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Gulf Downstream Whitepaper

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THE FUTURE OF WORK AND THE WORK OF THE FUTURE

Strategies for Refiners to Embed a Digital Transformation Culture Within the Workforce?

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GI Consultancy Gulf Intelligence **Whitepaper**

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EXECUTIVE SUMMARY

3%. That's how many survey respondents think the digital literacy within the Gulf's downstream industry is advanced. More than half (52%) said it's sufficient, and 45% said it's poor, according to a GIQ Industry Survey. Considering the industry, including refiners, is one of the region's major economic engines and pivotal to energy security, there's clearly catching up to do – and soon. The economic incentives are clear: 82% of respondents said the Gulf refiners that accelerate the adoption of the 4th Industrial Revolution (4IR) will have shorter turnarounds, potentially saving millions of US dollars in efficiency.

What's Next?

In short: spur a digital transformation within the workforce, for it is the ideas and passion of workers that determine operational and economic excellence. At the most basic level, a workforce must understand the relevance and importance of embracing the digital and technologies in the toolbox of the 4IR. They must understand that it is no longer a choice; there will be very, very few profitable refineries by the late 2020s that have given digital literacy a cold shoulder. It is an inescapable fact: digital and technology know-how are imperative in the men and women of the refining industry of tomorrow.

Half the respondents to a GIQ Industry Survey expect the impact of the 4IR on the Gulf's energy industry in the next decade to be transformational; 23% expect it to be notable, 26% expect it to be moderate. Many job descriptions will change, some will disappear entirely, and some entirely new ones will emerge – but all will require an element of digital literacy. "I expect artificial intelligence (AI) to change 100% of jobs in the next five to ten years," said Ginni Rometty, Chairman, President and CEO of IBM.

Global Challenge, Local Solutions

The Middle East is not limping behind in this global transformation. But it must accelerate progress. There is no single answer to this extremely difficult goal. Solutions will be multifaceted, depending on the age of the refinery, its output, the age and competencies of the workforce, plus the financial and geopolitical influences. The industry's ears are open; change is happening. The world's major energy companies are digesting how to smartly and sustainably implement digital

> **"Perhaps there is a technology out there that represents the 'uberization' of refineries? Nothing is impossible; that is what is so dynamic and unnerving in equal measure."**

trends into their workforce. Many have also started establishing integrated platforms and systems to both learn and implement digital solutions. But some still operate predominately with pen and paper, failing to modernize. Unsurprisingly then, more than half (58%) of survey respondents said the Gulf's energy industry is not doing enough to stay ahead of the 4IR curve. Let's pick up the pace.

Holistic Progress

This transformation cannot be dealt with piece by piece. It demands a holistic approach. A team working on one part of refining operations cannot be digitally fluent while another team on a different operation is not. Poor alignment will breed frustrated sentiment, dull efficiency and weaken competitiveness. At worst, it will jeopardize safety. Any approach must encompass human resources, finance, operations, engineering, accounting and so on – regardless of whether the worker falls into the millennial, baby boomer or any other age-defined camp. Holistic progress also means embracing more players in the wider energy industry, including academia and government. Relations with academia must especially be nurtured, for that is the birthplace of the talent that the refining industry so dearly needs. Academia must ensure its teaching skills are relevant in industry and industry must guide academia; this must be a two-way street of transparency; one that currently has many bends in it. More than three quarters (76%) of survey respondents said industry and academia across the Gulf are not aligning fast enough to ensure the right skills will exist for the region's downstream jobs of the future. The solution? Start talking, sharing and troubleshooting.

DEFINITION
4th Industrial Revolution

The 4IR represents a fundamental change in the way we live, work and relate to one another. The speed, breadth and depth of this revolution is forcing us to rethink how countries develop, how organisations create value and even what it means to be human.

Source: World Economic Forum (WEF)

Pressure Points?

There are two main worry points: job security amid the rise of digital (notably artificial intelligence (AI), robotics and automation), and the cost of implementing a digital culture. Both are entirely manageable concerns. For the former, reassuring the workforce that digital tools will complement – not replace – their livelihoods is key. For example, work that is manually repetitive with less creative thinking can be replaced by robotics, freeing that worker to retrain or upskill and contribute more innovatively – something machinery cannot replicate.

Digital Future

300,000 b/d
The Middle East had over 300,000 b/d of additions in 2018, most of which came from two 120,000 b/d condensate splitters at Iran's Bandar Abbas refiner, according to McKinsey's global downstream outlook to 2035.

6.8mn b/d
Capacity will grow more than 6.8mn b/d in the next five years, largely from projects in Asia and the Middle East, according to McKinsey's global downstream outlook to 2035.

120mn
people in the world's 12 largest economies may need to be reskilled because of automation over the next three years, according to a 2019 IBM study. Refiners in the Gulf are not immune.

$50bn
Interconnected emerging technologies can unlock $50bn in savings in the global oil and gas sector. AI, blockchain, robotics, sensor technology, machine learning, deep learning and edge computing can cut capital expenditure by 20% and operating costs in downstream by 1%-3%, detailed McKinsey.

78%
More than two thirds of respondents to a PwC survey of 1,200 business in 79 countries said they are identifying and building the future skills created by the impact of technology. This 78% result relates to the findings of leaders across nine countries in the Middle East. Digital is rapidly climbing the agenda of corporate priorities; refiners cannot be left behind.

$77.6bn
The International Data Corporation (IDC) said spending on cognitive and AI systems will reach $77.6bn in 2022, more than three times the $24bn forecast for 2018.

9.8bn
The global population will climb by more than 2bn – a 27% increase – by 2050 to 9.8bn. This is the equivalent of nearly duplicating the entire population of China and India, the world's most populated nations, by mid-century. Increasing refining efficiency via digital tools in the Gulf, a key supplier for Asia, Europe and Africa, is a relatively safe financial bet.

3x
Refiners must be on their guard in their digital transformation. Industries in the Middle East are vulnerable to cyberattacks; between two to three times more than the global average.

$6trn
Cybercrime damages worldwide will cost the world $6trn annually by 2021, up from $3trn in 2015, reported Cybersecurity Ventures.

3.5mn
There is a global shortage of cybersecurity staff worldwide. Up to 3.5mn jobs – equivalent to 80% of Oman's total population – will open globally by 2021, said Cybersecurity Ventures. Refiners' training programs must nurture this critical skill set, reducing the need to import talent, as per National Visions.

Take a Formula One racing driver as an example. The car has thousands of sensors feeding real-time data back to the team, all of whom are rapidly examining it and feeding information back to the driver. Yet, this is not the only reason the driver safely completes the race. It is equally the driver's instinct and ability to think critically. Applying this to the refining sector, the wisdom and gut feel of engineers can never be replicated. In addressing concerns over the cost of embracing the 4IR, the financial benefits speak for themselves. Digitalization in the oil and gas sector could be worth between $1.6trn to $2.5trn for the industry, its customers and wider society over the next decade, according to the World Economic Forum (WEF). The financial outlay of converting skills at work, upskilling, retraining and attracting a new supply of talent will pay off. When utilized smartly, the 4IR saves money, not wastes it.

Best of Both Worlds

Co-creation is essential to accelerating progress and leveraging the best of both worlds in a modern working culture: talent and digital. Nobody understands the business of a refinery like the engineers and wider workforce. Accordingly, the workforce must be engaged at every step of the digital transformation. Think collaboration, not dictation. But how to inspire both the engineers and technology players to create something together? This is best done via a top-down cultural change that promotes openness to new ideas, a supportive environment that does not fear (safe) failure and time factored into workers' schedules. Co-creation also decreases risk by raising the likelihood that digital strategies are realistic i.e. they are tailored to a refinery's needs. This is imperative for there is little time or funds for expensive backtracking when transforming the culture of a workforce. For example, a digital mission statement within Saudi Aramco must be filtered through to the company's 76,000 employees. Confusion must be kept to a minimum. ■

> **"Downstream operations have not changed significantly since their emergence. It is a 100-year-old business model for a market worth more than $2trn a year. Clearly, it's time for an upgrade."**

Source of Whitepaper Findings

The Workshop encompassed the views and expertise of more than 40 high-level downstream operators in the Middle East. The sessions were conducted under an Open Mic policy and the Chatham House Rule; both to encourage openness and sharing of information. Shared recommendations – a minimum of three per participant – were collated on two critical questions under – Stream 1 and Stream 2. These were then streamlined into the top three recommendations, as detailed in this Whitepaper. Further use of material must cite this Whitepaper.

Adapt or Disappear

BY PEYMAN MOH
Partner, Digital Advisory and Analytics, ERM

"The measure of intelligence is the ability to change," said Albert Einstein, a man who made changing the way we look at reality his life challenge. The relevance of this quote is striking in today's world, notably amid the 4IR. The best tool to thrive? Adaptability. There are still plenty of companies that say: "We've always done it like this, there is nothing to worry about!" But be sure, their life won't be long.

This is especially true for large and old industries, such as oil and gas, increasingly considered a 'dinosaur' industry that will face difficulties in the 4IR thanks to the size of its legacy data and information systems. Failure to establish flexible roadmaps will lead to the same fate of the real dinosaurs: extinction.

Blindly throwing resources and money at the problem will not work. The approach must be far smarter. One way to get around all these buzz words is to understand how the three key trends – digital transformation, energy transition and sustainability and environmental impacts – are all interconnected and co-enablers if utilized correctly. A new extinction threat is at the door; only the adaptable will survive. ■

Common Roadmap?

Every industry and company will need their own roadmap. But there are common points of progress that nearly all companies can embrace.

- Set a clear and realistic vision towards becoming a digital organization
- Have a transparent vision in the energy transition and sustainability
- Leverage openness and adaptabilities of C-level managers and strategic decision makers
- Nurture a culture of innovation and diversity to learn from industries and organizations
- Safety and security are the core of every decision for maximum efficiency, limit risks
- Improve personal and organizational learning and train existing human assets
- Build awareness and literacy in digital technologies

DATA: An Ally That Needs Careful Handling

BY ANDY LAVEN
Senior Partner, Energy Consulting

The future of data management is far more complex than we currently appreciate. Because of the drive to adopt the 4IR, the quantity of data and the speed of change, new challenges are rapidly emerging. We need to implement smart management solutions – equally rapidly.

It's not just the use of data; more importantly, it's the interpretation. What lessons can we learn and how quickly can we learn from them? A computer can interpret and compare thousands of data points in milliseconds and will often be more accurate than a rushed, overworked worker. But that's not the end of the story. When the boundaries of a problem are well-defined, digitalization is very successful. But where uncertainty exists, or curveballs are thrown... then it becomes problematic. With logic and rules, a computer can replicate our response. But once the rules are broken, any amount of data processing is irrelevant. We must ensure there are safety nets before broadly embracing the 4IR.

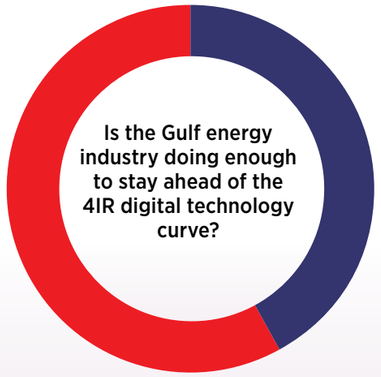
Humans must oversee processes, such as predictive analytics and AI, just as experienced hands supervise new hires. Staff must have the knowledge and confidence to interrogate and understand, and if necessary, to refute, the output of data-based systems. Data processing sees correlation, while experience understands causality. Unopposed, the broad use of inadequate data processes will have disastrous consequences.

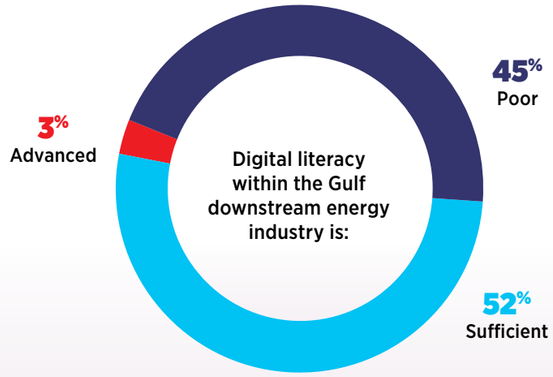
Refiners should be wary of providers who are selling generic solutions to issues that are not problems. The enthusiasm for digitalization has spawned a plethora of companies touting ideas where there is no positive benefit. For example, whilst blockchain may be very efficient in managing contracts, it cannot replace a basic quality management system. The solutions presented by the 4IR, including data management, must streamline and not complicate the challenge.

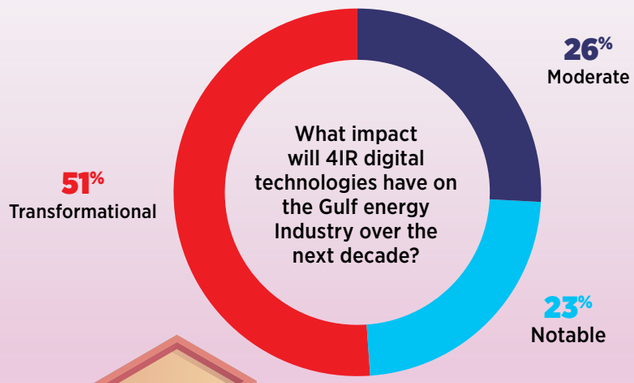
Engaging and educating the current workforce should be the top priority. Simply chasing the 4IR will result in weak economics and safety hazards – an absolute no-go for the energy industry. ■

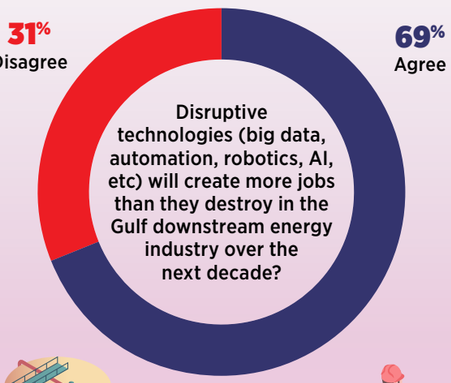
GIQ SURVEY

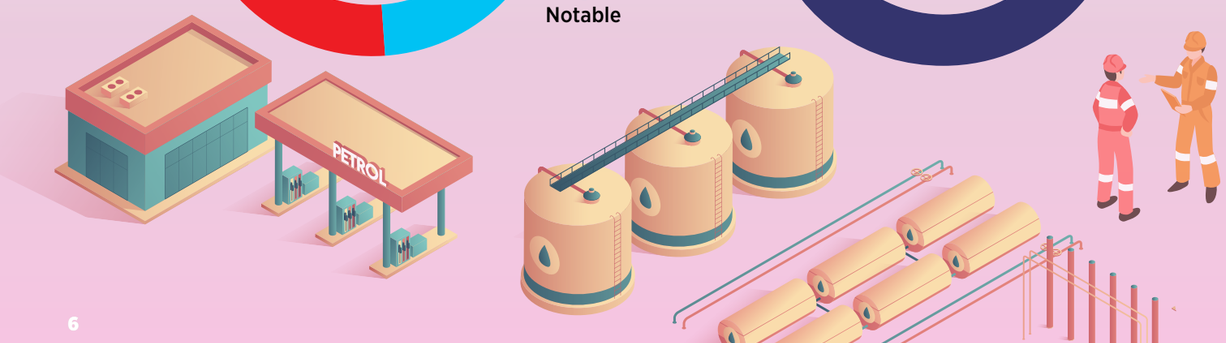
Top Strategies that Refiners Should Adopt to Embed a Digital Transformation Culture Within the Workforce?

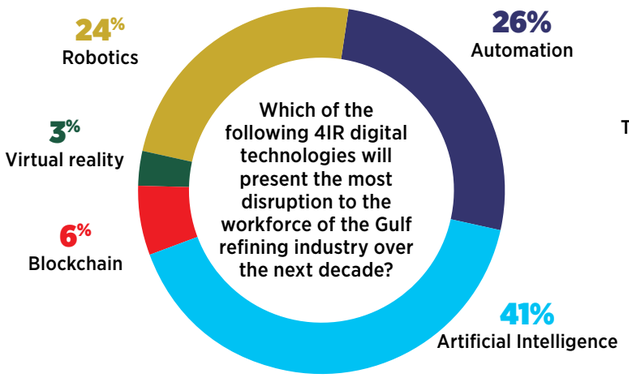


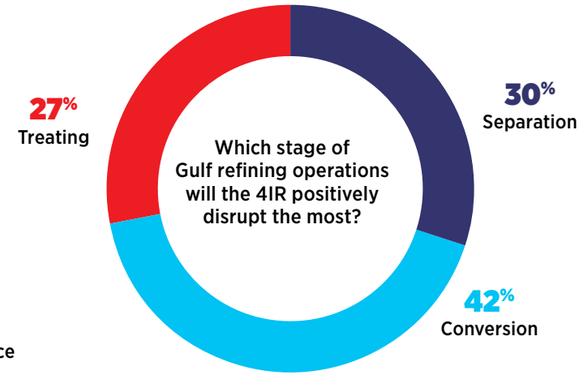


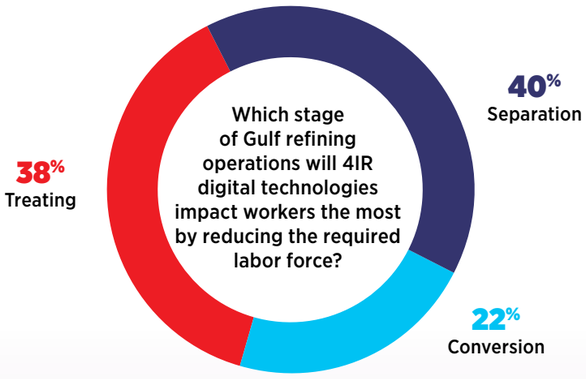


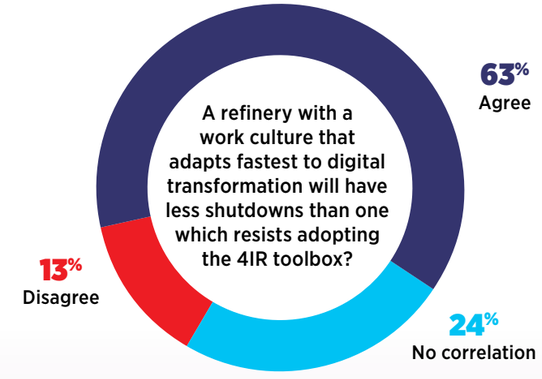


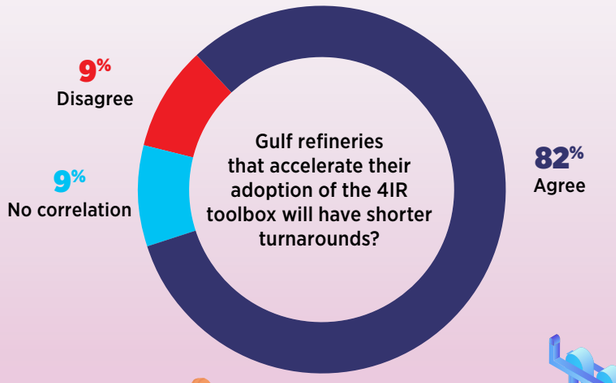












STREAM 1
Top Three Recommendations

DRAFT A JOB DESCRIPTION

What must be the top five skills of a refinery engineer by 2025?

1. Adaptable Intelligence

Tenacity. Intellectual and emotional agility. Critical and creative thinking. These all feed into adaptable intelligence (AQ); a set of interpersonal, self-regulation and communication skills underscored by adaptability. The engineer of the future must be able to flex to the ever-changing environment facing refiners: from digitalization, to meeting rising energy demand amid fluctuating oil prices, to curating a greener identity as per the Paris Agreement. Historically, education has focused on memorizing information. Yet, today, a mobile phone application can answer any question on any subject in milliseconds. This means the way engineers think must change. It should no longer only be a case of how much you can memorize – fundamental engineering skills are still vital – but also how much you can create and extract. Training and skills will need to focus on answering questions like: How can I create a steady, reliable and accurate stream of workable data? How can I ensure it is insightful knowledge and not a tsunami of numbers? How do I make use of this data to improve operational, financial and safety norms? This must encompass a broader shift at the start of the learning chain: schools, colleges and universities' learning programs must evolve along with industry. Just hiring new talent to solve existing challenges (rather than upskilling and retraining internally) will increasingly be discouraged. The way training is handled also needs to become more efficient. The time it takes to close a skills gap through traditional training has increased by more than ten times in the past four years, jumping from 3 days to 36 days, according to IBM.

2. Digital & Technology Know-How

Who identifies the most operational and safety day-to-day challenges and opportunities at a refinery? Engineers. So, as digital tools are increasingly integrated into refining operations, the engineers' digital/technology awareness must also evolve. This lies at the heart of continually improving operational efficiency and safety standards. Skills must encompass data science, data management, computing literacy, to name but a few. Not all engineers will have advanced digital/technology skills, but each refinery must establish a baseline of knowledge that all employees must adhere to. Everyone must understand the digital/technology language, even if some are more fluent.

3. Smart Processing

Appreciating process may not seem the most dynamic next step for engineers of future refining. But it is extremely important. Amid significant change in operational, talent and financial norms, there is a great need to ensure the day-to-day fundamentals are continually improved. For example, a refinery built in the 1960s was spending $30mn a month on garbage collection, one workshop participant shared. A new system for garbage collection was designed using standardized processes i.e. changing the size of the bin, as well as digital tools i.e. sensors to flag when the bin was getting too full (the refinery was receiving heavy environmental fines for overflow). Spending just $1mn on this $30mn problem means monthly garbage collection now costs $5mn a month – an 83% cost saving thanks to applying digital aids to established processes. Many refiners are already suffering from digital fatigue, which is concerning considering the early stage of the industry's 4IR journey. Yet, it's also unsurprising. There's a real risk of information overload, with new digital/technologies increasingly pitched to refiners as the 'new' solution. One of the routes to rebuild positive momentum is using tried and tested processes for traditional operations to find workable digital/technology solutions. ■

STREAM 2
Top Three Recommendations

CREATE A DIGITAL EMPLOYABILITY INDEX

What Should be the Key Assessments to Measure a Company's Performance on Advancing the Digital Competency of Employees?

1. Culture of Innovation

How strong is the culture of innovation in your company? How freely are new ideas sparked? How curious is the workforce? How does your company think outside the box to create new solutions? How does your company use existing solutions with a fresh twist? These can all be questions for the Digital Employability Index assessment. Crucially, having an innovative culture means having employee buy-in. Today, there is a gap between managerial willingness to push for digital transformation and the willingness of engineers to get involved. Attempts to curate a culture of innovation – and be part of the Digital Employability Index – will crumble without this alignment. Strategies to build this trust include facilitating agile environments for engineers and digital/technology entities to collectively brainstorm i.e. idea laboratories. This fuels creativity, ensures the idea is workable and builds a sense of accountability. Plus, from this environment, the positive influence of innovation champions can filter through the entire company. This feeds into the value of collaboration and establishing an ecosystem of knowledge, trust and best standards. Success means bolstering efficiency, increasing affordability and competitiveness. Why spend five years of resources and funds on research and development (R&D) for an idea that a fellow company solved years ago? If that company is willing to share its knowledge and your company is willing to embrace it, then years and potentially millions of US dollars can be saved. This enables both companies to hasten progress on a new challenge, versus going around in circles. A culture of innovation can also lead to collectively identifying pain points and collectively solving them. Again, this speeds up progress and with rising energy demand, time is money.

2. Digital & Technology Competencies

Participating in the Digital Employability Index clearly demands digital/technology awareness. But more specifically, this recommendation applies to the breadth and depth of digital competencies within a company. What percentage of your workforce understands the digital/technology fundamentals? What percentage has greater expertise? Are their digital/technology competencies holistic or more focused on one or two areas? How has their digital/technology competencies led to improved efficiency, competitiveness and sustainability? How advanced are your digital/technology training programs? Being able to answer these questions in detail would reflect a company's seriousness about spurring a digital transformation within the workforce, as would recording progress and setting quantifiable targets. Companies must ensure that their digital/technology competencies are tailored to the challenges that already exist. There are digital/technology companies trying to sell 'solutions' to challenges that should not be prioritized; there are other, more serious weaknesses to be addressed. Having robust digital competencies means refiners are not spoon fed 'remedies' to their operational trouble spots, but can be proactive problem solvers.

3. Flexibility

Does your workforce have intellectual and emotional agility, also known as adaptable intelligence (AQ)? How has your staff leveraged digital assets and knowledge in an unexpected situation i.e. an unscheduled shutdown? How quickly have new lessons been learned and how agile and quick are the internal risk-reward assessment processes? Does your company promote openness and creative and critical thinking? If so, what quantifiable progress has been made? Are the fundamental engineering skills – still very coveted – seamlessly complemented by digital expertise? All these can be areas of interest in the Digital Employability Index assessment process, for intensifying competition in the refining industry means corporate strategies must be light-footed and flexible. ■

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