NIST – I am writing on behalf of Dow AgroSciences in support of NIST addressing the need for Supply Chain competitiveness through Manufacturing Extension Partnerships.

Supply chain technology advancements are coming at ever increasing speed. It is unlikely that small and mid-sized companies will be able to keep up with the pace of change needed to remain competitive and meet the needs of its supply chain partners. Beyond new technology needs, employee preparedness to work with such technologies and the processes required to make them effective also pose a significant challenge. Today, the market is fragmented with many different kinds of technology solutions, leaving companies that do not staff highly skilled experts, wondering whether investments in one technology vs. another are warranted and whether they will be compatible with other technologies. This is an excellent opportunity for MEP to play a role with small manufacturers.

In order to be competitive for growth opportunities, small and mid-sized companies need to be able to meet the expectations that large customers like Dow may have to integrate aspects of our information. Today, increasing consumer demands for goods to be available in a volatile marketplace makes agility increasingly important and that requires use of state of the art technology. Our company expects suppliers to provide visibility to inventory and planned production which would allow us to operate more efficiently. By replacing inventory with information, getting better visibility of demand and supply, we can be more responsive to demand changes with less inventory, capturing revenue which can offset the higher labor expenses associated with doing business in the US. Being able to leverage relative proximity to the customer can be a competitive advantage vs. off-shoring. In Supply Chain, speed can be a great equalizer. By being US sourced, companies can be more responsive to market trends and volatile customer demand.

There is a vast array of technologies that are on the market and available. Generally, it is the larger companies that are able to field projects or implementations to try to drive efficiency through application of those technologies. If those capabilities were more feasible to implement for smaller manufacturers they would be better able to compete in the marketplace. Some technologies that come to mind that are important for small US manufacturers to consider for excellence in Supply Chain are:

- End to end visibility solutions that enable faster response to what is going on in the marketplace – For example, being able to see where excess truck capacity is available to be used by another entity drives costs down and reduces environmental impact of trade. Visibility of a supplier's inventory reduces the need for redundancy to protect the ability to shift supply plans.
- Auto-ID technology (RFID; Barcoding; etc.) that enable accurate capture of real time inventory movements reduce the need for excess pipeline inventory within a supply chain, provide system-to-system visibility; and warehouse automation.
- Data Analytics capabilities are needed to distill the vast array of data that comes into our systems into meaningful visualization of information so that we may quickly understand any exceptions that need to be addresses to meet customer needs. This goes beyond data manipulation and visualization to the skills of people within the business to interpret and respond to the information gleaned from the data.

Each of these technologies have an extended implementation timeline. Typically to implement such a technology, a company would start working with technology developers to demonstrate the capability to meet the needs via a pilot, from both a technology and a user acceptance perspective by engaging early adopter users at a MRL 5 (in the production environment). If successful, a company would broaden implementation which would help start to realize the benefits from the new technologies, perhaps at the same MRL, but with more span. Only at this point would the evaluation of ROI be meaningful. Each

new piece of technology implemented paves the way for future integration leading to new innovation and meeting needs that had not even been envisioned.

Our experience with such implementations is that anytime Supply Chain technology solutions are employed in a business, we cannot expect them to be "plug 'n play" like our iPhones or laptop computers. These technologies are required to be configured to meet the needs of the particular industry and company and the kinds of work that is done despite the basic functionality being the same. Interfaces with other technology that the company has need to be built by technology experts. Thus, complementary business services that specialize in implementation are becoming more common. Tier 2 and tier 3 manufacturing companies would be wise to employ them to help with the technology implementation. The more sophisticated the existing technology, the greater the need for integration and technical expertise beyond what the developer and the Tier 2 or 3 manufacturers could provide. The more our businesses can be connected via technology that works effectively, the more efficient and competitive US Manufacturers can be.

The power of engagement with peer Universities such as has been proposed between Penn State, Michigan State, and Arizona State, is to be able to provide both a vision for what could be possible for a particular industry or application as well as to share learnings across industries and speed adoption of capabilities. These advancements would not happen as quickly without mechanisms to accelerate growth of employee skill, which Universities are well positioned to support.

On behalf of Dow AgroSciences, I encourage NIST to support expansion of MEPs to include aspects that would drive improvements in Supply Chain competitiveness throughout the country.