of these leaders have put in place the people, skills, and resources to execute their AI strategy. This compares with just over half of all others. AI champions understand having these assets in place help their enterprises capture AI's value, drive value chain improvements, enhance customer engagement, and provide better risk management.

AI champions have made more talent improvements to support AI than their cohorts (see Figure 7). To address changing dynamics and opportunities, these leaders invest in Agile as a new way to work, which allows them to shift actions based on real-time feedback in product/service development and operational processes.

AI champions' investment in personal and technology skills drives purposeful agility. Seven in ten have invested in project management compared with just 41% of all others. Over half have invested in machine learning skills to train cognitive systems and nearly half have invested in robotics and process automation development skills. AI champions recognize that navigating a continually evolving environment requires people who can change course quickly and draw and act on insights from vast amounts of data.

Figure 7

AI champions enhance talent

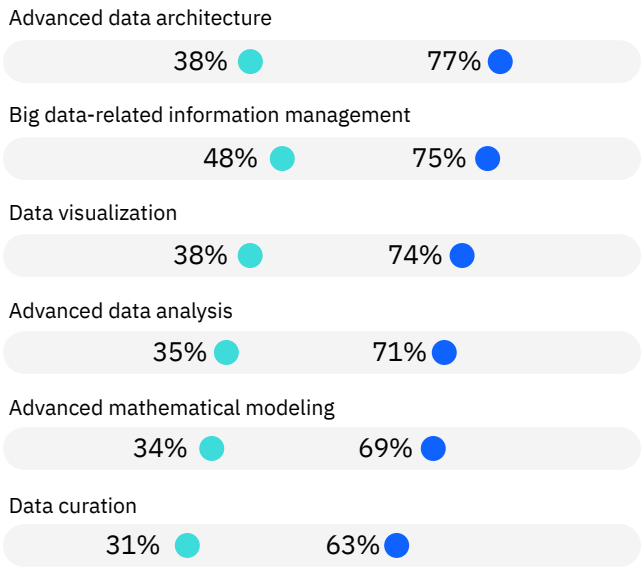


Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale. Source: Q12. To what extent has your organization invested in each of the following talent initiatives associated with your AI implementations? n=396 to 400

Twice as many AI champions than others have invested in data skills such as advanced data architecture, data visualization, and advanced data analysis (see Figure 8). These leaders can leverage the talent with these skills, combined with AI, to enable predictive analytics and prescriptive insights that recommend next best actions.

Figure 8

AI champions have the data skills to take advantage of AI



Percentages represent the number of respondents who selected 4 or 5 on a 5-point scale. Source: Q13. To what extent has your organization invested in the following skills to support the use of AI? n=400

Shell: Establishing an AI Residency Program[12]

Shell is an international energy company with expertise in the exploration, production, refining and marketing of oil and natural gas, and the manufacturing and marketing of chemicals.

In line with its ambition to grow and strengthen its talent pools, Shell has launched its AI Residency Program, a two-year immersive opportunity designed for students to work on projects across Shell's business.

Sponsored by the Shell Digital Centre of Expertise, the program offers residents the opportunity to develop deep, technical expertise across the spectrum of AI, learning more about the energy industry and working in agile teams to develop new solutions that can optimize current processes, enable workforce, and unlock new business models.

Successful residents may be invited for a permanent position in Shell and become one of its leading data scientists or AI engineers.

AI champions have applied AI to address their most important business objectives,customer engagement, M&A, and partnerships.

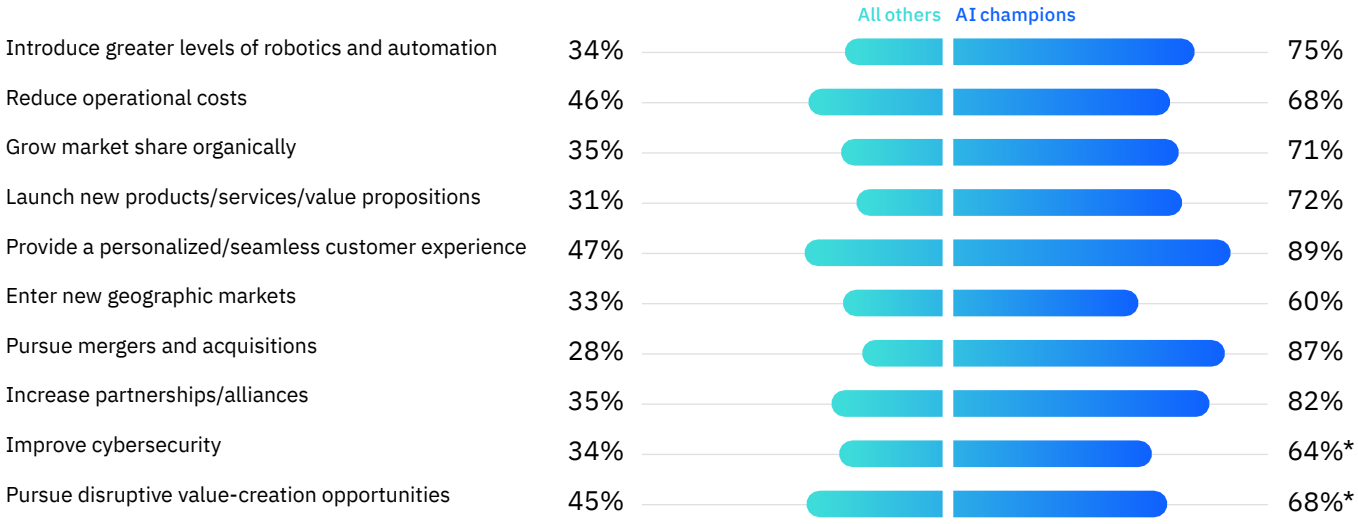
Infuse AI across the value chain

AI champions have applied AI to address their most important business objectives (see Figure 9).

In fact, three-quarters or more of AI champions have made these AI implementations operational or fully implemented and optimized for introducing greater levels of automation, providing a personalized customer experience, pursuing M&A, and increasing partnerships.

Figure 9

Supporting business objectives with AI



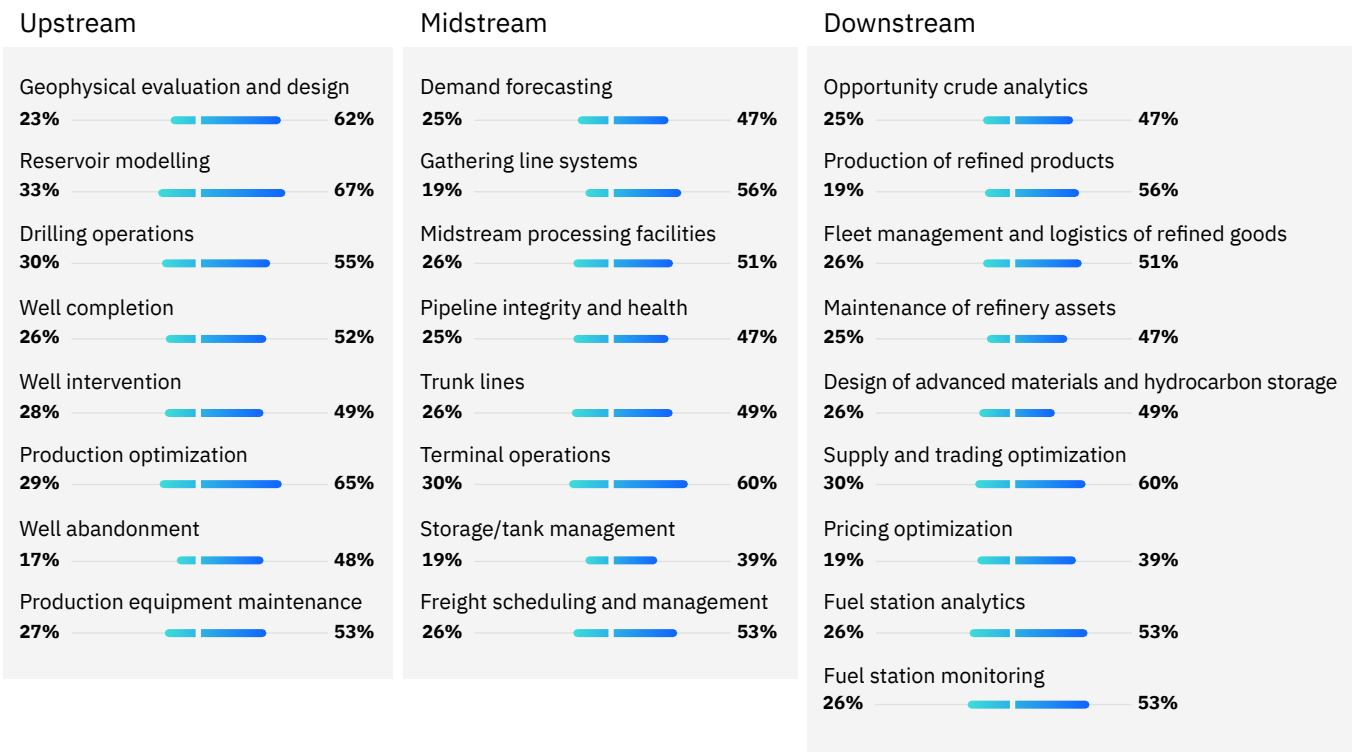
** Results using low counts are statistically unreliable but can be considered directional. Source: Q3. To what degree has your organization implemented AI to support the business objectives? Respondents selected either "We have made operational" or "We have fully implemented." n=99 to 250*

AI is helping drive innovation, optimize processes, and improve resource management.

AI champions' advantage with AI is showcased in the implementations for industry-specific areas that support upstream, midstream, and downstream (see Figure 10). AI is helping them drive innovation, optimize processes, and improve resource management. For these leaders, there are still opportunities to improve as less than half are using AI for well management, distribution, and refining.

Figure 10

Implementation of AI for industry-specific activities



Source: Q7. To what degree has your organization implemented AI in industry-specific activities? Respondents selected either "We have made operational" or "We have fully implemented." n=259 to 311 (Upstream), n=360 to 373 (Midstream), n=250 to 366 (Downstream)

Gazprom Neft: Improving oil drilling efficiency with AI-powered drilling analytics[13]

Gazprom Neft is a vertically integrated oil company primarily engaged in oil and gas exploration and production, refining, and the production and sale of petroleum products. It is one of the largest oil producers in Russia.

Increasing the efficiency of its drilling operations is a top priority for the company. As a result, Gazprom Neft decided to create a prediction system and deploy it in its Drilling Management Center (DMC).

A predictive drilling analytics solution was built that can identify a wide range of non-productive time events before they occur. Machine learning algorithms were developed and trained to monitor drilling conditions and provide alerts whenever a possible problem was detected.

Gazprom Neft expects to see significant reductions in operational costs and hopes to eliminate 75% of preventable causes of non-productive time. In addition to delivering a 15% reduction in drilling costs, Gazprom Neft's predictive drilling analytics solution significantly reduces the amount of low-value, manual analytics work that its drilling engineers must undertake, yielding more time for them to focus on further enhancing the company's data-driven drilling capabilities.

To drive inorganic growth, AI champions are tapping the power of AI for M&A. Two in five of these leaders are using AI to identify M&A candidates versus 16% of their peers. When supported by AI, companies can consider a broader set of potential acquisitions.

Natural language processing (NLP), information discovery, and categorization services can be used to evaluate business news and companies' public remarks, such as earnings calls. Then, sentiment analysis (such as word usage and speech patterns) can yield, in real time, a set of companies that align with M&A strategy guidelines and potential targets.[14]

Once the most promising target has been identified, nearly half of AI champions have implemented AI to conduct due diligence compared to 19% of cohorts. This includes identification of strategic, operational, financial, compliance, IT, and cybersecurity risks.

The application of AI helps AI champions understand and mitigate value at risk. Better risk assessments help determine if a target's value is truly aligned with the acquirer's needs. These assessments steer pricing guidelines, deal terms, and structure.[15]

AI champions have implemented AI for marketing, sales, and service two times more than their peers.

To support customer interactions and engagement, AI champions have implemented AI for marketing, sales, and service—two times more than their peers for these areas (see Figure 11). AI allows these leaders to integrate external data so that marketers can identify prospects and understand customers at an individual level with scale.

AI can provide deep knowledge discovery, helping sellers take the next best action. With respect to service, AI assistance can perform initial diagnostics and provide resolution recommendations.

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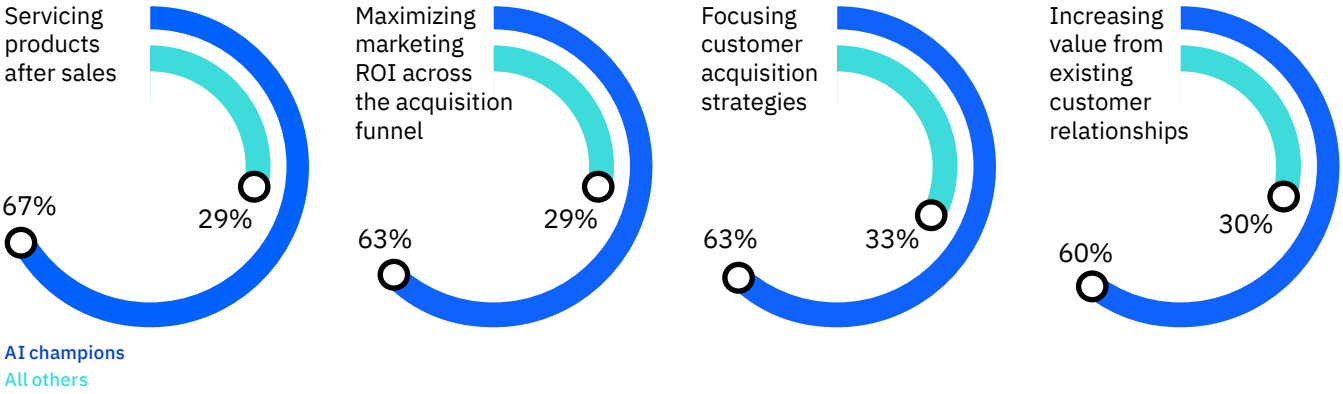
Figure 11

Marketing, sales, and service with AI lead to valuable benefits



Source: Q8. To what degree has your organization implemented AI in the following activities? n=400

eprimo: Using AI to augment the digital service experience for customers[16]

eprimo is one of Germany's top electricity and natural gas suppliers.

In the recent past, the company interacted with customers through call center agents, email, the postal service, and online forms. With customers increasingly turning to digital channels, this was no longer sufficient. Missing was a direct digital channel that could deliver the instant service customers expect.

The company created Sophie, a 24×7 conversational agent built with AI, that is the first point of contact on the company's online homepage. The agent can instantly answer questions about a customer's bill and due date, new service offerings, meter readings, and changes to customer contact information, banking details, and energy services. It also provides more general information about eprimo, the energy supply, and climate change policies.

When Sophie was first introduced in late 2017, it received around 700 inquiries each month. Today, it receives more than 70,000 monthly and correctly answers 55% on the first try. Thanks in large part to Sophie, the company's digital interaction rate has increased from 40% to 75% over the past two years. Agents are freed from answering routine questions and can focus on issues where customers prefer the human touch, delivering higher value to them. And the cloud-based service easily scales to meet the rush of seasonal queries to deliver high customer satisfaction.

AI champions harness AI to help their organizations close skills-related gaps by personalizing at scale. AI can help enable personalization and bring meaningful employee experiences to life by understanding the current skills of most employees, knowing where the company and the individual want or need to progress, and personalizing a learning and career path. Nearly two-thirds of AI champions have implemented AI to identify current skills and future skills gaps compared with less than a quarter of all others. And two in five of AI champions have installed AI to personalize learning versus a fifth of their peers.

AI champions recognize that managing knowledge across the organization is critical to being successful. Shared data on buyer behavior, customer profiles, competitive dynamics, and social sentiment can help teams analyze customers through multiple lenses, which helps them better design customer experiences. Knowledge sharing reduces redundant learning activities and allows the exchange of ideas that can result in new products, services, and business models. Nearly two-thirds of AI champions tell us that they have implemented AI for managing knowledge, versus a quarter of all others.

AI is the cornerstone to support and track strategy execution for AI champions. In fact, nearly four in five of these leaders have adopted AI for this purpose, as opposed to 37% of their peers. A company's strategy execution is guided by its KPIs. AI can help determine the outcomes that need to be measured, measurement of the outcomes, and prioritization of the outcomes. These KPIs create accountability for the execution of enterprise strategy. Strategic KPIs optimized through AI provide analytically enhanced oversight.[17]

Action guide

Energizing the oil and gas value chain with AI

AI champions have created the framework to drive AI across the business. To that end, O&G companies should focus on:

Build a foundation for AI

- Establish commonality and enterprise data governance framework to engender trust in data.
- Appoint a Chief Data Officer and a business-driven information governance committee.
- Map your data assets—your data, its sources, and platforms—to each of your business goals and AI initiatives.
- Embrace the integration of Information Technology (IT) and Operational Technology (OT) domains, a necessity for AI-driven information and recommendation exchange.
- Implement central repositories to aggregate financial, operational, and external curated data.
- Expand AI opportunities and learnings by tapping into new data sources.
- Collaborate with IT to create a flexible data architecture to support accessibility to multiple data sources.

Accelerate the AI journey

- Develop an enterprisewide AI strategy, with initiatives by value chain area, coordinated technology investments, and necessary resources. To do so, leverage the "garage concept" as a best practice, where business involvement and agile principles are used to identify, qualify, and prioritize ideas to be taken forward into Minimum Viable Product (MVP)—with a plan for pilot, deployment, and adoption based on successes.
- Put in place a leadership team that understand the power of AI and empower the organization to seize new opportunities.
- Add skills in mathematical modeling and data visualization to see correlations and data relationships.
- Provide training and support to staff that will be executing the AI vision.
- Adopt agile principles, determine AI initiative outcomes with clarity, and set milestones.
- Develop proactive change management associated with AI initiatives.

Catalyze the business with AI

- Expand horizons on what your enterprise's data can do by using AI to make sense of data in context, automate workflows, and humanize the customer experience.
- Apply AI across upstream, midstream, and downstream activities, with an emphasis on those most aligned to business objectives.
- Move AI into the hands of every employee who interacts with business partners and customers.
- Track strategy execution using AI.

About the authors

Ole Evensen

linkedin.com/in/evensen/
ole.evensen@no.ibm.com

Ole Evensen is the Global Chemicals, Petroleum and Industrial Products Center of Competence Leader in IBM Global Markets. He has over 25 years of experience with global organizations, serving as business division leader, technology advisor, and management consulting partner. He helps both national and international oil and gas companies develop and realize their business and technology strategies. He is a member of the IBM Industry Academy.

Spencer Lin

linkedin.com/in/
spencer-lin-35896317/
spencer.lin@us.ibm.com

Spencer Lin is the Global Research Leader for Chemicals, Petroleum and Industrial Products for the IBM Institute for Business Value. He has more than 25 years of experience in financial management and strategy consulting.

Dariusz Piotrowski

linkedin.com/in/
dariusz-piotrowski-921b086/
dariuszp@ca.ibm.com

Dariusz Piotrowski is a Director, Global Solutions, IBM Industrial Sector. He advises senior executives on strategy and implementation of innovative technologies and digital business transformation. He is a member of the IBM Industry Academy.

David Womack

linkedin.com/in/
david-womack-4b81454/
dmwomack@us.ibm.com

David Womack is the Global Director of Strategy and Business Development, IBM Chemicals and Petroleum Industries. He is responsible for identifying new market and solution opportunities, managing the development of the industry-specific solution portfolio, implementing go-to-market plans for business growth, and leading alliances with key business partners associated with these strategies. He is a member of the IBM Industry Academy.

Ash Zaheer

linkedin.com/in/ash-zaheer-a4890817
zaheer@us.ibm.com

Zaheer is the Global Chemicals and Petroleum Digital Customer Experience Leader in IBM Global Markets. He advises clients on the uses of exponential technologies to advance carbon neutral digital transformation programs, with a focus on enhancing our clients' customer journeys with sustainable and socially responsible attributes. He is a member of the IBM Industry Academy.

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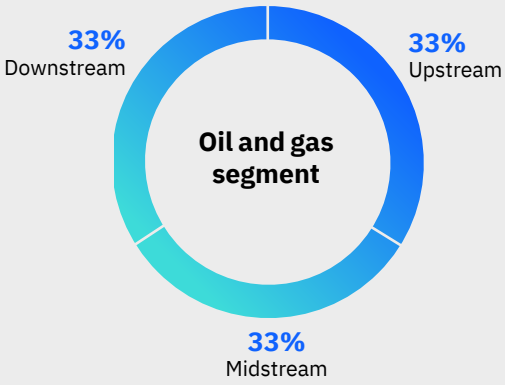
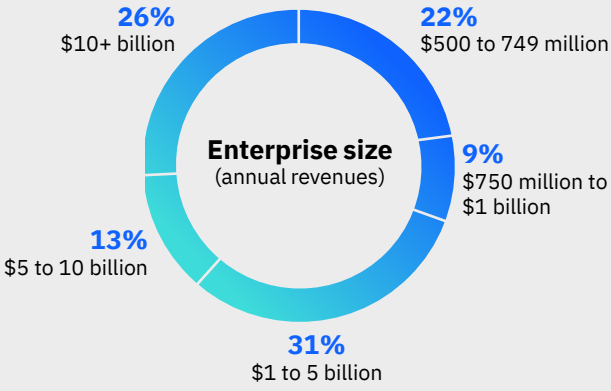
Study approach and methodology

In cooperation with Oxford Economics, the IBV surveyed 400 oil and gas executives in 18 countries from January to March 2020 (182 respondents) and from June to July 2020 (218 respondents). We collected responses from Chief Executive Officers, Heads of Strategy or Heads of Innovation, Chief Digital Officers, Chief Information Officers, Chief Operating Officers, and Chief Transformation Officers. Participants come from companies located in the Asia Pacific, Europe, the Middle East, North America, and South America. The 400 oil and gas executives come from different segments and from different sized organizations. All data is self-reported.





Source: D2c. In which primary segment of the Petroleum industry does your organization compete?; D4. What is your organization's approximate annual revenue in USD? n=400

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