



Battelle Technology Partnership Practice Cluster Analysis 2014 -

“Re-examining Maine’s Economic Position, Innovation Ecosystem and Prospects for Growth in its Technology-Intensive Industry Clusters”

WHY:

-MTI’s statutory responsibility includes building the ecosystem to support companies in technology-intensive industries – “The institute, through a public and private partnership, shall encourage, promote, stimulate and support research and development activity leading to the commercialization of new products and services in the State's technology-intensive industrial sectors to enhance the competitive position of those sectors and increase the likelihood that one or more of the sectors will support clusters of industrial activity and to create new jobs for Maine people. The institute is one element of the State's economic development strategy and will contribute to the long-term development of a statewide research, development and product deployment infrastructure.”

-The work of supporting clusters has important implications for MTI’s work supporting individual companies commercializing technology-based products and services as **the success of a cluster can only be determined by the success of the companies within the cluster.**

-The emergence of the knowledge-based economy means technological advancements, innovation and specialized skills are pronounced factors for economic growth across both emerging and mature industries.

-2008 Colgan Cluster Study uses 2005 data. Given 2008 Great Recession and its effect on the Maine and national economy, the analysis needed to be updated. MTI’s strategy with this study is also to look forward, and not just backward, in the analysis.

DEFINITIONS:

Cluster: A technology cluster is a grouping of industries that typically share common supply chains, markets and technology competencies or knowledge. Clusters are grouped around technology-related industry drivers and provide a state its unique competitive advantages.

“Technology areas” or sectors (within MTI’s statute): broad areas that cut across industries reflecting where Maine is positioned to generate economic gains from deployment or development of technologies.

“Economic base industries” – technology clusters that produce goods or services that generate **new income flowing into the state**- either by being exported outside of the state or substituting for imports to the state.

“Sheltered or local serving industries” – primarily serve the needs of the local population and business community. These industries may use advanced knowledge and technologies, but depend on the economic base industries to drive available incomes to support their goods or services and **circulate the same dollars within the state.**

APPROACH & METHODOLOGY:

Study's focus is on **economic base industry** technology clusters – where is Maine generating new income flowing into the State.

Methodology for identifying key clusters:

1. Analysis of all economic base industries in Maine aligned with the broad targeted technology areas with focus on understanding supply-chain inter-relationships and shared markets
 - a. analysis of most detailed industry levels (6-digit NAICS) based on size, relative concentration/specialization, and recent trends against regional and national performance.
 - b. research on activities of leading firms in specific economic base industries – corporate data bases, company websites, phone interviews
 - c. analysis of supply chain relationships using the IMPLAN input/output model for Maine to understand key inter-relationships
2. Analysis of core technology competencies
 - a. patent applications and awards
 - b. SBIR and venture capital funding across the patent innovation themes

Criteria for analyzing performance of key clusters:

- Concentration of cluster relative to nation
- Job generation
- Growth of cluster relative to nation
- Productivity
- Average wages
- Economic multiplier
- Projected national growth
- Position in New England regional economy

Methodology for determining growth opportunities within identified clusters:

Step 1. Identified detailed product/service markets in which Maine has a strong or growing presence and are economic drivers

Step 2. Assessed how these detailed product/service markets' drivers align with technology competencies or assets found in Maine

Step 3. Surveyed market research studies at the detailed industry and project level to identify market growth potential and critical technology and market advances required.

Methodology for assessing ecosystem supporting technology clusters:

- Examined three key functional areas involved in technology development
 - o Research & Development – basic and applied research through to technology transfer
 - o Commercialization/Market Entry – product development, new business formation, and access to capital
 - o Growth/scalability – range of issues for growing, retaining and attracting technology companies
- Sources for examination included
 - o Available databases of Maine activity

- Detailed interviews with over 20 stakeholder groups and individuals
- Results from DECD survey of companies receiving Development Loans from MTI

RESULTS

1. Identification of thirteen technology clusters, grouped into eight well-performing clusters and five mixed-performing clusters:

Well-performing Clusters

Agriculture, Aquaculture, fisheries and food production

Alternative Energy & Turbines

Biopharmaceuticals

Boatbuilding and related industries

Engineering & other Scientific/Technical Services

Environmental Services

Finance & Business Support Services

Forestry

Mixed-performing Clusters

Defense

Electronics & Semiconductors

Information Technology Services

Materials for Textiles, Apparel, Leather and Footwear

Medical Devices

2. Identification of detailed product/service market growth opportunities within these 13 clusters

Aquaculture

Electronic components

Engineering Services

Enterprise and data hosting services

Financial transaction processing and telemarketing

Functional foods

Molecular-based diagnostics and genomics

Remediation and environmental consulting

Turbines for energy production

Wireless sensor networks

3. Innovation Ecosystem Assessment Findings

- University and industry levels of R&D are well below national average but are growing. University growth rate outpaces national average.
- New business start-up levels higher than other New England states but below national average, level high-growth small businesses lower than other New England states
- Formal venture capital funding in Maine has increased since 2007, while it has declined nationally, but level well below other New England states and national average
- Maine also lagging in federal SBIR awards to innovative small businesses
- Maine has recorded strong growth in high-skilled occupations but high-skilled talent specializations are still limited
- Maine's general business tax climate falls in middle range for the U.S. and New England
- Broadband technology infrastructure, adoption and download speeds of broadband, is at about national average but lags other New England states.

RECOMMENDATIONS/IMPLICATIONS FOR MTI'S WORK

1. Understanding specific technology clusters, rather than simply broadly targeted technology areas (sectors), offers insights into industries driving Maine's economy and growth opportunities.
2. Raising productivity is a critical challenge for nearly all of Maine's technology clusters and can lead to higher wages, which can help address the Maine's average wages, which are significantly lower than regional and national averages.
3. Technology cluster development needs to continue to find the right balance between defined measurable projects to realize growth opportunities and broader outreach, increased innovation, and networking to create a more closely knit and collaborative business environment.
4. Regional context matters, and regional approaches may be needed to address the most difficult ecosystem challenges like financing and talent development.
5. Emerging companies' inability to scale is a critical gap in Maine's innovation ecosystem that must be addressed.

- a. Access to capital – particularly later stage venture capital (\$750,000 to \$5 million) and expansion capital for equipment
- b. Finding the right workers – specific skills and experience
- c. Reaching markets