



The Manufacturing Institute To The PolymerOhio Emerging Technologies Forum

**Remarks by Emily Stover DeRocco
President,
September 29, 2010
Columbus, OH**



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Thank you, Wayne.* Good morning and thank you very much for inviting me to speak today.

As Wayne mentioned, I am the President of The Manufacturing Institute in Washington, DC. We are an affiliate of the National Association of Manufacturers, which is the oldest and largest trade association in the country, with a reach to over 100,000 manufacturing companies. The Institute's job is to conduct the research and develop and implement the solutions that help keep the entire manufacturing industry competitive.



As many of you know, the President of the National Association of Manufacturers is John Engler, the former Governor of Michigan. When I told him earlier this week that I was headed to Columbus, he said, "Tell them they're lucky they haven't faced the Spartans yet this year." Of course, as a proud alum, I know the Big Ten title still goes through Happy Valley...

The nonstop Buckeye coverage aside, it is good to be back in Ohio and back with so many manufacturers.

Two months ago, I had the pleasure of joining the team at EWI for their materials joining conference, and we've been partners with the MAGNET group for years now. I must say, I am truly impressed with the entire network of Edison centers here in Ohio. It is a fantastic model for supporting manufacturers and one that we actually hope to replicate in other areas of the country.

Before we get to some of those opportunities though, it's important to review where manufacturing stands in this country, what key challenges threaten both the present and future success of our industry, and why it's critical to the United States to possess a strong and vibrant industrial base.

First the good news. The U.S. is still the largest manufacturer in the world. We produce over \$1.6 trillion of goods every year. To give you some perspective on that number, if U.S. manufacturing were a country by itself, it would be the eighth largest economy in the world.

Manufacturing is responsible for almost 60 percent of all exports. That is nearly double the amount that services provide and is a critical source of revenue and growth for both manufacturers and the country as a whole.

And from a jobs perspective, manufacturers employ nearly 12 million Americans. Those workers receive 20 percent greater wages and benefits than the average in other industries.

But those numbers cannot mask what has been a long and very painful transition for the manufacturing industry. In the last ten years, over 5 million jobs have been lost in the manufacturing sector. That's nearly 30 percent of the industry's workforce. The entire economy of the Upper Midwest has felt the effects of these job losses as town centers have been boarded up, once great cities have hollowed-out, and the population of the region has declined.

The reasons for this change in manufacturing are complicated but

there are several obvious factors. The end of the Cold War, the emergence of the Asian economies, and the advent of the internet and information technology have changed everything. We are now forced to compete with countries both large and small from all over the world. And these countries are not simply watching as their manufacturing sectors grow; they are actively assisting its development through aggressive government policies and incentives.

Meanwhile, the United States was slow to react to this development. Our federal government has traditionally refrained from anything that has the appearance of industrial policy – and for good reason -- and states and regions have been either focused on luring companies from other parts of the country or don't have the resources to compete with offers from other national governments.

The results are what we have witnessed over the past ten years. Manufacturing employment dropped dramatically as many firms were either pushed out of business or forced to pursue global sourcing options to remain competitive.

For a while, this erosion of our industrial base was masked by the bubbles in information technology and housing and the incredible ease of credit. But now that those artificial stimulants have vanished, the effect of losing nearly a third of our manufacturing jobs is really hitting home.

Why manufacturing is so important to our economy is that it is one of the few sectors that actually creates value. That value is the foundation upon which national wealth is generated and allows millions of bankers, lawyers, and doctors to be employed. It also creates the vast middle-class that a strong society requires because the value manufacturing produces allows firms to pay their employees a salary superior to most other industries. Manufacturing, in effect, guarantees our basic economic security.

Two wars and a world full of potential threats also reinforce manufacturing's role in our national security. In previous generations, this was never in doubt. There are posters around our office that highlight the "industrial army" from the first world war and perhaps some of you are old enough to remember FDR's "Arsenal of Democracy." No matter whether it's ships, tanks, and planes, or drones, lap-tops and body armor, manufacturers are still responsible for providing our servicemen and women with the tools to protect our freedom.

Fortunately, the public at large seems to understand how important manufacturing is to the United States. In a just released study we conducted with Deloitte, manufacturing was identified as the number two choice both of industries vital to our economy and industries they would choose to locate in their hometown. In each case, energy was the first choice which, given the attention from policy makers and media, shouldn't be a great surprise. It is that level of public support that manufacturers must harness and direct towards policies that support the growth of our industry.

The question, then, is what actions do we have to take to make the U.S. the strongest, most competitive manufacturer in the world for the next century?

From a policy perspective, the National Association of Manufacturers recently released a Strategy for Jobs and a Competitive America. It details the steps the federal and state governments should take to make the U.S. the best place in the world to manufacture goods, conduct research and development, and headquarter a firm.

We are now in an election season and the choices that our elected officials make have a tremendous impact on the manufacturing sector so I encourage all of you to read that strategy blueprint which is available on the [NAM](#) website.

While the right policy framework is critical to the strength and vitality of U.S. manufacturing, it alone cannot ensure the long-term success of our industrial sector. Manufacturers themselves must

understand the challenges the global market creates and develop the solutions that will keep their businesses strong. That starts by realizing where the U.S. has a competitive advantage.

We know we're never going to compete with the Chinese or the Indonesians or the Indians on cost alone. They simply have too many people willing to work for dollars a day. Instead, the U.S. is going to produce the highest quality, most cutting-edge products. We're going to be ahead of the curve across all areas of manufacturing and create things that businesses and consumers are willing to pay a premium to use.

To reach that position though requires more than just tinkering around the edges. It requires game-changers.

The first of those game-changers is the reason why everyone is here today – modeling and simulation – and the virtualization of the product life cycle.

Product improvement and new product development are a critical part of all manufacturers' growth opportunities. It's the way we stay ahead of overseas imitators. Unfortunately, the time required in the real-world to model and test any product design changes is significant. Assuming companies have the resources to devote the time and effort to R&D, it still takes months to prototype, test, refine, and test again.

The polymer industry should certainly know this as your business is built around the interaction of complex molecular structures. How they bond and then change over time is critical to the reliability of your products. Then when you add the complexities of temperature, pressure, and wear and tear, the only real option has been to "build and observe" for most polymer manufacturers.

But today, computing power, and the software to run complex algorithms, has finally reached the point where we can actually simulate the real-world effects electronically. While this technology isn't quite available on our desktops yet, it is accessible at a growing number of locations.

The Ohio Supercomputing Center is one of those places. So are over 60 colleges and universities around the country. And for the really-big jobs, the national labs have the fastest computers in the world, where they have been modeling and simulating nuclear explosions for years.

What makes this a true game-changer though, is that it no longer takes months for the computers to process the information. Most jobs can literally be done overnight. The productivity gains that this technology offers would be measured in multiples, not decimals.

Of course, just because this technology now exists does not mean that it is accessible to all manufacturers. In fact, it is really only the global giants in manufacturing that have access to this game-changing application. The price of the software required to run the simulations, the cost of the processor time on the computer, and even the cost and availability of the workforce that understands computational methods all have put this game-changer out of reach for over 90 percent of the country's manufacturers.

But later today, you're going to hear about a new project that PolymerOhio and the Ohio Supercomputing Center just received funding for that will begin to address these barriers. And in Washington, we at The Manufacturing Institute and other similar groups are engaged with the universities and national labs to deal with issues such as non-profit vs. commercial licenses for software, intellectual property rights, and the lack of awareness of these valuable assets.

But even if we successfully deal with these issues, the reality is that almost all small and medium-sized manufacturers do not have the staff capacity to undertake these types of projects by themselves. Which brings us to the next major game-changer – talent.

In surveys conducted by [The Manufacturing Institute](#) over the past several years, manufacturers consistently cite talent as one their top "pain-points." They cannot find the workers who have the education and skill levels to work in today's high-tech manufacturing environment. This lack of talent is really a three part problem.

First, too few individuals are being encouraged to go into manufacturing. Whether it's a misconception about the amount of money you can make, the lack of high school career and technical education programs that used to serve as a supplier of talent, or the lingering image of manufacturing as a low-skill, dangerous profession, our pool of talent has shrunk considerably.

Second, for individuals who do pursue science and engineering related fields, there is too much reliance on classroom teaching and not enough hands-on experience. As a result, the technical and design experience that 2 and 4 year college graduates should possess is absent, leaving it to manufacturers to train new hires on-the-job at the exact time when we can least afford non-productive employees.

And finally, there are almost no education programs that look over the horizon at what skills are going to be required in manufacturing just a few years from now. Computation is an obvious example. It seems relatively obvious that only a few years from now, advanced modeling and simulation capability will be possible on desktop computers. Are today's graduates being trained in these methods so they can be prepared for these soon-to-be ubiquitous tools? The answer in most places is no.

The Manufacturing Institute has created a system that we hope will begin to deal with this talent shortage. It is a skills certification system currently targeted at entry-level workers with expansion plans into higher level and sector-specific skills, including automation and computational sciences. We have implemented the entry-level system in community colleges in five states, including here in Ohio at Lorain County Community College near Cleveland.

This system does not create yet another group of certificates, but instead we selected and organized the best certifications from existing programs into a stackable set of nationally portable, industry-recognized credentials. With a clear alignment between educational programs and career pathways, we hope that this system attracts a significant number of students who expect to learn skills they can readily apply to the workplace and who want to earn money while they learn new skills.

PolymerOhio is another group that is focusing on talent development. Working with the Ohio Supercomputing Center, they have developed a computational program of study that is now integrated into area postsecondary schools. This is exactly the type of forward-looking program that I described earlier.

One of the tremendously important benefits of the focus on talent is that it raises the bar across the entire production process. Not only can companies be more productive and spend less time and money on HR and training, they should also expect to see higher quality products and an increase in the innovations that drive the next generation of products. Talent really is a game-changer

I mentioned earlier how much I admired the Edison model here in Ohio. We see game-changers here as well. The former Edison Welding Institute – now EWI – is essentially an application service center where high-end, capital intensive equipment and talent are available on a contract basis. A similar approach can be found in the German-driven Fraunhofer center network.

These groups are acting similar to the specialized firms you see in the services sector. Every small and medium sized manufacturer can't afford to buy laser welders or high performance computers, but an application center can pool the needs of many manufacturers in a region and create a sustainable business model for itself and a

cost structure that allows companies access to these advanced tools.

PolymerOhio's role is also something of game-changer for small and medium manufacturers. As a connector and networker of small, sector specific firms, they are able to both create and aggregate demand for the innovation tools that manufacturers need to compete. By acting as an intermediary between the Ohio Supercomputing Center and the polymer industry, they are adding a value to your companies that you alone would not have achieved.

U.S. manufacturers have had a difficult time for nearly a generation. And we have received very little help from Washington. But there are now tools available that can help us succeed over the next generation. So my call to action for you is:

1. First, on Policy – Leadership Matters. There are 286,000 manufacturers in the U.S. and we can be a powerful voice both in Washington and state capitals. So know your issues and stay involved; second
2. In Practice – Drive Innovation. Get involved with the PolymerOhio and Ohio Supercomputing portal project. It is your opportunity to get ahead of the curve using modeling and simulation; and third
3. On Talent – Demand Better. Start working with your community colleges to create the demand for the Manufacturing Skills Certification System. This will ensure that the next generation of talent is available and ready to contribute to your success.

*Wayne Earley is Chief Executive Officer of PolymerOhio and introduced Ms. DeRocco to those attending the Emerging Technology Forum.

Emily DeRocco is president of the Manufacturing Institute. She oversees the education and research arm of the National Association of Manufacturers (NAM), the nation's oldest and largest broad-based industrial trade association, which represents 11,000 companies in every industrial sector in every state. Dr. DeRocco's responsibilities include the operation of a new national center dedicated to fostering a new generation of manufacturing workers for the 21st century. Prior to NAM, she served as Assistant Secretary of Labor, implementing regional economical development initiatives in 39 regions.

PolymerOhio, Inc. is a polymer industry-specific Ohio Edison Technology Center, which is funded by the Ohio Department of Development. PolymerOhio focuses on enhancing the global competitiveness of the polymer industry, including companies from the plastics, rubber, bioproducts, and advanced materials segments. For more information, polymerohio.org

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