

Advanced to
Advantageous:
The Case for New
England's
Manufacturing
Revolution

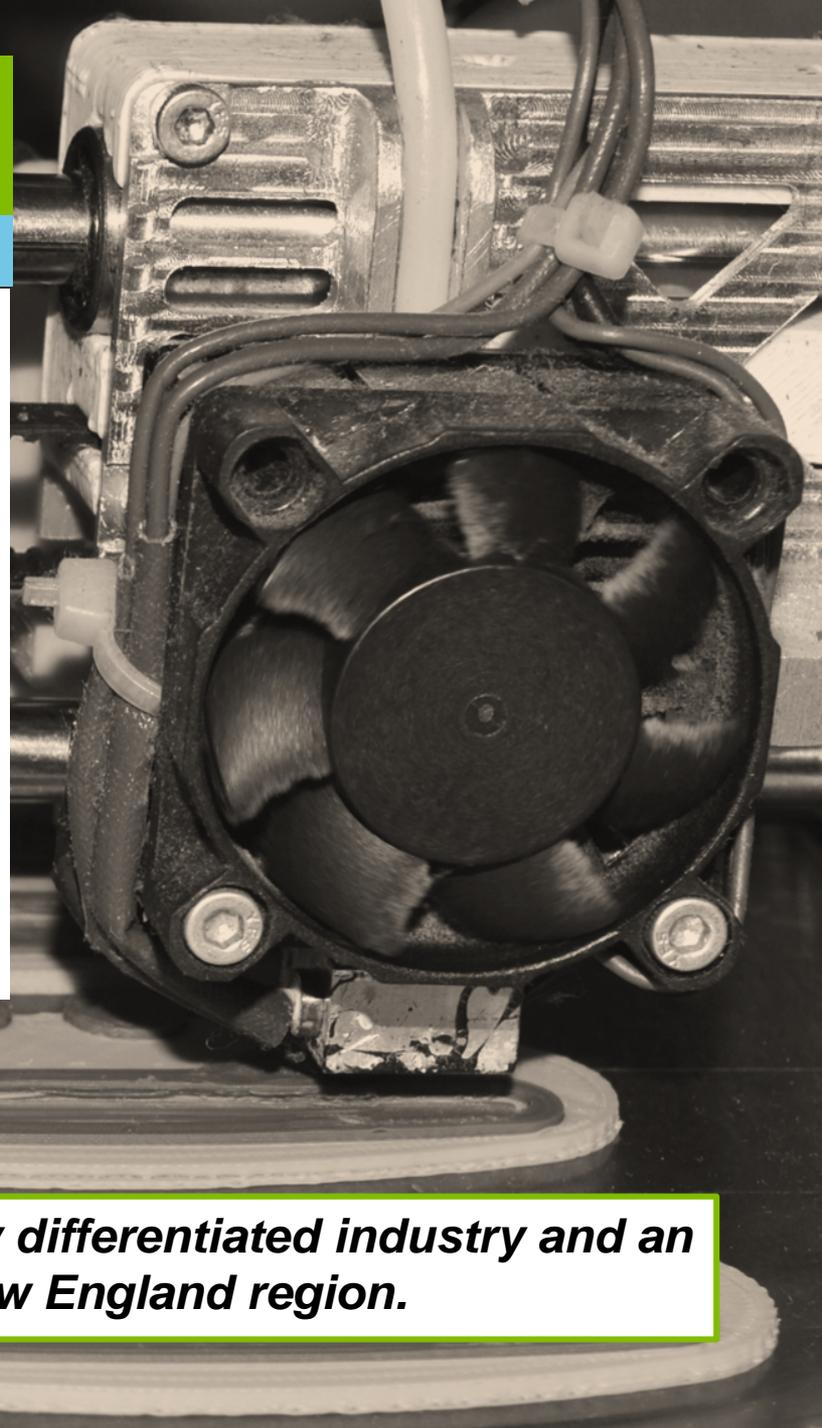
June 9, 2015



Understanding advanced manufacturing in New England

Key Topics:

- Advanced manufacturing combines innovative design with advanced materials, advanced manufacturing technology, and superior management methods.
- The perception of manufacturing as dirty, dark, dangerous, and declining is rooted in prior centuries – today the industry is increasingly advanced, advantaged, added-value and accelerating.
- Advanced manufacturing is impactful in New England, bringing jobs, foreign investment, and sustained economic growth to the region.

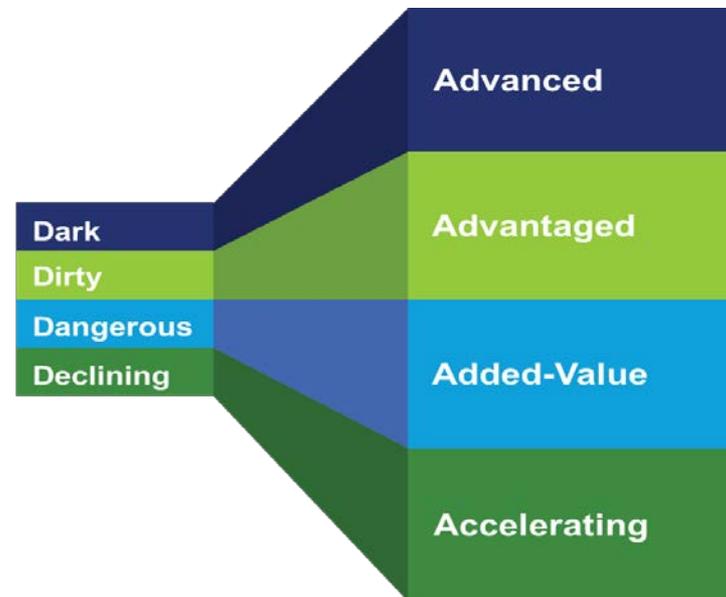


Advanced manufacturing is a competitively differentiated industry and an economic generator for the New England region.

Advanced manufacturing:

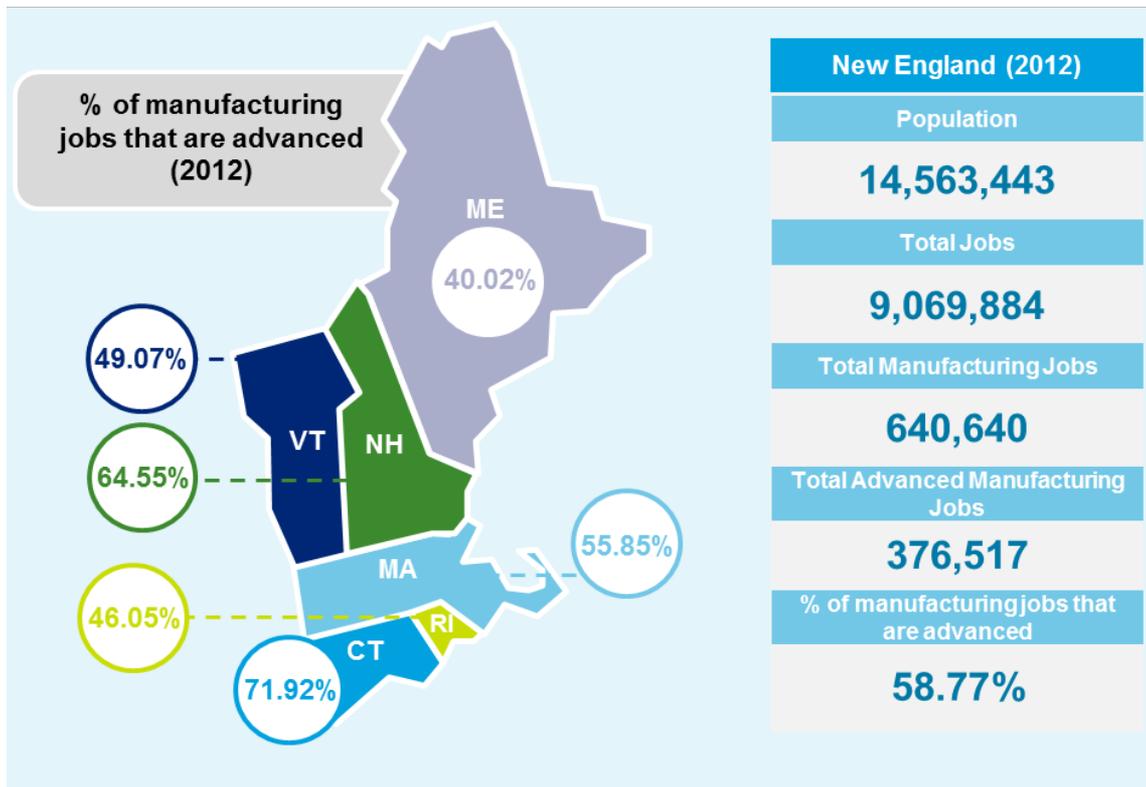
- Combines **innovative design** with **advanced materials**, advanced manufacturing **technology**, and **superior management** methods.
- Is **defined by how competitive advantage is gained** and not about what is being produced.
- Is growing – advanced manufacturing **added 16,000 jobs per month** nationwide in 2014, and **companies are reshoring jobs from abroad** to take advantage of regional innovation clusters and high-caliber domestic talent.

Advanced manufacturing is taking the old notion of manufacturing and transforming the industry into an emerging economic powerhouse



Advanced manufacturing is significant in New England

Advanced manufacturing constitutes a sizeable portion of New England's economy, representing more than half of the jobs in the manufacturing sector.



Source: Bureau of Economic Analysis (2012); U.S. Census Bureau; Deloitte Analysis

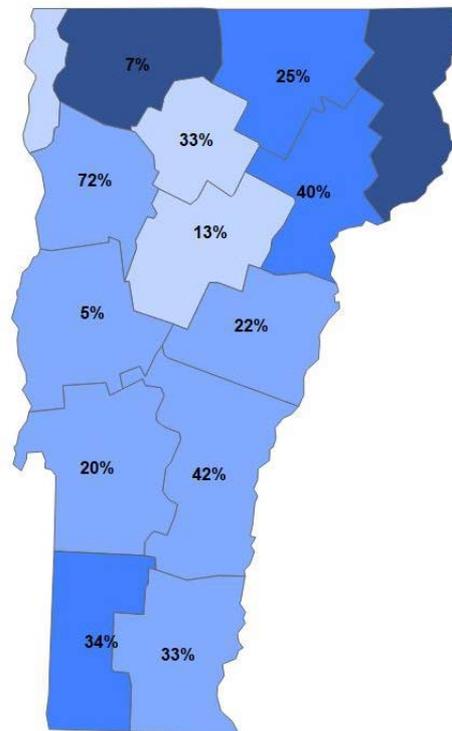
- Median wages for advanced manufacturing jobs averages \$70-80K per year
- Demand for workers in advanced manufacturing significantly exceeds supply
- In New England, if it's manufacturing, it's most likely *advanced manufacturing*

Advanced manufacturing is significant in Vermont

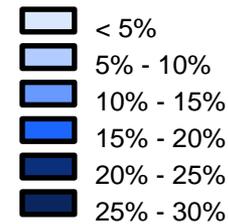
Within New England, Vermont is an integral partner in the regional advanced manufacturing ecosystem.

	New England	VT
GDP (billions)	\$874.2	\$28.4
Manufacturing GDP (billions)	\$92.1	\$3.2
Advanced Mfg. GDP (billions)	\$62.6	\$1.9
Total Population	14,562,704	626,011
Total Jobs	9,069,884	422,004
Total Mfg. Jobs	640,640	35,573
Total Advanced Mfg. Jobs	376,517	17,456

Percentage of Manufacturing Jobs that are classified as Advanced by County



Percentage of Private County Jobs in the Manufacturing Sector

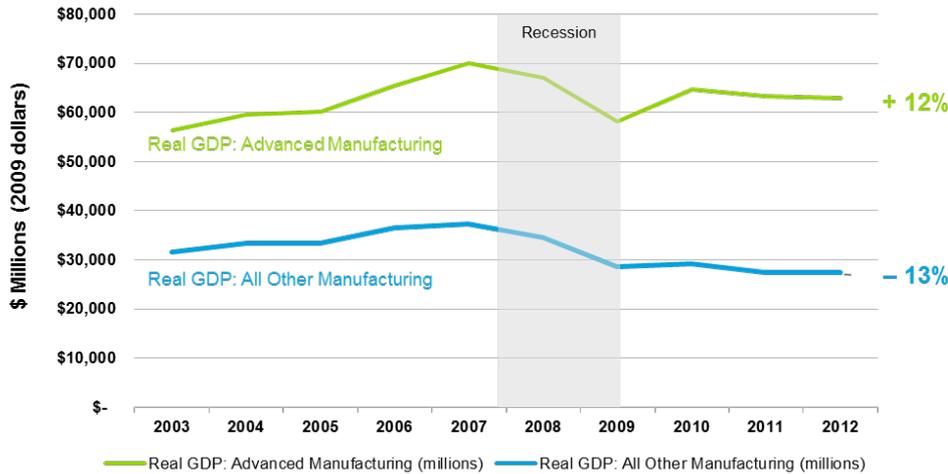


Note: Data not available for advanced classification in Essex County and Grand Isle County.

Advanced manufacturing promotes economic growth

New England Manufacturing Growth Trends

Real GDP Over Time of Advanced Manufacturing in New England



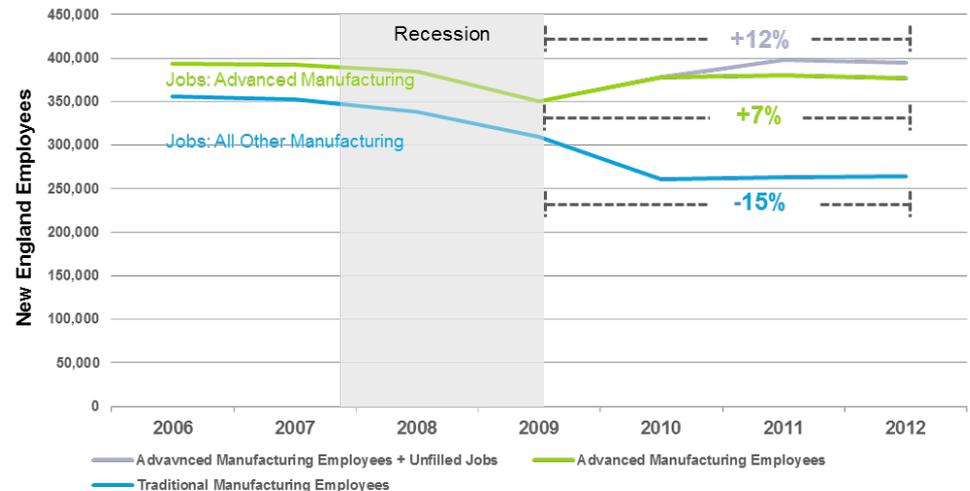
Advanced manufacturing as an industry has recovered quickly since the Great Recession, driving regional output (real GDP) at a level twice that of traditional manufacturing.

Advanced manufacturing is a growth industry, with labor demand well outpacing labor supply. In recent years, an excess demand of over 18,000 advanced manufacturing job vacancies has arisen across New England.

Sources: Skills Gap Report, Deloitte Consulting LLP; Bureau of Economic Analysis, Deloitte Analysis

New England Manufacturing Employment Trends

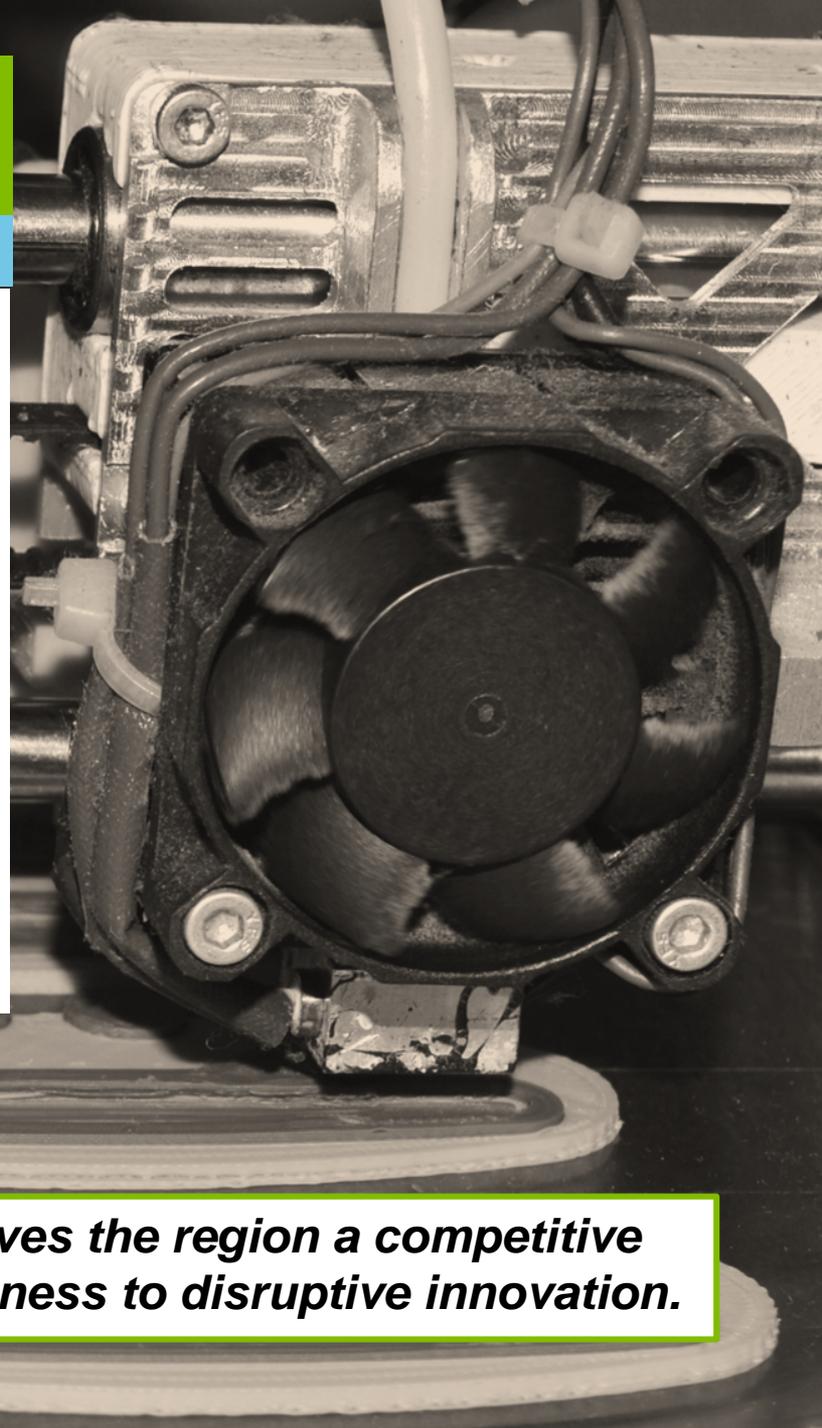
Year-over-Year Employee Count Change



New England's competitive advantage in advanced manufacturing

Key Topics:

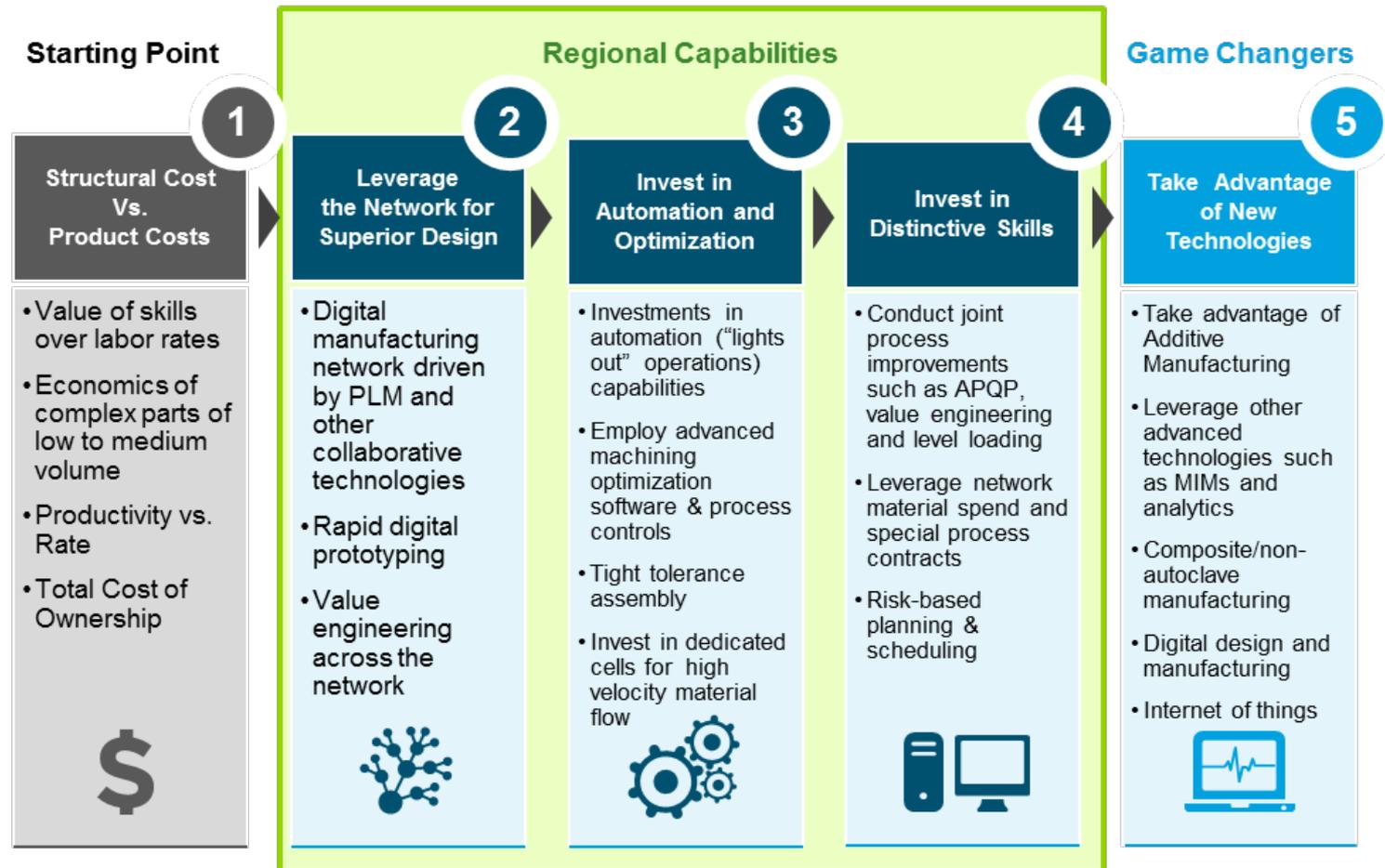
- Although historically considered a high cost region, the emerging economics of production (which favor innovation and co-location) give New England a competitive advantage.
- New England's strong industry clusters are overlaid with differentiated capabilities in software/AI, sensors and automation, and advanced materials, providing further advantage
- Disruptive technologies such as additive manufacturing, digital design, and the Internet of Things will serve as “game changers” to the advanced manufacturing landscape.



New England's strong network cluster gives the region a competitive advantage in terms of cost and responsiveness to disruptive innovation.

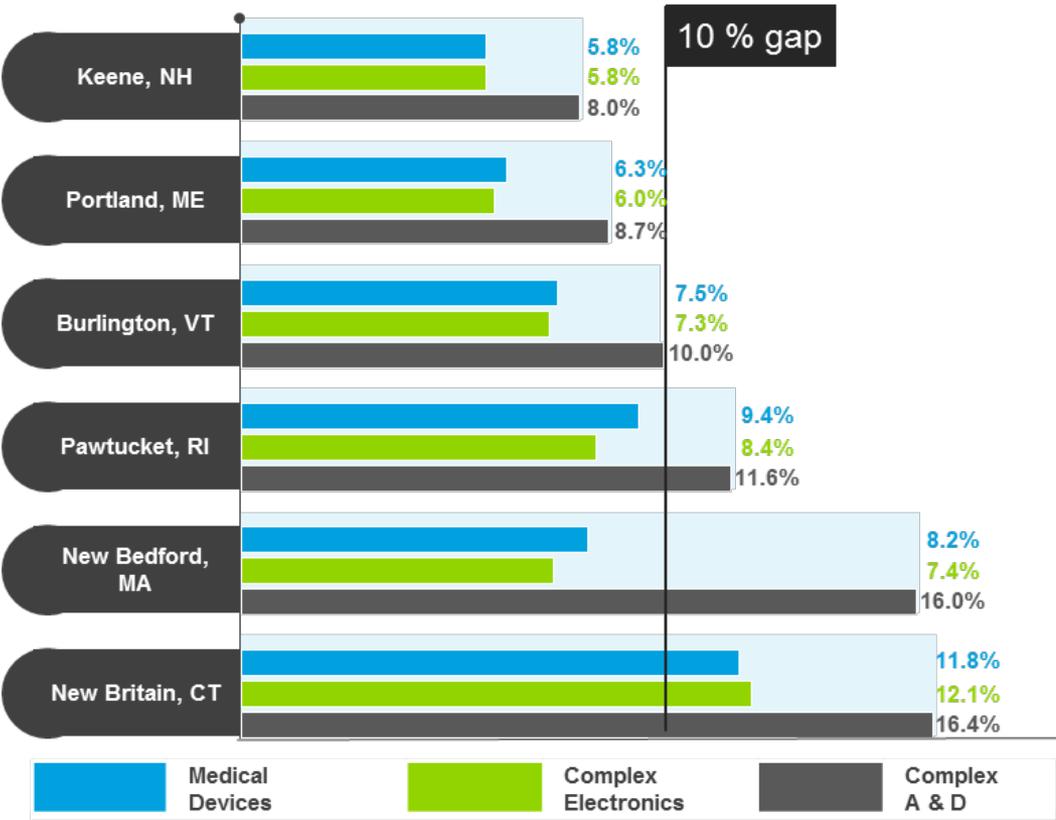
Emerging economics favor New England

The new economics of machining, which are focused on skills and innovation versus labor rates, yield a competitive advantage to densely networked, high-talent regions such as New England.



Emerging economics “closes the gap” between New England and lower cost geographies

Closing the Cost Gap



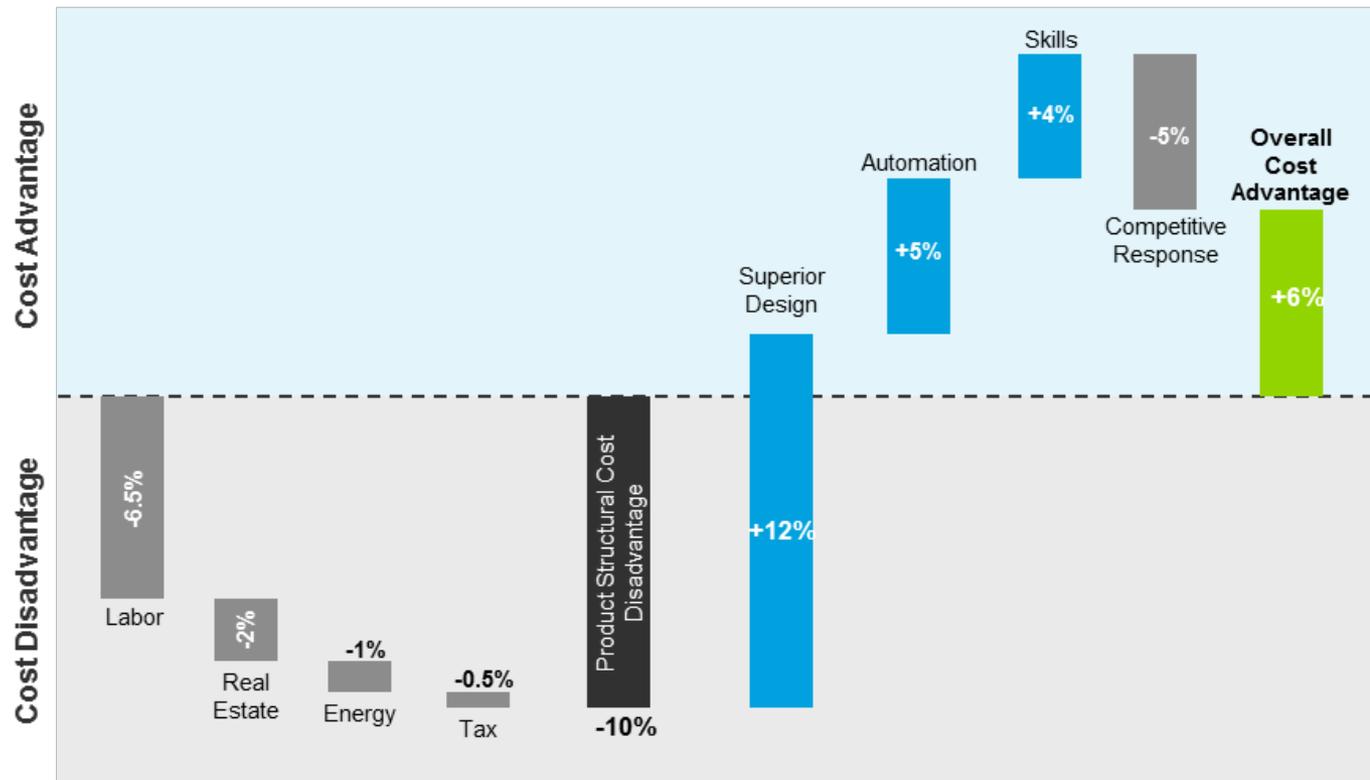
Compared to a low cost county in the South, New England would seem a comparatively high cost region for advanced manufacturers;

However, for certain sectors of the industry, there is a competitive cost gap of only 5-10% – a gap that can be closed through advanced methods and network cluster advantages.

Source: Deloitte Real Estate and Labor Database, Deloitte analysis

Traditional cost disadvantages can be overcome

Coupled with the proximity to suppliers, customers, and access to innovation hubs prevalent in New England, the emerging economics of production provide an overall cost advantage that largely offsets the region's historically high costs of doing business.



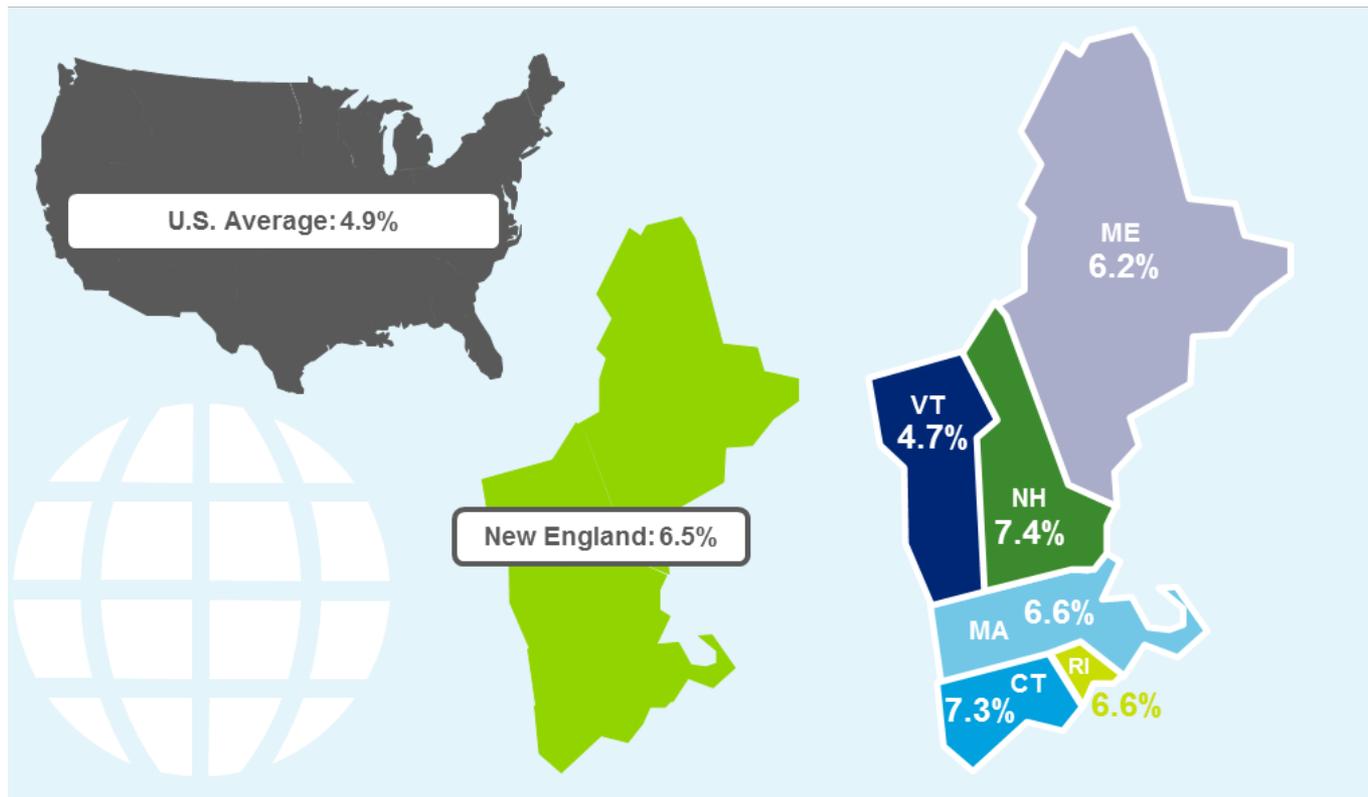
Note: Normally, 70% of product cost results from initial design. Value engineering practices range from 25% during the design cycle and 10-15% cost down for current production products.

New England's network strengths attract foreign investment

Additional confirmation of New England's robust manufacturing economy can be seen in the high percent of jobs in the region related to foreign direct investment.

Foreign Investment Creates Jobs in Advanced Manufacturing

Percent of Jobs Resulting from Foreign Investment (2011)

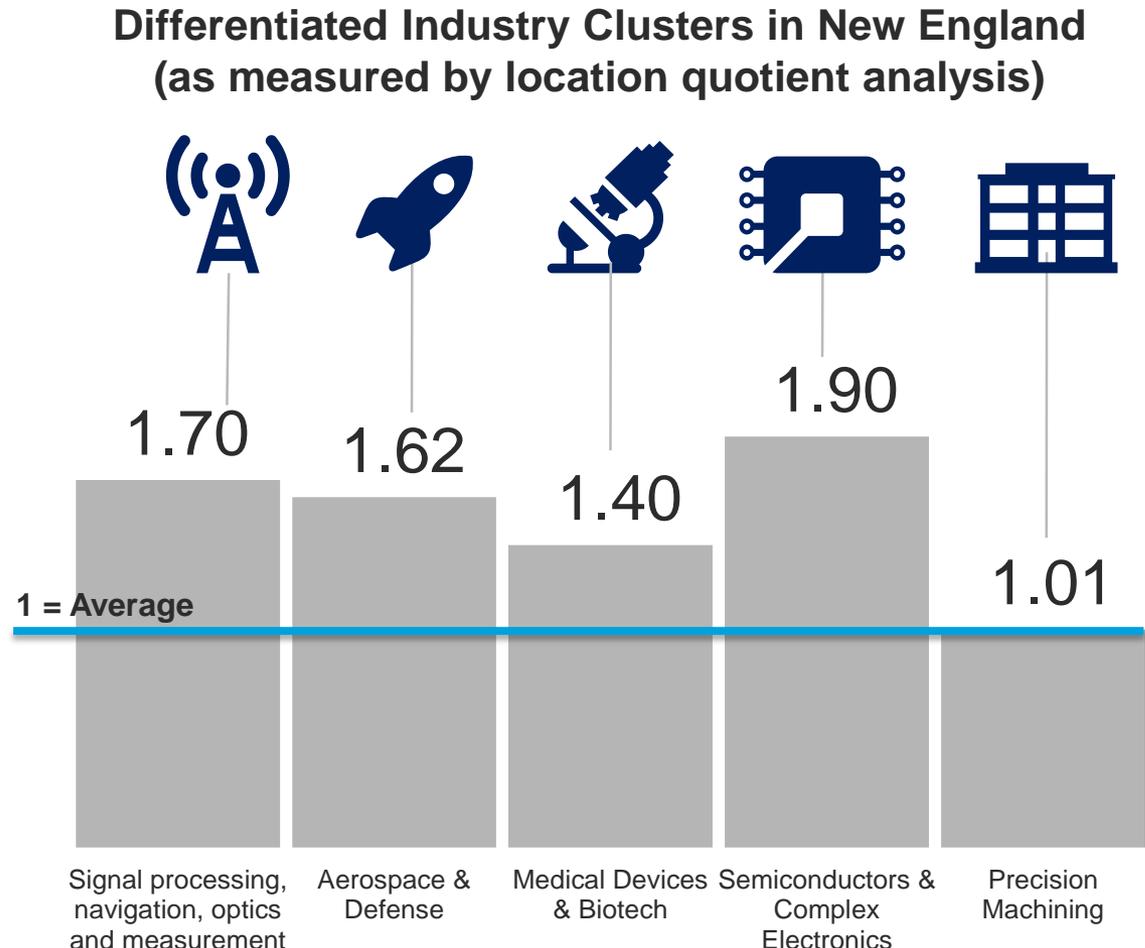


Source: U.S. Department of Commerce

Regional networks enable advantaged industry clusters

Integrated networks of firms, suppliers, customers and academic institutions combine to form a “cluster” where value is accelerated.

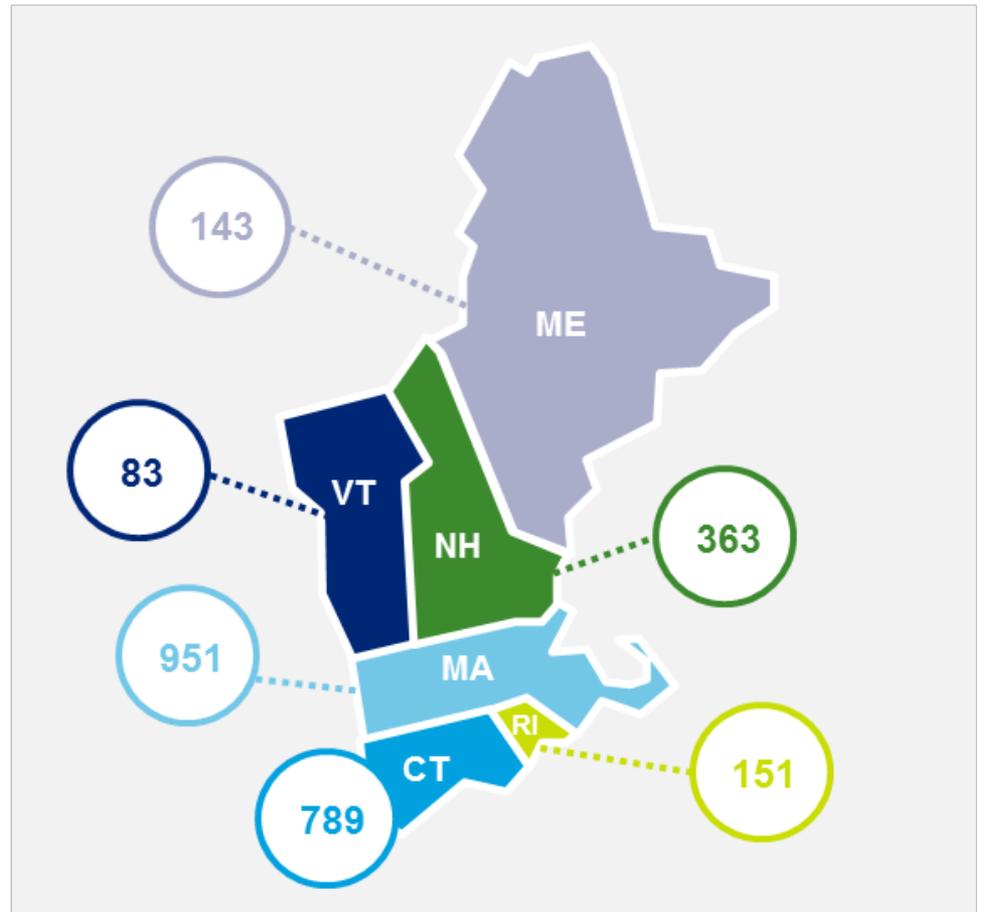
- Location quotients measure the economic competitiveness of an industry cluster relative to other geographies.
- A location quotient >1 means an industry is regionally advantaged relative to other areas.
- New England has a differentiated competitive advantage in five advanced manufacturing clusters.



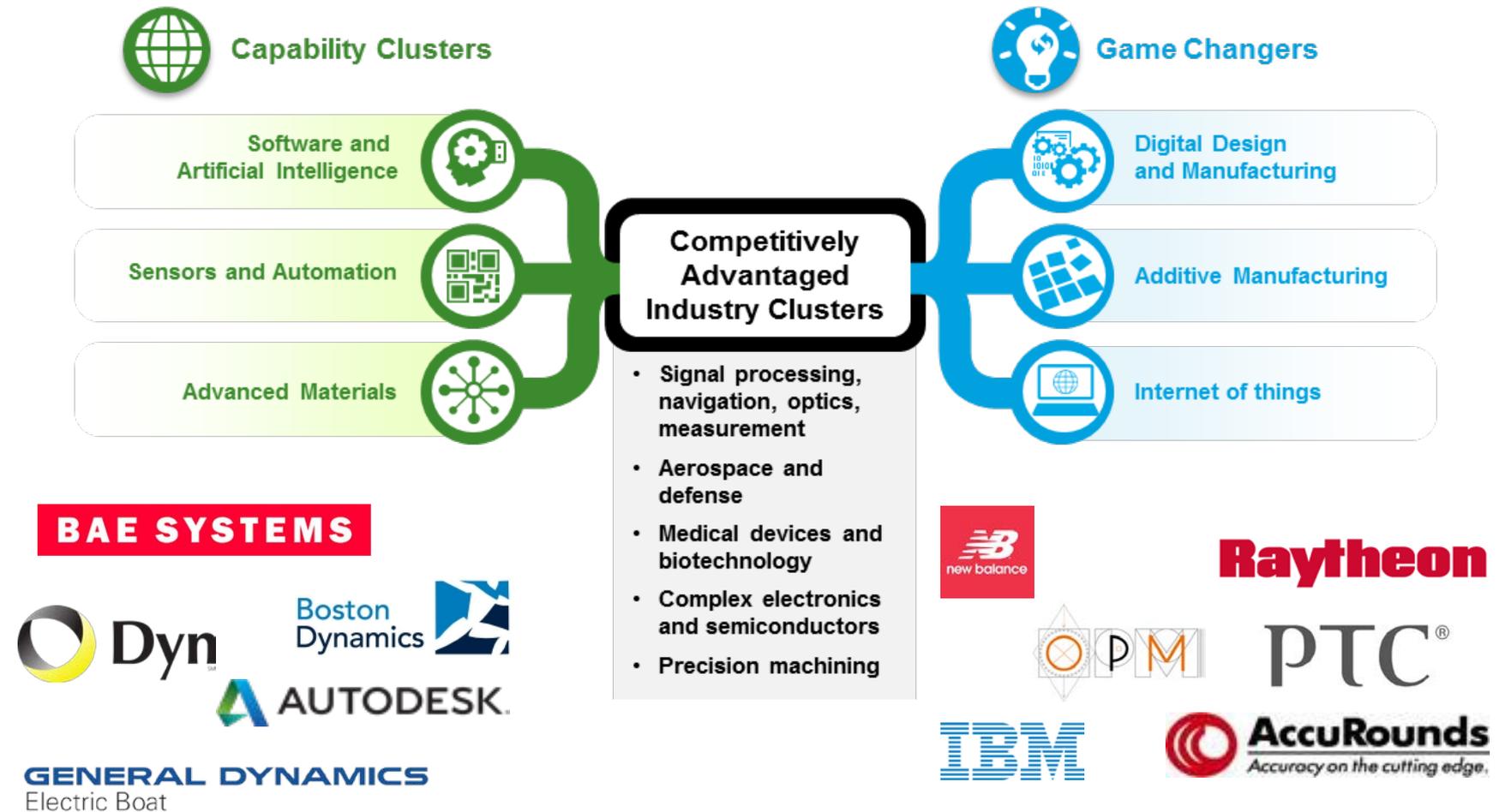
Precision machining is a lynchpin industry cluster within the region

- New England has historically been a stronghold for precision machining
- In recent years the industry has declined as a result of companies relocating to lower cost areas and a decreasing regional talent pipeline
- Machining is a critical component to the general health of the regional industry, as precision machined parts are frequently required as inputs for the finished products of other manufacturers

Precision Machining in New England Number of Precision Machine Shops per State



Clusters are enriched by regional capabilities and disruptive technologies

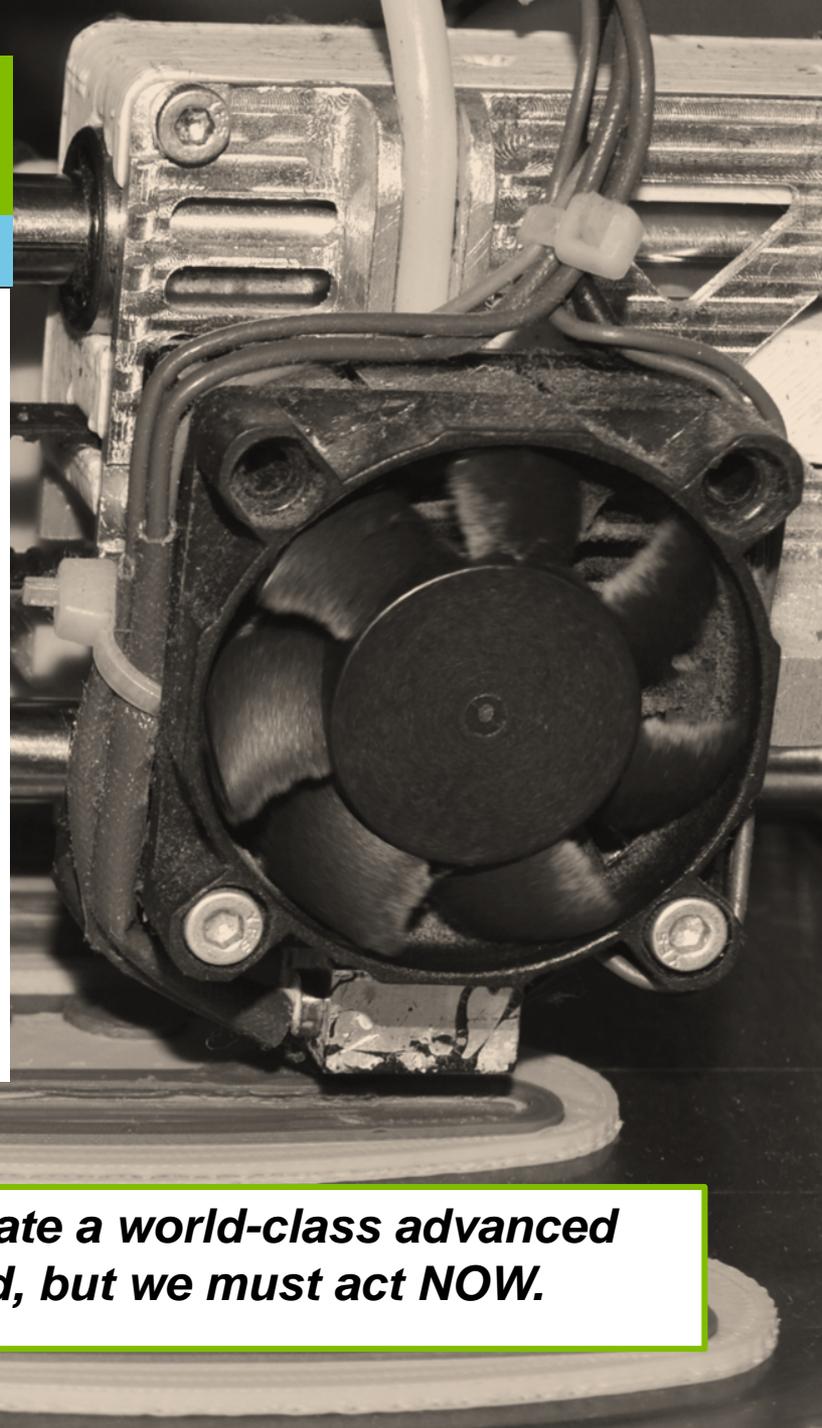


A call to action for New England

Key Topics:

- While advantaged, continued prosperity in advanced manufacturing cannot be taken for granted; significant challenges to growth persist
- While New England is known for education, there is a widening talent gap that threatens to deteriorate the region's network strengths
- Many "islands of excellence" exist across the current ecosystem, but lack the resources to coordinate, replicate and scale on a state or region-wide level
- A coordinated effort across a broad range of stakeholders is necessary to take full advantage of the opportunity to grow

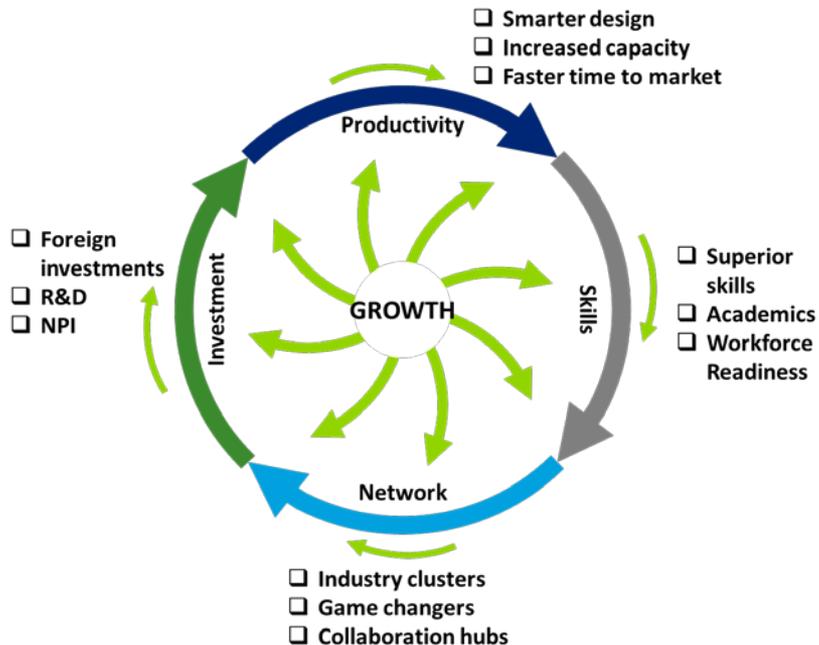
A compelling opportunity exists to cultivate a world-class advanced manufacturing cluster in New England, but we must act NOW.



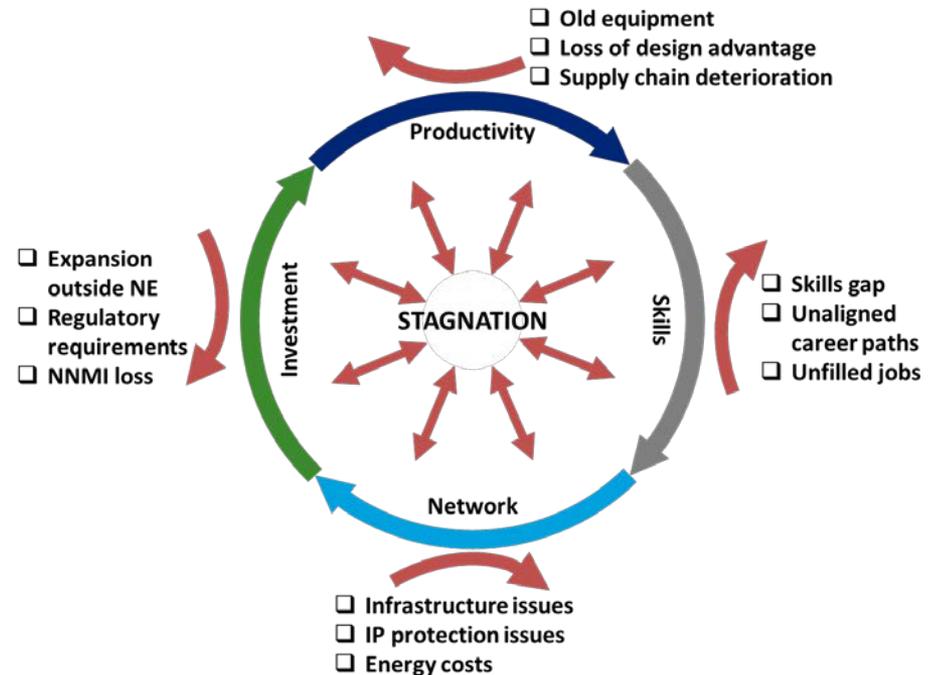
Industry challenges stall economic momentum

Challenges impacting the advanced manufacturing industry within New England and at a national level exert a downward pressure on an otherwise functioning economic engine, slowing growth.

Virtuous Growth Cycle of Advanced Manufacturing



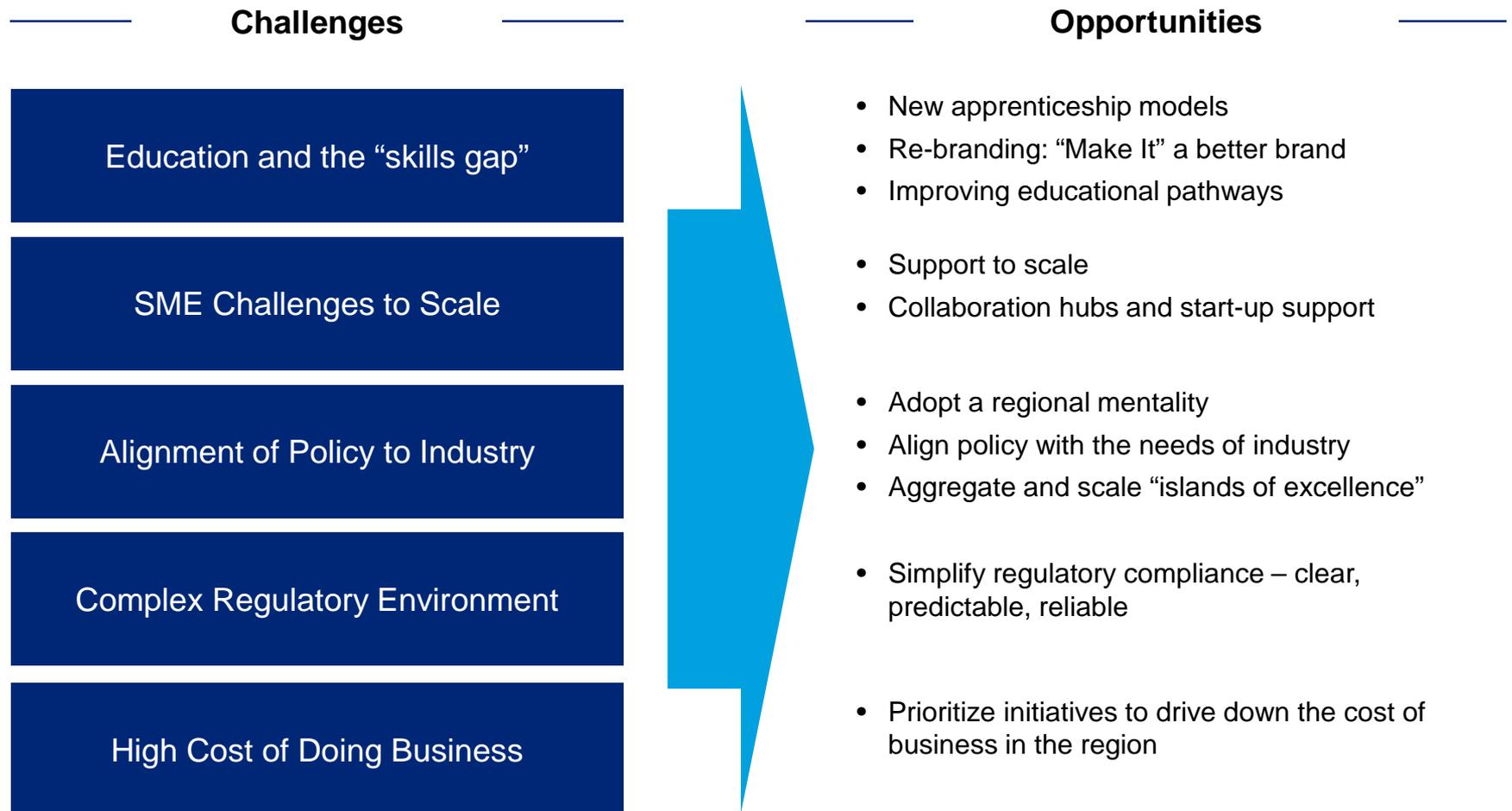
National Factors that Dampen the Manufacturing Cycle



Left unaddressed, the challenges give rise to market failures that are increasingly difficult to remedy over time.

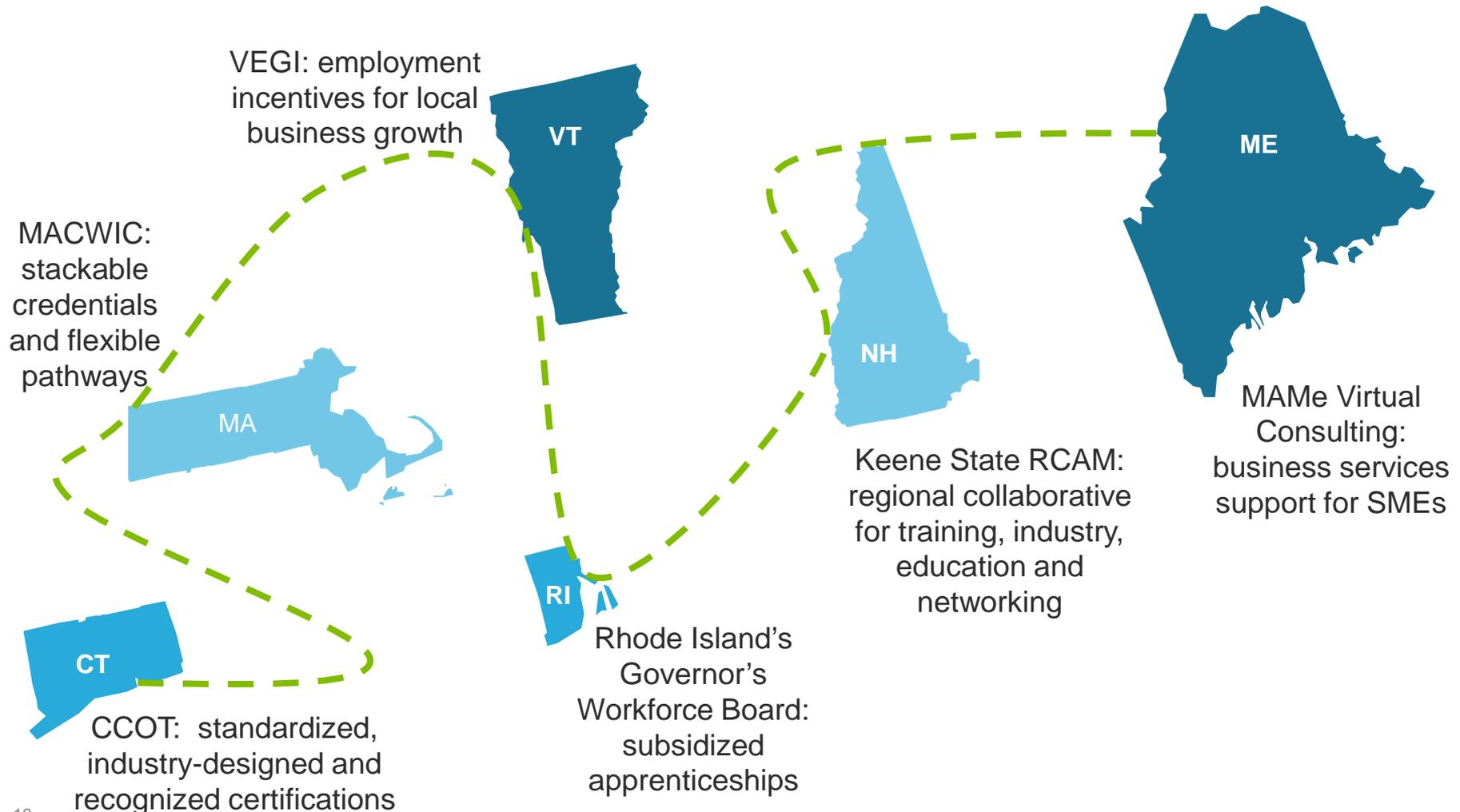
Challenges also embody opportunities for the region

Within the five key challenges identified exist underlying opportunities for growth:



“Islands of excellence” exist throughout the region

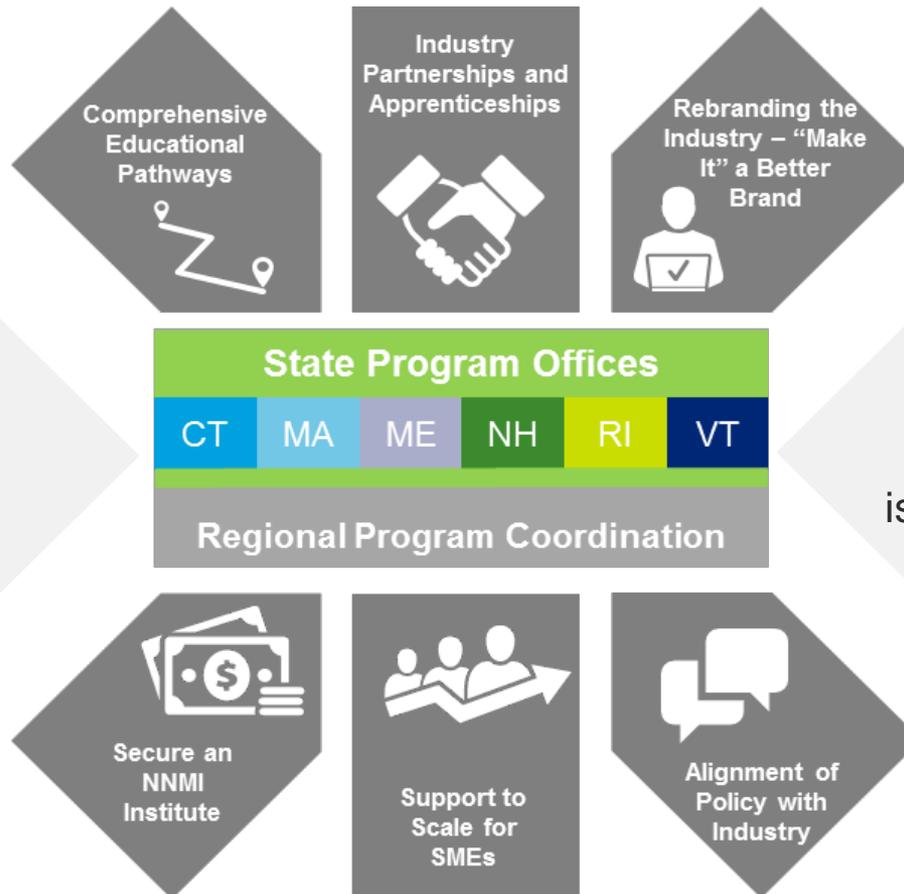
Many individual programs and initiatives exist across the region to respond to industry challenges, but issues of funding, scope, scale and outreach/awareness have prevented them from optimizing their impact to meet existing needs.



Recommendation: a systemic approach to change

The key to overcoming the challenges and turning them into opportunities is to employ a systemic, region-wide approach.

Six Key Recommendations

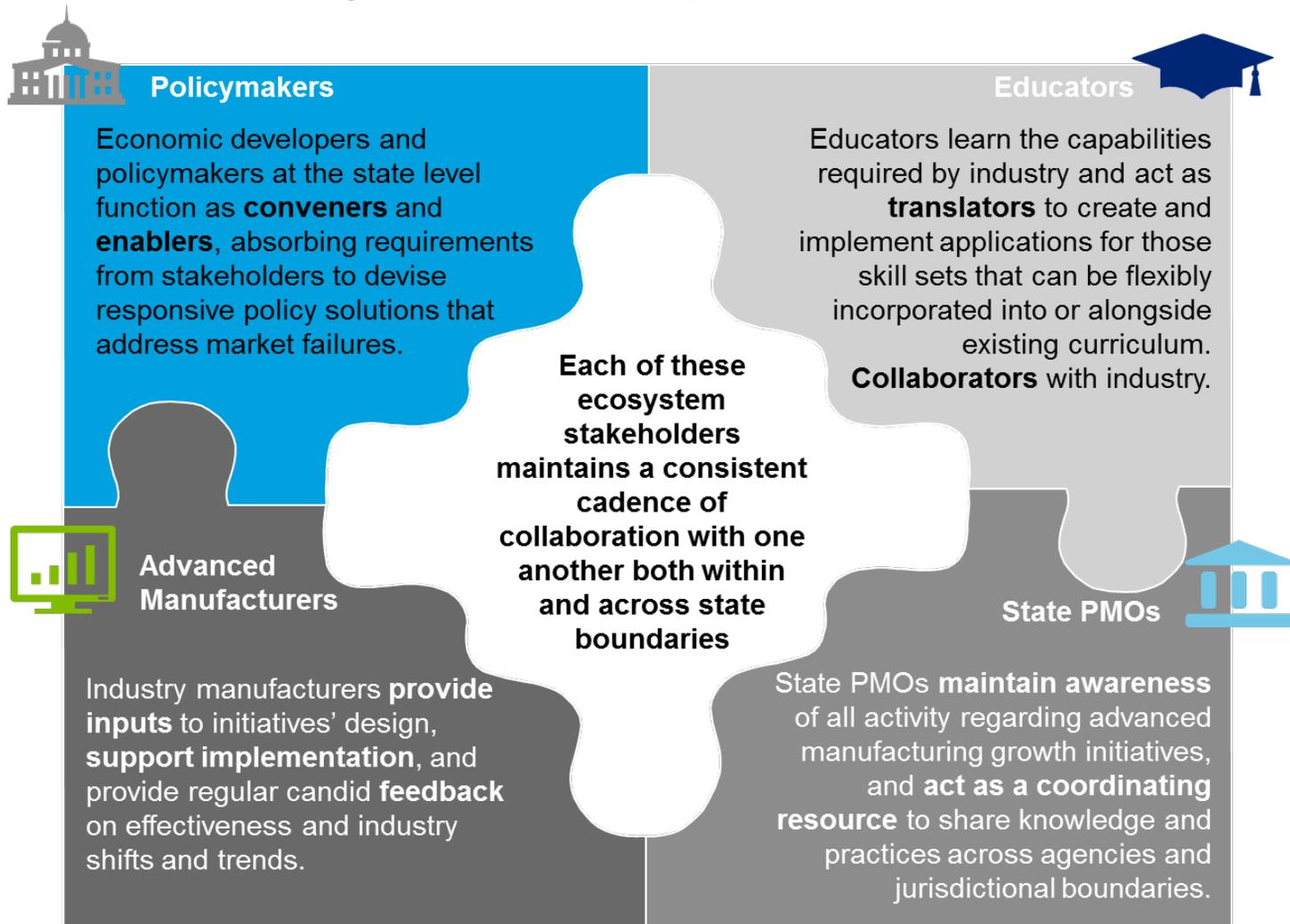


Each state addresses the recommendations individually, adapting and scaling initiatives as needed

Regional coordination connects states with resources and scales islands of excellence for regional benefit

Each group of stakeholders plays a key role

The key to affecting change at a systemic level is to develop a sustained model of collaboration and dialogue between ecosystem stakeholders.



Panel Discussion

For more information on *Advanced to Advantageous: The Case for New England's Manufacturing Revolution*, please visit:

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<http://newenglandcouncil.com/issues/advanced-manufacturing/>

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