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Research, Innovation, and Commercialization at the University of Maine

by James S. (Jake) Ward IV

The state of Maine endorsed and supported the growth and expansion of R&D beginning in 1998. As Evan Richert points out in his paper in this issue, educational attainment and R&D spending per worker correlate with per capita income (Richert 2014). Maine has made direct investments (R&D dollars/worker) into the University of Maine System through the Maine Economic Improvement Fund (MEIF) as well as periodic capital infrastructure investments through R&D bonds. However, are these investments positioned to help increase necessary industrial investments in R&D?

The legislature designated seven sectors for R&D investments. These sectors were a combination of traditional (strong presence in Maine) and new and emerging (low presence). The University of Maine undertook targeted efforts to support these legislatively designated technology sectors in Maine. The creation by statute of the Maine Economic Improvement Fund—an annual state appropriation to the University of Maine System—was not only dedicated to these seven sectors but also requires UMaine to

- leverage additional R&D funding from federal, state, and private sources
- partner and collaborate on applied research to solve Maine and the nation's problems
- commercialize and contribute to Maine's economy
- support workforce development

Since 1998, the university has created several centers to develop partnerships and collaborations with other researchers, institutions, and industries both in Maine and outside the state. The centers need to be responsive to existing industrial collaborations and needs while drawing attention to recent innovations. Richert (2014) states that industries that are traditionally strong in Maine spend significantly less on R&D

than the top R&D sectors throughout the nation, and sectors that nationally have high investments in R&D are less commonly found in Maine. For industries that spend little on R&D, UMaine centers often offer access to cutting-edge research and scientists. Companies already at the forefront of R&D in their fields can bring that expertise to UMaine researchers and students.

Since the establishment of the MEIF, the University of Maine has made tremendous progress on improving the innovation ecosystem and has used state R&D dollars to create the capacity and environment for industry to increase its R&D activity. The results reflect the university's increased capacity to generate innovations and support industry R&D (Table 1).

TABLE 1: University of Maine R&D, FY2005–2013

Number of UMaine FTE positions hired/ supported on MEIF-leveraged R&D funds	6,094 (avg. 677/yr)
Number of UMaine company contracts	2,867
Number of UMaine patents filed	132

Table 2 identifies University of Maine strengths relative to the seven state-identified sectors and their traditional or emerging status (for a more complete description of sector strengths and opportunities, visit umaine.edu/econdev). State investments at the University of Maine have led to world-class facilities and significant innovation opportunities. However, stimulating Maine's traditional and emerging industries remains a challenge. Financial incentives alone will not work. Culture and creativity in the leadership and workforce must be developed, supported, and rewarded.

TABLE 2: State-identified Sectors for R&D Development

Sector	Industry presence in Maine	Typical industry R&D spending as a percentage of sales	UMaine leveraged grants and contracts, FY2005–FY2013	UMaine R&D Strengths
Agriculture & Forestry	Traditionally very strong presence in Maine	Low	\$74,168,898	Oldest pulp & paper program in U.S., with strong industry support First in nation nanocellulose production capability Only forest bioproducts commercial-scale R&D facility*
Aquaculture & Marine	Traditionally very strong presence in Maine	Low	\$77,414,471	Among the best aquaculture R&D and incubation facilities in the U.S.
Biotechnology	Low to moderate presence in Maine	High	\$31,873,718	Graduate School of Biomedical Sciences linking six Maine non-profit research entities such as Jackson Lab and University of New England
Composites & Advanced Materials	Strong presence in textiles and boatbuilding; other areas low presence	Traditional sectors: Low Engineered wood products: High	\$81,198,379	Internationally-recognized composites research center One-of-a-kind offshore wind laboratory*
Environmental Technology	Low to moderate presence in Maine	Medium	\$55,516,315	Only forest bioproducts commercial-scale R&D facility* One-of-a-kind offshore wind laboratory*
Information Technology	Low to moderate presence in Maine	Medium-High	\$72,202,692	Advanced supercomputing capacity Geographic information analysis research Innovative Media Research & Commercialization Center
Precision Manufacturing	Moderate presence in Maine, with niches in certain sub-sectors such as transportation equipment	Electronics: High Metals: Low to Medium	\$15,524,982	Advanced Manufacturing Center for prototyping and manufacturing process improvements
Cross Sector			\$9,116,345	
Total external dollars in the seven sectors			\$339,228,616	

*Some programs overlap more than one sector.

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James S. (Jake) Ward IV is the vice president for innovation and economic development at the University of Maine. His office supports economic development by acting as a liaison for business and industry, facilitating technology transfer, and handling patenting, licensing and commercialization activities for the university. The office also supports federal and state government relations for the university's R&D mission. Prior to this role, he served as the assistant vice president for research, economic development and government relations.