

Sent: Friday, January 13, 2017 2:29 PM
To: meprfi <meprfi@nist.gov>
Subject: MEP Competitive Awards program RFI Responses

Maintaining world-class manufacturing capabilities in the United States has several key critical success factors related to achieving performance measurements across many dimensions, while recognizing strategic benefits to the national economy. In order for manufacturers to successfully compete, there are heavy dependencies on people with the right skills, with access to cutting edge technology, along with ability to transform and execute robust and dynamic processes with speed and agility. The nature of the business environment to maximize profit drives economic pressures not only on internal processes for inventory management, order responsiveness, and higher productivity, but this pressure is also passed on tier-1, tier-2, and subsequent upstream suppliers. These suppliers often times do not have access to resources (investment, cash, infrastructure, labor, or information) to make more effective decisions to accommodate client requirements. Therefore, the need to develop these capabilities to the extended supplier networks is absolutely critical for the ultimate success of the end-to-end model. In order for the supply chain to operate in a more collaborate, interconnected, and seamless manner, strategic imperatives like parameter transparency and smarter analytic solutions are the future. These imperatives have an underlying dependency not only on IT infrastructure and data standards, but also a much more skilled and educated labor force to optimize the productivity of the operations while meeting very demanding customer challenges (schedules, cost and quality.).

From a personal professional experience perspective, there is definitely a need to further develop enhancements and capabilities across secondary and tertiary supplier networks in order to foster a much more integrated and cognitive supply chain. Today, there are often shortcomings and diminished interest for investment in leading edge capabilities of these suppliers due to lack of capital to invest in their strategic best interests. Their time-thresholds for success are very often much shorter time increments focused on what they need to do today or this week to survive, rather than what investments do they need to make to grow and compete in a five year plan. Thus, in our opinion, the need for NIST to support the development of such programs for small to medium business suppliers is essential to the national strategy to sustain and grow US Manufacturing and compete on a global scale.

Lastly, over the course of the last few decades, IBM has benefited tremendously from several key university relationships, particularly in the area Supply Chain Research. To this day, we maintain partner with The Pennsylvania State University Center for Supply Chain Research, Michigan State, and Arizona State Universities. These relationships have provided mutually beneficial value to the respective universities, students, and industry. It is advantageous to continue to leverage these key relationships in a collaborative model in order to pair the strengths of the entities to their best interests. This would yield valuable intellectual property while developing more competitive supply chain processes, and also addressing solutioning of industries challenges. Simultaneously, there would be more accelerated development of students to contribute to a labor pool of technical skills for enhanced recruiting. The industry academic partnerships (and strategic alignment) is very much integral to the development of the next generation of manufacturing principles and key to the success of US Manufacturing capabilities.

▼ NIST MEP Questions/Answers.

(1) What are the key problems and issues facing small U.S. manufacturers and their competitiveness and opportunities for growth in the near-term (1 to 2 years), mid-term (3 to 5 years) and/or long-term (more than 5 years)?

The challenges facing small US manufacturers include many factors, including translating their requirements (Quantities, EC, Quality issues) to respective suppliers on a timely and accurate basis. There is also concern with high-degree of process variability and condensed development cycles for complex parts and subassemblies. There is a much higher dependency on IT and information to support complex manufacturing processes, and often times the suppliers floor control and ERP systems are dated, manual and antiquated. These factors limit the ability to provide supply commitments on a frequency commensurate with the business demands without opening vulnerabilities to IT security concerns. Ultimately, the supplier networks all need to have management systems, automation and decision support systems (including simulation capabilities) around their own supply chain IT networks.

(2) What advanced manufacturing technologies are and/or will be needed by small U.S. manufacturers for the companies to be competitive and grow in the global marketplace in the near-term (1 to 2 years), mid-term (3 to 5 years) and/or long-term (more than 5 years)? Manufacturing technologies must include ERP interoperability, integration with smarter floor-control systems, higher skilled labor to prototype and model processes through each phase of New-Product Introduction, Life Cycle management (including reverse logistic operations), and end-to-end data-transparency (from Clients to dependent suppliers. These factors will all be key to competing in the new manufacturing world. Depending on the segment of manufacturing, skills like CNC or 3D imaging, graphics, and printing will also be relevant skills and capabilities. Supply Chain entities must also have ability to navigate in uncertainty and accommodate disruptions due to natural disasters and other external factors beyond their immediate control. Systems and contingency planning should be considered and planned in advance of need. Also, leadership skills are an important element to manage these risks. In order for businesses to compete, the 'continuous education and learning of leading edge techniques' for management is important. This is an area where the MEPs and NIST can provide support and assistance to solution this opportunity in a world-class manner.

3) What technologies and/or business models are important to small U.S. manufacturers as they choose and participate in any particular supply chain? Perhaps this is an area that there could be a collaboration of various Manufacturing Industries and OEMS along with a University MEP partnership that could create some consulting services or certification standards to provide more confidence and subjective attribute score relative to measuring supplier capabilities. This could include elements like cybersecurity or sustainability factors as part of the assesment.

(4) What complementary business services, including information services, are and/or will be needed by small U.S. manufacturers and/or MEP Centers to take full advantage of advanced manufacturing technologies at the company or supply chain level? This area may also be another area where a MEP/University study may yield some valuable suggestions. The ability to scale operations (increase and decrease) and process modeling techniques through simulation and/or shared services maybe a useful service to provide to design more effective operations to benefit suppliers, and lower tiered suppliers, as well as customers.

(5) Are there any other critical issues that NIST MEP should consider in its strategic planning for future investments that are not covered by the first four questions? Experience and lessons learned is that the traditional supplier relationship has morphed more into strategic partnerships. One entity can not succeed without tight integration, collaboration

and communication with the relationship. It is incredibly important that engagement across multiple stakeholders at each phase of product life cycle is essential. Our experience also tells us that industry collaboration with both professional organization (APICS, IERC) and academic institutions (Co-ops, interns, consultants/research opportunities and bench marking) yields incredible insights and value. Continued investments in MEPS, specifically with the nationally recognized Supply Chain institutions will be a great investment in developing manufacturing capabilities in the US)

Thank you for your time and consideration of this matter, and please feel free to reach out to me directly should you have any further questions or have follow-on discussion.

Warren

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