



Technology

Industry 4.0's Smart Factory Is All About That Data

Don Sears | Apr 16, 2019

Overwhelmed by the digital promise of Industry 4.0? Don't be. The smart factory is all about getting accurate and precise information that should help manufacturers crank out more parts and help eliminate major tooling and machining problems.

The smart factory: It was everywhere at the *2018 International Manufacturing Technology Show*. From controlling a CNC machine by voice command to major tooling makers expanding into software and digital machining, new directions are dawning. Internet-enabled technology is a major part of the future for the industry.

Why? Because it is now possible to extract more precise information about operations than ever before.

Sensors aren't new. Radio-frequency identification is also not new. But operational information with a lot more context that can be easily distributed and put to use *is* new, say industrial manufacturing sources.

"Today is the 'internet moment' for manufacturing," says Graham Immerman, director of marketing at MachineMetrics in an interview with Better MRO. "Whereas many industries had their 'internet moment' 10 or more years ago, manufacturing is having its time right now."

"Data is the lifeblood for the factory of the future," *writes* Tom Leeson, a manufacturing expert, in the Open Text post "Six Trends Challenging the Factory of the Future."

Leeson casts data in this technology context: "Through applied AI and advanced analytics, data will drive all processes, detect operational errors, provide user feedback and improve the volume and quality of production output."

Despite the technology-heavy jargon about Internet 4.0, manufacturers believe in its promise, too. In 2017, 76 percent of manufacturers said they had smart factory initiatives "ongoing or being formulated," with over 55 percent of them investing \$100 million, according to *research* from Capgemini. Unfortunately, only 14 percent were satisfied with their efforts.

The rub? Adoption takes effort—which means investment and time.

Seco Tools and MachineMetrics

In 2018, cutting tool manufacturer *Seco Tools* and MachineMetrics became partners. The partnership was born out of Seco Tools having already been a customer of MachineMetrics.

“MachineMetrics has provided us valuable insight into our own Custom Products facility in Troy, Michigan, allowing us to reduce our lead time while improving on-time delivery and quality,” says Rob Keenan, president of Seco Tools North America, in a *press release*.

Seco Tools expects the partnership to help its customers better predict tool life, help prevent tool breakage, and optimize speeds and feeds.

The primary driver of the partnership is to help its customers gain transparency into underutilized machines and tools—and reduce production inefficiencies. Seco Tools also hopes to help eliminate “communication problems that prohibit most manufacturers from optimizing their production capacity.”

It says the only way to solve these kinds of problems is to capture data.

Accurate and Complete Data Is the Engine of the Smart Factory

“A plant floor with potentially thousands of connected devices now has significant value from a data standpoint,” says Raj Batra, president of the digital factory division for Siemens in the U.S., in an IOT Evolution World *article*. “The question is, while you are now able to collect this data, how do you analyze it and make it meaningful and valuable for your business objectives?”

It’s a legitimate question. There is so much that can be analyzed—so making all data into a cohesive decision-making narrative is not necessarily easy. It requires a bit more systems and skills from the information technology world—and new ways of thinking about how it all works together in a traditional operational technology world.

What isn’t changing? The pressure to deliver more parts in less time.

Need help boosting part-making output? Read “5 Ways to Prolong Tool Life and Amplify Productivity.”

More precise machining and tool information might help that cause, but without data accuracy, it could be a challenge. Today, many manufacturers are capturing relevant machine data on whiteboards and pieces of paper, says Immerman. But once you start to network that information and make it transparent, the data can become useful in more ways—and to more teams than just those nearby the whiteboard.

“I can give you an insight on our data (MachineMetrics): Most manufacturers think that they are working at about 60 to 80 percent capacity and utilization of their equipment. Those numbers are completely inaccurate,” says Immerman. “The average machine utilization across the industry is 27 percent. There’s a huge disconnect between what is actually happening on the shop floor and what manufacturers think is happening in their business.”

Data lies in that disconnect, says Immerman.

There's simply a lack of visibility on the shop floor, a lack of data integration between the shop floor, and other pieces of their business system, whether it's the enterprise resource planning (ERP) system, quality or assembly, or machining or tooling.

"The truth is in the data, and most people don't have the data to tell the truth. So, this is the state of the industry," says Immerman.

The Smart Factory Data Challenge: The Volume of Discrete Manufacturing Systems

The Capgemini data really stands out: Only 14 percent of companies are satisfied with smart factory results?

Here's why: Total visibility across the entire operational ecosystem is hard—and for many manufacturers, it feels overwhelming.

"Companies are reacting, saying things like, 'So, what you're telling me is I need to build this whole digital factory? And I need to implement eight different types of software? And how the hell am I going to do that?'" says Immerman.

Whether data comes from ERP (enterprise resource planning), quality systems, coordinate measuring machines (CMMs), inspection data, assembly systems, CNC machining cells, tooling—and several other manufacturing processes—there is a lot to know and make visible, explains Immerman.

"One of the more pressing challenges is the huge amount of data a smart factory entails," **says** the digital security company Trend Micro, in the blog post "A Look Into Smart Factories: A Model of IIoT Innovation." "Because of this [huge amount of data], the enterprise must have protocols and systems in place for the proper use and handling of such a large quantity of data before setting up a smart factory."

A Place to Start: Isolate the Machine Data on the PLC and Work with It

It may not be in everyone's interest to try to take on all of Industry 4.0 at once. A smart factory can come to life by starting small with part-making machines on the shop floor.

In the case of **MachineMetrics**, it extracts data directly from the PLC of machines and sends information via a small wireless "edge" device. The information is encrypted and distributed through a secure cloud to be viewed by customers. At its core, MachineMetrics is an analytics platform that offers production data, system health for maintenance teams, and remote services for original equipment manufacturers and equipment distributors.

"So we get part count, and we get up to 200 data points off the PLC ... We also get data about the machine tool, as in which tool is being used," says Immerman. "We get load information, the pressure on the spindle ... We get the alarms right from the machine."

This is performance and availability data. In essence: the how, the what and the why. With all of this data, companies can then begin to help themselves avoid downtime and answer questions, such as:

- Are our machines down because we're changing tools?
- Are machines down because we're taking too long to set up?
- Did we misestimate how long the job would take?

"You've heard of OEE (overall equipment effectiveness)?" asks Immerman. "Oftentimes when working with our customers we find that the top reason why machines are being underutilized is because their

performance expectations are completely inaccurate ... What are the *cycle times* expected for each part produced? How long should setups be? How many parts do we think we can produce in a given shift?"

Performance expectations are driven by an ERP system, says Immerman, and if it is inaccurate, then "it leaves a lot on the table for other companies to take your business."

Ultimately, the smart factory is about helping manufacturers improve, save time and make better decisions with the best information that can be shared.

MachineMetrics says all manufacturers are only using 27 percent of their machine capacity. Do you believe that? React in the forum. [registration required]

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