Manufacturing innovation and the Manufacturing Engineering Division.

BY SCOTT SMITH, FORMER MANUFACTURING ENGINEERING DIVISION CHAIR (2005-2006)

This is the final article in a series celebrating 100 years of the Manufacturing Engineering Division (MED) of ASME. Four former division Chairs have already written about the influence of MED on industry next, micro- and nanomanufacturing, and environmental sustainability, as well as its impact on Manufacturing USA. Now, I will address the future.

In the 1990s, some thought the economies of developed nations no longer needed manufacturing. The contribution of the manufacturing sector to total gross domestic product and employment had been shrinking since the 1950s. It seemed to some that we were becoming a service economy. At best, this was inaccurate. At worst, it led to policy land career decisions with damaging results.

Manufacturing is fundamental to wealth creation driving modern economies. In manufacturing innovation “casts a long shadow.” For example, integrated circuits at the heart of telephones, transportation, televisions, and much more are available because modern manufacturing has produced them at low cost and at a large scale. More importantly, manufacturing innovation is inextricably linked. Innovation in manufacturing has brought us a world where relatively few people work in factories. The lifestyles of the highest paid among us would have been unthinkable luxuries, even for the richest people, just a few generations ago. Air conditioning, washing machines, transportation, televisions, and much more are available because modern manufacturing has produced them at low cost and at a large scale.

In the 1970s, the NSF funded a project to describing surfaces with triangles, hence STL (surface tessellation language, not stereolithography language as is commonly thought) was born. Innovations in sensors, control strategies, safety and more built the backbone of what's next. Many innovations in robotics were published in our journal in the early 1980s. Innovations in sensors, control strategies, safety and more built the backbone that allowed robots to become a technology of the future. AI and machine learning have roots in our journal dating from the 1970s and 1980s. These were all fruitful areas for manufacturing innovation and lifelong workforce training.

Almost all manufacturing innovations start with a question like “Can we do this better?” or “What else could we do with what I learned?” We have an obligation to keep looking, learning, and thinking of ways to make the world a better place. We have an obligation to keep looking, learning, and thinking of ways to make the world a better place.

It is difficult to see the future of manufacturing, yet certain things surely will continue to be true. First, a vibrant manufacturing sector is central to economic wellbeing, and it will remain so. Second, manufacturing requires constant innovation and lifelong workforce training at all levels (from factory designer to manufacturing engineer to technician to shop worker). Finally, innovation is important. We can’t know what products will be developed in the future, but the importance of innovation is timeless. If manufacturing innovation is important, policies and investment should reflect that. Below are recommendations that I find essential.

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Funding for research: New materials, processes, and knowledge that lead to innovative products have the greatest impact on a nation’s wealth. Manufacturing innovators. Journal publications to change the world. A renewed focus on the critical links between manufacturing, innovation, and lifelong workforce training. Expanding this focus for the first Institute in what is today known as MedUSA, a three-robot metal additive manufacturing cell at the Department of Energy’s Manufacturing Demonstration Facility at Oak Ridge National Laboratory. We received ASME’s Editor Manufacturing Technology Award and Blackwell Award, and is a Fellow of ASME.