



## **TECHNOLOGY AND DATA:** **Driving manufacturing's future**

Written by

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Howard Heppelmann, divisional vice president for Connected Operations Solutions at PTC

## Technology and data are driving manufacturing’s future

Manufacturers throughout the sector are looking for and implementing advances in technology and production processes to improve their operations and remain competitive. This significant transformation in manufacturing, often described as Industry 4.0, is a high-stakes game that can be challenging for many companies. That’s because of the complexity of the disruption and the need to raise the skills of existing employees or recruit new ones.

But the search for leading-edge innovations can be seen in virtually every industrial sector. This can include everything from optimizing and accelerating production through new equipment to analyzing big data to measure and improve machine output, work processes, customer preferences, and engagement. These insights can illuminate new opportunities for manufacturers, such as potential offerings or changes in business models for improved operational efficiency.

Indeed, in a survey conducted by The Economist Intelligence Unit (EIU) and sponsored by Prudential\*, manufacturing executives stressed the importance of innovation. Nearly two-thirds of respondents have implemented industrial transformation strategies, and many have seen enterprise-wide benefits as a result.

## New opportunities for efficiency

“For manufacturers, we’ve seen a steady and accelerating shift in product value from mechanical components to embedded software to enable digital product platforms,” says Howard Heppelmann, divisional vice president for Connected Operations Solutions at PTC, a global software company. “When companies connect products, the continuous feedback from their data streams is something that changes nearly everything—how they design, manufacture, market, operate and service their products to generate value for their customers.” Although the shift from a traditional manufacturer to becoming a highly connected digital enterprise is disruptive, the effort can be critical to success.

One example of a manufacturer embracing this change is Illinois-based Mennie Machine Company, which produces parts for SUVs and trucks, as well as other machine-tooled products. Struggling with bottlenecks in its production system and quality issues, the executives implemented a computer-based robotics system to increase output and make other improvements. These changes have resulted in fewer defects, greater production flexibility and a rise in output per hour from 80 to 120 pieces.<sup>1</sup>

\*The Economist Intelligence Unit Survey, July 2017.



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Kim Stevenson, former CIO at Intel

## **Bridging the silos**

Yet among both small and larger manufacturing businesses, the implementation of automation or other computerized, data-driven systems does not guarantee success. Mr. Heppelmann emphasized the importance of enterprise-wide strategic thinking and execution that link operations and systems. “Most companies are very siloed,” he says, noting that the most successful companies pursue enterprise-wide initiatives with top-level commitment and digital processes that “connect the dots between islands of automation.”

But that means collecting and assessing massive quantities of data, which is especially challenging when every product rolling down the line is different and new technologies are not fully integrated. “That’s where the real story is,” Mr. Heppelmann says. “There’s so much data that goes unused. The challenge is for humans to collect, contextualize and experience the abundance of data in a way that they can make sense of it all.”

The manufacturers in the EIU survey who identify themselves as leaders in innovation and adoption of technology are energetically pursuing initiatives involving data. They cite a wider range of technologies than others as likely to contribute the most value to their businesses in the next three years. They point to cloud and mobile technology, the Internet of Things, and big data and other advancements in manufacturing. This group is more confident that over the next three years the development of more flexible manufacturing techniques and smart supply chains will enable manufacturers to provide better products and services.

## **The intersection of manufacturing and technology**

Global tech giant Intel is using automation, big data and data analytics in its factories to increase uptime, accelerate output and decrease errors. This relies on cloud computing, sensors and the Internet of Things for real-time data to control the whole system and track year-over-year improvements. An April 2016 Intel white paper outlines how these technologies accrue benefits such as a reduction of costs, increased velocity and improved quality.<sup>2</sup>

Sensor data collected from equipment in factories, for example—over five billion points of data every day—reduced the time required to analyze and focus on key needs of manufacturing equipment from four hours to 30 seconds. “Nowadays, every business is a technology business,” writes Kim Stevenson, then CIO at Intel, in the company’s 2015-16 annual performance report, “where data is the key asset and services drive monetization.”<sup>3</sup>

But making this shift relies on taking calculated risks, such as investing in new machinery and software. As a 2016 PwC survey of U.S. industrial manufacturing executives found, only 30% planned to increase spending on information technology over the next year.<sup>4</sup>

**A successful shift depends on expanded collaboration and increasing data-based skills, requiring manufacturers to rethink and reorganize the way their existing and new employees work.**

Moreover, a successful shift depends on expanded collaboration and increasing data-based skills, requiring manufacturers to rethink and reorganize the way their existing and new employees work. Rather than envisioning implementation of new technologies and new systems as a singular moment, such changes require ongoing initiatives. Through the continuous collection and analysis of data, companies position themselves to be more flexible, handle more variations required by their customers, and introduce new products and product revisions more swiftly.

Gone are the days when a manufacturer could implement new equipment and simply count the benefits once the integration is complete. Whether it is a small machine company looking for increased efficiencies with robotics or a multibillion-dollar global enterprise optimizing its production and processes with greater integration and real-time data, improvements depend on frequent assessment and continual efforts to innovate. The companies that will prosper in the coming years and decades will not fear disruption—they will embrace it.

## Sources

<sup>1</sup>Robotics Industries Association, “Robots Impact Production at Mennie’s Machine Company, Inc.,” [https://www.robotics.org/content-detail.cfm/Industrial-Robotics-Case-Studies/Robots-Impact-Production-at-Mennie-s-Machine-Company-Inc/content\\_id/293](https://www.robotics.org/content-detail.cfm/Industrial-Robotics-Case-Studies/Robots-Impact-Production-at-Mennie-s-Machine-Company-Inc/content_id/293)

<sup>2</sup>Intel, “Using Big Data in Manufacturing at Intel’s Smart Factories,” <https://www.intel.com/content/dam/www/public/us/en/documents/best-practices/using-big-data-in-manufacturing-at-intels-smart-factories-paper.pdf>

<sup>3</sup>Intel, “From the Backroom to the Boardroom: IT propels Intel business value. 2015-2016 Intel IT Annual Performance Report,” <https://www.intel.com/content/www/us/en/it-management/intel-it-best-practices/intel-it-annual-performance-report-2015-16-paper.html>

<sup>4</sup>PwC, “Manufacturing Barometer: Business Outlook Report July 2016,” <https://www.pwc.com/us/en/industrial-manufacturing/assets/pwc-manufacturing-barometer-q2-2016.pdf>

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