

Industrial data is a gold mine: Building a sustainable system of success

According to Dr. William Edwards Deming, engineer, statistician, professor, author, lecturer and management consultant, “Without data, you are just another person with an opinion.” While his *System of Profound Knowledge* was a keystone manual for modern data science, the late Dr. Deming did not highlight that, with industrial data, companies are literally sitting on their own gold mines. Gaining actionable insight from industrial data represents the next frontier of growth for industry.

To achieve operational excellence, process manufacturers must quickly and systematically address the root causes of asset reliability problems, which include inadequate operating procedures, poor design and improper scheduling of production. Existing approaches to maintenance must be data-driven and optimized. A sustainable system of success is necessary, and requires asset optimization—a comprehensive, holistic philosophy that drives the highest possible financial return across the entire asset lifecycle, with continuous improvement.

A glimpse of gold. According to ARC Advisory Group, the global process industry loses \$20 B/yr from unplanned downtime, because more than 80% of plant failures cannot be detected by preventive age- and wear-based maintenance practices. Most assets display a seemingly random failure pattern—symptom-based failures that cannot be addressed by traditional approaches to reliability. Process manufacturers require deeper insight and greater knowledge, via predictive and prescriptive analytics, to mine the gold in the data.

By integrating a new suite of software innovations, including advanced analytics,

ensemble modeling and machine learning technology, organizations will have the tools to address unplanned, process-induced downtime. With these advanced solutions, the industry can shift gears from being reactive to investing in proactive operations and maintenance. With a proactive approach, companies can prevent and mitigate failures with prescriptive guidance to achieve greater reliability and increased availability throughout the asset’s lifecycle.

Next-generation asset performance management (APM). In the broader scheme of things, McKinsey & Co., a global management consulting firm, wrote, “...entirely new and more affordable manufacturing analytics methods and solutions—which provide easier access to data from multiple data sources, along with advanced modeling algorithms

and easy-to-use visualization approaches—could finally give manufacturers new ways to control and optimize all processes throughout their entire operations.”

ARC Research Group further crystallizes this view by explaining: “With a good APM strategy, operations and maintenance groups become more collaborative, exchanging information to manage critical issues and operational constraints, while improving overall operating performance. Combining the information from traditionally separate operations and maintenance solutions improves the effectiveness of both areas and offers new opportunities for managing risk and optimizing performance.”

In taking a step into the future of manufacturing, APM 2.0 incorporates the advanced analytics that predict issues and prescribe operator actions. Advanced APM solutions are available,



FIG. 1. A sustainable system of success is necessary, and requires asset optimization—a comprehensive, holistic philosophy that drives the highest possible financial return across the entire asset lifecycle, with continuous improvement.

offering a holistic view of the process and asset by combining asset analytics, reliability modeling and machine learning to analyze, understand and guide. Advanced data analytics and data science enable the reliability strategy, which includes machine learning. As a dominant predictive analytics technology in information technology today, machine learning on manufacturing assets requires domain-specific knowledge of chemical processes, mechanical assets, maintenance practices and more.

To add value to capital-intensive industrial assets, machine learning must interpret and manage complex, problematic sensor and maintenance event data. Eventually, it can determine the operating conditions and patterns that can have an adverse impact on the asset, by capturing the patterns of process operation and merging them with failure information.

A sustainable system of success.

APM is an engine of growth for asset optimization. When applied across the entire asset lifecycle, it is a perpetual process, as assets tend to be in service longer than the people working on them. To unlock its full value, companies should deploy five key optimization initiatives:

1. Capital expenditure (CAPEX) excellence
2. Operational excellence
3. Supply-chain excellence
4. Maintenance excellence
5. Organizational excellence.

All of these initiatives contribute to the ability to sustain competitive leadership.

CAPEX excellence has enabled global refineries to reduce energy costs by millions of dollars per year using integrated design to achieve best-in-class energy intensity index (EII) ratings. To achieve operational excellence, refineries and chemical companies saved time and money with advanced process control (APC) software. During APC controller revamps, industry average savings for major units range from \$2.5 MM/yr–\$6 MM/yr.

In pursuit of supply-chain excellence, chemical companies have achieved a 35% reduction in production workload. Increased efficiency helps companies better mitigate the impact of any carbon pricing initiative. To achieve organizational excellence, companies should partner with established technology experts and develop centers of excellence in process systems engineering. Finally, to sustain competitive leadership, companies

should dynamically address operational challenges with a concerted and continuous effort to adopt innovation.

Asset optimization empowers more informed decisions. It is made more powerful with the Industrial Internet of Things (IIoT), which accelerates the optimization of business assets. Supported by the capabilities of Cloud computing, visualization and mobility, key stakeholders gain better insights into the use of data to address real-time operational needs. Optimizing the asset lifecycle across design, operations and maintenance offers the potential for the biggest transformation in productivity growth for process manufacturers to date.

The time to turn industrial data into gold via a sustainable system of success is now. **HP**



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