

# TRANSFORMING UPSTREAM OIL AND GAS OPERATIONS

## WITH BUSINESS-DRIVEN PURPOSE



*By Jeff Monk, Sr Industry Executive-US Energy, Microsoft Corporation*

### INTRODUCTION

The “oil wars” between on-shore American companies and traditional oil and gas suppliers have created an opportunity for companies to leverage data to fuel technology. Companies that utilize data to make informed decisions are leading the industry and turning a profit.

Digital transformation in the oil and gas industry could unlock about \$1.6 trillion of value for the industry, its customers, and wider society. This total estimated value from digitalization could further increase to \$2.5 trillion if existing organizational and operational constraints are relaxed.

Historically, supply chain managers, field workers, and operations and maintenance technicians do not feel connected to changes made within their companies at the enterprise level. Oil and gas companies are looking to engage field workers in the design and implementation of new technologies to permeate change throughout the entire enterprise.

In oil and gas, people—not technology—are at the heart of the operation. There is an increasing need to focus on individual personas, their trust in change, and the behaviors that could help or hinder technology adoption. Companies need to identify key talent and form teams of IT experts, field technicians, business unit managers, production engineers, and supply chain managers to create more cohesive enterprises. Individuals chosen to be members of these diverse teams will have demonstrated the ability and desire to learn from those outside of their normal function. They possess the skills necessary to leverage what they learn and drive improvements across the enterprise. These workers also have a mindset that is equal parts accountability, acceptance of change, and a willingness to take risks and learn from failures. A diverse team of decision makers will help kick start the technology conversation. Each persona will have a better understanding of the needs of the enterprise and can start discussing how to introduce technology into their processes. Technology adoption begins with team members who already have a vested interest in the enterprise’s success.

Additionally, trust is a major factor in driving any enterprise’s adoption of technology. Oil and gas operations have heightened safety risks for employees, sensitive mission-critical components that can lead to costly, unplanned downtime and lost productivity, and a culture of “seeing is believing.” The industry has been slow to adopt new technologies, which has led to a general mistrust of technology.

Necessary trust can be built through leadership, proof of value, and accepting and driving accountability throughout the enterprise. In rare cases, credibility is instant. In most cases, credibility must be demonstrated early and often. To generate the level of trust needed for the successful adoption of new technologies, field workers must see validated results that can be reconciled with traditional engineering techniques. They also need to be able to trust the quality of the data that informs key decisions and see that the roadmaps and success criteria are aligned to the personas in the field, from operations and maintenance technicians to supply chain coordinators to rig operators and inventory managers.

## **THE STATE OF THE OIL AND GAS INDUSTRY**

According to a study from Gartner, oil and gas companies lag behind other industries because they are still in the early stages of adopting digital tools.<sup>2</sup> Today, the oil and gas industry has disparate data sources and data silos that limit the view of each persona within an enterprise. An overall lack of technology adoption makes it difficult or sometimes impossible for enterprises to perform integrated planning, and there is no high-level view of the consequences of decision making from one persona to the next. Every oil and gas company has silos, and those will always exist; however, skillset or discipline silos do not need to exist because technology provides transparency across business units and personas. About 33.5% of oil and gas companies are addressing these silos by training their workforce in digital skills related to upstream.<sup>3</sup> The adoption of new technologies like Connected Field Service provides ongoing training materials for every persona in oil and gas, and allows them to see how each individual role contributes to and affects company outcomes.

Oil and gas enterprises are also inefficient: The daily tasks of field workers make it difficult to track equipment maintenance schedules. As a result, routine maintenance is often overlooked or unnecessarily repeated. For example, one technician based in the Eagle Ford Shale drives around a prescribed operation route twice a week to perform maintenance on equipment. Streamlined maintenance processes would eliminate much of the technician's drive time and increase his productivity. Enterprises will be able to predict problems before they occur, eliminate rework, and increase productivity. Field workers could leverage mobile devices in the field to track and upload documents, as well as reference materials needed to make repairs.

## **OIL AND GAS COMPANIES' APPROACH TO NEW TECHNOLOGY CAPABILITIES**

Today, it takes an oil company about 12 months to plan a well site. It takes this long because the necessary information is everywhere. By leveraging Microsoft platforms and tools, oil and gas enterprises could reduce this timeline by 50%. Microsoft is helping power a better future for the oil and gas industry. They provide the technology scenarios that support oil and gas use cases for improved processes, increased sustainability efforts, a reduced number of safety incidents, and a reduced number of field hours for short-term deployments. Tools like Dynamics 365 Field Service, HoloLens, and Augmented and Mixed Reality are enabling first-line workers to shape and define transformation at the field level and drive the quickest value, simplify and improve their lives, and recruit-train-retrain a new generation of talent. Dynamics 365 helps companies reduce manual data entry, improve back office processes, and allows workers to plan maintenance routes. These technologies help break down information silos to improve inefficiencies across enterprises so they can adapt more effectively to the ever-changing industry.

**Workforce transformation:** skills enhancement, knowledge and task management, productivity enablement, process improvement, collaboration solutions

**Energy innovation:** seismic process, reservoir simulation, field development, drilling

**Connected Field Service:** e-permit to work, connected worker, first-line worker, fleet management, mobile worker, worker tracking and field tickets

**Connected sales and service:** Customer Insights, CPQ—Configure, Price, Quote, Contract Lifecycle Management, Customer Service

**Sustainability:** Visibility and orchestration, Planning, Sourcing, Logistics and distribution

**Intelligent supply chain:** Visibility and orchestration, Planning, Sourcing, Logistics and distribution

**Oil and gas operations of the future:** health and safety, connected operations, asset management, production optimization, autonomous and robotics

## HOW TECHNOLOGY IS BOOSTING U.S. OIL PRODUCTION

The oil and gas industry has been on a downturn since 2014. In 2016, oil prices were as low as \$36 per barrel, and at those prices, oil companies could not make a profit. With oil prices so low, many companies stopped their long-term rig contracts, abandoned sites, and laid off staff. The companies that remained in business and turned a profit during the downturn were smaller U.S. onshore companies that leveraged technology more than their larger competitors. In 2018, the U.S. has become a net exporter of oil and refined products, even with the challenging oil climate. While most of the world's oil suppliers reduced production because of the price of oil and the overall industry outlook, smaller onshore companies ramped up their production helping the US to increase its annual oil production from 7 million barrels per day in 2013 to 10 million barrels per day in 2018. As of October 2019, the US is producing 12.6 million barrels per day thanks to the efforts of onshore exploration and production companies. Technology allowed these companies to remain efficient and profitable. Oil used to be a scarce commodity, and new finds were important to the industry—stock prices would skyrocket on a new find. Although new finds are still important, the industry has shifted its focus to productivity, fully integrating business units, and getting more out of what they have.

## HOW TECHNOLOGY IS BOOSTING U.S. OIL PRODUCTION

Large global organizations cannot avoid the silo pitfall. These silos naturally occur because of regional regulatory constraints, product categories, or enterprise-level functions. But, at the operational level, these silos can and should be reduced or broken down completely. A decision made in one sub-discipline runs the risk of having an immediate negative impact on another area of the operation. An open, collaborative platform can increase the levels of transparency across the entire operation and enable an integrated model that allows for the mitigation of these risks. The current state of the industry requires that these risk factors are assessed in a manual and linear fashion, which inevitably creates blind spots along the way. This leads to fragmented planning cycle times, disparate data sources and tools, no transparency across disciplines, and unclear communication. There are hundreds of different factors, and sometimes dozens of interfaces, involved in the upstream value stream. This includes the appraisal

of the potential investment, constructing production facilities, production, and exiting the location, which makes the industry very complex.

In an open and collaborative ecosystem, integrated models can be developed with visibility into each sub-discipline. Workflows, data inputs, and data analysis are automated, reducing overall decision cycle time and increasing the productivity of the asset and the people operating it. In an environment where subcontracting services is common, supply chain coordinators and project managers can forecast needs and plan spend and inventory levels accordingly, which significantly reduces the cost of materials and services. Permitting cycle times can be reduced and regulatory reporting can be automated, freeing up resources to focus on other mission-critical activities. With this level of field connectivity, maintenance technicians can more efficiently dispatch services, plan routes, and coordinate activities across large geographical areas, spending time where they are needed the most. New employees can be quickly onboarded and deployed with the information and instructions necessary to perform their duties.

By introducing technology into the different personas and reducing complexity, one persona, such as a drilling engineer, can understand the collateral impact on another persona, such as the production engineer as decisions are made, and better understand how those decisions affect overall processes and production.

## **THE FIELD WORKER OF THE FUTURE**

The industry's workforce is aging, and this trend offers an opportunity to leverage digital solutions, which poses another unique problem for the oil and gas industry. Enterprises need to figure out how to transfer the knowledge these employees have gained from years on the job to the next generation of the workforce. By 2025, the oil industry is expected to experience a shortage of 10,000–40,000 technicians.<sup>7</sup> Future employees will receive information from their company's experts, AI, machine learning, and augmented reality tools to inform and institutionalize the operating decisions that are made across the enterprise. Specifically, technology can help field workers access up-to-date manuals and service bulletins, increasing first-time fix rates and cutting down on the need for manual equipment repairs. Machinery inspections can be performed by autonomous devices, reducing safety risk factors and the amount of non-productive inspection time done by field workers. An enterprise's existing workforce has gained skills and knowledge from years on the job, and they possess a set of experiences that guide every decision. More and more, these industry veterans are learning to lean on data to support their decisions, but actual data-driven insights have not permeated through most oil and gas operations. These workers' experiences are difficult to capture and transfer to the incoming generation of workers without technology. Investing in a cloud-based infrastructure improves a company's ability to capture, organize, and store data, but companies need cloud platforms with SaaS and PaaS extensions to help managed and transfer learned knowledge. Companies need to invest in other digital solutions to connect subject matter experts (SMEs) to the field workers of the future.

Dynamics 365 Connected Field Service is the tool by which oil and gas companies can build the field worker of the future and transfer knowledge. Companies are leveraging this tool to create a new way of working that allows them to leverage AI and IoT devices to gain insights into remotely connected devices, drive operational efficiency, and drive technician productivity. Connected Field Service helps rationalize the number of applications a field worker has running at any given site and brings them together into a single platform. Field workers can access the information they need quickly and streamline their workflow, making them more productive in the field. By introducing technology into

manual workflows, oil and gas companies can automate time-consuming processes, cut down on the number of service records on a given piece of equipment, and gain a 360-degree view of their operations. Connected Field Service gives field workers all the information they need at their fingertips. The platform helps to improve the uptime of assets and increases the utilization of resources in the field. For example, a field worker in the Permian Basin can call a SME based in Houston, Texas for work that they are doing on a piece of equipment on a rig. The SME can help the field worker with the repair and provide additional knowledge for new workers entering the field. New technologies also allow for predictive maintenance and cut down on the number of repeated or unnecessary rig visits a field worker makes in a year. Not only is technology saving time and money, but it is also increasing safety measures across the industry.

#### **FRONT-LINE SOLUTION: WORKFLOW INTEGRATION WITH CONNECTED FIELD SERVICE**

- A field worker, preventative or predictive maintenance, condition, or IoT alert triggers a work order.
- Advanced scheduling ensures that a field worker with the right skills is scheduled and dispatched.
- Before arriving on site, the technician views a map of the worksite location and the service tasks to be completed on their mobile device.
- The field worker changes the work order to “in progress” to let their company’s back office know the job has been started.
- Real-time updates allow the company’s engineers to view the completed work order and determine if follow-up is needed.
- The field worker resolves the issue, takes a photo of the affected part, signs the work order, and uploads all documents to the portal before leaving the worksite.
- Supervisors can view the field worker’s progress in real-time via the Connected Field Service portal.
- The field worker can look up the equipment’s repair history, current telemetries information, and a 3D model of the equipment while they are working on the issue.

#### **MAKE DIGITAL TRANSFORMATION A PRIORITY**

Oil and gas companies face significant challenges to the adoption of digital initiatives, and many of these challenges stem from a lack of standardization across enterprises. Information is siloed, and data from IoT sensors is not standardized or integrated across platforms; the ownership of or access to data within an organization is often uncertain; and if the data is accessible, it is often too complex to gain usable insights from. Although historically slow to incorporate technology into everyday processes, the oil and gas industry is on its way to a digital overhaul and utilizing technology to overcome these challenges. Companies are driving technology adoption at the field level to better incorporate digital into every aspect of the enterprise. The high-level objective is to achieve the level of margins at a lower commodity price that the oil and gas industry was achieving at a very high commodity price several years ago. Enterprises also want to gain incremental production growth and expand production from their existing assets. Oil and gas enterprises are taking a more strategic and intentional approach to business and sending field workers where they are needed instead of along a preset, inefficient route. Investing in large-scale infrastructure technologies does not equal digitally transformed.

#### **MAKE DIGITAL TRANSFORMATION A PRIORITY**

In an ever-changing industry, new technologies will allow oil and gas companies to adapt to environmental and industry shifts effectively and efficiently. Profitability will increase because the right people, the right parts, and the right equipment will be available for every maintenance visit. Productivity will increase because field workers will have the technology and knowledge, they need to perform their jobs, cutting down on unnecessary trips and downtime. Predictive maintenance will keep companies ahead of the competition and position them to remain profitable regardless of the economic climate. Ultimately, transformation efforts are less about back-end technology and more about a relentless pursuit of business value. It is about the candid distinction between a good idea and a valuable idea. Often, it's not the shiny new solution that brings the most value. Instead, there is basic field level digitization that demonstrates the quickest returns, while laying a foundation of adoption for longer term transformation efforts. Looking to the future, the oil and gas industry is well positioned to combat the fluctuations in market price and the demand for oil. Enterprises are working to create streamlined processes that will ensure digital transformation initiatives can be adopted at a low cost and with little disruption to the business and increase productivity.

#### RESOURCES

1. <http://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/dti-oil-and-gas-industry-white-paper.pdf>
2. <http://reports.weforum.org/digital-transformation/wp-content/blogs.dir/94/mp/files/pages/files/dti-oil-and-gas-industry-white-paper.pdf>
3. [https://www.slideshare.net/accenture/drill-deeper-into-digital-2017-upstream-oil-and-gas-81111584?from\\_action=save](https://www.slideshare.net/accenture/drill-deeper-into-digital-2017-upstream-oil-and-gas-81111584?from_action=save)
4. <https://www.macrotrends.net/1369/crude-oil-price-history-chart>
5. <https://www.wsj.com/articles/u-s-becomes-net-exporter-of-oil-fuels-for-first-time-in-decades-1544128404>
6. <https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=WCRFPUS2&f=W>
7. <https://www.accenture.com/us-en/insight-talent-run-dry>

© 2019 Microsoft Corporation. All rights reserved. This eBook is for informational purposes only. MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS DOCUMENT. The descriptions of other companies in this document, if any, are provided only as a convenience to you. Microsoft cannot guarantee their accuracy, and the companies and products may change over time. Also, the descriptions are intended as brief highlights to aid understanding, rather than as thorough coverage. This document is provided “as is.” Information and views expressed in this document, including URL and other Internet website references, may change without notice. You bear the risk of using it. This document does not provide you with any legal rights to any intellectual property in any Microsoft product.