Oil and gas producers place faith in AI to boost margins

Advances in digitalisation are helping drive efficiency gains and reduce costs
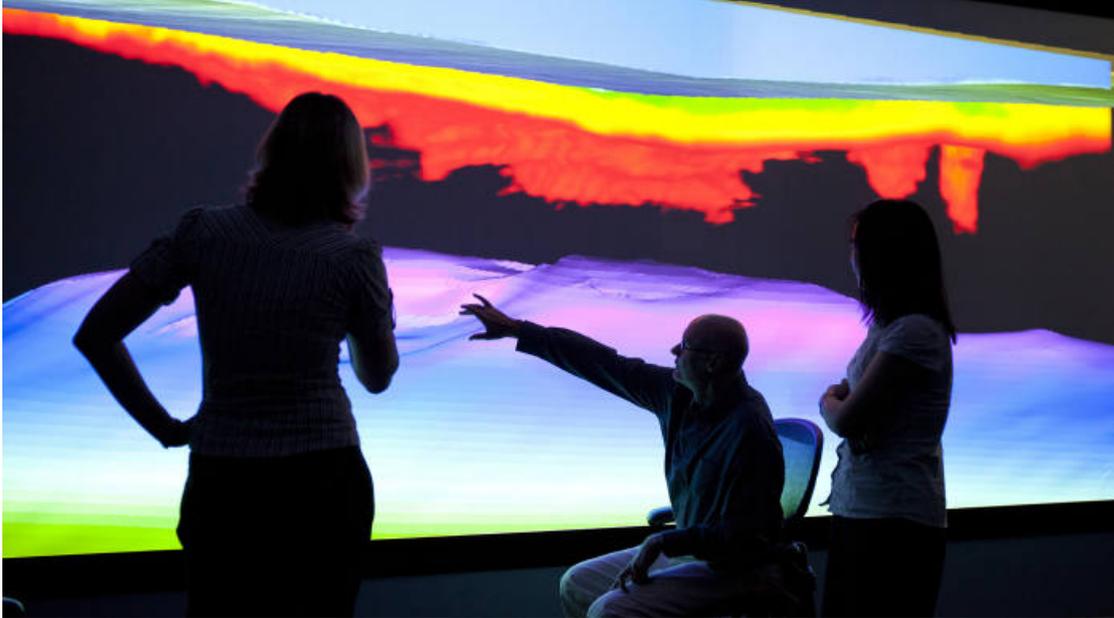
Looking ahead: BP staff reviewing seismic data in Sunbury, UK

At a time of low oil prices, artificial intelligence (AI) is offering new hope to executives in the oil and gas sector that healthy margins are still achievable.

It is in upstream operations, where field developments can cost tens of billions of dollars, that AI's potential is perhaps most keenly anticipated. BP's chief executive of upstream Bernard Looney told a conference last year that AI, combined with supercomputing, "is helping us to see our world through new eyes", adding: "We can uncover resources. We can compare wells instantly. We can pinpoint corrosion risks by applying machine learning to 40 years' worth of data."

In other words, through digitisation and the use of AI, there may be new opportunities to extract more product from oil and gasfields, with less capital investment.

"A low-price oil environment has significant implications in terms of spend and cost," observes Chris Ganje, a former group technology adviser at BP and now chief executive of AI start-up Amplyfi. "High-cost assets get stranded. Exploration often takes a big hit."

As part of his work at BP, he identified digitisation as the company's best chance of reducing cost and boosting efficiency.

"Artificial intelligence is a natural step on from this, since it enables companies to take the data flowing from their digitisation efforts and use it to understand the best opportunities to improve performance," he says.

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Oil and gas companies have collected a great deal of data for decades, says Simon Tucker, energy partner at Infosys Consulting. "But in many cases the business of extracting insight from these resources has required a lot of skill, time and effort from data scientists." AI promises to enable machines to shoulder a great deal of that work — and get it done much faster, he adds.

"Executives at oil and gas majors have realised in recent years that AI is not an area where their company can afford to be a 'fast follower'," according to Mr Tucker. "They need to be at the front of the curve, reaping the benefits."

Huge amounts of computing power and data storage are still needed to sift through seismic data images and produce drilling simulations that help maximise likely production. But these are now more accessible at lower cost through cloud technologies. For many companies in the sector, that opens up opportunities to explore more of the data they collect, in finer detail, without the need to make further substantial investments in their own computing facilities.

Last year French oil company Total announced it was partnering with Google Cloud to jointly develop AI technologies that will be applied to exploring and assessing oil and gasfields.

Total has said that its teams are exploring a range of AI applications with , including forecasting the likely output of sites over time and analysis of satellite images and rock sample images to enhance exploration efforts.

But as a recent report from management consultancy Deloitte points out, exploration and production activities are at very different stages of the journey in exploiting the potential for AI to deliver efficiency gains among oil and gas groups, with exploration clearly out in front. By contrast, progress in production is more patchy. This is because data in these environments must be drawn from sensors, meters and actuators embedded in a wide variety of machinery and assets: drills, wellheads, vessels and field equipment, for example.

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Bringing all that field data together in coherent formats for analysis involves a huge data integration effort. This is a challenge that is frequently complicated by limitations in connectivity, says Mr Tucker of Infosys. Many oil and gas companies struggle with these problems — but they are unlikely to achieve all their available efficiency gains without overcoming this hurdle, he says.

Drilling continues to represent an expensive and risky investment for oil and gas companies. AI could go a long way in helping boost life-long field production at cheapest cost by helping to predict the sites most likely to offer the easiest and cheapest extraction — and then ensuring that the maximum resources are drawn from that site.

At the same time, AI might also shed useful light on drilling tasks, by keeping a real-time eye on the condition of machinery and identifying risks to work disruptions by analysing data such as seismic vibrations, strata permeability and thermal gradients.

"Upstream is where the real action and investment is right now when it comes to AI in oil and gas," says Shervin Khodabandeh, senior partner at strategy firm Boston Consulting Group. "In a low-price oil environment, delivering as much product as possible with the least risk and at the lowest cost just about trumps any other concern these companies face."

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