U.S. Department of Defense
Office of Economic Adjustment

Project Profile: Delaware Valley Industrial Resource Center

Impact Statement

DVIRC is filling a key role as a thought leader and convener among service providers and intermediaries, and as an advocate for the manufacturing community; its activities demonstrate that the ecosystem is willing to come together to collaborate when there is agreement about the mutual benefit to those participating.

Key Project Takeaways

This profile will discuss briefly the activities of the initial planning grant (April 2017-March 2018) and focus on the Phase 2 award (April 2018-March 2019) to begin to implement the plan for activities under the Manufacturing USA Access Project, or MAP.

With project management support from Deloitte Consulting, the Delaware Valley Industrial Resource Center (DVIRC) used the planning grant to organize and engage a network, or ecosystem, that connects makers, designers, hardware entrepreneurs (HEs) and manufacturers with regional universities, other economic development organizations (EDOs), and the Department of Defense (DoD)-supported Manufacturing USA Institutes. This engagement and collaboration are continuing features of the initiative in Phase 2.

A key takeaway resulting from the planning effort is that this network can provide the training and technical assistance necessary for manufacturers to learn about and adopt Advanced Manufacturing Technologies (AMTs) to help them meet DoD's goals for resiliency, lethality, and readiness. This ultimately will strengthen the regional manufacturing ecosystem and provide the increased technological sophistication, efficiency, flexibility, and innovation needed among Small and Mid-sized Manufacturers (SMMs) in the DoD supply chain. A related takeaway is that understanding and strengthening this ecosystem takes time, so outcomes related to specific companies and some DoD objectives are nascent at this point in the project. A final takeaway is that the partners and stakeholders view the collaboration as generating benefits for all involved, and that they are comfortable with DVIRC taking the lead to help navigate the path through a complex regional economy.

Project Description

Rationale

The Greater Philadelphia region spans ten counties across three states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; Burlington, Camden, Gloucester, and Mercer in New Jersey; and Newcastle in Delaware. Home to some 14,000 manufacturing businesses, this region is one of the densest manufacturing zones in the U.S. and is heavily dependent on defense contracts. Between 2000-2015, its 5,000 defense contractors realized contracts totaling $133 billion, including contractors such as Lockheed Martin, Boeing, BAE Systems, and AmerisourceBergen. Manufacturing companies in the Greater Philadelphia region are crucial assets in the DoD supply chain and cuts in DoD spending significantly impacted the region's economy.

Achieving resiliency in the military supply chain depends on the ability of these companies to adopt AMTs to enhance their capacity, strengthen their ability to innovate, and attract commercial customers to diversify their dependence on DoD contracts.

This project fits into the broader context of national security, encompassing homeland security, U.S. economic security (e.g., globally competitive domestic manufacturing), and the long-standing requirement to rapidly support our armed forces globally with high quality and cost-effective materiel. The DoD's current and future needs for U.S. production capability overlap with the need for a globally competitive manufacturing base: ever-increasing speed, efficiency, and flexibility from continuous innovation in the development, design, production, and service capabilities of a company when supporting an existing or new platform, system, product, or service.

The project focuses on current or prospective DoD suppliers that sell manufactured systems, products, parts and services. Using web-scraping, Deloitte brought to the project team a new capability to identify existing defense suppliers that have some level of AMTs in their businesses and that are likely to further invest in AMTs. The project will further use web-scraping analysis to identify companies that have the potential to help meet specific DoD needs or deliver their current products and services more rapidly and at lower costs. By identifying specific characteristics of individual companies in the regional supply chain, DVIRC will be able to help address disconnects and problems that limit supply chain efficiency.

Program Activities

In the first phase of this project, DVIRC led an extensive planning process to develop a business plan to strengthen the capabilities and competitive positions of SMMs critical to the DoD supply chain, and to build out parts of the manufacturing ecosystem that are needed to help SMMs accelerate their investment in AMTs. The second year of the project continued the planning effort and moved toward implementation in key areas.

The business plan consisted of four main elements: consulting with companies on AMT, creating a virtual and physical hub of ecosystem assets, creating a network of community-sourced incubators, and providing access to workforce training and education. Each element except the virtual hub is discussed below in the context of the Phase 2 implementation grant activities.

After extensive investigation in Phase 2, the project team determined that the virtual hub – intended as a repository of assets that would connect partners and provide access to virtual assistance, demonstrations, and trainings -- would not be practical to build or maintain and was not essential to project success. They decided to focus on actions to advance the other elements.

During the second year, the project team strengthened engagement among four of the eight DoD Manufacturing USA Institutes, including those with technology focus areas of 3D Printing, Robotics, Digital Manufacturing, and Functional Fabrics. The work made progress on continued planning and implementation in the following areas:

- To "regionalize" the technology expertise of the Institutes, private enterprises such as Bosch Rexroth, Rockwell Automation, and other system integrators, planning continued for the creation of a physical hub in the Greater Philadelphia region that would make Institute and related AMT expertise readily available to SMMs. The team prepared to engage an Architecture and Engineering firm to develop specific plans (specifications and estimated cost) for a site in Phase 3.
- The project started to bring Institute education and training programming into the region to develop the talent required to take full advantage of AMT investments and to support existing education and training programs.
- The team began to connect hardware entrepreneurs, makers, and other assets with SMMs to support the product and process innovation necessary to enhance their ability to support DoD.

In addition, the project continued a strong focus on developing DVIRC's AMT consulting practice, building the foundation to offer the technical assistance SMMs need to make smart AMT investment decisions. In Phase 2, the project team conducted 40 assessments (called "discussions") with current or potential defense suppliers; the next step is to follow up on the findings from those discussions to provide consulting, technical assistance, and training to help SMMs utilize AMTs for a variety of anticipated outcomes described below. They also collected and shared information on MEP Centers' ability to offer an AMT consulting practice, with potentially national implications for promoting AMTs in the defense supply chain.

Resiliency Impacts

Increasing Awareness of the Defense Industrial Base

As a large and broad-based regional group of manufacturing companies, hardware start-ups, makers, designers, educational institutions and economic development organizations, the team is promoting specific value propositions for all involved. DVIRC, vendor OEMs, and other partners and stakeholders are increasingly visible as they strengthen the ecosystem and reach out to SMMs. They have presented at large outreach and awareness-building events such as a trade show at the Philadelphia Convention Center, the DVIRC's annual Manufacturing Summit, and others. In Phase 3, engaging vendor OEMs in training and outreach will touch hundreds of SMMs and lead to engagements with dozens of them.

Enhancing Force Multipliers to Support the Defense Industrial Base

Phase 2 included numerous activities to enhance the value of community intermediaries within the ecosystem, bolstering the force multiplier that will support DoD (and SMMs) at the regional level. The project team collaborated to better understand: the strengths and gaps in the existing ecosystem, the role of each organization engaged, the leadership required by DVIRC as the coordinating intermediary, and SMM needs related to AMTs. They identified 1-2 regional experts for each Manufacturing 4.0 technology to help SMMs understand the value proposition and implementation opportunities. They brought together the community of makers, designers, and educators, discussing DOD's focus on resiliency, lethality, and readiness, and created a first-ever database of incubators and related resources in the region. DVIRC also developed and delivered training to its staff and to two MEP Centers, MANTEC

(York) and Manufacturers Resource Center (Allentown), on AMTs and their benefits for SMMs. DVIRC and its partners are now moving to engage the market and those SMMs that are committed to developing the capabilities and capacities that are needed to support DoD needs.

Commercial Diversification of Defense Companies to Sustain the Industrial Base

Following up on the 40 company assessments completed in Phase 2, DVIRC and its partners will deliver consulting, technical assistance, and training to help those SMMs adopt AMTs. Undoubtedly, some of the work will involve helping SMMs use AMTs to diversify their product line and expand their non-defense customer base, strengthening individual companies and helping to grow the industrial base. Targeted companies will receive services and DVIRC will report on the services, company project activity levels, specific outcomes for individual suppliers associated with this work, and the implications for DoD regarding resiliency, lethality, and readiness. We expect to have specific company outcomes to include in Phase 3.

Cost Savings to DoD Through Business Diversification Efforts or New Products/Customers

DVIRC and its partners will also help SMMs use AMTs for process improvements or product enhancements that will reduce costs and lead to cost savings to DoD. Moreover, DOD suppliers that diversify with more commercial customers typically can reduce unit costs because of higher production volumes and more consistent production schedules. We expect to include specific company outcomes in Phase 3.

Lethality Impacts

Innovation Through Development of New Intellectual Property or New Technologies

Some of the work undertaken will involve innovation, including developing or adopting new technologies to enhance the technological sophistication of specific products and processes. Specifically, AMT experts anticipate close collaboration with Manufacturing Institutes, providing information from SMM engagements to identify gaps in the capabilities of emerging technologies. This can inform subsequent Institute Project Calls. DVIRC will report on the services, company project activity levels, and specific outcomes for individual suppliers associated with this work. The project partners will collaborate to measure the implications for DoD and individual SMM contributions to lethality.

Readiness Impacts

Training and People Support

In Phase 2, the project team launched a wide variety of activities to engage the region's educational institutions in AMT talent development and to develop a continuum of student learning experiences. The activities included:

- Training delivered by OEM vendors to SMMs (Bosch, Rockwell, Avanceon, and others)
- Training delivered by third party partners with specific AMT expertise
- Working with university engineering schools to develop capstone projects that create unique learning experiences for students
- Offering Manufacturing Institute training programs and models to industry

  - ACADEMII (America Makes)
  - Cybersecurity webinars
- Working with the regional STEM ecosystem to define opportunities for high school and community college engagement
- Pilot testing apprenticeship and pre-apprenticeship models, targeting the engineering assistant position

DVIRC also convened an advisory group comprised of community colleges and engineering schools to help guide the activities and further develop relationships between education and industry, strengthening the educational fabric of the regional ecosystem. Taken together, these activities will enhance the capabilities of the region's workforce, from job seekers to current workers to SMM decision makers.

Improved Capability and/or Production Adjustments

Working with the SMM community at large and, more specifically, with DOD suppliers, DVIRC will document the results of its work through the standard, long-standing NIST MEP Survey Process. Typical results to be measured are a wide range of production-costs, improved quality, increased throughput, shorter production cycles, increased inventory turns, and the like.

Cybersecurity Preparedness

Because of the importance of complying with DoD requirements regarding cybersecurity, the project's implementation phase incorporates training and consulting support regarding cybersecurity. While SMM demand for this support has not emerged strongly, DVIRC will continue to educate the market about both the DoD requirement and business benefits of a strong cybersecurity infrastructure. DVIRC will report on these services and the implications for DoD regarding readiness.

Other Community Benefits

By the end of Phase 2, the MAP project benefitted the Philadelphia metro region through a stronger ecosystem supporting manufacturing and defense suppliers. Key components of the ecosystem – makers, hardware entrepreneurs, educators, local government, business assistance programs, and others – universally expressed more familiarity with other complementary organizations' missions and core expertise, their work, and their role in supporting SMMs. In particular, MAP articulated value propositions for all members of the ecosystem, enabling them to engage more deeply in their work with SMMS, and building a framework for continued collaborative action.

An additional community benefit is that MAP set the stage for building a region with more numerous SMMs that are less dependent on defense business or single products (i.e., more diversified). Most of the project work with specific companies to achieve this objective will occur in Phase 3, but a path forward and target companies are emerging more clearly. Ultimately, this will result in the region's SMMs using more AMT for products that enhance their competitive position, increase their technological sophistication, and enable them to meet the increasingly sophisticated demands from customers, including DoD.

Lessons Learned

Greatest Challenge

The virtual hub concept proved too difficult to pull together, largely because of the complexity of the task and opportunity cost of focusing on it compared to other, higher value, components of the MAP project.

Most Important Lessons Learned

There is a need for DOD Manufacturing Institute programs and services among SMMs in the region, but the programs may need modification and adaptation to effectively add value in a way that generates revenues from customers that are willing to pay, and that can be offered at price points that are digestible for SMMs.

Initial Work Plan/Improved Work Plan

DVIRC is filling a key role as a thought leader and convener among service providers and intermediaries, and as an advocate for the manufacturing community. The activities of the first two project years demonstrate that the ecosystem is willing to come together to collaborate when there is agreement about the mutual benefit to those participating.

Sustainability

The MAP project is already showing the potential for sustaining some of the major activities of this work. Specifically, companies that find value in the AMT consulting and the cybersecurity assessments will pay fees for consulting services received directly from the DVIRC or from an objective third party. This proposition will be tested more fully in Phase 3 as companies that are receiving assessments determine which steps to take to address issues identified in the assessments.

Educational institutions are finding that the opportunity to offer a continuum of learning experiences for their students can distinguish them from their peers in a competitive educational marketplace for students. Further development and discovery of particular content, delivery models, and pricing will occur in Phase 3, hopefully encouraging educators that these programs are worth maintaining over time. It is also likely that the deeper relationships with industry will also prove valuable, since educational institutions are increasingly seeing the need to engage in economic development and other outward-facing activities.

Finally, the project team anticipates exploring funding from state or local government for the physical hub once the A&E firm can develop specifications and associated costs. There is precedent for local government to invest in similar infrastructures, but the timing and level of those investments are yet to be determined.

The key to sustainability is the ecosystem's ability to continue to provide high-value programs, products, and services to a market that is already culturally predisposed to paying for value. The challenge now is to get this value-exchange to scale as rapidly as possible.