

Oil producers must embrace digitalisation to survive the COVID-19 era

By: **Uwe Troeger**, Senior Executive Vice President of Digital Industries, Siemens Middle East

If there's one winner to emerge from the devastating toll of COVID-19, it's technology, and those victors are well known. The giant internet companies connecting us to each other and to our online shopping carts. Cloud providers enabling most office workers to continue business, while industrial technology companies keeping factories, infrastructure and energy facilities running.

Oil, gas and petrochemical companies have come under pressure due to collapse of demand during the pandemic. Still, they stand to benefit from prudent investments that digitalise their industry. Unlike many consumer goods, aerospace, automotive and pharmaceutical industries, oil and gas producers have been more hesitant in their digitalisation journey. Some producers are reluctant to allocate capital to projects that won't show returns for years. Others are concerned about sharing data and cybersecurity, reinforcing the industry's preference for tech conservatism.

Market forces is solidifying this conservatism for some producers. Even before crude's unprecedented plunge to negative values in April, the consensus forecast was that prices would be "lower for longer." The latest declines are further straining energy companies and may jeopardise nascent digitalisation efforts that lower lifecycle costs, optimise output and protect the planet.

Enter the 'Digital Twin'

The slow pace of technology adoption in the energy industry isn't uniform, and many oil and gas companies, especially in the Middle East, are on the cutting edge of digitalisation and devote considerable resources to technology. Most innovations in the sector today, from exploration to downstream projects, are aimed at squeezing maximum value from each barrel. Switching out old equipment and installing sensors that





allow for real-time production optimisation are some examples of the quick upgrades to brownfield assets.

But the greatest promise lies in technology that isn't widely adopted, yet. Digital twins are long established in the industrial world, and proving to be even more useful as the remote operation and servicing of critical oil and gas infrastructure become integral

to current operating environments. This software solution allows energy companies to create virtual copies that emulate their plants, providing operators a comprehensive and accurate assessment of their assets.

Developing a digital twin is a key step toward connecting the virtual and real production worlds of the digital enterprise. By deepening the integration of automation

hardware and software, producers not only collect and process data from machines and plants, but they can turn the information into a competitive advantage. The deeper the integration, the better the outcome.

Today's tools are often specialized for specific tasks and may lack the connectivity that would enable the easy comparison and cross-reference of asset information.



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Engineering tools work well during the design and build phases but are less suited in operation and maintenance. Functional information is disconnected from 3D designs used when building a plant, even though these designs could provide excellent context for operations training, maintenance task planning, troubleshooting and decision-making during crises. So-called 'dark data' which is untagged and unlinked information stored in PDFs, drawings or paper documents, and electronic data in legacy systems are rarely accessible in current control portals.

In order to mitigate the disconnect, a new approach is needed that combines operations intelligence, simulation, asset performance management, and artificial intelligence platforms in a sensible yet powerful way to make complex information more accessible and comprehensible to decision makers. Real-time data - accessed via a secure cloud-based solution in a single platform - can help operators make more confident decisions, act faster, and ultimately increase operations performance and safety.

Real-time Insights

My company Siemens, along with our partners at Bentley Systems, have developed a solution we call PlantSight, which merges digital twins with both physical reality

and engineering data, creating a holistic digital context for any operating plant. This allows for immediate access to consistent representations of the most complex production facilities, and is especially useful to accelerating the time and effort needed to federate and complete asset information for brownfield installations.

Here's how this approach would help improve a typical oil and gas production facility or petrochemical plant. Data, which is constantly generated, has historically been collected in various databases and paper files and then stored somewhere, at headquarters or on location. PlantSight takes all these data, including 'dark data,' and merges them into a portal that provides a rich visual experience that covers the complete lifecycle of assets.

An operational snapshot of overall production and equipment health indicators such as reliability, maintenance and health, are clearly visualised, and users can quickly view anomalies at individual assets. Historic data like false starts, missed preventative maintenance and alarms are easily accessed, and operators can determine if, for example, a plugged filter is the likely cause of low lube oil pressure, and then send a maintenance team to resolve the issue. Schematics and 3D models are also embedded in the system,

making the portal a one-stop solution.

This digital twin system is designed to be enabled without disrupting the existing physical or virtual environment, which is crucial when critical industries are operating at heightened capacity. When engineering or maintenance trouble shoot an operational issue or need to start a modification project, they lose precious time when trying to determine the current status and performance of the asset before starting their actual work because often, the asset information is missing or inaccurate. Functional, operational and 3D spatial information, coupled with accurate information on spare parts, has proven to shorten project duration and 'mean time to repair,' thus lowering operational and capital expenditures.

The post COVID-19 lockdown phase will be characterised by economic uncertainty, repeated disruption to labor and supply chains, and for energy companies, low oil and gas prices. As the energy industry prepares for this new era, technologies that reduce operating costs and prolong the life of existing assets will feature more prominently in investment budgets. Digital twins are poised to become integral systems needed to operate efficient, safe and reliable oil, gas and chemical facilities.



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