



THE INTELLIGENT ENTERPRISE IN THE EXPERIENCE ECONOMY FOR THE OIL AND GAS INDUSTRY

Creating superior customer experiences by embracing standardization for simplification to enable innovation



Oil and Gas Industry

Vision 2025:

Deliver safe, reliable, and sustainable energy products and services focused on the customer and enabled by innovation.

“In the experience economy, oil and gas companies that are intelligent enterprises embrace market standards and the cloud to innovate and differentiate.”

Benjamin Beberness

Global Vice President
Oil and Gas
SAP SE

WELCOME

Dear Customers,

There is no question that society is moving toward renewables and low-carbon alternatives. At the same time, the global population is expected to exceed eight billion people by 2025, the standard of living is rising throughout the world, and as emerging economies evolve, their need for inexpensive, reliable energy continues to grow.

Whether you're an upstream producer or a fully integrated company, the industry must embrace dramatic business transformation driven by the adoption of technical, cultural, and organizational change to **deliver safe, reliable, and sustainable energy products and services**.

The transition is already underway throughout the entire value chain. The speed, scope, and impact of the fourth industrial revolution dwarfs that of its predecessors, as processing power and access to knowledge is accelerating innovation and empowering customers.

In response, global oil and gas companies are embracing the experience economy by becoming more customer centric, providing personalized offerings and digitalizing hydro-carbon supply chains to improve visibility and increase innovation. This includes personalized offerings from live order and inventory management to pay-for-outcome pricing. Downstream companies, for example, will provide custom offerings to retail fuel customers based on previous purchases, and larger oil and gas companies will diversify into adjacent industries and sectors such as utilities, solar and wind power, and energy storage.

The path forward requires finding a balance between planning for an uncertain future and optimizing for today's opportunities. The world is facing huge social, economic, and environmental challenges that promise to reshape the landscape. Simultaneously, access to resources and capital is no longer enough to sustain competitive advantage in the digital economy.

The companies that put customer experiences in the center of their strategy and those that can weave together formerly siloed processes, intelligent technologies, and real-world data from operations, customers, partners, and the environment will develop new business models and revenue streams.

We have identified four strategic priorities that will keep oil and gas companies relevant and thriving:

- **Extending beyond the barrel** – Break free of the traditional energy demand and price curves to capture new value and provide new customer experiences.
- **Digitalize production and delivery** – Disrupt the value chain by managing physical deliveries across the network with the help of the Internet of Things and machine learning, without owning or operating the inventory or hiring the resources.
- **Competing as an ecosystem** – Use a network of business partners and customers to foster predictive supply chain planning and to manage projects collaboratively.
- **Unlock value with technology** – Deliver operationally ready assets by using automation and machine learning for more accurate exploration and effective asset design and constructability.

To put these strategic priorities into action, oil and gas companies must change the way they operate. By shifting routine tasks from humans to systems enabled by machine learning and artificial intelligence, they will free up the capacity to define and pursue transformative business models.

Powered by tools such as predictive analytics, blockchain, and machine learning, **the digital core is expected to become the platform for managing and optimizing systems and processes, suppliers and networks, the workforce, the customer experience, and all the data an enterprise collects using sensors and other connected Internet of Things (IoT) assets.**

This paper takes a deep dive into the trends shaping our industry over the next five years and the path to innovation.

The future may seem uncertain, but one thing is unambiguous: the oil and gas industry has an important role to play for many, many years to come. The companies that embrace emerging technologies to increase their agility will be best positioned to respond to market changes, whatever the future may hold.

Sincerely yours,

Benjamin Beberness

Global Vice President
Oil and Gas
SAP SE

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A photograph of an industrial refinery at night, showing a complex network of steel pipes, towers, and structures illuminated by artificial lights against a dark blue sky. The scene is viewed from a low angle, looking up at the intricate framework of the facility.

OUR PLACE IN THE NEW WORLD

Global “megathemes” are affecting the oil and gas industry and are providing new opportunities for growth.

- The emerging **circular economy** requires oil and gas companies to find ways to reuse CO₂ and other by-products. For example, [Abu Dhabi National Oil Company \(ADNOC\)](#) improves operational efficiency by increasing sour gas production and using CO₂ in enhanced oil recovery, delivering greater power output to the United Arab Emirates.¹
- The need for **integrated mobile technology** enables real-time visibility to dramatically improve work execution, responsiveness, and productivity for oil and gas workers. [Shell Aviation](#) is leveraging mobile apps and the IoT to improve operational efficiency, business insights, and seamless integration to save time and resources and improve innovations and customer experiences.
- The emergence of **global supply chains** requires oil and gas companies to have full visibility of demand, supply, and financial information in real time anywhere. For example, [Saudi Aramco Shell Refinery Company \(SASREF\)](#) operates a digital refinery that provides greater competitiveness, profitability, and efficiency for the Saudi Vision 2030 program and global energy mix changes. Benefits include 100% real-time tracking of inventory movements and expenses for projects.²
- New emissions laws and regulations are requiring oil and gas companies to contribute to **sustainable energy**. Faster-than-expected growth in renewable fuels is creating margin pressure, requiring oil and gas companies to look “beyond the barrel” at new business models. French multinational oil and gas company [Total](#) is now the second-largest solar power provider in the world and has backed up its position by purchasing a battery storage company called Saft. Shell also recently announced it is adding battery charging capabilities to its retail stations.³



The oil and gas industry is being reshaped by four major trends.

- **Circular economy:** Companies are required to find ways to reuse CO₂ and other by-products
- **Integrated mobile solutions:** Companies are providing real-time, end-to-end visibility to their workforce and assets to improve productivity and utilization
- **Global supply chains:** Companies have full visibility of supply, demand, and financial information in real time, anywhere
- **Sustainable energy:** The shift to faster-than-expected adoption of renewable energy is creating added margin pressure, requiring oil and gas companies to look “beyond the barrel” at new business models

Being able to address the global megathemes and the industry challenges will determine who will be among the winners in the next 10 years. Successful business model innovation, process optimization, and workforce productivity are directly aligned to delivering great customer and employee experiences. In fact, the best-performing companies are pulling away from the rest, widening the performance gap by embracing the cloud to focus on innovation, differentiation, and delivering experiences.

According to a July 2018 study by Forrester Consulting commissioned by SAP, organizations view the cloud as a foundational component of digital business.⁴



Digital strategies are disruptive and changing the rules for the oil and gas industry.

When new UK exploration and production company [Assala Energy](#) launched its African operations using assets purchased from Shell Gabon, it relied on digital tools in the cloud, as well as industry templates, to become operational in a mere 24 weeks.

[Shell Aviation](#) implemented a cloud-based mobile app to enable airport operations staff to work more efficiently, freeing them for higher-value work. It creates quicker turnaround times for airlines, so customers spend less time waiting on the tarmac or at the gate. Shell Aviation now has a globally scalable tool for optimizing its airport refueling operations. With the ability to monitor and manage stock levels at each of its airport installations in real time, the company gains fast, data-driven business insights that it can use to more effectively manage fuel price risk on a global basis.

[BP](#) has joined forces with six other companies to develop parameters for market-standard upstream digital solutions housed in the cloud, with the ultimate goal of removing complexity from its landscape.

[HOERBIGER](#) monitors customers' remote wellhead compression units. Service technicians need to travel to the asset only when maintenance is required, based on live insights in the assets' operational status. Service tickets are being generated automatically, and operating hours are transferred for pay-per-use billing.



PAVING THE WAY FOR BUSINESS MODEL INNOVATIONS

Oil and gas companies pursue a bold vision for 2025 to deliver safe, reliable, and sustainable energy products and services focused on the customer and enabled by innovation.

To do this, oil and gas companies will focus on the experience economy by implementing new business models with a keen focus on customer centricity. This will include personalized offerings from live order and inventory management to customer-centric, pay-for-outcome pricing. For example, downstream companies will provide custom offerings to retail fuel customers based on previous purchases. Shell has even set a target of 50% of its total revenues to come from its retail business by 2025.⁵

Larger oil and gas companies will continue to diversify into adjacent industries such as utilities, solar and wind power, and energy storage. For instance, after its acquisition of SunPower, French energy giant Total is now the second-largest solar power company in the world. Additionally, Total and other supermajors are investing in energy storage (batteries) and utilities. Shell, for example, intends to become a regional electric utility in the United States, and, amid a global shift to lower-carbon energy resources, it believes it could become the largest power company in the world by the early 2030s.^{6,7}



90%

Of oil and gas companies will leverage real-time equipment and asset performance data to self-diagnose issues by 2021⁸

35%

Of oil and gas companies will have created new ecosystems by implementing AI and blockchain by 2022⁹

50%

Of new mobile apps use voice as a primary interface¹⁰

30%

Of manufacturers are predicted to use innovation marketplaces by 2022 for on-demand services and software that raise margins by up to five percentage points¹¹

50%

Of manufacturers are predicted to network related products and set digital twins into digital twin ecosystems for a systems-level view of their business by 2024¹²



FOUR PRIORITIES FOR SUCCESS

We have identified four strategic priorities necessary for oil and gas companies to transform their business.



EXTEND BEYOND THE BARREL



DIGITALIZE PRODUCTION AND DELIVERY



COMPETE AS AN ECOSYSTEM



UNLOCK VALUE WITH TECHNOLOGY

EXTEND BEYOND THE BARREL

With the advent of the digital economy and the deregulation of energy markets, consumers are more empowered than ever and are demanding simplicity and service quality. Energy providers will extend beyond the barrel to master:

- Consumer energy usage analytics to offer services that optimize the delivery of transportation, heating and cooling, and power
- Creation of new services and experiences focusing on convenient energy outcomes that cross traditional market boundaries, such as delivering the outcomes of transportation, climate control, or a powered device – not just the traditional fuel inputs

The Vision

By 2025, consumers will be more empowered than ever and will demand simplicity and service quality. Oil and gas companies will be able to

extend beyond the barrel to new business models that deliver new value and revenue streams. For example, oil-field services companies are now owning part of the oil fields. And fuel service companies are now providing fuel-delivery services that delivers fuel to a customer's car while they are at work (see Figure 1).

The Journey

Oil and gas companies will start toward this goal by simplifying order commitment and fulfillment processes through live inventory management, real-time available to promise, and faster material replenishment planning. They will extend their journey by running real-time predictive analysis on portfolio performance at any process stage, and then fully transform and achieve their vision with customer centricity and personalized configurations with pay-for-outcome pricing (a "lot size of one").

Figure 1: Extend Beyond the Barrel¹³

Art of the Possible

Life Without Gas Stations



Company

Startup company Booster Fuels offers an innovative fuel-delivery service that brings fuel right to a customer's car while they are at work.

Challenge

Develop an innovative business model that extends "beyond the barrel" with new ways of engaging customers more effectively.

Solution

Booster created a new customer experience by eliminating the need for drivers to visit the gas station. Instead, customers can use a mobile app to book a refueling time, arranging for a tanker to come to them and fill up their cars while they are at work.

Total's €1.4 billion acquisition of Direct Énergie came close on the heels of Shell Petroleum Company completing a similar acquisition of First Utility, a UK-based electric provider – part of a flurry of maneuvers by members of Big Oil's old guard to reinvent themselves by broadening and extending the reach of their product and service portfolios into multiple consumer markets.¹⁴

The Abu Dhabi National Oil Company (ADNOC) is currently testing out its new service "Call to Fuel," where residents will have their cars filled up with gas with a simple click of a button.¹⁵

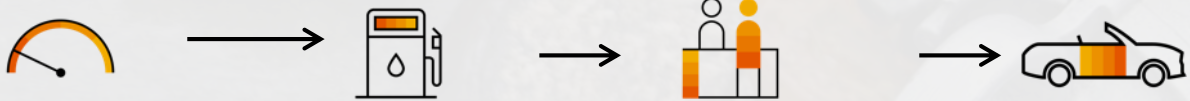


EXTEND BEYOND THE BARREL

BUILD NEW BUSINESS MODELS AND EMPOWER CONSUMERS

With the advent of the experience economy and the deregulation of energy markets, consumers are more empowered than ever and are demanding simplicity, service quality, and a positive experience. Energy providers will extend beyond the barrel to master value-added activities, such as consumer energy usage analytics, so they can offer services that optimize the delivery of goods, transportation, heating and cooling, and power. For example, fuel retailers will become more customer centric, using pay-for-outcome pricing and offering personalized configurations that improve the customer experience. They will create new services and experiences that focus on convenient energy outcomes that cross traditional market boundaries, including delivering the outcomes of transportation, climate control, or a powered device, and not just the traditional fuel inputs.

OLD SCENARIO



While driving to work, the driver notices the fuel gauge alert indicates the fuel in the vehicle is near empty.

The driver starts looking for a service station while continuing the trip.

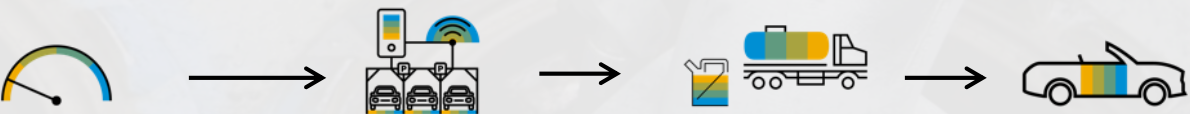
The driver locates a service station and stops the vehicle to fill up the tank.

It is difficult to shop for the best fuel value; selection is limited to current geography; inclement weather may be annoying.

After filling up the vehicle, the driver enters the building to pay for the purchase.

The driver resumes the trip but has lost time and could be late for work.

NEW-WORLD SCENARIO



While driving to work, the driver notices the fuel gauge alert indicates the fuel in the vehicle is near empty.

The driver arrives at the workplace and addresses the issue while still in the parking lot.

Using a mobile app, the driver books a time for a tanker to come to the work location and fill up the car.

After the vehicle is filled up, the app sends a message that the driver's credit card has been charged for the purchase, along with a survey to collect data on the driver's experience.

The vehicle owner has saved time and leaves work with a full tank of gas. A completed survey is fed back to the retailer to see if the customer experience can be improved.

TOP VALUE DRIVER

US\$95 billion

Personalized offerings in oil and gas are expected to become a \$95 billion business opportunity by 2025.

Source: SAP Performance Benchmarking

DIGITALIZE PRODUCTION AND DELIVERY

Oil and gas operators will disrupt the entire value chain by managing physical deliveries across the network, often without owning or operating any of the necessary inventory or assets or hiring the necessary employees. Oil and gas operators of the future will become masters at gaining insights into operations, products, and services, using real-time monitoring, integrated data sources, AI, predictive analytics, and machine learning capabilities. They will optimize human activities by digitalizing assets and outfitting humans with digitalized sensors (“wearables”), minimizing manual intervention, and supporting the digital hydrocarbon supply chain.

The Vision

By 2025, oil and gas operators will implement a digital hydrocarbon supply chain by digitalizing products and services (see Figure 2).

The Journey

Oil and gas companies will start toward this goal of optimizing maintenance and operations by collaborating in a business environment of the asset lifecycle. They will extend and continue their journey by providing a remote monitoring and collaboration platform, and they will eventually transform and fully achieve their vision with 360-degree digital tracking and analysis of all hydrocarbon molecules. Additionally, they will monitor primary and secondary costs to optimize pricing and the supply chain.

Figure 2: Digitalize Products and Services¹⁶

Transform Aircraft Operations to Improve Refueling Services with Real-Time Operational Insight

Obtaining digital insights into the global airline demand for fuel based on real-time monitoring, integrated data sources, predictive analytics, and gaining learning insights.

To transform its operations, Shell Aviation needed to digitalize everything to make the refueling process faster and to achieve better data quality and fewer invoice errors. Using mobile and cloud technology, real-time business insights of sales and stock data enhance decision-making, while streamlined processes have removed duplication of effort and improved operational efficiencies.

“We **innovate with a focus on customer benefit**. Airports want smooth and safe operations, which in turn allow airlines to take their customers to their destinations without delays. Skypad is one of the ways we help them achieve this and help them be more competitive.”

Victoria Guy, VP Downstream Cost Strategy, Shell Aviation



70%

Increase in data accuracy for fuel orders

50%

Improvement in processing hours for orders

45%

Improvement in time to service for refueling

15% higher productivity for connected workers by 2020 by digitalizing assets and outfitting humans with digitalized sensors¹⁷

In a matter of months, [Shell Aviation](#) implemented a cloud-based, end-to-end refueling app, developed by Shell on SAP® Cloud Platform, that transformed the experience the company delivers to its airport customers. Now, it has deployed the app throughout its entire aviation network, which includes more than 100 airport locations across four continents and 36 countries.



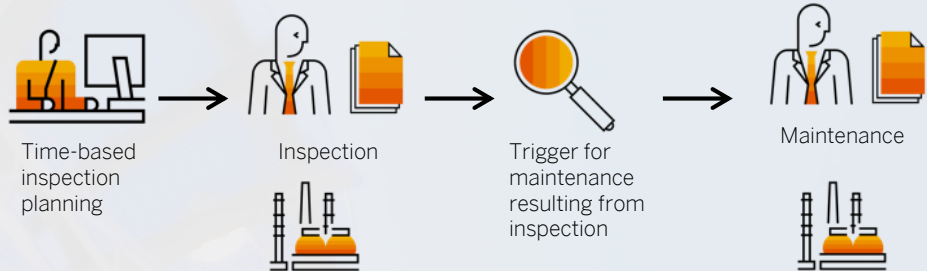
DIGITALIZE PRODUCTION AND DELIVERY LEVERAGE AUTOMATION

Oil and gas companies will disrupt the entire value chain by managing physical deliveries across the network with the help of the IoT and machine learning. This will be done without owning or operating any of the necessary inventory or assets or hiring the necessary employees.

For example, the SAP Predictive Maintenance and Service solution provides real-time equipment monitoring and health information for assets, based on critical values and trends, thus enabling efficient asset maintenance strategies for better managing costs, risks, and performance. The SAP Upstream Operations Management application integrates field data capture, production planning with what-if scenarios, production allocation, maintenance, reporting, and analytics capabilities so upstream oil and gas companies can improve decision-making related to hydrocarbon production operations.

TRADITIONAL SCENARIO

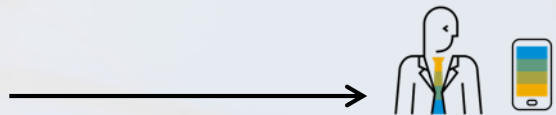
- Time- and condition-based inspection and maintenance
- Real-time risk of failure and performance not known
- No optimization of cost, risk, and performance



NEW-WORLD SCENARIO

SAP Predictive Maintenance and Service enables real-time monitoring of asset health to predict failures before they occur. Maintenance and equipment orders are triggered just in time, avoiding unnecessary inspections, improving resource utilization, and decreasing the cost and risk of unplanned failures.

Asset health monitor



Maintenance is scheduled based on real-time asset health status and failure prediction. The right strategy can be applied to assets to extend the life and output by applying predictive maintenance and allowing for supply chain optimization.

Maintenance

TOP VALUE DRIVERS

5%

Improvement in return on assets

25%

Improvement in first-time fixed rate

15%

Reduction in unplanned asset downtime

Source: SAP Performance Benchmarking

COMPETE AS AN ECOSYSTEM

The success of energy operators will largely be determined by three variables: safety, cost, and agility. Augmented reality and robotics will help to improve safety and productivity. Companies will work together in meeting production, profitability, and safety targets (possibly as “pay for outcome”). They will also master the convergence of IT and operational technology with machine learning and prescriptive operations and maintenance, and develop greater asset intelligence by cooperating and sharing performance data with OEM and engineering specialists. Last, they will collect performance feedback from connected assets to continuously improve and innovate the design and operation of new and existing assets.

The Vision

By 2025, there will be an increasingly volatile energy market with a broadening range of asset types and energy sources, as the lines between oil and gas companies and alternative energy companies continue to blur and combine into energy companies.

Operators will push the boundaries of automation and AI in operations activities to improve safety and productivity and seamlessly share data with all ecosystem partners to work together in ensuring that production, profitability, and safety targets are met (see Figure 3).

The Journey

Oil and gas companies will start toward this goal by providing a collaboration network for business partners and customers. They will extend to continue their journey by fostering predictive and optimized supply chain planning capabilities such as integrated business planning and secondary costs, and will transform and achieve their vision by managing projects collaboratively across the entire project lifecycle and ecosystem. Customer experiences can be improved by driving feedback to resolution in no time, leveraging in-the-moment customer feedback to enable high retention and loyalty while optimizing cost to serve. Loyalty is also improved by using customer and field technician feedback to orchestrate agreeable experiences for both.

Figure 3: Compete as an Ecosystem¹⁸

Seamlessly Manage Contractors

Managing your total workforce and improving the efficiency of contingent labor

To manage its external workforce, Halliburton needed to gain the visibility to drive cost savings, enable better decision-making, and maintain compliance. By using the SAP® Fieldglass® solution to manage its in-scope contract labor, the company dramatically improved its visibility into these previously segmented workers.

“It was **important for us to be able to understand** where our contingent workers sit, where they are operating, what rig they are on, whether they have the proper background checks, whether they’ve done their HSE screenings, whether they’ve done their safety classes before going on-site. . . . We’ve leveraged the SAP tool **to help track, manage, and monitor** those workers for us.”

Michelle Williams, Global Human Asset Manager, Halliburton

Circular collaborative ecosystem – Applying integrated digital platforms enhances collaboration among ecosystem participants, helping to fast-track innovation, reduce costs, and provide operational transparency.¹⁹



11,000

Halliburton workers managed in 14 countries with SAP Fieldglass solutions

8%–12%

Typical cost savings for companies using SAP Fieldglass solutions

27%

Greater order-to-cash personnel efficiency

Shell recently announced its intent to acquire German battery manufacturer Sonnen. The company will become a wholly owned subsidiary of the fossil fuel giant. Shell says the acquisition by Shell Overseas Investment B.V. will accelerate the ability of the two companies to provide integrated energy services and electric-vehicle charging solutions. Shell had previously invested in Sonnen in 2018.²⁰



COMPETE AS AN ECOSYSTEM CONNECT AND COLLABORATE BEYOND YOUR TRADITIONAL BUSINESS MODEL

The success of energy operators will be largely determined by three variables: safety, cost, and agility. Operators are pushing the boundaries of automation and artificial intelligence in operations activities to improve safety and productivity and seamlessly share data with all ecosystem partners to work together to ensure production, profitability, and safety targets are met.

Applying integrated digital platforms enhances collaboration among ecosystem participants, helping to fast-track innovation, reduce costs, and provide operational transparency.

TRADITIONAL SCENARIO

Disconnected silos and limited access to the business network prohibit responsive planning:

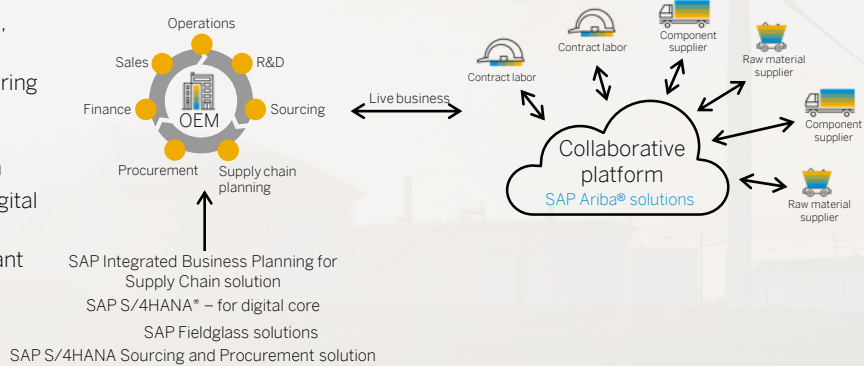
- When plans are not consistently created and shared, information cannot flow quickly.
- When R&D, sourcing, sales, operations, and planning are not aligned, time and money are wasted.
- When companies rely on a few external partners and communicate manually with suppliers, visibility is limited, collaboration is difficult, delays are inevitable, and the risk of error is high.



NEW-WORLD SCENARIO

One plan that can be shared with all critical resources and partners to achieve visibility, agility, and responsiveness:

- Collaboration between R&D and sourcing, accelerating time to market
- Insight into future demand for manufacturing and procurement, optimizing inventory
- Alignment of sales, manufacturing, and delivery, improving customer satisfaction
- Linear supply chains transforming into digital supply networks
- Simultaneous collaboration with all relevant stakeholders – with your company at the center



TOP VALUE DRIVER

15%

More productive for connected workers by 2023

Source: SAP Performance Benchmarking

UNLOCK VALUE WITH TECHNOLOGY

Powered by tools such as predictive analytics, blockchain, and machine learning, the digital core becomes the platform for managing and optimizing systems and processes, suppliers and networks, the workforce, the customer experience, and all the data an enterprise collects using sensors and other connected IoT assets. Housed partially or wholly in the cloud, a strong digital core is critical to an energy company's ability to efficiently and nimbly create new revenue centers, develop new business models, and build relationships with consumers.

The Vision

By 2025, continued investment and ingenuity will expand intelligent enterprises for oil and gas companies. Digital leaders will deliver operationally

ready assets, often on a performance or revenue-share basis, by using the power of automation and machine learning for more accurate exploration and effective asset design and constructability. Additionally, the industry will use a networked platform for collaborative project management that will orchestrate work and logistics across multiple trades and disciplines (see Figure 4).

The Journey

Oil and gas companies will start toward this goal by optimizing real-time, profit-based decision-making driven by edge-to-digital-core connectedness. They will extend with industry market standards for next-generation, optimized business processes in the cloud and will transform and achieve their vision with fluid collaboration with business partners over networks.

Figure 4: Use Technology As an Enabler²¹

Digital Transformation to Boost Efficiency and Unlock Operational Insight

Creating an intelligent enterprise that responds actively to customer demand

Vivo Energy is the market-leading pan-African retailer and distributor of Shell and Engen-branded fuels and lubricants. Its rapid expansion generated major data growth, but existing business systems could not provide much-needed insight and analysis that would help fuel further development. To support its development and gain greater strategic oversight of its operations, Vivo Energy chose to deploy SAP S/4HANA® with a new implementation, including the SAP S/4HANA Oil & Gas solution, the SAP S/4HANA Retail solution, the SAP S/4HANA Finance solution, and the SAP S/4HANA Supply Chain solution. The SAP Fiori® user experience further enabled Vivo Energy to transform its employees' user experience.

"We are focused on continuing our remarkable growth story, and to achieve this, we decided to transform our approach to business management and look for ways to enable the comprehensive operational insight that we desired."

Mike McCormick, CIO, Vivo Energy

\$40 million saved by Shell by highlighting design flaws at an early stage²²



Streamline
Processes

Enhance
Employee productivity

Improve
Data visibility

At the airport or at the wellhead, an end-to-end digital ecosystem such as the one put in place by [Shell Aviation](#) can be the lever for an oil and gas company to improve productivity and efficiency in the field and in the back office. By connecting assets to a central digital core using IoT sensors, companies have the means to collect and analyze data in real time to gain a clearer and timelier multidimensional perspective of their operations and their assets.

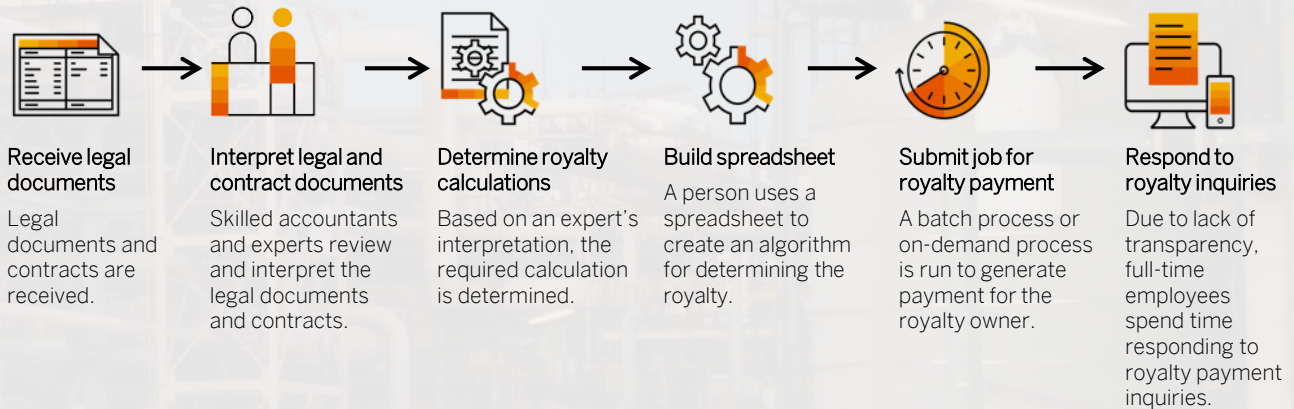


UNLOCK VALUE WITH TECHNOLOGY EXPAND THE INTELLIGENT ENTERPRISE

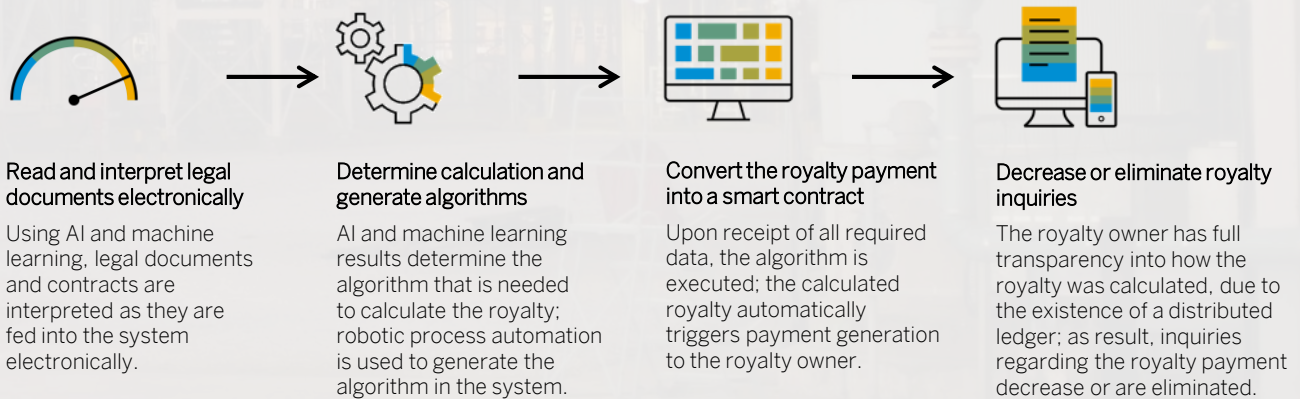
Continued investment and ingenuity are expanding the energy network infrastructure. Digital leaders are delivering operationally ready assets, often on a performance or revenue-share basis, by using the power of supercomputing for more accurate exploration and effective asset design and construction. Automation using artificial intelligence and robotic process automation can be used to improve efficiency and accuracy. Others are using a networked platform for collaborative project management to orchestrate, design, build, and run logistics across multiple partners.

For example, using artificial intelligence, machine learning, and robotic process automation, royalty calculation and payment can be automated to efficiency and accuracy.

TRADITIONAL SCENARIO



NEW-WORLD SCENARIO



TOP VALUE DRIVERS²³

-22%

In audit costs

+76%

In margins

TOP EXPERIENCE DRIVERS ALONG THE OIL AND GAS VALUE CHAIN

Linking Experience Management (XM) with Oil and Gas Processes

Oil and Gas Experience Management



Experience Management – the ability to understand what is happening through operational data (O-data); interlock it with experience data (X-data) from customers, suppliers, and employees; and act on insights to improve organizational performance and deliver better outcomes.



KEY TECHNOLOGIES

The current pace of technological advancements has the most profound impact on enabling how oil and gas companies transform themselves to respond to their customers' needs and to market trends.

Intelligent technologies promise to bring great benefits, such as productivity and efficiency gains, enabling innovative new business models and new revenue streams. The following intelligent technologies are instrumental in helping companies respond to market trends.

Artificial Intelligence and Machine Learning

Artificial intelligence and machine learning algorithms are being used in oil and gas to "learn" from existing data, to improve outcomes without being explicitly programmed. Once the algorithm is trained, it is used to monitor and predict performance for equipment or process outcomes. Oil and gas companies are using this capability to eliminate repetitive manual tasks such as scheduled maintenance on equipment, monitoring downhole casing performance, ordering new materials for supply replenishment, and routing service tickets to the right team for response management. By embedding more intelligence in the process, companies are saving time and money and using resources more effectively to drive greater value into operations across the enterprise.

The Internet of Things

Advances in ubiquitous connectivity and edge computing are driving a step change in business productivity. This connectivity, coupled with AI and machine learning, enables companies to analyze

petabytes of data and affect business outcomes. Although oil and gas companies have been using the Internet of Things for some time, they have yet to connect end-to-end field processes to drive notifications across the enterprise. Data-driven insights improve operations, lower material costs, improve safety, and reduce risk. Remote condition monitoring of oil field equipment provides real-time data to predict maintenance needs and identify failures before they occur. Remote equipment identified as a digital twin is tracked by manufacturers and oil field operators to improve maintenance, performance, and asset lifecycle management.

Advanced Analytics

Empowered users can get real-time visibility into their operations, customer feedback, and the changing environment, so they can simulate the impact of business decisions, mitigate risk, and achieve better outcomes. The integration of advanced analytics capabilities – including situational awareness – into applications enables oil and gas operators to analyze all types of data on the fly to improve decision-making at all levels of the company. Empowered users, benefiting from embedded analytics, can use real-time feedback to model or simulate equipment performance, dramatically improving transparency and field productivity. This improves profitability and reduces overall costs.



Data Platform to Manage Experiences

In the digital economy, reducing the cycle time to sense, analyze, and respond is a big competitive differentiator. Leaders are interlocking the operational performance data, or O-data, from companies' business systems (what is happening) with the experience data, or X-data, coming from customers and employees (why it is happening). The purpose is to improve customer interactions, retention, products, and brands.

Blockchain

A relatively recent breakthrough technology, blockchain is revolutionizing the movement and storage of data by creating a chain of unalterable transactional data. Oil and gas operators are testing blockchain models, using its distributed consensus process to reshape supply chains and commerce across digital networks of industry, resulting in savings in economies of scale by reducing steps in the process. For example, blockchain integrates suppliers through the bill of lading and automatically transacts across operators to streamline delivery and custody transfers, reducing time and logistics for international shipping. SAP is partnering with IBM to implement blockchain in the SAP Joint Venture Accounting application.

Virtual and Augmented Reality

Virtual reality (VR) and augmented reality (AR) use visualization capabilities combined with specific data to immerse users in a real-world simulation environment, which they use to analyze and test performance before making changes in the real world. Examples of how the oil and gas industry uses this

technology include subsea template maintenance and repair, downhole directional drilling, refinery unit repairs, and system upgrades for offshore platforms. It is also used extensively for worker training. The use of VR and AR in oil and gas will continue to grow as operational improvements in technologies are made to improve operations, mitigate risk, and maximize oil production.

Conversational AI

Advancements in machine learning and AI are enabling improvements in cognitive capabilities, such as image and voice recognition. Oil and gas companies use this technology to enable hands-free work to ensure safety in processes and, where possible, in operations. Using primarily voice-command-driven processes, companies are enabling greater simplicity, enterprise mobility, and efficiency while increasing worker productivity and reducing the need for training.

Robotic Process Automation

Robotic process automation (RPA) streamlines repetitive, rule-based processes and reduces costs through the use of software robots that perform specific, repetitive tasks. Examples of the use of this technology include automatic processing of supply replenishment orders, sending reminders to personnel for training certification renewals, and producing daily drilling reports that are distributed across the enterprise. By 2022, 72% of organizations will have started their RPA journey.²⁴ SAP is implementing this now in the SAP Production and Revenue Accounting application.



~50%

Of new mobile apps use voice as a primary interface, and 50% of the consumer-facing G2000 use biometric sensors to personalize experiences²⁵

30%

Of manufacturers will use blockchain services as a foundation for digital trust at scale²⁶

50%

Of new industrial robots will leverage AI by 2019²⁷

57%

Increase, on average, of the contribution of machines and algorithms to specific tasks by 2022²⁸

>US\$1 trillion

Will be the amount of IoT spending in 2022²⁹

75%

Of manufacturers will provide their service teams with access to searchable video content through mobility and wearables by 2021³⁰



GETTING THERE: A PHASED APPROACH

Companies will become intelligent enterprises on three distinct tracks as they evolve their strategic priorities to match their company's vision.



1. **Optimize** what they already do by implementing a stable and scalable digital core to make processes more transparent and integrated

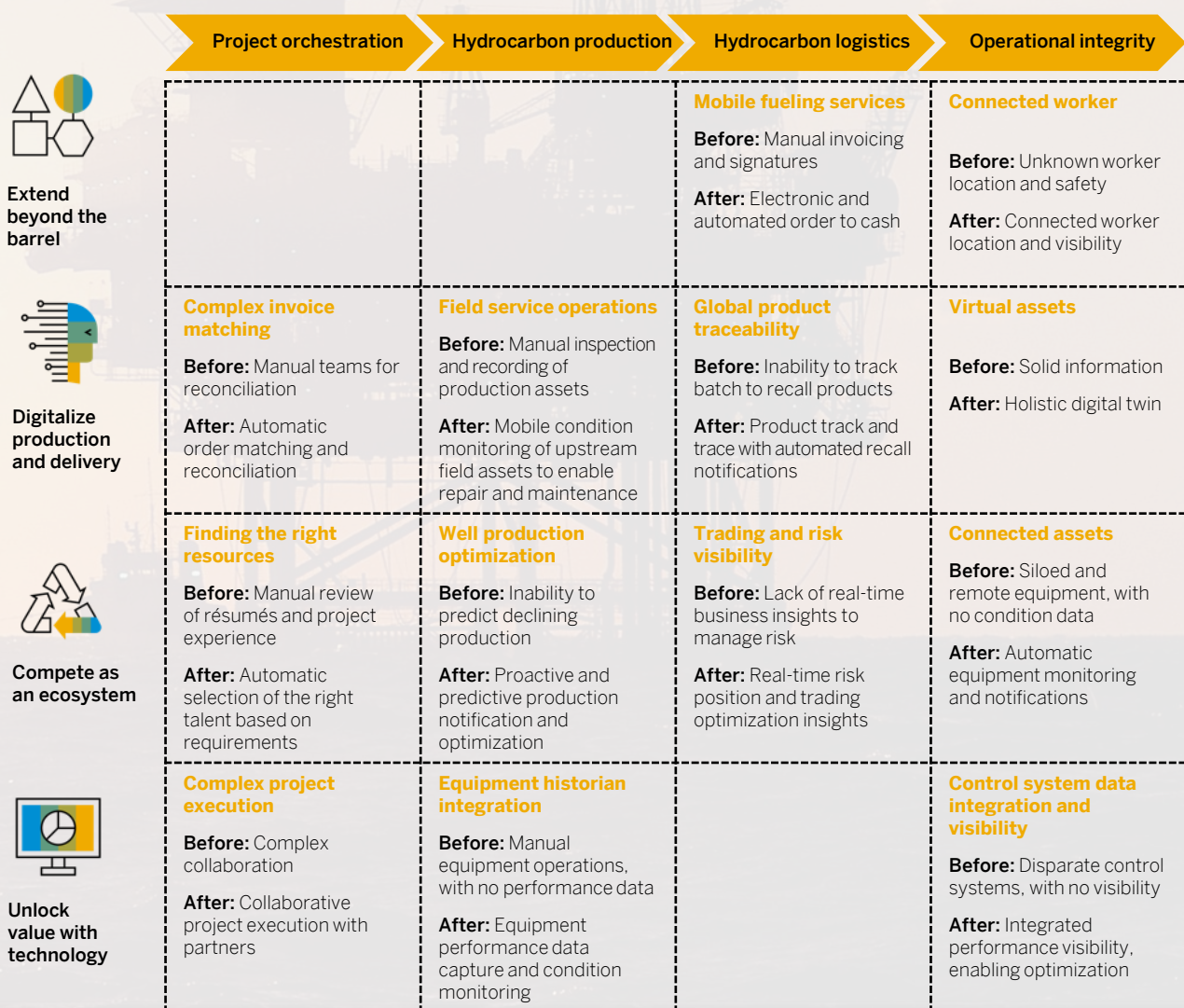


2. **Extend** their current processes by connecting them to the real world using IoT technologies



3. **Transform** their business using a constant stream of data enabling new service-driven business models (see Figure 5)

Figure 5: Enabling Innovation Across the Value Chain



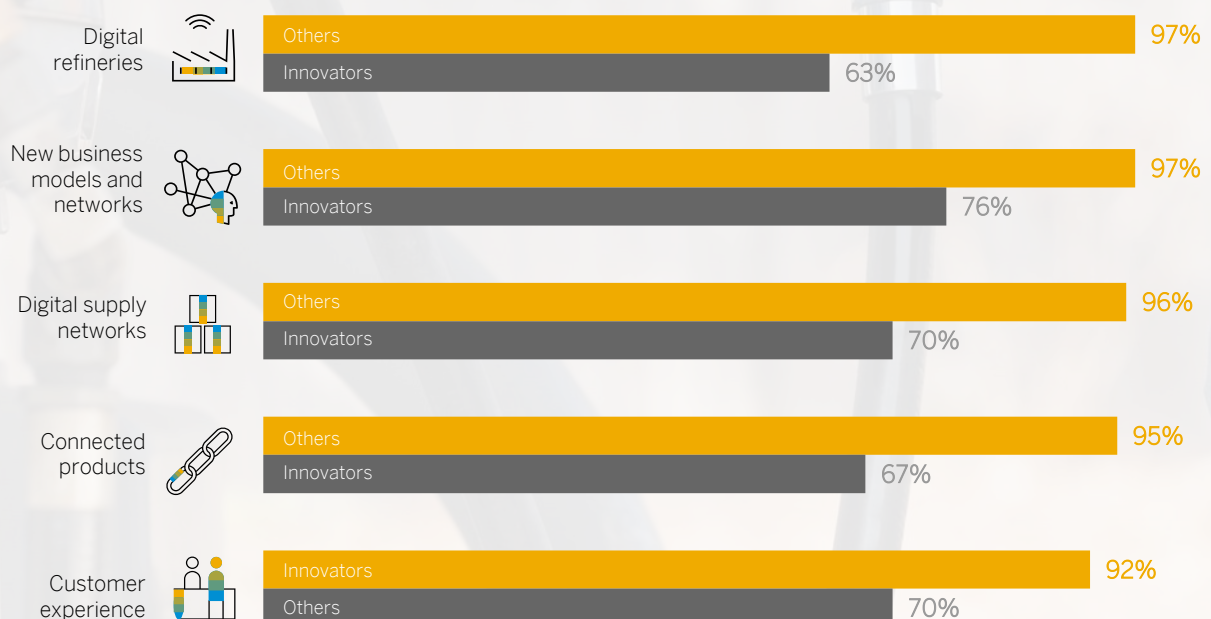
EARLY DIGITAL ADOPTERS LEAD THE WAY

How do you achieve these strategic priorities?

Start with reimagining your business together with your customers. Then build a path for even more optimization and intelligent automation to simplify your business and free up resources to invest in even more digital transformation programs and find new business models and revenue streams

According to a July 2018 study by Forrester Consulting that was commissioned by SAP, innovative companies focus on digital priorities to help them achieve digital transformation more than other companies (see Figure 6).

Figure 6: Innovators Focus More on Digital Priorities Than Others ³¹





SAP'S FRAMEWORK FOR THE INTELLIGENT ENTERPRISE IN THE EXPERIENCE ECONOMY

Most organizations understand what is happening in their business but may not always know why.

They know what's happening because they have systems that capture operational data (O-data) – about their customer transactions, supply chain, manufacturing, spending, and the activities of their workforce. They can see that data through reports and dashboards. They can see trends and predict what will happen next.

But to influence what happens next, companies need data about the interactions that people have with their products and their business. Experience data (X-data) captures beliefs, emotions, opinions, and perceptions – the “why” something is happening. And when companies know why something is happening, they can make an informed decision about the best way to respond.

To win in this experience economy, intelligent enterprises connect experiences with operations. They use both X-data and O-data to guide their business decisions. Intelligent enterprises collect insights from customers, employees, products, and brands at every touch point. They use powerful technologies to automate and integrate their data, processes, and applications, enabling them to sense risks, trends, and opportunities. And they act on this intelligence across every part of their business. (See Figure 7.)

Only SAP has the strategy, expertise, and solutions to deliver on this vision, enabling intelligent enterprises to turn insight into action.

Figure 7: SAP® Intelligent Enterprise Framework*



*Note: This representation is a general visualization of the Intelligent Enterprise and may include functions not covered in every industry.



HOW TO PLAN YOUR PATH TO THE INTELLIGENT ENTERPRISE

In the digital economy, intelligent technologies and integrated business processes are now driving digital transformation.

To do this effectively requires an end-to-end plan for becoming an intelligent enterprise. This includes creating an intelligent enterprise road map and implementation plan with proven best practices and deployment options that optimize for continuous innovation with a focus on intelligent outcomes.

Driven by leaders in industry, SAP and its partners are enabling oil and gas companies to become intelligent enterprises through a portfolio of industrialized, innovative, and intelligent cloud services that set the new market standards for the energy industry. This portfolio offers immense business value through automation and operational excellence and is the foundation for the Intelligent Enterprise.

The cloud services are primed for upstream (the wells) and use the latest technologies, including artificial intelligence, machine learning, and blockchain. The services provide oil and gas companies with full transparency to help ensure profitable operations and generate cash flow. This results in immense customer business value through automation and operational excellence within oil and gas and is the foundation of the Intelligent Enterprise for the oil and gas industry.

SAP's strategic imperative is to build every new product based on cloud-native principles, with an API-first microservices architecture and standardizing on Cloud Foundry and containers, and to evolve existing products by selectively decomposing and carving out loosely coupled functionality into microservices on SAP Cloud Platform.



The End-to-End Journey to Becoming an Intelligent Enterprise



Plan
well to manage expectations

Simplify and innovate

- Reimagined business models, business processes, and work
- SAP Intelligent Enterprise Framework methodology as a guide for digital transformation
- Value-based innovation road maps



Build and launch
with proven best practices

Standardize and innovate

- Model-company approach to accelerate adoption with model industry solutions
- Design thinking and rapid, tangible prototypes
- Coengineered industry innovations delivered with agility



Run
all deployment models

Run with one global support

- One global, consistent experience
- End-to-end support – on premise, in the cloud, or with a hybrid approach



Optimize
for continuous innovation

Optimize to realize value

Continuously captured and realized benefits of digital transformation

To move forward with speed and agility, it helps to focus on a business process where data is combined with industry-specific requirements and data analytics to monitor and improve performance. In this context, a model-company approach is used to simplify and increase enterprise agility and the speed of the digital transformation. Model companies represent the ideal form of standardization for industry-specific processes that are nondifferentiating but essential for operations. They are built on preconfigured SAP solutions and based on industry best practices along with business content to encompass our experience and expertise for the industry. They provide a comprehensive baseline and come with accelerators to jump-start digital transformation projects.

For further information, see our [oil and gas industry landing page](#).

COMPREHENSIVE SAP ECOSYSTEM: ORCHESTRATING THE PARTNER ECOSYSTEM TO DELIVER VALUE FASTER

Our comprehensive ecosystem for the oil and gas industry offers:

- The Intelligent Enterprise as the overarching strategy to meet future requirements, providing:
 - SAP S/4HANA co-development programs for customers and partners
 - Industry co-innovation programs for industry-specific use cases
 - Delivery of enterprise-to-enterprise industry clouds
 - Thought leadership, evangelism, and enablement by industry through events, councils, and regular customer exchange
- Integration into a wide range of business services (OEMs, suppliers, key vendors, and more)
- Open architecture, with a choice of hardware and software specifically designed to meet requirements
- Complementary and innovative third-party solutions to provide leading-edge and state-of-the-art technology

Our partner ecosystem includes, among others:



SAP IS COMMITTED TO INNOVATION



Oil and gas cloud consortium

Driven by leaders in industry for industry, SAP and Accenture are enabling oil and gas companies to become intelligent enterprises with a portfolio of industrialized, innovative, and intelligent cloud services that set the new market standards for the energy industry.

- Incorporates innovative technologies delivering real-time insights, greater visibility, and better decision-making
- Delivers preconfigured, integrated processes that are user ready
- Reduces complexity and the cost of adopting and running new capabilities and technologies



Comprehensive industry coverage

SAP enables comprehensive coverage of the complete oil and gas value chain across the enterprise. With its clear industry road map, SAP is the partner of choice for the oil and gas industry.

- More than 3,300 oil and gas companies in 118 countries innovating with SAP solutions
- 99% of oil and gas companies in the Forbes Global 2000 as SAP customers
- Support for all lines of business on a single platform



Proven services offering

By bringing together world-class innovators, industry and emerging technology expertise, proven use cases, and design thinking, we help oil and gas companies develop innovations that deliver impact at scale.

- Proven methodologies to drive innovation, from reimagining customer experiences to enhancing operations
- Innovation that is fueled through a managed innovation ecosystem from SAP
- Ability to build your own innovation capability and culture

SAP supports oil and gas companies in becoming intelligent enterprises – providing integrated business applications that use intelligent technologies and can be extended on SAP Cloud Platform to deliver breakthrough business value.



Learn more

- [SAP for Oil and Gas solutions](#)
- [SAP Services and Support](#)

RESOURCES

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Note: All sources cited as "SAP" or "SAP Performance Benchmarking" are based on our research with customers through our benchmarking program and other direct interactions with customers.





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