

## Digital trends in the era of oil and gas 4.0

Despite fluctuations in oil and gas prices over the last five years and alternative sources of energy becoming mainstream, oil demand continues to grow. With the question of how to secure the oil and gas sector's future production, digitalisation of this industry – or oil and gas 4.0 as it is also known – may provide answers to the sectors' biggest challenges such as profitability, operational efficiency and safety.

Accelerated by shifting trends in supply and demand, technologies such as cloud computing, the Internet of Things (IoT), 5G, Artificial Intelligence (AI) and big data allow oil and gas companies to respond swiftly to changes in the market and offer the greatest potential for impact across the value chain.

### FACTS

-  Oil consumption expected to increase by about 750,000 barrels a day each year to reach 103.2 million a day in 2030.
-  Drones and autonomous robots to reduce drilling and completion costs by 20% in deep-water areas and 25% in inspection and maintenance of assets.
-  Digitalisation to unlock up to up to US\$2.6 trillion by 2025 in the Middle East & Africa.
-  Demand for cloud services in Saudi Arabia forecast to reach up to US\$10 billion by 2030.



### CLOUD COMPUTING

Cloud computing allows oil and gas companies to scale their data management and storage, driving greater flexibility in infrastructure costs. The high computing power delivered via cloud platforms is inexpensive and supports adopting other technologies such as AI, big data and IoT technology.

#### Saudi Aramco & Google

- Saudi Aramco & Google Cloud teamed up to offer cloud services in the Kingdom
- Cloud Computing to deliver high performance, low-latency cloud services to enterprise customers



### IoT

IoT is a system of interrelated computing devices, machines, and people, where data and equipment communicate. In the oil and gas industry, IoT sensors can gather data from an oil well, such as continuously measuring oil composition and flow rates. Today's oil and gas companies are increasingly focusing their IoT initiatives less on underlying sensors, devices, and "smart" things and more on developing bold approaches for managing data, leveraging "brownfield" IoT infrastructure and developing new business models.

#### Kuwait Oil Company (KOC) & Halliburton Company

- Collaborated on their digital transformation journey through the maintenance and expansion of digital solutions for their North Kuwait asset
- By using cloud computing, IoT and real-time technologies to drive new ways of working, the collaboration aims to improve production planning, scheduling and enable virtual and autonomous reservoir optimisation.



### 5G

A study by GSMA has estimated that there will be more than 50 million 5G connections across the Middle East and North Africa (MENA) region by 2025, covering around 30 per cent of the region's population. The oil and gas industry can significantly benefit from the 5G network's high availability, reliability and quality of service and will have the opportunity to transform its communication and application technology fully.

#### Saudi Aramco, STC and Huawei

- A Memorandum of Understanding (MoU) was signed to launch a joint innovation programme to study the application of 5G technology in the oil and gas industry and to eventually develop relevant innovative solutions.

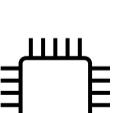


### AI

Within the oil and gas industry, AI can be used in two main applications: machine learning to study the potential risks of new projects and data science to get a comprehensive picture of the project. The application of AI goes beyond "better" or "faster" processes, and it is inspiring new ways to approaching exploration, development, production, transportation, refining and sales.

#### Abu Dhabi National Oil Company (ADNOC)

- Launch of AIQ - an AI joint venture company with Group 42, an Abu Dhabi-based AI and cloud computing company - that will focus on developing and commercialising AI products and applications for the oil and gas industry.



### BIG DATA

Big data analytics assists in streamlining critical oil and gas operations, such as exploration, drilling, production and delivery, in the upstream, midstream and downstream sectors, by providing complex and real-time insights to improve asset management.

#### Saudi Aramco

- Big data is used to improve CO2 sequestration, carry out data modelling for reservoir management and forecast production performance.

#### ADNOC

- Big data also plays a significant role at the Panorama Digital Centre where real-time information is aggregated across the energy company's many business units, including 65 operating sites. It uses analytics, AI, and big data to generate operational insights and recommendations.

