

# Technology is Changing Manufacturing - and the Workforce

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*Technology is transforming manufacturing into something completely different from what it was 10 years ago — and is quickly changing the expectations for individual manufacturers and their workers.*

(American Machinist - Nora Leary: 3-10-16) Manufacturing accounts for an impressive \$2.17 trillion of the U.S. economy, and despite the common misconception manufacturing is expanding in the U.S. — up by over 27% since 2009. It's a segment of the overall economy that has seen its significant ups and downs over the years though, from offshoring to job cuts: manufacturing is influenced by major economic developments and broad international trends. The latest factor affecting manufacturing is technological change, and its various effects on individual manufacturing operations and on workforce demographics.

Many changes in the manufacturing industry have been driven by consumer demand. Consumers want things faster, more individualized, and newer than last year or even last quarter. Therefore, manufacturers have had to keep up with not only the demand for products but with finding skilled workers to make these products.

New and advanced manufacturing technologies have helped to better meet consumer demand. With the implementation of computerized maintenance management systems (CMMS), manufacturers have become significantly more efficient. CMMS tracks system maintenance, inspection, and breakdowns, reducing or eliminating the effects of disruptions.

Instead of manually tracking problems or changes on a piece of paper, a CMMS handles all of these tasks remotely, increasing productivity drastically. The benefits include fewer repairs, lower maintenance costs, streamlined workforce, and historical data and trend reports. All of these help to keep up with consumer demand.

The influence of the Internet of Things (IoT) and Big Data CMMS technology also connects devices remotely, allowing them to “talk to each other.” The still-developing IoT establishes individual factories as sources of (and destinations for) information via the Internet, increasing the potential for automation and remote monitoring. Instead of a manual check, IoT allows control systems to be networked to each other, and essentially monitor each other’s process.

With this connection, factories can easily collect and aggregate big data, or a mass of information concerning their systems. This information can be measured and analyzed to increase productivity and efficiency in a factory. IoT should help manufacturers to work better (getting products to the consumers faster), and it’s also an aspect of the product consumers now demand.

Consumers now demand that products are intelligent, responsive, and connected, or in other words, “smart”. Terms like “smart lighting”, “connected cars”, and “wearable technology” are all examples of how products are becoming more valuable to the buyer and user. Consumers use this type of technology to track a variety of aspects in their daily lives – from what they eat to how much they exercise, people are becoming more reliant on smart technology.

Products becoming “smart” means that manufacturers must be able to produce these technologies on a large scale – but also to keep up with technological evolution of such products as they are improved and personalized. Essentially, this changes not only the business model for manufacturers but also the skillsets for workers.

Smart products are not stand-alone objects; they are a service, too. Manufacturers become service providers, which links them closer to the consumer. Manufacturers must understand and meet consumer demand with these products, connecting with them on a more personal level.

These products are no longer simply the outcome of mass production; they require specialized talent to create and produce them on a large scale.

# What's happening to the workforce?

As exciting as they are, these technological advances have profound effects on the manufacturing workforce. 80% of manufacturers say they have a moderate or serious shortage of qualified applicants for skilled or highly skilled positions. In the next decade it's expected that as many as 2 million manufacturing jobs will be unfulfilled due to this "skills gap."

For example, 3D printing is becoming cheaper, and it is taking less time and material to produce a complex design. These products will not require an assembly line, instead they will require a small number of product designers, programmers, and manufacturing engineers to produce shapes that may (or, may not) otherwise be producible in a factory system. It's easy to see how manufacturing is shifting its need for "blue collar" workforces to highly trained "white collar" professions as the technology advances and grows.

Considered on its own value and potential, the U.S manufacturing sector would be the ninth biggest economy in the world. But, looking at it another way, a study shows that the average U.S manufacturer is losing roughly 11% of its annual earnings due to the lack of talent. Now imagine this effect on the broader U.S economy — it makes a significant difference.

Manufacturers have been attempting to blunt the effect of what will happen if the skills gap isn't closed, and it's beginning to be noticed. A variety of ways to close the skills gap have been proposed: encouraging STEM studies in schools, changing the stigma surrounding manufacturing jobs, training internal workers to prepare them for more complex jobs, etc.

How that gap will be closed is still unknown. The most likely solution would be a combination of efforts and a shift of public opinion will prove successful.

What is known is how technology is converting manufacturing into something completely different than what it was 20, even 10, years ago. New manufacturing workers are not only highly skilled, but highly paid, earning about 24% more annually than the average worker in the United States. Technology is helping to make these jobs more lucrative than before, and individual manufacturers must

assess how to close the skills gap. It's important on a nationwide, industry-wide scale not only to track the progress of technology but to also find ways to keep up with the job demand.

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