Opportunities with Data

Machine-to-Machine (M2M), control systems and sensors have been around for many years where machines communicate with remote applications to monitor and control processes. The truth of the matter is that most of these machines produce useful information, but are not connected to the internet. Consequently, the majority of that data is never collected or stored for analysis.

Today, leading companies want to analyze the data from M2M control systems and sensors. They aim to gain higher levels of productivity and even reinvent manufacturing to be flexible and quickly meet changes in market demand, customer requirements, or supply conditions. To achieve these goals, companies are turning to digital technologies to transform manufacturing into a strategic advantage. Digital technologies help to overcome the traditional limits of time-to-market, process quality, cycle times, and lot size. This creates a more flexible business model, delivering customized products in smaller quantities.

The Journey to Manufacturing Transformation

While M2M communication between devices is a source of this transformation, more importantly the Internet of Things, or IoT, spearheads this transformation by providing the ability to capture and ingest real-time factory data as well as data from wide range of sources. While a necessary step, the connection of physical assets does not create value in itself. The real value is unlocked when this data is used to gain better insight through advanced analytics in manufacturing operations.

Manufacturing transformation is a journey that starts with digitization (see Figure 1). At this state, factory data – such as information drawn on whiteboards or noted on paper, and which is often not digitized or shared – is collected with sensor data, machine controller data, business data, external data and existing IT data into a central repository, called a “data lake.” Following digitization comes analytics through data blending, correlation and visualization, helping factory personnel gain better insight into operations. Advanced analytics can further be implemented using
machine-learning algorithms, as well as artificial intelligence (AI), in collaboration with human resources. Following digitization and analytics is a third stage, where a ‘digital twin’ can be created. This stage is the ultimate goal for a manufacturing transformation where location and shift hours are not limiting factors. The ‘digital twin’ allows production personnel to run simulations on digital replicas of factories or equipment and to apply advanced analytics from remote locations to improve flexibility and efficiency.

Enabled by IoT, manufacturing transformation can result in many benefits such as smaller lot sizes, more variation for production, and moving from mass production to mass customization. Manufacturing transformation can even enable flexibility on physical factory locations, with the option to move factories around the world.

**Hitachi Is Taking Advantage of IoT Insights to Improve Manufacturing**

As a global manufacturing and IT company, Hitachi has long been a leader in applying digital technologies to gain new insights and transform operational performance. Hitachi works with our global R&D labs to deliver innovations to solve practical problems in manufacturing for our customers as well as for our own operations.

**Hitachi Increases Factory Productivity for Aerospace Manufacturer**

During a period of strong order growth, an aerospace manufacturer was plagued by production bottlenecks that reduced throughput and productivity. Although the workforce was well trained in lean manufacturing methods, they lacked the required data to optimize end-to-end operations. Working with the shop floor managers, Hitachi delivered a solution that digitized and aggregated the daily production data throughout the value stream. The analysis of this real-time data enabled the reduction of bottlenecks, significantly increasing the factory productivity.

**We Increased Overall Productivity for Hitachi’s Factory Distribution**

In 2015, one of Hitachi’s own distribution operations was faced with ever-changing customer demands, which traditional IT systems were never designed to handle. Workers were under pressure to process unexpected orders, often rescheduling work at the last minute. This fire-fighting mode was inefficient and stressful for the

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**Hitachi Delivers Multi-Million Dollar Cost Savings for Global Producer**

A global producer of high-performance polymer products was struggling to maintain consistent yields in their mixing process. This problem was exacerbated by variability in ingredients, operating conditions, and product recipe changes. Hitachi delivered a solution that performed advanced analysis of the process data, to optimize the most relevant parameters. Through continuous data collection and analysis, machine learning techniques rapidly improved the process over time. This solution achieved a significant increase in process yield, a reduction in scrap, and improvement in delivered product quality. This translated into multi-million dollar cost savings, but also greatly increased the flexibility of plant to more easily produce a wide range of different products.

**Let’s Transform Together**

Hitachi is in a unique position with over a century of history in the manufacturing industry as well as over half a century of expertise developing IT solutions. With a strong pedigree about how to develop, build and solve issues with data analytics, we are developing solutions that combine the latest cutting edge IT technology, including advanced AI driven analytics. Hitachi can help you acquire the insights you need to achieve optimization in your manufacturing transformation journey and to make society more efficient, environmentally friendly and cost effective. Partner with Hitachi and together we can transform manufacturing into a strategic advantage. To learn more, visit HitachiInsightGroup.com.