YOKOGAWA ◆

 KBC A Yokogawa Company

Digital Twin

Enable effective decision-making and maintain situational awareness of your plant

1. What is a Digital Twin? Buzzword or Value Creator?

Decision cycles across the Energy and Chemical industries are becoming increasingly disrupted by proliferation of data, new data sources, and compute speeds within an increasingly volatile business environment. Analytics, particularly through a digital twin, have become vital for maintaining situational awareness and effective decision-making in this new world.

A digital twin is an advanced analytical and a decision support tool that enables improved capital efficiency, safety, reliability, and profitability in design or operations. It creates business value in the design and operations phases of projects, enabling better decisions to be made faster, that deliver superior and sustainable results.

A digital twin works in the present, mirroring the actual human, device, system or process in simulated mode, but with full knowledge of its historical performance and accurate understanding of its future potential. Therefore, a digital twin can exist at any level within the traditional ISA-95 architecture.

A digital twin consumes data from connected sensors to tell a richer story – past, present and future – about an asset throughout its lifecycle.

A digital twin enables people to see inside assets and processes to perceive things that are not immediately apparent and not being directly measured. It is implemented, such that insights are instantly available without data and model wrangling by end users, and operate in a consistent way that everyone can understand and agree on.

A Digital Twin is:

- a virtual or digital copy of a human, device, system or process;
- that accurately mimics actual performance;
- in real-time;
- that is executable and can be manipulated;
- allowing a better future to be developed.

When run in the Cloud, a digital twin:

- Can engage people and technologies from outside corporate boundaries
- Enable applications to subscribe to external data feeds
- Allow analytical capabilities to be offered remotely by 3rd parties
- Support and nourish agility
- Radically reduce infrastructure costs

2. Where Can Value be Extracted From a Digital Twin?

From the C-suite in the boardroom to the operators on the shop floor, a digital twin drives agility and convergence of understanding and action across the entire business. For example, from engineering to operations; operations to maintenance; operations to supply chain; reservoir to facilities; shop floor to boardroom.

# Yokogawa's Digital Twin Solutions

Enterprise Insight
A series of business and financial Key Performance Indicators (KPI's) are updated in real-time, plan versus actual, as part of an enterprise-wide balanced scorecard for corporate situational awareness. Advanced logic is applied to real-time operations data to project current and future understanding of the business for executives.

Capability Assurance
Key operator actions are captured, controlled and manipulated in real-time through monitoring and control of work processes. Minimize the learning curve for new operators, support change management and enable vastly improved scenario validation through operator training simulation and an ISA106-compliant modular procedure automation solution.
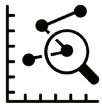
Advanced Production
Multivariable predictive controls drive the plant continuously to its optimum constraints by reacting to disturbances in a closed loop.

Value Chain Optimization
Drive agile and efficient alignment of supply of premium products as closely as possible to market demand with sufficient resilience or operational flexibility to readily adjust production. Exploit market opportunities through supply chain planning, scheduling and production accounting.

Automation and Control Integrity
Digital representation of the live plant and its automation algorithms through the "twin" function of an Integrated Control and Safety System (ICSS) allows engineers to conduct fundamental process control tests at an engineering workstation, as well as any proposed adjustments, before they are applied on the live plant.

Instrumentation and Equipment Productivity
Minimize the need for breakdown and preventative maintenance, reduce OPEX through advanced online monitoring and prediction of field device health, and process interface conditions that reduce unnecessary trips.

Advanced Chemistry
Highly intelligent devices, such as pumps, flowmeters, transmitters, and chemical analyzers provide total insight into their ongoing performance as well as the ability to adapt to changing duty requirements throughout the measurement device lifecycle.

Plant Process Optimization
Online and offline high-fidelity models for non-linear performance monitoring, simulation, and optimization using first principle kinetics deliver optimized yield performance, flow assurance, energy efficiency improvement, enhanced reliability and operator capability assurance.

Digitalization is accelerating and disrupting the decision cycle. Yokogawa's digital twin solutions enable better decisions to be made faster which deliver a superior level of sustainable value

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