



# The Precision Manufacturing Regional Alliance

a cluster development initiative in Massachusetts' Pioneer Valley

## EXECUTIVE SUMMARY

**T**he Precision Manufacturing Regional Alliance (the Alliance) of Massachusetts' Pioneer Valley illustrates how a region can position its roots in a declining industry into strengths for new cluster growth.

This Policy and Impact Study is the fourth in a series of four developed as part of the U.S. Cluster Mapping Project, an initiative supported by the U.S. Economic Development Administration. The study offers an example of how an organization such as the Massachusetts Technology Collaborative (MassTech), through its Innovation Institute (the Innovation Institute), can leverage public funds to make strategic investments that enrich cluster performance. In turn, these improvements foster new public and private investments that can independently sustain the cluster and its supporting organizations.

## Manufacturing in the Pioneer Valley

Massachusetts' Pioneer Valley, located in the western part of the Commonwealth of Massachusetts (the Commonwealth), has deep foundations in manufacturing that include textiles, paper, electrical components, and precision machining. Many companies in the Pioneer Valley can trace their roots to the Springfield Armory, which pioneered the manufacturing process for machine-made interchangeable parts. As the more traditional manufacturing firms left the region for lower-cost areas, precision manufacturing companies survived by using previously built supply chains. Furthermore, they established relationships with the aerospace and defense industries to form a cluster that is critical to

the Massachusetts economy. Precision manufacturing is a key export-based cluster, as 90 percent of the markets for these firms are outside the region and 75 percent are located outside of Massachusetts. It is also a growing cluster, employing approximately 8,000 people in the Pioneer Valley and 55,000 people in Massachusetts despite national downward trends in manufacturing.

The companies that comprise the precision manufacturing cluster are engaged in highly engineered, high-tech precision manufacturing for major companies both domestically and internationally. Their work calls for high performance in areas such as machine geometry and control, motion control, thermal and environmental control, tooling selection and application, machining strategy, and real-time performance monitoring and correction. With computerized processes, compact equipment, and cleaner technology, these manufacturing companies are dramatically different from the smokestack factories of the past.

## Precision Manufacturing Cluster Challenges

Historically, aerospace and defense-related contracts dominated the customer base for Pioneer Valley firms. However, in recent years, this base has diversified to include sectors such as medical devices, transportation, and energy. As technology develops and new product types are required, companies in the region need to remain agile and respond swiftly to new markets. To do so, their workforce has to be continually trained and retrained to meet the evolving demands of the market.

Unfortunately, despite the need for new skilled workers, the precision manufacturing sector was seen as being in the same downward spiral as the manufacturers in textile, paper, and electrical components that had fled to lower-cost regions. This perception made it extremely difficult for precision manufacturing companies to attract new workers on their own or through traditional workforce development programs. The challenge of attracting, developing, and retaining skilled workers poses an ongoing problem for firms in this cluster. As a result, companies have resorted to hiring workers from their competitors to meet production demands, which is not sustainable in the long term.

## The Role of the Innovation Institute

The Innovation Institute, the innovation-based economic development arm of MassTech, has been active in the Pioneer Valley since 2005, addressing workforce challenges and supporting cluster development in the area's precision manufacturing cluster. Its work in this arena exemplifies a distinctive approach to cluster development that has come to be recognized within the region and across the Commonwealth as a best practice for promoting the competitiveness and supporting the growth of a key regional cluster.

This approach is guided by two basic principles: (1) innovation is a key driver of cluster and company competitiveness, and (2) innovation is an inherently social process. At its highest level, the Innovation

Institute aims to engage cluster leadership and stakeholders in projects that can enhance cluster competitiveness through innovation.

Providing both financial and nonfinancial assistance, the Innovation Institute supports initiatives that can nurture a favorable environment for attracting, establishing, and expanding technology-intensive businesses. Before engaging in or funding any project, the Innovation Institute considers three essential questions: (1) Is there a clearly identified unmet need that, if addressed, will positively impact cluster competitiveness?; (2) Will the activities to be supported by the grant result in outcomes that influence cluster competitiveness?; and (3) Are the principals from the industry at the table and actively engaged in the project?

The Alliance is a collaboration among several organizations within the Pioneer Valley precision manufacturing cluster, including the Regional Employment Board of Hampden County, Inc. (REBHC), Western Massachusetts Chapter of the National Tooling and Machining Association (the WMNTMA), University of Massachusetts Amherst (UMass Amherst), Springfield Technical Community College (STCC), Holyoke Community College, Economic Development Council of Western Massachusetts (the EDCWM), and several vocational technical high schools. The Innovation Institute provided funding to the Alliance through two grants: a \$150,000 Regional Priority Grant for the REgional NEtWorks Project (RENEW), and a separate \$500,000 Project Award Grant for the Precision Manufacturing Regional Alliance Project (PMRAP). Both grants were made with public funds provided to the Innovation Institute by the Commonwealth. Through RENEW and PMRAP, the Alliance has addressed critical workforce issues, emerging marketplace demands, innovation opportunities to improve competitiveness, and opportunities to enter new markets. More important, these projects have created a collaborative framework within which company executives, academic partners, and the public sector can develop shared understandings. An independent program evaluation from Mt. Auburn Associates concluded: "The Innovation Institute's grant awards were . . . strategically important because: (1) they leveraged other investment; and (2) they helped lay the groundwork for a new set of relationships between the industry and the educational and training community."

## Outcomes and Indicators of Success

Outcomes from RENEW and PMRAP have been substantial. Estimated gross sales for companies that were part of these projects grew to \$243 million in 2009, an increase of 125 percent from 2005. Membership in the WMNTMA also grew by 50 percent between 2005 and 2009, and is one of only two chapters of the National Tooling and Machining Association that is growing. A stream of graduates from regional vocational education schools enabled these companies to add over 400 employees during those five years, in spite of the recession. The relationships between these companies and vocational education schools have expanded even in the absence of further financial support from the

Innovation Institute, largely based on the mutual understandings that were developed through the projects. New certificate programs have been instituted, and further connections with UMass Amherst also have been made to help interest a new generation of students in the field. Most important, the cluster and its supporting organizations have been able to leverage the initial Innovation Institute funds into hundreds of thousands of additional funding dollars from public and private entities.

Another measure of success in this cluster initiative can be found in the significant contribution it made toward changing the public perception of the viability of manufacturing in Massachusetts. Policymakers have watched with increasing interest as a collaborative framework has taken hold in precision manufacturing in the Pioneer Valley, just as it has in the life sciences and technology sectors. RENEW, PMRAP, and the intermediary role of the Innovation Institute figure prominently as seminal and prescient initiatives that expanded this university-industry-government dialogue.

## Lessons Learned

There are a number of transferrable lessons from RENEW and PMRAP for organizations looking to identify and champion successful, self-sustaining cluster programs.

1. **Engaging stakeholders from the cluster, not just from the region, are important for encouraging cluster growth.** Proposals with the biggest potential impact are those with cluster principals who are directly involved and committed to achieving outcomes that create strong value within the cluster.
2. **Successful grants are responsive to the specific needs identified by the cluster.** Regional assets and leadership that can support cluster growth should be identified on the basis of whether they can be supportive of the specific needs identified by the cluster.
3. **Fund-granting organizations can act as a catalyst for cluster growth in nonmonetary ways.** In RENEW, the Innovation Institute managed discord among stakeholders representing the cluster and those representing the region by bridging needs defined by the cluster and existing services that could be adapted or realigned to meet those needs.
4. **Grant programs should allow for flexibility as understandings of the cluster's needs evolve.** RENEW was initiated with a specific focus on building the talent pipeline, but the Regional Priority Grant Program also was able to adapt to a variety of unmet needs identified over time.
5. **Fund-granting organizations can collaborate with the cluster to develop stronger proposals that lay the groundwork for cluster growth.** Many cluster organizations are informal or thinly staffed. In those cases, the Innovation Institute often engages its own research and analysis capabilities to complement those of the cluster organization and shape an effective proposal.

6. **Staged investments can lead to a successful cluster while managing risk to the granting organization.** The Innovation Institute has employed this technique by creating smaller Regional Priority Grants that are developed consultatively. After the Regional Priority Grants demonstrate a proof-of-concept, larger project awards are granted based on a strict, competitive basis.
7. **Grant programs should require the cluster to address sustainability after funds are no longer available.** The Innovation Institute is willing to underwrite the risk associated with piloting new approaches to cluster and regional growth, but the outcomes of the projects must demonstrate sufficient value and allow stakeholders to perceive a path to sustainability. Often, the strong working relationships that are created among key stakeholders form the basis for true sustainability.

## Conclusion

Policymakers and practitioners can learn from the Innovation Institute's experiences as a fund-granting organization and as a more traditional institution for collaboration. Through RENEW and PMRAP, the Innovation Institute demonstrated its approach to achieving sustainable change in cluster trajectories. By carefully selecting programs that focused on specific cluster needs, granting staged monetary investments, and providing a bridge between different stakeholders, the Innovation Institute helped the precision manufacturing cluster in Massachusetts' Pioneer Valley grow and become self-sustaining. This example can be useful to other regions, but each location needs to devise the right competitiveness strategy to leverage its own mix of industry clusters and business environment conditions and, in turn, increase business growth and productivity.

<sup>i</sup> "The Precision Manufacturing Regional Alliance" was prepared for the Innovation Institute by Robert Kispert, Director of Cluster Development and Dr. Carlos Martínez-Vela, Former Director of Innovation Policy. The full report can be found at <http://www.clustermapping.us/resources/regional-and-cluster-studies/lessons-learned-policy-and-impact-studies>.

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**THE INNOVATION INSTITUTE**  
at the MassTech Collaborative

100 WASHINGTON STREET, SUITE 200, BOSTON, MA 02108



**INSTITUTE FOR STRATEGY  
AND COMPETITIVENESS**

100 WASHINGTON STREET, SUITE 200, BOSTON, MA 02108

**EDA**  
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

