

We are submitting the attached survey that we conducted from a group of our manufacturers in January, 2017, to gain the most insightful and accurate information on what is needed, the “voice of the customer”, to effectively grow and sustain our US manufacturing base. When we look at the responses, we felt it was necessary to add some dialogue to it (see below), translating what they answered today and how they see it, into what that solution can look like going forward, considering current and future technology and other rapid advancements that only a few may be available to and currently applying. There are many more SMEs that require an understanding of what their small businesses may look in the near future considering these advanced techniques. And more importantly, how do they get there? We see this as an instrumental part that NIST MEP can contribute to.

**Essentially all manufacturing businesses have to be price competitive, meet basic quality standards, and deliver on time as demanded. They all also must be concerned with Valuation of the business** whether for eventual sale or an ESOP or transfer within the family. To different degrees they need to know how to address and access the market. For **some segments of our constituency, getting business is primary, but in most, reliable and short lead time delivery is more the factor but better delivery is often the means even where new business is needed.** That does not obviate need for better marketing skills which is certainly useful for a smaller segment of our constituency.

**In CT now, delivery is probably the short and midterm primary concern for both the lower level in the supply chain as well as the OEMs.** How to meet the delivery demand is answered in different ways depending on size of company, where they are in the food chain, and the level of sophistication and complexity. **For some it translates to workforce inadequacies. For others they have already committed to automation and other technology choices** to help fill the workforce voids. Highly flexible robots are meeting and will meet some of that shortfall cost effectively; mobile robotics would be an answer to manufacturers concerned about both handling volume operations and moving things and even measurements will be handled by automated means.

For the **workforce pipeline needs fall in at least two categories, the CNC operator and other specialists like welders. In CT the CNC operator need is being fulfilled and the others are being addressed by apprentice programs.**

**The other type is more sophisticated involving design, complex engineering, materials application** and the like. **That is a shortage not being met and a source of weakness over the next 5 years or more.** The medical device, other biotech and healthcare generally face this long term dilemma.

**The other aspects of delivery include the two most important—process excellence and supply chain management.** This continues to be in need of upgrading for much of the manufacturing base.

**The medium to long term technology need is dealing with the convergence of digital technology with manufacturing.** The two most obvious targets here are additive and robotics/ automation. The Internet of things is another facet of this convergence. This overlying need for the next decade at least will require meeting **workforce needs: the operators will have skill sets similar to CNC operators; the other**

**segment however is what we are short of now-- people with access to content, but more importantly team inter disciplined players with great problem solving capability and innovative thinkers.**

**The access to and utilization of technology is the lack of awareness to understand the need, how it intersects the company's capability and future growth, but also how to access it and how to adapt it to individual infrastructure.** The NIST effort for regional collaboration and the NNMI programs are all trying to address these issues.

**On the Valuation side we see the current and future need as the turnover is already in high gear and expected to continue for the next decade. Understanding how to improve the company Valuation is the most immediate need along with developing a succession plan. Deciding whether the future is sell, buy or merge, and then executing the decision is now to long term.**