

**NEW REPORT FROM MIT'S INDUSTRIAL PERFORMANCE CENTER  
STATES THAT MASSACHUSETTS MUST "UP ITS GAME" TO STAY  
GLOBALLY COMPETITIVE IN ADVANCED MANUFACTURING**

*Massachusetts' manufacturing ecosystem needs to be better  
connected and focused on increasing innovation capacity*

**For immediate release, Monday, May 18, 2015...**MIT's Industrial Performance Center (IPC) released a report today that outlines how the Commonwealth can improve the advanced manufacturing innovation ecosystem within the state. The state's advanced manufacturing capabilities undergird many of the key industry clusters within the Commonwealth such as aerospace/defense, computers and semiconductors, medical devices and biopharma. The report was sponsored by MassDevelopment and released today at the Southeastern Massachusetts Regional Manufacturing Summit.

Employment has stabilized since the financial crisis to approximately 250,000 jobs, a high percentage of which are R&D intensive and pay high wages. However, important changes are taking place - within companies and how they are organized for production, in terms of new technologies, and in the global economy as regions and countries work aggressively to increase manufacturing investments and build capabilities.

"This changing landscape requires Massachusetts to "up its game" and look to maximize its assets in terms of how those engaged in advanced manufacturing are connected and how innovation is supported within the manufacturing ecosystem", said lead author of the report, Elisabeth Reynolds, Executive Director of MIT's IPC. "Taking such steps will help fully establish the region as a **world-class leader in advanced manufacturing.**"

"Massachusetts is well positioned to take advantage of opportunities arising from changing cost structures that favor the U.S. in manufacturing, like increasing wages in Asia and declining energy costs in the U.S., a desire by companies to shorten lead times, and the introduction of new "game-changing" advanced manufacturing technologies that play to the strengths of the region," said Professor Willy Shih, a member of the report's Advisory Board, Professor of Management Practice at the Harvard Business School and co-author of *Producing Prosperity: Why America Needs a Manufacturing Renaissance*.

Dr. Yilmaz Uygun, Research Fellow at the IPC and an author on the report added, “Massachusetts competes in manufacturing based **on talent, quality and innovation.**” The state’s large manufacturing companies draw on **four primary assets**:

1. Well-educated and **highly skilled labor force**, particularly in engineering;
2. Suppliers with the ability to quickly deliver difficult-to-manufacture parts of very **high quality and reliability**;
3. **World-class universities**; and
4. Innovative startups and a dynamic **entrepreneurial ecosystem**.

At the same time, they note the challenges that exist with finding skilled technical workers, misperceptions about advanced manufacturing by younger generations, and the increasingly aggressive policies by state and national governments to attract and support manufacturing in their jurisdictions.

The Massachusetts advanced manufacturing Innovation ecosystem is comprised of **four nodes**:

- Large original equipment manufacturers (OEMs)—these are firms with more than 500 employees that manufacture marketable products based on ‘original’ designs
- Supplier SMEs—these are firms with fewer than 500 employees that manufacture parts & components for OEMs
- Universities and research institutions
- Startups

In general, **OEMs** have the **strongest links** within the innovation ecosystem because they are driving much of the innovation based on their insights into technological trends, global markets, supply chain management and training and skills requirements. In contrast, **SMEs** generally have the weakest links within the ecosystem. This is in part because they have historically been on the receiving end of knowledge flows from their large customers. As a result, their ability to drive knowledge and ideas toward the OEMs has been limited and highly dependent on the OEM. SMEs also generally have weak links to universities and to the startup community. **Universities** have relatively strong links with large OEMs and with the startup community, but limited engagement with SMEs. Finally, the vibrant community of **startups** is an important source of innovation in advanced manufacturing, particularly for OEMs. Links between startups and SMEs, by contrast, are generally not strong in Massachusetts.

“This recent report by the IPC builds on approximately 25 years of research in the areas of manufacturing, innovation and productivity. We are pleased to have engaged with many of our business and research colleagues in the Commonwealth on this work toward building a more robust and dynamic manufacturing innovation ecosystem,” said IPC Founder and Faculty Director, Professor Richard Lester.

The report makes several recommendations, including the following:

- ***Develop an Advanced Manufacturing Strategy for the State***  
In contrast to the state’s other cluster-focused strategies (e.g. for the biotech industry), advanced manufacturing requires the development of cross-cutting capabilities that work across industries (e.g., photonics, robotics, flexible electronics, and advanced materials).
- ***OEMs Need to Lead the Formation of a Commonwealth Manufacturing Innovation Advisory Group***  
OEMs are a driving force for innovation in Massachusetts, yet their collective voice on the subject is not being heard. With a window into global trends, R&D opportunities, supply chain demands, and training needs five to ten years out, OEMs need to be engaged in setting the state’s manufacturing innovation strategy going forward.
- ***Initiate an OEM Joint Supplier Upgrade Program***  
Most OEMs have their own individual supplier development programs to help suppliers produce efficiently and meet the OEMs’ delivery, cost, and quality requirements. However, there is little collaboration across OEMs in the same or different industries when it comes to upgrading the supplier base in the state, even when OEMs share similar suppliers.
- ***Move Beyond Lean to Provide Technological and Engineering Support to SMEs***  
Thus far, state efforts to support SMEs have largely revolved around workforce training and lean practices. Such practices can lead to greater efficiency and accuracy in terms of quality, cost, and time. However, lean practices are a necessary for success in today’s global manufacturing environment. With the rise of new technologies, such as additive manufacturing, programs to support SMEs and build their innovation capacity need to go further.
- ***Better Connect the Startup Community to SME Capabilities in Early-Stage Scale-Up as well as to OEMs for Beta Testing and Piloting***  
Many Massachusetts startups, let alone startups outside Massachusetts, are unaware of the deep capabilities that exist within the state to support early-stage prototyping and piloting. Startups currently find manufacturing support through an ad-hoc, word-of-mouth process.

Efforts by SME trade associations and intermediaries to better communicate these capabilities, together with a more explicit, systematic effort to connect SMEs and startups, is required. In addition, OEMs can be very helpful to the scale up process of advanced manufacturing startups. More could be done to facilitate such partnerships within the region.

###