

Small business technology and innovation in oil and gas

Oil and gas companies rely on various Australian businesses to provide goods and services that support their operations across the supply chain, and many of these are small businesses. The Australian Petroleum Production & Exploration Association (APPEA) has commissioned Deloitte Access Economics to examine the role and economic contribution of small business suppliers to Australia's oil and gas industry, focusing on inputs to exploration, extraction and processing activities. This note summarises the findings on small businesses' role in facilitating innovation in the sector.¹

New digital technologies are being rolled out across the oil and gas supply chain. Technology is continuing to support the productivity of the oil and gas industry by providing more sophisticated machines, which can **improve the efficiency** of capital-intensive processes throughout the supply chain. Some examples include:

- Machine learning and artificial intelligence (AI) applied to optimising plant design to reduce piping, and to anticipate issues with production assets and facilities
- Automation of drilling process and exploration
- 3D printing enabling the manufacture of spare and bespoke parts on site (especially useful in remote and/or offshore locations)
- Increasing physical, chemical sensor networks to collect more data for use in optimisation
- Smarter devices for workers to increase their productivity (National Energy Resources Australia, 2018).

Investing in digital technologies that improve real-time decision making and asset management can lead to large increases in productivity and competitive advantage for oil and gas companies, as well as additional safety, cost and other benefits – for example, reduced environmental impacts resulting from improved inspection and monitoring capabilities (Venables, 2018). The introduction of these innovations also has the potential to create new, highly skilled jobs in the oil and gas industry, as they facilitate increased production and greater demand for workers with the advanced skills required to implement and operate the new technologies (Mills, 2018).

Given growing applications of data-driven and automated technology in the oil and gas industry, there is great scope for small businesses in Australia to contribute to innovation in this field. Small businesses are generally able to be more **agile** in their innovation, which means they can collaborate with research partners and international providers to develop best-practice solutions, and then tailor their supply of new technologies to support efficiency gains for particular companies and projects. Box 1 highlights an example of how Qteq is bringing sensor technologies to the Australian oil and gas industry.

Box 1: Sensor technology solutions in the oil and gas industry

Qteq is an Australian-owned business that develops and implements sub-surface sensor technology solutions for exploration and production in resources projects. Predominantly owned by its staff and management, the business currently employs around 140 people, the majority of which are based in Queensland supporting the local coal seam gas market. Qteq's growth has been quite recent and rapid, with its staff count near tripling from around 50 employees in 2017.

¹ Deloitte Access Economics' research was informed by a survey of 15 oil and gas companies and consultations with oil and gas companies and small and medium-sized suppliers. For further details on the research and modelling methodology, as well as a list of references, please refer to the accompanying *Methodology note*.

The use of both wired and wireless sensor technologies enables oil and gas companies to collect large volumes of data which can be used to plan, manage and execute their operations. According to Stuart McCulloch, Managing Director – Monitoring at Qteq, “almost all of our technologies are installed below the ground. This allows oil and gas companies to get a better understanding of what’s happening within their reservoirs and assets, with the data collected through these measurement and monitoring sensors allowing real-time, smarter, accurate and (importantly) faster decision making.” For example, Qteq recently installed its 5,000th downhole monitoring system for a major customer, who uses the data collected from their underground surveillance network to operate in-well production equipment and meet their gas sales contracts.

As a business focused on innovation and new technological applications, Qteq invests significantly in its own research and development. Partnering with universities enables Qteq to work with leading researchers in developing new ways to use sensor infrastructure and data to improve industry decision making. Most recently, Qteq’s joint research venture with the University of Western Australia and Wallis Drilling has received a \$2.8 million Federal Government grant to develop technologies that will enable real-time, sub-surface data collection on drilling instruments.

Qteq also works with leading international technology providers to introduce systems and solutions able to solve major challenges facing the Australian georesources industries. Stuart says that “we have partnered with overseas companies such as GEO Pressure Systems Inc. (Canada) and Hansen Downhole Pump Solutions (Norway) to bring various digital solutions to the local oil and gas industry, including downhole sensors, artificial lift technologies and wireless subsurface monitoring and telemetry.” As a medium-sized supplier, Qteq has adopted a novel market position in the relationships established with these international providers, using a collaborative approach to adapt leading technologies for local industry needs.

A recent roadmap released by the CSIRO highlighted a number of **strategic opportunities** to assist with ensuring the long-term sustainability of Australia’s oil and gas industry. These included using technology to unlock greater innovation and competitive advantage across the sector, and improving the ‘business ecosystem’ to enable oil and gas companies to collaborate with other industry players – including governments – in order to achieve success (CSIRO, 2017).

As an important component of the oil and gas supply chain, small business suppliers will play a role in ensuring that the economic dividends from future industry growth can be realised. The need for increased digital investments to enable innovation will provide new opportunities for Australian small businesses that can tailor their products and services to suit the local operational needs of oil and gas companies, especially in disruptive technologies such as AI, robotics and sensor networks.

Extended reality technologies – including virtual reality, augmented reality and other real-and-virtual combined environments – are also likely to see rising adoption in oil and gas, as companies recognise the cost and safety benefits associated with using these interactive digital interfaces (Burns, 2019). Box 2 highlights an example of how Sentient Computing works with oil and gas companies to develop gaming technology solutions to meet specific business needs. It is the increasing uptake and integration of these technologies with the core operations of the oil and gas industry that will unlock future growth in the Australian industry in the medium to long term.

Box 2: The growing potential of gaming technology

Sentient Computing is a Perth-based software development company that specialises in the application of gaming technology in the resources sector. Founded in 2000, the company now employs 27 staff and supplies technology to a range of oil and gas companies across Australia.

Gaming technology enables the creation of a virtual model of an oil and gas facility, allowing employees to examine and manage equipment through an interactive digital interface without the need to be on site. According to Doug Bester, Managing Director at Sentient, "it provides a linked environment which liberates the large volumes of data available to oil and gas companies, enabling better and faster decisions". For example, a company might use a gaming engine to remotely look at a pump on a particular site and understand how it is performing now, which valves are required for its isolation, when it was last maintained, whether there are related hazards, and what the surrounding equipment looks like. The ability to quickly gather this data to inform real-time decisions creates efficiency gains and safety benefits.

The relatively small size of Sentient's operations enables the business to be agile and iterative in how it works with larger oil and gas companies on technological innovations. Doug notes that "we work closely with our oil and gas customers on proofs of concept and pilots. This means that an oil and gas company can try a new solution, see where the benefits are, and roll out more widely across a large asset once success has been proven. If it doesn't work, we can 'fail fast' with only a small investment at stake, and move onto developing other solutions."

Doug believes that there is potential for gaming technology to play a bigger role in the oil and gas industry in the future: "the gaming industry is now bigger than film, but the use of these technologies in the resources sector is still relatively unknown". Amidst the broader shift towards automation and unmanned facilities throughout the industry, gaming technology provides companies with the ability to operate remotely in a digital environment that closely replicates the experience of being physically located on site. The cost savings and safety benefits associated with these applications can lead to significant operational improvements for oil and gas companies across the industry.

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