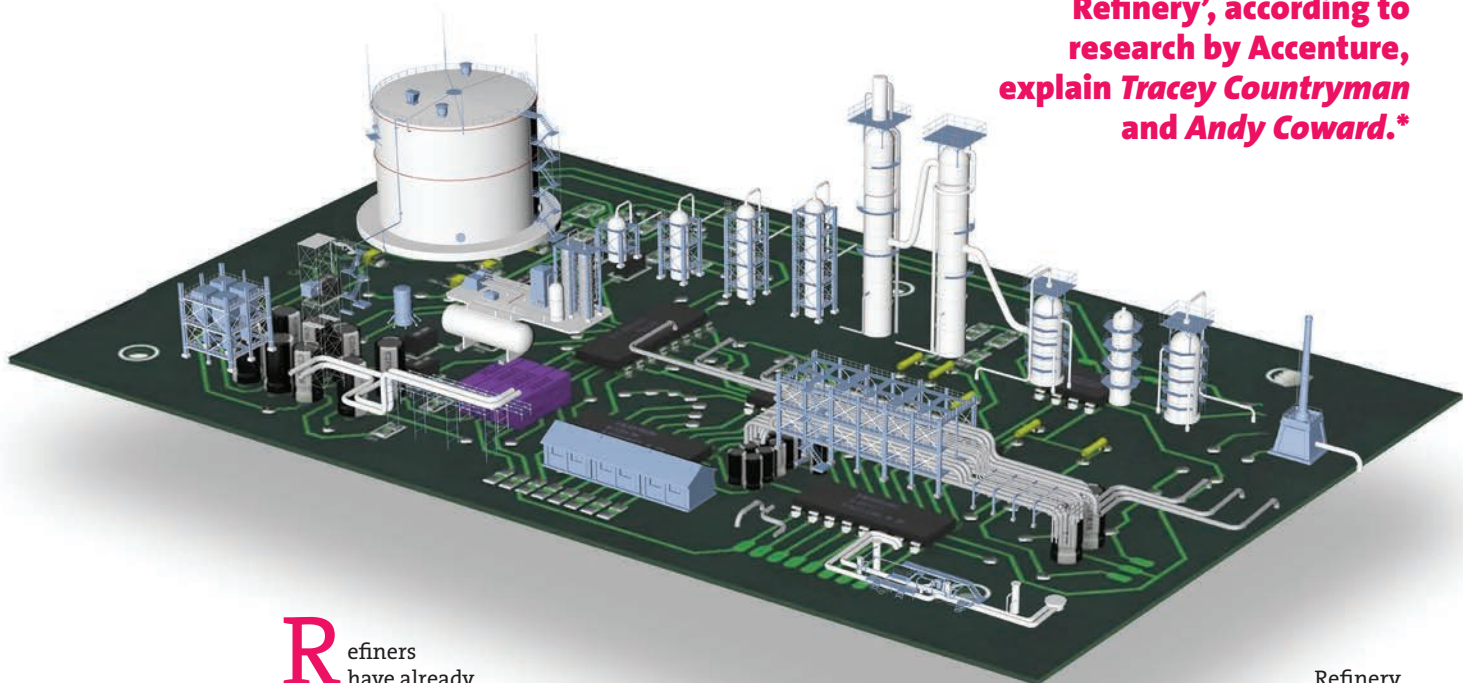**DIGITAL STRATEGY**

Smart moves

Refiners still have some way to go to reach the goal of the full digital or 'Intelligent Refinery', according to research by Accenture, explain *Tracey Countryman* and *Andy Coward*.*

Although the refining sector has already embarked upon its digital journey, refiners still have a long way to go to achieve their digital ambitions

Photo: Accenture

Refiners have already embarked upon the journey towards creating what Accenture identifies as the 'Intelligent Refinery', making fundamental investments in digital technologies such as cloud, advanced analytics, robotics and applied artificial intelligence (AI). However, our research into the real-world experiences of about 170 refining professionals globally indicates that refiners still have a long way to go to achieve their digital ambitions.

It is clear the global refining industry faces some significant challenges and potential disruptions in the not-too-distant future. For example, the introduction in 2020 of new specifications for bunker fuel oil by the International Maritime Organisation (IMO) for the world's marine fleet will change the refining mix and shift demand. Emission regulations for plants and for specific fuels are tightening, while newer fuels such as natural gas, biofuels and electricity are making inroads into the traditional fuels market. Add in the broadening and ever-changing crude mix, and this pushes the boundaries of what refiners can process competitively.

Coupled with the looming 'retirement bubble' of some of the best and most experienced industry operators and engineers, it is no wonder that the sector is looking at new methods to help update its operations. Refiners need to make their plants more efficient, cost-effective and reliable, and they need to be able to respond more quickly to rapidly changing markets.

Accenture's *2018 Digital Refinery Survey* showed that refiners are keenly aware of the possible loss of competitive advantage due to a lack of investment in digital technologies, with more than two-thirds (67%) of respondents citing this as a top risk. Another major concern – cited by 64% – is the lack of ability to continue to reduce costs whilst increasing margins.

Refiners are already realising value from digital investments and 75% said they intend to spend more on digital over the next three years. But, as of today, the value being released through the application of digital remains largely untapped.

The Intelligent Refinery

Digital technology is enabling greater transparency across the fuels value chain, challenging existing operating models and breaking down legacy functional silos. Our view of the Intelligent Refinery presents an organisation that uses advanced digital technologies to become much more agile in its manufacturing, based on real-time market intelligence, commercial optimisation scenarios, and operational upsets and/or constraints. The operation will become more predictive and reliable, based on better understanding of equipment and process health. Better decision making will be facilitated, with benefit of optimised operational activity, enabling workers to be more productive with the benefit of the right information at the right time to execute work in the plant.

Our research showed that many refiners (48%) already consider themselves mature or semi-mature in their deployment of digital technologies. However, there still appears to be lack of widespread use of digital technologies.

That is not to say that refiners are not making progress on the digital front; they certainly are. Over half (56%) said digital technology was making a significant impact on their maintenance and reliability and 50% cited benefits in production scheduling and planning. The full value of being digital at scale, however, has yet to be realised.

Five key digital challenges and opportunities

In our analysis of the 2018 survey results, five key areas of challenge and opportunity emerged in refiners' attitudes towards and responses to digital technology:

Operational technology and information technology convergence is a reality – Respondents are recognising the convergence between the previously highly segmented organisations representing information technology (IT) and operational technology (OT). To address the new trend, 34% of companies are creating new organisational models, 28% are setting up steering committees and 15% are establishing new C-level (chief-level) roles. Digital will continue to accelerate this convergence, as refiners strive to make the full value chain transparent from the board room to the control room, pushing the need for new security standards, collaboration processes across silos, and back-end data architectures.

Digital is as digital does – Refiners are using a relatively small set of digital technologies and, as mentioned, may tend to over-rate their digital maturity levels. The technology with the most widespread adoption by far is advanced process control (35% of respondents say they have adopted it). But there is a sharp drop-off to the next technology – tools to improve cybersecurity, at 14%. In fact, no refiners are near full-scale digital adoption, and use of advanced technologies including AI (artificial intelligence), machine learning and robust data science modeling is still in early stages. In addition, there is considerable opportunity to expand and scale the mix of digital technologies further into refining operations to achieve competitive advantage.

Most refiners have yet to realise potential value – Refiners are putting digital solutions to use in areas such as plant maintenance, production scheduling and production execution. Nevertheless, there is much less adoption of digital in important areas such as energy management (24%), engineering and capital projects (22%) and trading (15%). Four out of five refiners (80%) said that digital is adding $5mn or less to their business, and only 6% are realising $100mn or more. In short, there is much more opportunity for digital to deliver greater operational transformation and release trapped value within and across refinery operations.

Lack of digital investment increases risk – Refiners recognise that the pace of disruptive change is accelerating, putting their ability to compete at risk. Refiners have been utilising traditional methods for incremental cost reduction and operational excellence improvement for decades and they believe that if they do not invest in digital, the next step change is a real challenge. Going digital can help them become a more viable business. Wider digital adoption can help refiners defend against industry disruption while supporting additional cost reduction and margin improvement.

Improved workforce skills are important – In our survey, 50% of refiners identified the cost of deployment as the top barrier to wider digital adoption, about the same level as in 2017. There was a major increase, however, in concerns about relevant digital skills and the possible impact of the lack of these on refining operations. It is hard for the oil and gas sector to compete for digital talent (ie digital scientists) and 'digital natives' do not generally exist in refining operations given the sector's demographics. So, refiners need to work extra hard at reskilling the existing workforce to increase digital adoption, identifying next generation leaders to be digital champions, proactively targeting new hires for skilled people, and looking to third-party partners to help them along their digital journey.

The cyber issue

In addition to operational and workforce concerns, the refiners we surveyed showed increasing concern about their cyber defenses. More than a quarter (28%) of respondents said they are seeing more cyber-attacks than last year, and 38% of respondents said they see data security as a barrier to adopting digital technologies in their organisations.

However, only 28% of respondents said that digital tools to improve cybersecurity were one of their top three priority areas for investment. Given the requirement of real-time data and pervasive information access required to achieve digital transformation, OT cybersecurity is a fundamental building block to assess in the early stages of a refiner's digital journey.

Digital as strategy enabler

Refiners face increasing competitive pressures in the coming years. In fact, the Accenture Disruptability Index identified energy as *the* industry most susceptible to future disruption. Our research shows that refiners are stepping up their tactical digital investments, and this will enable gains in efficiency and performance.

Digital transformation can be an essential component in maintaining or increasing margins and capturing value. However, the ability to reduce costs, be more reliable, optimise refinery margins and maintain or improve safe operations is at risk unless companies put their money where their mouth is.

To accomplish this, refineries should be relentless about focusing on value, both in terms of hard dollar benefit realisation, and in new ways of developing the workforce of the future. They should understand the biggest drivers of value leakage, pick common strategic pillars to focus on, and then double-down and scale the solutions across their operations. The scale, however, cannot be achieved without two critical elements of enablement – bringing IT and the digital backbone into alignment, and focusing on their people – or else all this effort is for naught.

Finally, no major transformation can succeed without visible leadership from the top. Refiners should strive to ensure that their leaders are working hard to articulate the vision of the refinery of the future, hold digital and business teams accountable for moving the needle in value generation, and inspire a culture of innovation.

The final objective – the Intelligent Refinery – reflects an organisation that anticipates and responds to changes in the marketplace whilst getting the maximum margin out of every barrel of oil and product processed. ●

*Tracey Countryman is Managing Director and Global Lead for Refining and Resources Industry X.0, Accenture, and Andy Coward is Managing Director and European Lead for Refining Digital Plant, Accenture.

> *Refiners are keenly aware of the possible loss of competitive advantage due to a lack of investment in digital technologies*