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Mercedes Goenaga,
Philipp Radtke,
Kevin Speicher,
and Rafael Westinner

# Ops 4.0: Manufacturing's future, made by people

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## Digital manufacturing connects massive data pools, smarter machines, and innovative process technologies to help people be more productive.

**Much of the business** world's attention has focused on new manufacturing technologies, such as 3-D printing. But what promises to have an even greater impact is the way these innovations combine with less dramatic but equally far-reaching developments, such as the emergence of cheap Internet-linked sensors (a highly pragmatic application of the Internet of Things) and user-friendly advanced-analysis tools. Together, these technologies, which give human beings an unprecedented degree of understanding and control over forbiddingly complex processes, have an enormous economic effect.

*Finding opportunity—fast.* One large high-tech manufacturer illustrates the potential of combining these tactics. Facing heightened competition and eroding margins, the leaders of the company knew that it needed the improvements promised by digital technologies and advanced analytics.

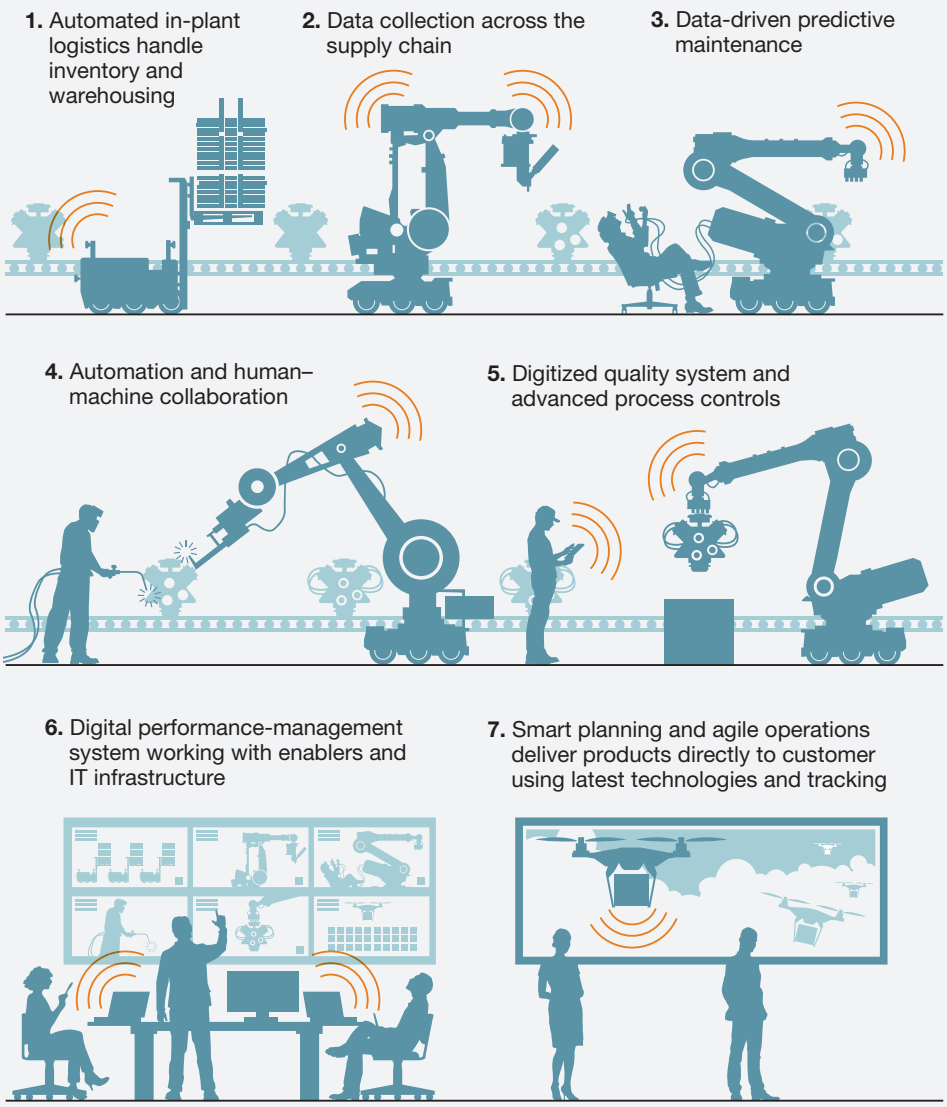
The first step was a 48-hour diagnostic: specialists gathered data on the company's most important production equipment, revealing many gaps in basic manufacturing hygiene. Equipment downtime was unacceptably high, production quality uneven, and overall efficiency much lower than what competitors had achieved. Until the company addressed these issues, adding new technologies would be a waste.

*Upgrading the supply chain.* Within operations, demand planning and supply-chain logistics have long been at the forefront in applying digital technologies. Now the bar is rising still higher: customers increasingly expect the quality and service breakthroughs that Operations 4.0 technologies make possible.

No-touch order processing and real-time, reliable replanning, for example, enable a better customer experience. But they also mean erasing the traditional boundaries between the supply chain, manufacturing, and fulfillment, as 3-D printing reconfigures logistics and advanced robotics support smart warehouses (exhibit).

Exhibit

## The factory of the future combines technologies that are available today.

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*Changing people first.* But the root causes of the challenges centered not on equipment but on people—especially managing performance. A new digital system now does so all the way from the factory floor to the CEO level, allowing everyone to see and fix gaps at all times. The company quickly made the equipment about 20 percent more effective, with corresponding increases in quality.

Most important, the company could then start restructuring about 50 percent of its manufacturing processes to enable technologies such as data-driven predictive maintenance (reducing downtime by an additional 30 percent), a digitized quality system, advanced process controls, robotic in-plant logistics, and automation, as well as human–machine collaboration. Throughout the initiative, human capital has been preserved, subject only to natural attrition and redeployment of people to other areas of the company. ☐

**Mercedes Goenaga** is a senior expert in McKinsey's Paris office, **Philipp Radtke** is a senior partner in the Munich office, **Kevin Speicher** is a senior partner in the Chicago office, and **Rafael Westinner** is a partner in the Madrid office.

This article is adapted from "Ops 4.0: Fueling the next 20 percent productivity rise with digital analytics."