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Dec. 01, 2015



Advanced technologies are shaping the future of manufacturing, according to a study conducted by Deloitte Touche Tohmatsu Limited's (Deloitte Global) Global Consumer & Industrial Products industry group and the U.S. Council on Competitiveness (CoC).

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- Smart factories (Internet-of-Things)
- Digital design, simulation and integration
- High performance computing
- Advanced robotics
- 3D printing and scanning
- Open-source design / direct customer input
- Augmented reality

“By investing in advanced manufacturing technologies, nations may enhance their competitiveness and drive economic prosperity,” said [Craig Giffi](#), vice chairman, Deloitte LLP. “Investments in research and development (R&D) can lead to advanced manufacturing capabilities. This, in turn, can lead to more complex and exclusive products for export—and these high-tech, often high-value, exports can then make a nation more competitive.”

In the US alone, advanced industries support 40 million workers and account for \$2.7 trillion in output, according to third-party data cited in the study from Deloitte Global and the CoC. “That’s 17 percent of the US gross domestic product (GDP),” said Giffi.

Giffi also indicated that advanced technologies directly benefit worker pay. “The average US worker compensation in advanced industries has increased five times that of all industries since 1975 and is now nearly twice the average of traditional industries.”

“Advanced technologies are one of America’s brightest economic lights—playing a pivotal role in our nation’s GDP, employment and ability to produce high-value products,” said Deborah L. Wince-Smith, president and CEO of the U.S. Council on Competitiveness.

“American executives consistently feel that our entrenched creativity and

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foundation established over the last century. “The US innovation ecosystem possesses the critical attributes that put it at the forefront of cutting-edge science, technology and innovation,” said [Michelle Drew Rodriguez](#), leader of the Deloitte Center for Manufacturing Insights and a senior manager at Deloitte Services LP.

These attributes include an educational system that fosters creative thinking, world leading universities and superior talent. They also include an excellent research infrastructure, low hurdles to entrepreneurial innovation and strong support for regional innovation groups. “America’s strengths position us to embrace the promise of advanced technologies and reinforce our advanced industries,” said Drew Rodriguez.

However, said the CoC’s Wince-Smith, the study shows America’s lead may not be secure; it faces future challenges from increasingly competitive countries such as China. “The US currently spends the most of any nation in terms of R&D—with a 23 percent share of global R&D spend—but China is on pace to overtake America’s leadership in R&D investments by the end of the decade.”

The majority of executives interviewed for the Deloitte Global and CoC study also worry about America’s talent pool and the widening skills gap in the face of competition from state owned entities. In addition, they are concerned about foreign countries providing targeted support for their focused industries.

“The aging of the engineering and manufacturing workforce is exacerbating the skills shortage, not only in the US, but also globally,” said Drew Rodriguez. “Further, many of the executives interviewed for the study indicated that immigration policies—when combined with the challenge of nurturing STEM (science, technology, engineering and math) capabilities among workers—is creating a global struggle to attract and retain top talent.”

One way for America to compete, according to Giffi, could be to “strengthen our

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“Though the US remains a global advanced-technology leader, retaining our leadership depends in large part on how successfully and holistically our innovation ecosystem operates moving forward,” he concluded.

Small Business • Technology

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