



Digital Twin Strategy Playbook 2022

FEBRUARY 2022

Industry Report

WWW.CUSTOMER-EXPERIENCE.LIVE/INTELLIGENT-AUTOMATION-MIDDLEEAST

Why should oil and gas enterprises embrace the digital twin technology?

Digital Twin is not simply the deployment of a new digital tool; it represents a new way of thinking that allows oil and gas conglomerates to become resilient, evolve, and mature as they strive to de-risk their business and prepare for the future. Digital Twin enables technically skilled oil and gas personnel to embrace their digital co-workers to harness the immeasurable benefits of emerging technologies.

Agile enterprises are keen to embrace digital twin technology to create resilience in processes and experiences by automating predictive maintenance and production optimisation.

The oil and gas sector has a tremendous opportunity to evaluate the risks of embracing the digital twin to expedite innovation and meet the needs of the changing environments. The energy sector has always valued innovation and adopted advanced technologies before other industry sectors. As such, the digital twin technology is a monumental opportunity that allows real-time data analytics to elevate benchmarks for the predictive analysis of assets. It also supports measuring asset performance through multiple channels across the entire supply chain.

Digital twin helps deliver consistent and sustainable results that optimise the maintenance and production cycles by removing the limitations imposed by IoT. Thus, it extends the asset's lifecycle by reducing unplanned maintenance and labor costs. The benefit of digital twins is massive with significant impacts on cost savings and strategic competitiveness in the industry.



What makes Digital Twin special?

Digital twin is a system, method, or device that mimics the actual process with enough prior experience or through data mining. When the assets are stimulated, the data triggers the future predictive algorithm where the digital twin can offer agile and comprehensive operational understanding based on the environment. No doubt this boosts productivity, encourages effective decision-making, and helps to achieve the strategic goals of maximizing safety, reliability, and profitability.

“

13% of organisations implementing Internet of Things (IoT) projects already use digital twins, while 62% are either in the process of establishing digital twin use or plan to do so.

***Infoq 2021**



The Benefits of Digital Twin Technology

Below are 10 reasons why oil and gas companies should embrace digital twin technology:

Benefit 1

Increased **reliability of equipment and production lines**

Benefit 2

Enhanced **production optimization** and faster production times

Benefit 3

Reduced **HSE risk** and reputation damage due to errors

Benefit 4

Improved efficiencies through **reduced downtime** and improved performance

Benefit 5

Decreased maintenance costs as predictive maintenance ensure **breakdowns** do not occur

Benefit 6

Enhanced business opportunities through **customised manufacturing** based on real-time insights

Benefit 7

Enhanced customer experience through **remote product customisation**

Benefit 8

Enhanced insights vial multiple real-time environments to improve the **process and product quality**

Benefit 9

Enhanced **efficiencies in operations and supply chain**

Benefit 10

Enhanced **bottom-line impact** and profits



According to Forbes, 62% of oil and gas companies are aware of the benefits of implementing digital twin and plan to do so in the near future.

Digital twin and maintenance

Every business needs to ensure essential assets are running at optimal efficiency to maximise the return on capital investment. The digital twin system can numerate process-model simulation that provides real-time data analytics across the entire chain of processes. There are various maintenance stages of the equipment where enterprises can adopt digital twin:

- **Corrective Maintenance:** Most organisations rely on corrective maintenance to manage the equipment breakdown, however, overheads in downtime, labour, unscheduled maintenance requirements, need to be factored in. Digital twin helps reduce these and also helps increase the lifecycle of the asset.
- **Preventive Maintenance:** Preventative maintenance is when the data and performance cycle is monitored proactively across the lifetime of equipment giving prior warning before the actual failure happens. This process prevents unscheduled and catastrophic failures but is still an expensive process as with scheduled downtime, there is under-utilization of assets.
- **Predictive Maintenance:** Some technologically advanced market leaders are already using IoT & Digital Twin systems to optimize the maintenance cycle, stabilize corrective factors and develop preventative maintenance techniques. This maintenance delivers a cutting-edge management system to monitor the equipment lifetime data, predict projected replacement precisely, and help increase the expected component lifetime by reducing unscheduled maintenance and labour expenses.



How do digital twins promote an intelligent transformation journey?

Digital Twins are part of the Intelligence Automation (IA) scheme that leverages AI to create scenarios and decide on the action plan. The main points of difference between Digital Twins and AI applications such as machine learning (ML) are:

- Machine Learning (ML) algorithms deduct the information from asset behaviour patterns and assume possible outcomes. Thus, they have blind spots in the deep data of physical assets that digital twins help to uncover.
- Digital Twins can deliver better and faster decisions for the software application based on "What If" and "What is the probability?" scenarios to trial efficient revenue approaches.
- Digital Twin have the ability to predict and calculate the likelihood of asset situations. Thus, digital twin and physical data can optimize, solve problems and perform various preventative and corrective actions.

“

According to a survey by Gartner 75% organisations implementing industrial Internet of Things (IoT) plan to leverage digital twin.



How does a digital twin deliver value to the oil & gas sector?

According to Forbes, 13% of enterprises that initiated internet of Things (IoT) projects are already stepping up to implement Digital Twins.

Further, 62% are aware of the benefits of implementing Digital Twin and plan to do so in the near future.

Digital Twins have been leveraged by Chevron Corporation, where they are addressing unresolved critical maintenance problems in oil fields. This will release millions of dollars annually reserved towards preventative equipment failure.



Relation between digital twin and digital transformation

Digital transformation focuses on creating a resilient value chain, asset life cycle, and intelligent maintenance by leveraging emerging technologies like IA, ML, AI, IoT, and digital twin.

There are four types of digital twin tools used to progress digital transformation.

Component Twin

Component twin focuses on one component in the production process. Component twin assists bottom-line service technicians supports constant performance monitoring and offers predictive maintenance insights whilst reducing equipment downtime thus enabling a proactive, service-based business model.

Asset Twin

Asset twin creates a digital twin of a single piece of equipment within a production line.

System/ Unit Twin

System twin helps manage an entire production line. It is used to help product engineers, designers and architects increase product mix features and value innovation to optimize efficiency and accelerate time to market.

Process Twin:

Process twin focusses on the entire manufacturing process – process design, production optimisation, maintenance and reliability. It is used to help senior management get reliable insights from realtime data feeds thus enabling faster decision making across production, processing and planning models.



Digital twin pitfalls

Digital Twin is a complex implementation and has lengthy revisions. When a business leader isn't engaged and committed to making the project succeed, teams are involuntary in taking the disparate path, avoiding trouble to keep everyone pleased and thereby adding to the difficulty. Thus, most companies fail in the first stage of implementation, but if the below gaps can be addressed, achieving success is not difficult:

Lack of market research – Forward-looking companies are commencing digital twin implementations to create value. However, most organizations misalign their core value and vision with innovation. The external market and competitive analysis should match with complete internal assessment –capital, data, processes, products, people, and gaps.

Failure to learn - Effective learning doesn't just happen on its own. The leader must make enormous investments in digital twin enhancement and business model transformation.

Lack of necessary skills – Some companies that embrace digital twin are misled about the duration it takes to build capabilities. They start their project scheme without knowing how much digital talent needs to be acquired or nurtured or what kind of specialist will close their gaps. Companies should invest time and effort in identifying the problems that need to be solved via digital twin. After an initial analysis, the company can determine the need for people with specific skills sets, leaders, and doers to complete a core project until the transformation can begin.

Lack of market utilization – Supplier partnerships and resource acquisitions are critical to a successful digital twin strategy. Technology should never pressure any business from testing with or launching new commands. The right tools can help you achieve your goals, but you are likely dealing with vendors rather than partners if you are not benefiting from them. Presumably, your internal talents cannot be guaranteed to reach a certain level of insight, knowledge, and skill compared to people who built it. Thus, it is important to include technical partners as part of your digital twin transformation team.



Where to Next?

IA and Digital twin technologies enable the oil and gas industry to reap enormous benefits in the short-term as well as the medium and long-term. Oil and gas companies should start analysing and implementing these new and potentially disruptive technologies to remain competitive.



Researched and Developed by Customer Experience Live.

Copyright 2021 Teenspire Global Mission and Customer Experience Live.. No part of this work may be reproduced, quoted or used for any other purpose without the explicit consent of Teenspire Global Mission and Customer Experience Live.