



Tech Trends 2018 | Deloitte Insights

## 2018 Tech Trends for the oil and gas industry

Tech Trends 2018: The symphonic enterprise is Deloitte's ninth examination of the forces that are disrupting and redefining information technology (IT), business, and society in general. When advances such as digital reality, cognitive, cloud computing, and blockchain—to name just a few—work in concert with strategy and operations they can fundamentally reshape how work gets done, set the stage for new products and business models, and drive greater organizational value.

Evidence of technology's disruptive impact on the oil and gas industry is clear and growing. This publication explores eight trends that forward-thinking executives should consider as they seek to build or acquire capabilities that can move their organization into the future. ➔

# A brief look at the trends

## Reengineering technology

### Building new IT delivery models from the top down and bottom up



With business strategies linked inseparably to technology, leading organizations are fundamentally rethinking how they envision, deliver, and evolve their IT infrastructure and solutions. The reengineering technology trend offers oil and gas company CIOs and their teams a roadmap for fundamentally overhauling IT, from the top down and the bottom up, to drive business growth and create enterprise value.

In a marketplace where speed and flexibility are more important than ever, oil and gas companies are using cloud computing, automation, and other technologies to transform their back-office systems, operations, and product and platform offerings. For example, by instituting process and workflow automation, one oil and gas company was able to spin up a new, cloud-based SAP test environment in just 14 minutes—a dramatic reduction from a previous, two-week timeframe—to experiment with a new functionality.

## No-collar workforce

### Humans and machines in one loop—collaborating in roles and new talent models



Ward robotics are upending long-held assumptions about jobs, careers, and the role of technology in the workplace, and the way work gets done. The no-collar workforce trend offers oil and gas companies the opportunity to reimagine an organizational model in which humans and machines become co-workers, complementing and enhancing the other's efforts in a unified digital workplace.

By redesigning legacy practices, systems, and talent models around autonomics (virtual workers, cognitive agents, bots, and other AI-driven capabilities), oil and gas companies can begin the transformation into nimble, fast-moving organizations. In one example, a global oilfield service company with manufacturing facilities piloted the use of robots to pick, pack, and ship product from the shop floor. To help alleviate employees' concerns about being replaced by robots, the HR organization began developing and deploying new strategies and tools for recruiting, retaining, and training a hybrid human-machine workforce.

## Enterprise data sovereignty

### If you love your data, set it free



As data grows exponentially in both volume and strategic importance, there is an increasing demand to “free” it—to make information accessible, understandable, and actionable across business units, departments, and geographies. The enterprise data sovereignty trend provides oil and gas companies with a blueprint for turning themselves into data-driven organizations.

But doing so requires modern approaches to data architecture and governance, as well as long-term investments in data integration, cataloging, security, lineage, and other areas.

With focus, careful planning, and strategic investments, oil and gas companies can generate enterprise return on investment (ROI) in the form of an evolving, learning, and growing data management capability. To illustrate, a company that owns, operates, and develops a portfolio of pipelines, storage, and related midstream assets was looking for a solution to address increased compliance regulations, safety concerns, maintenance, and integrity management of its pipeline networks. The company implemented a solution integrating data from multiple internal sources (GIS, work management system, control center) and external sources (e.g., government agencies). It also incorporated data sources such as pipeline attributes, risk scores, inline inspection findings, planned assessments, high-concentration-area locations, leak history, one-call tickets, emergency valve locations, precipitation, and fault lines. The approach provides an enterprise-wide, near-real-time view of more than 15,000 miles of interstate pipelines, including monitoring pipeline threats, improving risk management, and providing situational awareness.

## The new core

### Unleashing the digital potential in “heart-of-the-business” operations



Cloud, cognitive, and other digital disruptors figure prominently in supporting new customer experiences, product innovation, and rewired industry ecosystems. They also offer great potential in core back- and mid-office systems and in operations, where digital technologies are poised to fundamentally change the way work gets done. This transformation is beginning with finance and supply chain; from there, next-generation transaction and financial systems, blockchain, machine intelligence, automation, and the Internet of Things are redefining what is possible in these mission-critical functions.

Fueled by digital innovation, the new core trend presents a host of valuable opportunities for oil and gas companies to redefine heart-of-the-business work. For example, a leading fuel distributor and supplier to convenience stores and commercial clients was faced with shifting demand of its fuel products due to increased uptake of biofuels, changes in customer preferences, and shifting crude prices. The supplier wanted to analyze the impact of projected future demand patterns for fuels on its terminal infrastructure. It traditionally employed a yearly planning process to forecast demand, product mix changes and supply scenarios using spreadsheets and paper but this lacked the ability to truly understand the end-to-end value chain, and could not support the desired analysis. Instead, the company implemented a technology platform integrating data from various systems and had the ability to conduct in-depth sensitivity analysis of alternate potential network structures and policies. The platform could help identify capacity gaps, define storage tank requirements, determine optimal safety stock, identify tipping points for capital investment requirements, model sourcing changes, and define impact. The platform also helped make the supply chain planning process repeatable and scalable.

## Digital reality

### The focus shifts from technology to opportunity



Digital reality is poised to transform the way individuals and organizations interact with data and experience the world around us. As more augmented reality (AR) and virtual reality (VR) use cases accelerate into full production—and as drones, 3D printing, and other technology innovations proliferate—the idea that digital reality is moving down the path to full commercialization and industrialization seems like a reasonable vision of the future.

Early adopters are laying the groundwork for broader adoption of the digital reality trend; among them oil and gas companies that are focusing, for instance, on sensor-based technology to track assets in real time. In another industry example of applied digital reality, a US-based refining company wanting to reduce the operating cost and order delivery time for its warehouse operations combined wearables and AR to implement “vision picking” to enable hands-free order picking. Employees are guided through the warehouse by graphics displayed on a Smart Glass device to speed-up the picking process and reduce errors. The software helps pickers identify objects in real-time, scan barcodes, navigate areas, and pull information from the warehouse management system.

## Blockchain to blockchains

### Broad adoption and integration enter the realm of the possible



Blockchain technologies are on a clear path toward broad adoption and are causing disruption across all major industries. Now is the time for oil and gas companies to begin standardizing on the technology, talent, and platforms that will drive future blockchain initiatives and opportunities; among them, integrating and coordinating multiple blockchains within a single value chain.

Key blockchain opportunity areas in oil and gas are land administration, supply chain, finance, inventory operations, and marketing. For example, oil and gas companies have started piloting blockchain-powered “smart contracts”—self-verifying and self-executing agreements that function autonomously when engaging with vendors and engineering, procurement, and construction (EPC) companies. At one company, sophisticated smart contracts have the ability to realize cash flow once shipment can be confirmed and make payment on feedstock if costs or volumes reach a certain level. The contract automatically executes its terms when conditions are met, reducing human involvement in completing a deal.

## API imperative

### From IT concern to business mandate



For many years, application programming interfaces (APIs) have made it possible for solutions and systems to talk to each other. Now APIs are being valued for another capability: They expose technology assets for reuse across and beyond the enterprise; such reuse can drive greater ROI in IT investments and offer API consumers a set of building blocks for using existing data, transactions, and products in creative ways.

As the API imperative trend gains momentum, expect further innovative approaches to emerge for contracting, pricing, servicing, and even marketing a venerable—and still valuable—technology. For example, an oil and gas major with operations in over 70 countries was facing challenges in its lubes business because the company's IT systems and processes did not support supply chain planning or demand forecasting. The existing forecasting led to huge demand-supply gaps, high stock levels at the plant and warehouses, frequent stock-outs at the demand end, and overproduction at plants due to very little visibility into real-time demand. The company developed a demand-sensing solution that integrates internal data (historical sales, expected sales forecast) and actual sales data (point of sale, partner forecast, sales channel inventory), and feeds the data into supply network optimization/material requirement planning. In less than one year, the new system generated a 30 percent reduction in forecasting error and a 30 percent reduction in safety stock.

## Exponential technology watch list

### Innovation opportunities on the horizon



In a business and technology climate where the ability to innovate has become critical to survival, leading organizations—working within ecosystems that include business partners, start-ups, and academics—are developing the disciplined innovation responses and capabilities they will need to sense, experiment with, incubate, and scale opportunities emanating from exponential innovations.

Oil and gas companies are taking steps to develop breakthrough innovations that will set the stage for future success. Many are investing in changing corporate culture from incremental thinking to an exponential mindset so they can create exponential value. Organizations are “upskilling” their workforce with Lean Startup training even as they face the challenge of “unlearning” long-held ways of thinking and doing, and embracing the unfamiliar. In addition, oil and gas companies are infusing talent from innovation hubs, labs, accelerators, and universities to accelerate progress by concurrently learning from the best and seeding their own innovation groups. Finally, as companies develop a disciplined innovation response to disruptive forces, they are evaluating whether they should create or acquire capabilities that sense, scan, vet, experiment, and incubate.

## Tech trends working in harmony

### Digital Oil Recovery

The theme of this year's Tech Trends report is the *symphonic enterprise*, a concept that describes how multiple technologies can work together in harmony to create disruptive change. An oil and gas industry example of this orchestration is Digital Oil Recovery™ | Powered by FOROIL (DOR). Oil brownfields suffer from higher operating costs, declining oil production, aging equipment, and a complex subsurface configuration of pressure and saturation. Redeveloping these fields using existing enhanced recovery techniques requires substantial investments in people, time and capital. DOR is a new, short-cycle technology innovation that increases oil recovery, production, and reserves by combining sophisticated mathematics with reservoir physics and applying technology trends including advanced data management, machine learning and cognitive analytics, and parallel computing. The result is a behavioral model that describes what the reservoir does, to complement the geological model that describes what the reservoir is. The behavioral model can screen over 15 million potential field development plans in 24 hours, finding the optimum plan tuned to the operator's objectives. In just a few months, DOR technology can create a production forecast that is 95 percent (or greater) accurate, along with an actionable, optimized field development plan that produces a substantial impact without adding organizational or technical implementation complexities.

### Contact

For questions regarding Oil and Gas Tech Trends, please contact:

#### Amy Winsor

##### Principal

Oil & Gas Consulting Leader  
Deloitte Consulting LLP  
E-mail: [awinsor@deloitte.com](mailto:awinsor@deloitte.com)

For questions regarding Digital Oil Recovery™ | Powered by FOROIL, please contact:

#### Scott Sanderson

##### Principal

Deloitte Consulting LLP  
E-mail: [scsanderson@deloitte.com](mailto:scsanderson@deloitte.com)

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