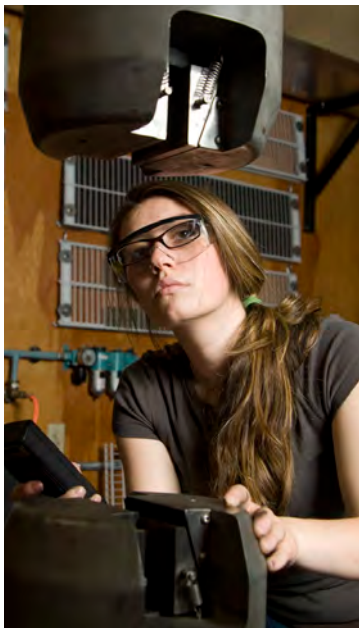
the innovation landscape in maine:

Strengthening the Role of Maine's Industry Associations in Supporting The Maine Innovation Economy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A Case Study for Maine's 2009-10 Comprehensive Evaluation of State Investments in Research and Development

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INTRODUCTION

Each year, a *Comprehensive Evaluation of Maine's Investments in Research and Development* is conducted by an independent evaluation team and reported to the Maine Office of Innovation, Commissioner of the Department of Economic and Community Development, and the Business Research and Economic Development Committee of the Maine Legislature. As part of the annual evaluation, a case study is conducted to take a closer look at an issue that impacts the performance of Maine's Research and Development and innovation economy. This year's case explores the role of business and industry associations in the development of clusters and the acceleration of an innovation economy.

Business and industry associations can be important for providing services and networks to help companies survive and grow. They can also be important for the development and strengthening of industry clusters and the diffusion of innovation. Maine has several industry associations that are directly involved in serving businesses within the state's targeted technology sectors. They include:

- Technology Association of Maine
- Biotechnology Association of Maine
- Manufacturing Association of Maine
- Maine Composites Alliance
- Maine Aquaculture Association
- E2 Tech Council

Appendix A contains an overview of each of Maine's technology related industry associations.

Business and industry associations have a variety of models. In addition to associations that focus on specific industries, there are also associations and organizations that support and serve business in general including state, regional and local chambers of commerce, along with regional and local economic development agencies/corporations. Some business and industry associations focus solely on Maine, while others are multi-state regional and national associations that serve Maine business and industry.

Business and industry associations' connections and contributions to economic development can vary by their mission and goals. Most, however, contain at least one goal to help improve the competitiveness and market share of their member firms. For many of these organizations, access to new research and technology, capital, and growth markets are critical for their members along with relationship and partnership opportunities.

In Maine, like many other places, industry associations can often struggle to survive with unclear or changing missions, inadequate revenue, unstable membership, and limited connections to other stakeholder entities. Furthermore, many compete for the same limited resources. These factors and others may limit their ability to contribute to their industry's health as well as the regional/state economy. Understanding the networks and operational environments that allow these associations to contribute to economic growth can help Maine policymakers best leverage an effective industry association network and service system to strengthen the targeted technology sectors and innovation economy.

This case study revolves around two key framing questions:

1) How do industry associations play a role in the promotion of innovation and industry cluster development in Maine and help make firms more competitive?
   a. What do businesses and entrepreneurs want/need from support associations?
   b. What activities provide greatest value added to their bottom lines?

2) What are the various models by which other states work with industry groups to coordinate and leverage innovation and industry cluster efforts?

The report is organized into three sections. Part One examines the innovation landscape in Maine, focusing on the role of technology-based industry associations within the state. Part Two explores collaborative models in other states and regions, including alliances among industry groups as well as their relationship with state government. Part Three includes recommendations for enhancing the ability of associations to serve their members and build stronger companies within and between sectors.

PART ONE: THE INNOVATION LANDSCAPE IN MAINE

While innovation-based firms and industries have always been a part of Maine's history, the State of Maine is a relative newcomer when it comes to designing and implementing explicit public policies and support tools for technology-based businesses. The earliest such efforts in the US date back to the early 1980s;[1] Maine's first policy forays into technology-based economic development (TBED) were begun in the early to mid 1990s. Appendix B contains a timeline of significant milestones in Maine's Innovation and R&D programs and investment.

Much of this early work was pioneered by the Maine Science and Technology Foundation (initially established as the Maine Science and Technology Commission in 1987), which created the state's first Science and Technology Plans in 1992 and 1997.[2] The Foundation, which operated between 1992 and 2002, helped to spark Maine's first major TBED-related investments. These initial efforts helped spur a series of new investments and programs in the late 1990s, which included creation of the Maine Economic Improvement Fund, the Maine Patent Program, the Maine Technology Institute, and several state-sponsored Technology Centers.

A large portion of the initial investment was focused on playing "catch up," with funds devoted to the "infrastructure" for R&D—building facilities and obtaining research funds. Later investment cycles expanded funding to programs and services for leading institutions, support organizations, and technology-based businesses. The Maine Office of Innovation, which was created in 2003 to bring science, technology, and innovation policy under the direct control of the Maine Department of Economic and Community Development and closer to the Governor's Office, now focuses significant attention on the state's technology-based economic development (TBED) policies.

This history has influenced the unique innovation ecosystem that has emerged in the state. The state's 2010 Science and Technology Plan paints a comprehensive picture of the current state of play.[3] With more than a decade of investments, Maine has significantly improved its performance on key innovation

1 See, for example, Walter H. Plosila, State Science and Technology-Based Economic Development Policy: History, Trends and Developments, and Future Directions, *Economic Development Quarterly*, Vol. 18, No. 2 (2004), pp. 113-126.

2 More recently Science and Technology Plans have been produced by the Maine Office of Innovation in 2005 and 2010. 2005: The 2005 plan is available at: http://www.maineinnovation.com/r&e/pdfs/science_technology_action_plan_2005.pdf. The 2010 plan, released in 2009, is available at: http://www.maineinnovation.com/r&e/pdfs/October_28_Final_Draft_S&T_Plan.pdf

3 Maine Innovation Economy Advisory Board and the Maine Office of Innovation, *2010 Science and Technology Action Plan*, October 28, 2009.

inputs, such as R&D spending. However, the state still faces challenges in terms of commercializing technology and in generating bottom line economic benefits from R&D investments. While the state's R&D investments are growing, their impact on the average Mainer is still somewhat unclear. At the same time, the report notes that much less attention has been paid to entrepreneurial development, especially the start-up and growth of high impact or innovation-based companies—a role supported to a large extent, by industry associations.[4]

WHAT IS THE INNOVATION ECO-SYSTEM?

While there is no single consensus on how to define an innovation ecosystem, most observers acknowledge that these systems are growing in importance. A 2008 White House Report from President's Council of Advisors on Science and Technology (PCAST) offered a helpful description.

> *This (innovation) ecosystem includes a range of actors from academia, industry, foundations, science and economic organizations, and government at all levels. While widely recognized as non-linear and iterative, in it is most simplified form the innovation process can be viewed as generating both new knowledge (education and training) and technology (development and commercialization) that is moved from basic discovery research to the marketplace... The organization of the innovation ecosystem is not rigidly planned with well-defined roles for the various actors. As a result, the relative position of each actor, as well as the conditions encouraging or restraining the innovation process, can change continually.*[5]

An effective innovation ecosystem contains several key building blocks. First, it has the capacity to generate new ideas. While many observers view universities or major research facilities as the key generators of these new ideas, this depiction is too limiting. New ideas can come from a variety of sources, primarily entrepreneurs and existing private sector companies. And, not all new ideas must be based on new technologies. They may emerge from new processes, new business models, or new ways of marketing or packaging.

Moving beyond this mix of new ideas, successful ecosystems also have the capacity to commercialize new ideas, i.e. to convert ideas into business opportunities. Technology transfer and commercialization of university research is probably the most widely understood of these processes. However, the capacity to help aspiring entrepreneurs start new businesses is another effective, and likely the most important, approach to commercialize ideas.

Finally, effective innovation ecosystems contain a local capacity to help turn these new business opportunities into successful ventures. In other words, they help entrepreneurs and their firms move from start-up, through critical growth stages, and to maturity as a successful business venture. The system also encourages a culture of risk where failures and restarts are recognized, and even celebrated, as part of the processes.

In all of these activities, both public and private sector leadership is needed. Indeed, the most effective support systems are built around strong public-private partnerships where responsibilities are shared and all players are committed to close cooperation and collaboration. In Maine, many of the key building blocks are in place, but several critical areas

4 High impact or innovation-based companies refer to firms that have significant impact on their economies through the development and application of new technologies, high wages, and/or considerable growth potential.

5 President's Council of Advisors on Science and Technology, University-Private Sector Partnerships in the Innovation Ecosystem, (Washington, DC: PCAST, 2008), p. 7. Available at http://www.ostp.gov/galleries/PCAST/past_research_partnership_report_BOOK.pdf.

are missing or under-developed. For example, the 2009 Maine Comprehensive Research and Development Evaluation indicated that the state lacks the capacity and resources needed to effectively support start-up ventures that are seeking equity capital or other more sophisticated support services needed to achieve rapid growth.[6]

KEY PLAYERS IN MAINE

While Maine has formally embraced public investments in TBED for just over a decade, some of Maine' s leading technology and business support organizations have been in operation for many decades. In fact, the Maine State Chamber of Commerce, the state's largest business organization, can trace its origins back to 1889. Maine Aquaculture has been in existence for more than 30 years.

While organizations like the state chamber have a long history, most of the technology-focused organizations in Maine are of more recent vintage. At present, the key technology related trade associations and business networks in Maine[7] include the following:

- Biotechnology Association of Maine, established in 1989 (www.mainebiotech.org)
- E2 Tech Council established in 2002 (www.e2tech.org)
- Maine Aquaculture Association established in 1976 (www.maineaquaculture.com)
- Maine Composites Alliance established in 1999 (www.mainecompositesalliance.org)
- Maine Manufacturers Association established in 1969 (www.maine-metals.org)
- TechMaine established in 1992 (www.techmaine.com)

These associations are not the only business groups with concerns about technology and innovation, but they all serve technology intensive sectors that are also part of the Maine's targeted business clusters as identified by the legislature in the late 1990's. An overview of each of these industry associations is presented in Appendix A.

INDUSTRY ASSOCIATIONS AND THE INNOVATION ECOSYSTEM

Industry associations do not exist in a vacuum. Like any private business, they have customers–their members–who join the association with the goal of bringing bottom line benefits to their companies.

Yet, at the same time, most groups pursue two other related missions: to enhance the value chain[8] that makes the overall industry more competitive, and to help build or expand the local[9] support infrastructure for their members. In these roles, associations play a critical function in developing, managing, and serving as key service providers in the state's innovation ecosystem.

Thus, job number one for most industry associations is to build stronger companies.

6 Maine Office of Innovation, *Maine Comprehensive Research and Development Evaluation 2008*, (Augusta: Maine Office of Innovation, 2009).

7 See Appendix for further details on each organization.

8 For this document we define value chain as firms and organizations that provide materials and inputs, R&D and technical expertise, capital, market development, and operational and processional resources.

9 Local implies municipal, regional or state level.

How do associations support these missions? They operate via three primary mechanisms:

- They help share needed information with their members and outside stakeholders,
- They build networks within their target industries and with other partners and stakeholders, and
- They help engage with the public sector, either advocating for industry interests or assisting members in accessing various forms of public sector support.

What do industry associations identify as the processes central to carrying out their mission?

- Communication channels to improve the flow of information and knowledge.
- Connection points to develop stronger networks within and outside of the state and among industry groups.
- Advocacy vehicles to quickly align organizations and develop a common voice.
- Economic and business infrastructure efforts that enhance the competitiveness of companies including enhanced access to capital, entrepreneur and management talent, and markets.

These connections occur at the local, state, regional, national, and international levels. Below, we examine each of these activities in greater detail.

Share Needed Information

The simplest, but perhaps the most important, role of industry associations is to promote the flow of information so that their business members can learn the latest trends in the field, identify emerging opportunities, and more effectively respond to external challenges and emerging issues. Most associations share information by both passive and active means. Passive methods include the use of newsletters, web sites, social media, or the publication of research reports. Active methods are more interactive, taking the form of workshops, training sessions, conferences, or other events.

Building Networks

Providing tools and venues so that member companies can build networks and value chains is a critical and often underappreciated role of industry trade associations. Network building is becoming even more important in the 21st century economy where a premium is placed on agility, the ability to move quickly and to operate in collaborative teams. Successful entrepreneurs and companies rarely "go it alone." Instead, they rely on multiple connections and collaborations with customers, partners, and sometimes even business competitors.

Associations that build strong network connections do more than simply host a "mixer" or networking event. They develop a deliberate set of programs and strategies that help strengthen industry networks across several dimensions, including:

- Vertical Linkages: These connections occur within an industry where peers interact to learn about "best practices" or the unspoken "rules of the game" that govern an industry's standard operating procedures.

These connections can be built by informal networking, training opportunities (e.g. learning a new software language), or even via formal industry certification programs.

- Horizontal Linkages: These connections rely on networks that reach out beyond a given industry toward a wider variety of potential collaborators who operate within an industry's value chain or broader cluster. For example, a software designer with world-class technical skills may need to build a broader team to launch a start-up. In this case, networking helps firms gain access to expertise in areas such as marketing, finance, or business management and operations.

- Cross-Sector Connections: A growing body of research indicates that new innovations are rapidly emerging at the intersection of industries or academic disciplines. Everyday examples include products like the Apple iPod that seamlessly connect innovations in design, marketing, and information technology. Other examples include fields like nano-materials that combine innovations in manufacturing and nanotechnology, or genomics, which builds upon innovations in genetics, biotechnology, mathematics, and computer technologies, or wind energy, which combines energy technology with advanced materials.

Engagement with the Public Sector

A final and critical role of industry associations is to act as a key intermediary with public sector agencies. Few business owners have the time or interest to advocate for key public policy issues, especially if these activities do not have a direct and immediate effect on the company bottom line. Trade associations thus serve as a critical engagement mechanism. They deploy resources to gather information on new rules, regulations, or future legislation of interest. They help link their members to potential State and Federal grant or contract opportunities, and also ensure that the industry "speaks with one voice" on key policy issues. Finally, they play an important role as a partner with government agencies.

All of these activities serve two broad purposes. First, they are part of the core mission of all industry trade associations: to provide high quality service offerings to their members. These offerings may vary from newsletters to training programs to world-class conferences, but they all directly contribute to the mission of making member companies more successful. Via these activities, associations play an essential role in building, expanding, and strengthening a region's or state's innovation ecosystem. In their role of promoting information flow, they help share new ideas or policy proposals that government officials hope to implement. By engaging their members, they provide critical feedback to ensure that policies aid leading sectors, or, at a minimum, do no harm. In their networking role, associations are a critical connection point that link businesses to one another but also build networks between the private sector, the public sector, and education. Finally, they provide advocacy vehicles where companies, industry, or cross-industry coalitions can come together to align organizational goals and develop a common voice in regard to local, state, or federal policies.

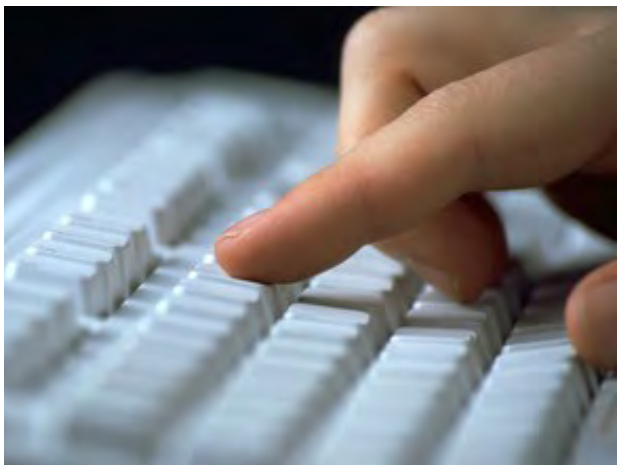
MAINE BUSINESSES, TRADE ASSOCIATIONS, AND THE INNOVATION ECOSYSTEM

Maine's leading industry associations are presently engaged in all of these important ecosystem building and expansion-related activities. In some cases, Maine-based associations have developed programs that are world-class, and could compete with related efforts across the US and overseas. In other cases, new initiatives need to be started, expanded to reach a wider audience, or redesigned to increase effectiveness.

Information

All of the state's associations place a heavy premium on their roles as information providers. At the most basic level, all associations produce regular newsletters and other publications that cover industry trends or other issues of interest. For example, Manufacturing Matters, produced by the Manufacturing Association of Maine (MAM), provides a monthly review of key issues facing the state's manufacturing firms as well as updates on association activities. TechMaine produces and distributes its newsletter electronically, a trend that has become more common for cost effectiveness and ease of distribution.

Most groups also provide venues for training and skill development. For TechMaine, training and skill development through peer-to-peer user groups has been the cornerstone member service since its beginning. For the Maine Composites Alliance, workforce training within the industry on the latest skills and techniques was seen as key to the future survival of the industry in Maine. As a result and through assistance from the Maine North Star Alliance program (a state and federal grant supported effort) custom training was developed and is being delivered at multiple higher education facilities throughout Maine. Others associations even provide specialized consulting to member companies. For example, MAM operates its own business services division that provides its members with specialized consulting services in areas such as industrial engineering, human resources management, or strategic planning. E2 Tech Association holds well-attended monthly forums on an array of topics for their industry, and provides sector information and research. E2 also has webinar courses and online resources to augment in-person information exchanges.



Networks

Maine's associations also operate a host of very popular and effective network groups. Tech Maine has developed a national reputation for its excellent user groups and special interest groups. These groups cover a wide range of issues. Current networks include some that address general industry topics (such as bioinformatics or information security) as well as those that dig deep into specific technical applications or software packages, such as Java, Linux or Oracle. While most participants are based in Southern Maine, the groups are open to all and can even be accessed via teleconference linkages. These groups are further supported by on-line forums where participants can share information, news, or ask for outside assistance.

The Biotechnology Association of Maine has developed their network to include a strong alliance with the New England Biotechnology Association (NEBA). Membership in the Maine Biotechnology Association gives members an automatic membership in NEBA. NEBA, in turn, acts as a consolidated voice in policy and awareness issues for the biotechnology industry throughout the Northeast.

Networks are also built around shared economic opportunities. This is currently the approach related to wind energy. The Maine Composites Alliance, in collaboration with the University of Maine Advanced Engineering Wood Composite Center, First Wind, CIANBRO and the Maine Port Authority, has launched the Maine Wind Industry Initiative (MWII) whose mission is to leverage opportunities for Maine companies in both on-shore and off-shore wind development in the Northeast wind industry market.[10]

10 http://www.mainewindindustry.com/

Workforce development has consistently been identified as a major factor in supporting business growth in Maine. TechMaine was part of a collaborative effort, with the Maine Department of Labor, Maine Department of Economic and Community Development, and Maine Career Centers, to identify IT workforce needs and to provide career training scholarships for persons impacted by the closure of the Brunswick Naval Air Station. The program led to the creation of a soon to be available suite of on-line training courses to Maine workers statewide to build IT and business skills from beginner through advanced. The project is being supported through a Cluster Grant from the Maine Technology Institute. The Maine Aquaculture Association, in response to the need for skilled workers, has turned to the traditional fisheries industry as a source for both workers and entrepreneurs to support industry growth.

Most observers agree that these network groups are an essential way to learn the ins and outs of one's own industry or business clusters. However, some contend that many association-based networks build strong vertical connections within a given industry, but do not build strong horizontal connections outside of the target sector. This limitation becomes especially pressing for new or aspiring entrepreneurs. While they must remain up to date on their specific industry or market niche, they also seek wider grounding in knowledge about how to start or grow a new venture. While each industry has its unique quirks, experts or peers with this knowledge most likely operate in other sectors or participate in other kinds of networking activities. For new entrepreneurs, association-based networks need to be supplemented with networks focused on the business of business building. This search for other knowledge and connections has helped prompt the creation of groups such as the Maine Entrepreneurs LinkedIn Group and programs like Top Gun,[11] a specialized mentoring program led by Maine Center for Enterprise Development. These efforts unite individuals from a variety of industries who share an interest in learning the diverse sets of skills needed to succeed as an entrepreneur. In Maine, like many places, there is a need for more of these networks.

Advocacy

Maine's technology associations also pay special attention to public advocacy efforts. In many cases, such efforts are defensive—designed to block new taxes or regulations that might worsen the state's business climate. For example, the Maine Aquaculture Association regularly monitors and testifies on regulations and policies that would negatively impact the ability of its members to conduct and expand business through restrictions on site licenses. TechMaine took an active role testifying against state legislation that would have created new taxes on computer, software development, and network services in the 2009 Maine Legislative session.

But, a much larger portion of association advocacy efforts seem to align well with the state's own objectives of building a more effective set of programs to stimulate innovation and entrepreneurship. TechMaine's recent effort to create a statewide "Fund of Funds" to attract private equity investment is a case in point.[12] For many years, TechMaine members had reported serious roadblocks to accessing new sources of equity capital in Maine. Seeking to

11 Kathryn Skelton, "Entrepreneur School: MCED's Top Gun Program Aims High," Mainebiz, August 10, 2009.

12 Rebecca Goldfine, "Risk and Reward," Mainebiz, December 15, 2007; Joe Kumiszcza and Peter Murray, "Maine Needs Venture Capital Stimulus," Portland Press Herald, May 15, 2008.

nurture more home-grown investment capital, TechMaine helped develop LD 2320-An Act to Stimulate Investment for Innovative Businesses in Maine. The bill passed both the House and the Senate, but was not signed into law. Regardless of the outcome, TechMaine had assumed a leading role in supporting new initiatives that, while they could aid TechMaine members, could have had an even more profound effect on the wider state-wide innovation ecosystem.

Because of Maine's importance as leading aquaculture center, the Maine Aquaculture Association has been especially active in seeking to influence state and federal policy directions. The association's Executive Director, Sebastian Belle, regularly testifies before Congressional hearings and actively participates in both state and federal advisory groups. MAA also actively participates in the advocacy efforts of a network of associations related to Maine's natural resources which includes the Maine Forest Products Council, Maine Potato Board, Maine Aquaculture Association, Maine Snowmobile Association, Wild Blueberry Commission, Maine Farm Bureau, Small Woodland Owners Association, Sportsman's Alliance, Friends of the Allagash, Maine Dairy Industry Association, Maine Lobsterman's Association, Maine Trappers Association, and the Maine Professional Guides Association.

For several of Maine's technology industry associations, leveraging the "Maine Brand" characterized by purity and high craftsmanship is key...

Advocacy of Maine's technology associations appears to follow patterns of other states. Newer or smaller organizations look toward larger groups within the state and across state lines to take a lead position. This is illustrated through the collaborative efforts of the bioscience association to work with larger regional and national organizations and in E2's collaborations with other more established associations in Maine.

Advocacy also extends beyond state and federal legislation and can broadly be viewed to include marketing. Maine's technology industry associations all participate in efforts to market the strengths and advantages of their industry beyond Maine, nationally and globally. This also involves partnerships with other business associations in the state, such as Maine and Company and the Maine International Trade Center, as well as collaboration with national industry associations. For several of Maine's technology industry associations, leveraging the "Maine Brand" characterized by purity and high craftsmanship is key to this marketing. This is particularly true for the sectors of advanced technologies for forestry and agriculture, marine technology and aquaculture, environment and energy, and advanced materials.

Common Challenges Facing Maine's Technology Associations

In most cases, the primary challenges facing Maine's technology associations are not unique to Maine or to specific industry sectors. All industry associations face issues of raising funds, gaining visibility, and generating positive impacts for their members. Nonetheless, because of Maine's small size, dispersed population, relatively small technology sector, Maine's associations do face some particularly daunting pressures.

The most pressing challenge concerns funding. Technology associations across the US face major funding challenges, and rely on a somewhat tenuous mix of funding sources that might include dues, revenue from events, fees for service, and outside grants. A significant drop off in any funding category, due to a money losing conference or loss of a government grant, can sometimes put an association out of business. In more populated regions, associations can access a wider base of funding sources, and a potentially larger membership base. They also

regularly tap into larger service providers, such as banks, law firms, or accounting firms, who can make significant up-front investments in these associations. This base of outside investors is more limited in Maine as the state is not home to large firms that are focused on providing services to technology firms or new entrepreneurial ventures.

The relatively small size of Maine's technology sector can also hamper efforts to improve networking between firms. Interviewees from other states note that successful networking efforts require that "you keep it fresh," i.e. always introducing new ideas, concepts, and new people into the network. Like many small states, Maine's small population and its rural nature complicate this task. With longer driving times and fewer technology entrepreneurs, it is harder—but not impossible—to build strong networking organizations in Maine.

Finally, technology associations face the same challenge facing everyone who leads or manages a small non-profit organization: how to develop the organization and to build a professional operation. Association managers are no different from managers in the private sector. They need to participate in training, learn from their peers, and develop a viable career. Yet, there are few resources to support this needed work. Most foundations and most government agencies fund projects. They are less willing to invest in the critical work of capacity building and organizational development.

All of these factors coalesce to create a challenging environment for Maine's technology associations. Given the circumstances, most associations do an excellent job of running a lean operation while also providing value-added services to their members. However, they could do an even better job with the right mix of support and resources. And, in the process, they could more effectively contribute to strengthening Maine's innovation ecosystem.

PART TWO: COMPARISON TO OTHER MODELS

While Maine's industry associations serve a specific industry or cluster, they do not operate in isolation. Associations also work to build wider collaborations that link their members and their concerns to other industries and related support efforts. These wider linkages are especially important in newer emerging sectors, such as technology-related industries, where the pace and direction of change is rapid and uncertain. As they serve their members, technology associations must also assess their role in the wider innovation ecosystem.

Part two of this study examines these questions by assessing how other associations in other states and regions collaborate across sectors and organizations. This research is based on interviews with representatives from leading associations in eight states. Interviewees were asked to share their experiences and offer lessons learned that might be appropriate for Maine's technology industry associations.

As associations consider broader roles, several key issues emerge:

- What are the most effective models for collaborating with other associations?
- What is the appropriate service area? Should the association operate in a single locality, a single state, or a multi-state region?
- How should associations interact with public sector partners? What are the most effective approaches?

COLLABORATION MODELS IN OTHER STATES

A key question explored in this case study is how industry groups collaborate to strengthen their value to members and their voice within the science and technology community. While Maine's industry associations are engaged in a wide range of system-building activities, it is not really accurate to refer to the current situation as a system. Each organization, or individual business, pursues its own agenda, and when collaboration makes sense, ad hoc coalitions form to address a problem area or to advocate for key policies. For example, nearly all of the leading technology associations were strong advocates for passage of the $50 million Research and Development bond in 2007.

Maine's current organizational structure is not unique, and is indeed the common pattern found in most states. However, other options do exist as many states have established different organizing schemes. In addition to the traditional model of independent technology-related business associations, other models rely on the development of more formal alliances or even consolidation of associations into a single umbrella group or several groups targeting cross-cutting issues.

We examined different merger and alliance models to gain insights into why organization chose their current model and what made that model work for them. We used two sources of data: a 2008 report completed by the Arizona Technology Council[13] and interviews we conducted with eight organizations. In addition to understanding organi-

13 Arizona Technology Council, "ATC Business Case for Collaboration and/or Consolidation," Phase I Final Results, January 15, 2008.

zational models, we also sought initial insights into the question of whether or not there is evidence that combined organizational structures lead to improved working relationships with state offices of innovation or related commerce activities. In other words, did the presence of an alliance make it easier for the state to identify and act upon key challenges in science and technology sectors?

When organizations act independently, a considerable amount of fragmentation may result. This fragmentation can lead to duplication of services or underutilization of resources such as when multiple organizations hold similar workshops on equity capital or intellectual property management. Issues of effective scale economies may also arise if associations compete for resources from a relatively small number of innovation-based businesses. These organizations have a difficult time in achieving a membership level or even event attendance to sustain organizations and programs. To minimize the negative aspects of having multiple industry groups, many associations build collaborative relationships with other partners.

Industry collaborations in science and technology tend to occur via three models:

Informal or Ad Hoc Alliances: Collaboration among industry groups on specific issues that tend to be project based or have a limited time period, such as a proposed state regulation or tax. Members of the alliance may change as the topic changes. Many states rely solely on industry groups to self-align around issues with little or no government support or coordination channels. Government, however, can play a role in helping with issue-based alliances. In Oregon and Arizona, the Governor's Innovation and Technology Councils serve as a conduit for collaboration among industry associations providing a forum by which organizations can share business development needs and coordinate support for state programs.

Formal Alliances: In some regions, organizations have developed more formal alliances based on working agreements or signed memoranda of understanding. In these cases, organizations retain a distinctive identity but agree to share staff or resources for specific functions or activities. Each organization continues to operate with its own Board of Directors and operating budget. Examples of these types of alliances include the Pittsburgh Technology Council, and the Virginia Technology Alliance. In Pittsburgh, the council is physically collocated with other organizations that are not associations to share infrastructure and overhead costs. In Virginia, the alliance has a specific mission to serve as a statewide advocacy group for regional tech councils that have similar issues and needs.

Mergers: In some cases, two or more previous organizations joined forces into a single association or council. The majority of mergers were either regional in nature (e.g. Maryland Tech Council, Technology Council of Northwest PA, TechColumbus) or with closely related sectors, primarily software or electronics merging with IT (e.g. Arizona Tech Council, Minnesota High Tech Association, Northeast Ohio Software Association. Very few examples such as Utah exist where the merger was statewide and included both tech and biosciences sectors.

Mergers tend to occur in response to several types of outside influences:

- When the board and executive leadership of each merging organization perceive value and increased opportunity in a merger, primarily related to building a membership level adequate to sustain operations, and attracting sponsors that were not willing to fund multiple organizations with similar missions.
- When the target industry faces significant upheaval, especially in a downturn where member companies face major financial challenges. For example, many mergers in the information technology sector occurred in the aftermath of the dot.com bust in the 2000-2001 period.
- When multiple organizations operate within the same sector in a heavily populated state or region, thus creating confusion by companies and funders as to the unique value of each organization.

- When a pressing public policy issue creates major challenges or presents major opportunities to target industries. In these cases, groups may merge in the belief that a larger organization would carry more weight. These mergers tended to have working committees that reflect the various 'pre-merger' industry sectors.

	Informal Alliances	Formal Alliances	Merger (Consolidation)
Factors driving collaboration	Opportunity driven: collaboration on key issues as they arise Flexibility in building networks at the scale or with a geographic footprint that fits key business needs Ability to keep identity when needed	Opportunity driven: collaboration on key issues as they arise Need to build stronger value chains or knowledge networks among organizations A history of working together that maximizes the flow of information and the ability to coalesce around advocacy positions Ability to keep identity when needed	More impact or timely resolution of key business issues Need to build stronger value chains or knowledge networks among organizations A history of working together that maximizes the flow of information and the ability to coalesce around advocacy positions
Perceived benefits/ desired outputs	Stronger voice on selected issues Cost savings and improved funding possibilities on collaborative activities	Stronger voice on selected issues Increased value to members of each organization Cost savings and improved funding possibilities on collaborative activities	Stronger voice overall Increased value to members of each organization Cost savings and improved funding possibilities on programs and general overhead
Primary Challenges	Organizational structure/ understanding of roles are typically recreated for each event Sense of a cohesive voice not as strong as formal models	Developing a clear understanding of the role of and value for each organization Ability to maintain alliance when there is no crisis or large project to drive collaboration	Members of individual sectors feel they have lost identity Boards/leadership of merged organization have a difficult time believing everyone benefits equally Takes a while for the merger to run smoothly (3 years typical)

Much like many mergers and acquisitions in the private sector, many alliances and mergers among technology associations fail to deliver anticipated savings, efficiencies, or other benefits. Interviewed association leaders report that membership rolls generally held steady or grew slightly in the aftermath of an alliance or merger. However, they also reported difficulty in defining common issues and value among subgroups. In cases of formal mergers, it regularly required two to three years before key operational details were finally resolved.

LESSONS LEARNED FROM ALLIANCES AND MERGERS INCLUDE:

A history of working together is critical for an alliance to work. Successful alliances or mergers typically require a long history of previous collaboration or partnership. One interviewee noted, "We dated for years before we took the plunge." Without a previous history of collaboration, alliance leaders noted there would be little trust and a higher likelihood of failure.

Alignment of issues and needs matter: mixing industries with different needs is a difficult proposition: Most alliances and mergers are among industries with similar needs or common challenges. The needs can be similar markets or technology platforms, a heavy dependence on the regulatory environment, or shared funding sources. Alliances also regularly emerge when sectors share similar challenges related to workforce development and training.

Yet in some cases, sectors or issues are more diverse, and require unique organizational structures such as sector-specific working committee to maintain value among members. An alliance developed around mixed sectors or issues appears to take time in reaching a balance. In the case of one organization where bioscience and technology sectors were combined, the response was ***"it's been three years and it's still not a stable or pleasant marriage."***

Shared vision first, funding second. Some organizations noted that their merger was driven to large extent by outside pressures from funders and sponsors. While a merger helped with maintaining funding sources, they noted difficulty in identifying and determining priorities for funding, and thus felt as if they were having a hard time "gaining traction." If they could go back to start, they would put much more focus on developing a strong shared agenda before pursuing funding.

An alliance or merger did not directly result in a stronger relationship with state innovation programs or agencies. While organization leaders admitted that increased collaboration helped maintain relationships with funders, it did not necessarily result in better access to state agencies (departments of commerce or innovation offices) with regard to shaping policies, programs or budgets. Many felt their advocacy position was often too reactive or "after the fact"---trying to support or oppose a new policy, rather than helping develop the policy in advance. The intensity and regularity of engagement between the private sector and state government seemed to be more of a factor than the specific business model under which they operated. Those groups with ongoing and two-way engagement with state government fared better with legislative efforts than organizations that interacted with state government on an occasional or episodic basis.

Adequate state support is critical for nurturing the start-up and transition of alliances. Combining forces (either through an alliance or a formal merger) is hard work that takes years to complete. Many groups relied on state support/funding to help with their transition. In the case of Maryland, the two largest councils were each given operating grants of $300,000 per year. This was by no means their entire budget, but was sufficient to allow them to develop effective operations. Other alliances rely on ongoing state sponsorships for a portion of their budgets. State support seemed to be particularly important in states with smaller populations and fewer large sponsor-level companies like law firms or banks.

Somewhat surprisingly, many of the association mergers in other states did little to reduce the total number of local or state-wide technology business associations. Mergers appear to have a limited impact on reducing industry fragmentation. For example, in 2002, the Arizona High Tech Industry Cluster (HTIC) merged with the Arizona Software & Industry Association (AZSoft.net) to form the Arizona Technology Council. However, at least eight other major technology organizations continue to operate in the state. These include the Greater Tucson Technology Alliance; the Arizona Optics Industry Association; the Bioindustry of Southern Arizona; Aerospace, Manufacturing and Information Technology; AeA Arizona; and the Arizona Telecommunications & Information Council as well as cluster groups in nanotechnology, biotechnology, environmental technology, and e-Learning.

THE DEFINITION OF "REGION" IN ALLIANCES AND COLLABORATIVE MODELS

Research increasingly suggests that regional knowledge networks are key to the growth of science and technology companies.[14] Yet, the term "region" can be defined in many ways—as an area within a state, a state, or a multi-state geography. Furthermore, regional alliances can differ by industry, even within the same geography. Effective economic development and innovation strategies operate at the level of "region" as defined by businesses markets and key resources, not by political jurisdictions. To gain an understanding of what drives an industry's definition of a region, we explored how various technology organizations define the geography of their working alliances.

Multi-state regions: Areas with strong regional recognition or a history of working across state lines tend to form industry alliances that cross state borders. Yet, even within an area with a strong identity, an industry's definition of region can differ. For example, in the Pacific Northwest, industry associations define their regional networks based on natural affinities.

Oregon presents an interesting mix. In the case of the software industry, the Software Association of Oregon serves Oregon and the SW Washington region, where strengths in small firms, a history of Unix based applications, and a commitment to open source create a business culture that differs from that of the Seattle metropolitan areas. In contrast, the Washington Technology Association where larger corporations and Microsoft based products and e-commerce are more prominent, operates according to a different philosophy.

The Oregon Chapter of the American Electronics Association serves two primary functions: to actively lobby for state policy (often acting as the voice for other related technology associations) and connecting their members to national and international issues. Compared to other technology organization, there are fewer connections to local efforts (except in education and workforce development).

Food processors, however, have a multi-state organization and collaborative research spanning multiple universities and geographic boundaries. The Northwest Environmental Business Council merged efforts of five states to create a network that fit their regional definition.

Hybrids like the Oregon Entrepreneurs Forum have a statewide chapter in Oregon, yet their major programs, such as the venture capital forum, serve the entire Northwest.

14 See, for example, Purdue University Center for Regional Economic Development, *Crossing the Next Regional Frontier*, Report prepared for the US Economic Development Administration, October 2009; Karen G. Mills, Elisabeth Reynolds, and Andrew Reamer, "Clusters and Competitiveness: A New Federal Role for Stimulating Regional Economies," (Washington, DC: Brookings Institution, April 2008).

Sub-state regions: In more populated or geographically dense regions like the Mid-Atlantic States, regions are often defined by sub-state geographies. While recently merged organizations like the Maryland Technology Council implies a statewide organization, it actually serves a limited geography around the Montgomery County region, with three other major technology councils located in other regions of the State.

Regions based on resource allocation: States like Ohio and Pennsylvania have large scale, comprehensive, and well-coordinated state programs, such as Pennsylvania's Ben Franklin Technology Partnership and Ohio's Third Frontier Program. These programs invest significant long-term resources to build ongoing partnerships between industry groups, state government, and state R&D institutions and programs. Both of these examples have a strong regional focus in terms of program implementation. As a result, regional industry alliances have formed to interface with state programs and to better connect resources within the private sector. One example is TechColumbus, which has recently received over $20 million from Ohio's Third Frontier program to accelerate R&D and innovation-based companies in central Ohio.

Observation: While the Northeast United States also has a strong multi-state identity and active cross-state efforts and organizations, there were few examples where Maine technology associations were actively participating in broader initiatives. Engagement appeared to be more limited to events and conferences, rather than ongoing issues or policies affecting the growth of their industry. This is also true with regard to general economic development efforts – except for a few isolated examples, the Maine economic development community does not focus on networking and collaborating outside of the state borders.

In addition to state or regional resources, federal funding can also promote the establishment or growth of an industry organization. For example, Maine's North Star Alliance was established in response to federal funding and was designed to serve a specific sub-state geography – coastal Maine composites and boat-building.

ENGAGEMENT BETWEEN INDUSTRY AND PUBLIC SECTOR IN SUPPORTING INNOVATION

Industry associations play a key role in promoting industry clusters and enhancing the innovation infrastructure through strong partnerships with the public sector, especially state government. To help us gain insights to this issue, we interviewed state government officials from seven small and medium-sized states (with populations between 1.3 and 9 million). Like Maine, these states sometimes face challenges of scale, i.e. they may be home to more limited number of technology-based businesses or have limited resources for investing in support programs. During our interviews, we asked public sector leaders how they engaged the private sector and how the private sector partners informed their innovation policies and programs. Three of these states (Arizona, North Carolina and Oregon) operated a formal state innovation council that interacted with a wide variety of active technology associations. This structure is similar to the current environment in Maine. Two states (Maryland and New Hampshire) had active industry groups, but did not utilize a formal state council. Finally, Kentucky and Nebraska operate without an active state technology council and very few active technology business groups.

States with Innovation Councils

Arizona, North Carolina, and Oregon all operate with an active innovation council or science and technology board whose members are appointed by the Governor. In Arizona and Oregon, these boards include significant representation from technology industry executives and entrepreneurs. In contrast, the North Carolina Board for

Science and Technology's membership is more heavily weighted toward representatives from higher education or research institutions. In councils with a large number of private sector representatives (Arizona and Oregon), the business community plays a key role in driving the discussion and developing recommendations for state policies and programs for innovation. In North Carolina, because the council had fewer private sector representatives, the Science and Technology Board staff has built a direct working relationship with industry associations and interfaces with associations informally on a regular basis, and formally as needed. All three view their council or board as a key communication channel by which the private sector can interface with and help shape the innovation economy and industry clusters for their state. All three organizations also work diligently to ensure that businesses, and their support associations, find real value from their participation in these efforts.

In terms of membership composition and size, the councils in Arizona and Oregon are similar to Maine's Innovation Economy Advisory Board. In both Arizona and Oregon, council members tend to be business owners or managers as opposed to representatives of technology business associations. While this ensures that the council has a strong business voice, these council members may not effectively represent the interests of needs of the wider technology sector. In these cases, councils, and state economic development leaders in general, must develop other means to communicate with technology associations. Both Arizona and Oregon have opted to establish a separate set of committees to seek input from businesses beyond their limited number of council members. Committees tended to be centered on key innovation drivers and lead by private sector leadership.

In Oregon, both the Oregon Innovation Council and its predecessor The Council for Knowledge and Economic Development created a separate advisory committee with additional university and private sector representatives that included executive directors or chairs of major industry associations. Oregon also has working committees on specific innovation issues—e.g. capital, technology transfer, and industry clusters. Industry associations were active in these working committees, which identified key issues and developed prioritized recommendations for state innovation policies and programs. This structure allowed industry groups to be engaged in the issues with the greatest impact on their constituents while also keeping abreast of broader efforts. Groups included electronics, software, biotechnology, food processors, and metals associations as well as more general business groups. During legislative sessions, the working committees were instrumental in quickly aligning businesses and organizations to testify or contact legislators regarding new policy, budgets or programs. Given the structure of MIEAB, this model for expanding ongoing private sector engagement could be adopted in Maine.

Interviewees also noted that, to be effective, an innovation board or council must be more than just a sounding board for government. Instead, the council should serve as a vehicle whereby the private sector can be active in setting the state's innovation agenda. States like Kentucky, which operated a Kentucky Innovation Commission until 2007, an innovation council in past years, noted that their group was now defunct because business members found limited value from its work. Meetings focused on providing updates from state agencies or state programs, rather than affording opportunities for real engagement or active discussions around solutions.

States without an Innovation Council

Many smaller or heavily rural states operate without a Governor-appointed Innovation Council or active technology associations. We talked to officials from two of these states, Nebraska and Kentucky, to understand how they interact with private industry to promote an innovation agenda and industry clusters.

Nebraska relies on larger industry groups, and their industry-specific working groups, as the primary tool from obtaining industry input and representation. The most significant collaboration occurs through the Diplomats[15], a nonprofit membership organization with more than 475 business executives and community leaders to support the Nebraska Department of Economic Development's efforts to grow, expand, and attract business to the state. Each diplomat agrees to call on at least three businesses per year, and to participate in special projects to promote economic development in the state. While these businesses cover all types of industry sectors, the model has been an effective way to connect science and technology sectors to the state's economic development programs. The state has only recently begun to focus economic efforts on industry clusters. In their first cluster, logistics, they formed a specific industry council to connect with private sector needs. This model will likely be expanded as other cluster efforts are formed. Between the Diplomats, cluster efforts, and the State Chamber's Innovation committee, the Department of Commerce receives consistent input from the tech community.

In Kentucky, there are only a few technology organizations that tend to be small and struggling. The primary method by which the state receives private sector input to inform their policies and programs in through the 12 state-supported Innovation and Commercialization Centers (ICCs) which work with start-up companies and entrepreneurs, and the Kentucky Science and Technology Corporation (similar to the Maine Technology Institute) that manages a variety of state R&D funds and programs. The Kentucky Office of Commercialization and Innovation communicates regularly with these organizations and works with them to help shape state innovation policy and programs related to start up and growth of science and technology companies.

In both Nebraska and Kentucky, state officials felt that their current structure allowed them to receive adequate input from the private sector with regard to their innovation and target industry work. In Kentucky, private sector input and support were essential to building support for new programs like their SBIR matching grant effort.

States with active technology associations but no formal state council have seen mixed results in terms of building a strong working relationship with state government, especially if the associations lack an active lobbying component. For example, conversations with representatives of Maryland's Technology Council revealed little coordination between industry groups and the state agencies and policymakers shaping the innovation agenda. A clear example of this can be illustrated by the recent passage of a sales tax on computing services. While other tax options were considered by the legislature, organizations representing these other alternatives (such as landscaping services) were quick to organized and headed off attempts to tax their industry. The lack of ongoing dialogue between the state government and the tech community found the industry scrambling at the last minute and unable to make their case in time for the sales tax package to pass the legislature. This was a wake-up call for better coordination among tech groups, and in how these groups keep a constant dialogue with state leadership.

For industry associations to have an effective working relationship with state government, they must see value in their participation–shaping policies, programs and investment levels of innovation efforts. The process by which the state engages the private sector seems to have a significant influence on the degree to which the industry associations participate in public dialogues. Communication vehicles that are seen as one-way communication from the state to the private sector appear to be less effective than two-way processes where the private sector has equal input into the process.

15 www.neded.org/content/view/365/660

PART THREE: CONCLUSIONS AND RECOMMENDATIONS

The success of an industry association, and its role in a state's innovation economy, is ultimately defined by its ability to add value to companies and to sustain membership. By this criterion, Maine's technology-based industry associations appear to be providing sufficient value to their member firms who "vote with their pocketbooks" by actively participating in the organization's work. Are there ways in which this value might be enhanced? Are there ways in which collaboration among groups might leverage additional resources? We believe there are. This section outlines a set of recommendations based by suggestions from associations in Maine as well as insights from other states.

Maine's industry associations face some significant challenges in developing sustained capacity that can help companies within the state build strong, competitive ventures. A small population means relatively few industries have sufficient scale and critical mass to support many elements of their value chain, requiring them to look beyond state borders for resources. Fewer companies and private sponsors also means that state and local governments may need to fill specific gaps to put Maine on a more competitive playing field.

Helping industry associations to better serve their members and develop stronger companies within their respective sectors could be supported through various means of collaboration among technology groups, with other business and industry associations in Maine, with other state and national organizations, and with state government. As state agencies and technology associations consider new collaborative approaches, they must also be cautious to do no harm. New collaborations should not come at the expense of jeopardizing associations' ability to serve and grow memberships in their niche sectors – groups need to maintain the programs and services that are at the core of their membership activities.

GENERAL CONCLUSIONS

Insights from other states and regions indicate that alliances and mergers have the potential to enhance the value of associations in promoting clusters and innovation through expanded programs and services. Results can be seen in all types of models (informal and formal alliances), indicating there is no single model with a significant advantage over others. Effective approaches tend to develop organically in response to unique historical patterns or in response to unique personalities of the region or state. Most formal collaborative models were based on strategic

alliance built around similar sectors, markets or geographies. While advocacy is a common role of industry associations, mergers or alliances did not automatically result in better relationships with the public sector. The working relationship between industry associations and the state appears to be driven more by the formal processes by which the state reaches out to the private sector rather than the number of groups with which the public sector engages.

The operations of alliances are based on strong trust, a history of working together, and clearly defined value to members. One clear lesson from the field is that mergers or alliances need to be driven by the organizations themselves, with expectations that it will take years, not months, to work out the kinks. While there are some cost savings associated with combining organizations, the primary driver was greater value to and impact on members. Businesses define this value based on how associations help them identify, understand, and connect with key aspects of their supplier network or value chain including key research players and technical expertise, sources of capital, access to markets, or access to professional services and resources.

The critical mass of these resources varies dramatically by industry sector. For example, Maine bioscience must look outside the state for capital, and for certain professional or research expertise. Other industries, such as manufacturing and aquaculture, have a more robust set of in-state resources and capabilities.

At first glance, Maine's technology association landscape appears fairly fragmented, with little cooperation across industries. However, a deeper look reveals many explicit examples of collaboration among groups in Maine. Much of the collaboration is driven by specific opportunities, rather than any systematic planning or strategy. Most association leaders agreed that more could be done to increase collaboration within the state and with organizations outside of Maine. Still, technology associations did not view the lack of any formal cross-industry alliance as a significant issue in inhibiting the competitiveness of their industry.

For the most part, alliances in Maine are driven by shared interests in issues or opportunities. Economic projects, federal funding, marketing and advocacy issues drive most alliances.

- For the Aquaculture Association, an effective advocacy alliance has been formed among other natural resource based organizations, including the Maine Forest Products Council, Maine Potato Board, Maine Aquaculture Association, Maine Snowmobile Association, Wild Blueberry Commission, Maine Farm Bureau, Small Woodland Owners Association, Sportsman's Alliance, Friends of the Allagash, Maine Dairy Industry Association, Maine Lobsterman's Association, Maine Trappers Association, and the Maine Professional Guides Association. They all share a common need to protect Maine's environment, while avoiding excess regulation or regulation/legislation with negative unintended consequences. They also benefit from strong brand for Maine-based products and services.

- Maine Composites organizes around major issues and initiatives rather than ongoing collaboration. For example, they are now collaborating with other industries around wind and ocean energy. The Northstar Alliance was organized in response to a federal WIRED Grant around the opportunity to bring together the Maine composites, marine trades, and boat building industries.

RECOMMENDATIONS

Based on the interviews, research, and resulting findings for this case study, we present the following recommendations for enhancing the role of industry associations in developing a strong Maine innovation economy:

A. Enhance Support for the Core Mission of Information Exchange And Network Development

A-1 Establish an ongoing and systematic vehicle by which shared issues and opportunities for joint programs, partnerships, and collaborations can be identified.

Through the course of our research and interviews we have identified the following ideas for shared services, partnerships and collaborations as a starting point for moving forward:

Marketing: At present, branding for Maine's innovation driven assets, opportunities, and culture is nearly non-existent. Existing efforts are small and fragmented with limited impact. For example, funding limitations have prevented Maine from participating (at a state level) in major national trade shows, such as BIO2008, the National Specialty Food Trade Shows, and Aquaculture related trade shows. In response, economic developers in the Greater Portland Region have chosen to go it alone with their own resources and no state support for participation in BIO2009. They are considering similar efforts in other industries. A system to support greater participation in tradeshows and to expand national and international marketing efforts is badly needed.

Workforce: Technology associations and their member consistently cite workforce development as a top issue impacting the future growth and success of Maine's technology sectors. Simply put, Maine's higher education institutions are not developing a sufficiently large and skilled pipeline of science, technology, engineering, and mathematics students. Associations still report challenges in building strong partnerships with key workforce players, such as the Department of Labor, Regional Workforce Boards, Career Centers, and the industry boards of academic institutions. Business input into key workforce development strategies appears limited. A lack of funding for key industry training programs, such as the Governor's Training Initiative, also constrains progress.

Regulatory and Business Environment: Maine's technology industries all share a commitment to creating an environment conducive to business growth and development. Most of the interviewed association leaders cited challenges in areas such as taxes, permitting, and human resources policies. Land use issues, especially those related to the siting of new facilities, are particularly important in the energy and aquaculture sectors. For information technology firms, taxes and labor/contractor regulations have the most significant impact on business growth. Each technology industry association conducts some advocacy efforts to influence state policy, particularly as they relate to their specific industry. However, when it comes to ongoing advocacy for major issues, such as state research and development bond proposals that cut across technology sectors, collaboration remains fairly limited. In most of these cases, the state Chamber of Commerce has been the primary, and sometimes the only, prominent business voice. Maine's technology community needs to better coordinate its policy agenda to help influence future policy debates.

A-2 Provide seed or operational funds for associations representing the emerging sectors of the State's targeted industry clusters, and for emerging entrepreneurship networks that connect businesses across industry sectors.

Supporting Observations: Associations act as the knowledge intermediaries for companies within a specific sector or market; connecting talent, technology, capital, and policy in ways that can accelerate the growth of member businesses. Many states and regions provide some type of seed support to help groups specifically associated with their targeted industry clusters. Unlike traditional industries in a region with mature associations and a critical mass of firms, innovation-based clusters can often be classified as emerging clusters with relatively new markets or a small, yet growing number of firms. Their comparative size makes it difficult to engage in larger scale project grants that many states, including Maine, use to support industry cluster development. This is a chicken and egg situation--without a solid foundation for operating capacity, the state's targeted innovation clusters are less inclined or able to take on new projects or specific initiatives. Yet state grant programs are not likely to fund organizations without strong capacity. In the absence of large private sector sponsors, other states and regions have turned to their government to help build capacity of emerging clusters.

Recommendation: If the state is committed to promoting innovation and entrepreneurship, it should consider providing capacity-building grants for associations representing the emerging sectors of Maine's seven target industry clusters (e.g. Biotechnology, Information Technology and Environment). This would assist these organizations in building the networks and programs like that of other mature cluster organizations including the Manufacturer's Association of Maine and the Maine Food Producers Alliance. For example, a three-year capacity grant of $100,000 per year would be equivalent to one cluster initiative grant. These grants need to be of scale and a long enough period of time to create sustained capacity. It is our recommendation that capacity building grants be managed at arms length of project grants; perhaps by the Office of Innovation, rather than through MTI. This structure could limit potential conflicts of interest and allow MTI to maintain the competitive nature of its project grants.

A related effort should focus on providing seed support to regional entrepreneurship networks where new business owners can interact with their peers and potential mentors. Relatively small investments can play a catalytic role in stimulating the emergence of these entrepreneurial networks. For example, the Wisconsin Entrepreneur's Networks has seeded a statewide network of Inventor and Entrepreneur Clubs by providing small $1,000 grants to defray the early operating costs of these networks. Thanks to these small grants, more than 40 local entrepreneur networks now operate across the state.

A-3 Expand the capacity of the Maine Office of Innovation (OOI) to serve as a comprehensive communication vehicle for innovation, entrepreneurial, and technology sector activity

Supporting observations: Each of the technology related associations and service providers have communication activities that spread information about training events, legislation, services, and advocacy. Most even include information about the activities of other organizations. The state and state supported organizations also provide communication vehicles. The Maine Technology Institute publishes a regular newsletter that includes information on technology-related programs and services statewide, and the Office of Innovation has a regular e-newsletter. While these are effective at promoting the organizations' activities to their members and providing critical information to members and companies in their industries and service areas, the communication channels are inadequate for creating a shared voice and an expanded presence for the technology community statewide and beyond.

Recommendation: The Maine Office of Innovation, along with key partners such as MTI, should help establish a Maine innovation web portal that expands upon the current tools and resources. The site should include a shared calendar for events sponsored by all technology-industry associations and support groups, and it should also include regular newsletters and other information that can be pushed out to key partners and stakeholders. The portal does

not need to be operated by the Office of Innovation; this work could be contracted out to other organizations. Numerous options are possible. For example, in Wisconsin, the Wisconsin Entrepreneur's Network (www.wenportal.org) has proved highly successful. In other states, private sector providers manage these functions. For example, Xconomy.com manages web portals covering the technology economy in numerous locations, such as Boston, San Diego, and Seattle. Other states, such as North Carolina, operate a portal and customer service center where business owners can request information or access to support services. The Maine Business Answers website provides some of these services, but does not presently provide access to wider range of information related to innovation and entrepreneurship.

A-4 Expand the communication of Maine's innovation resources to audiences outside of the state

Supporting Observations: There is no central location where one can find information about Maine-based innovation, R&D, workforce, financing, entrepreneurship, and education assets. At the same time, the stories of successes among researchers, entrepreneurs, and businesses are rarely presented to a wider audience. While Maine has made some significant strides in supporting its innovation economy, businesses inside the state as well as those outside of Maine know little about this progress and the number of resources and programs that may be available to them.

Recommendation: Building on lessons from the Maine Office of Tourism, a similar approach for branding Maine's assets can be developed through the Maine Office of Innovation . The state started such a comprehensive information approach under the Maine Science and Technology Foundation in 2000 through the creation of Mainescience.org, but the effort was scrapped with the demise of the Maine Science and Technology Foundation. It should be revived and revised to act as a portal where industry groups can obtain information and access resources as well as submit their stories to be a part of the state's innovation community. These recommendations will require additional resources for OOI. The current dedicated evaluation fund should be examined as a possible partial funding source for this effort to be combined with appropriations and even sponsorships.

B. Increase the Capacity for Growth and Competitiveness of Companies

Much of what industry associations do for their members has little direct interface with state government, with the exception that governments are often involved in funding or providing incentives for certain programs or efforts. Members of Maine's innovation-based industry associations would be better served with continued and accelerated focus on the following issues.

B-1 Increase access to early stage capital

Supporting Observations: All of the interviewed technology association leaders noted that their member firms face significant challenges in accessing outside sources of equity capital. Maine is not unique in this regard, as traditional venture capital firms are investing in fewer sectors, fewer regions, and in fewer deals. Many of Maine's technology firms are caught in what some observers call "the valley of death." They have built successful businesses that are poised to move into a rapid growth phase, but they need outside capital to help fuel more rapid growth. Yet few investors operate at this early stage phase, when firms need investments in the range of $250,000 to

$1 million. Maine has made efforts to address this challenge. Several nationally-recognized funds, such as Coastal Ventures, operate in the state, and angel investing has increased in recent years. For example, the Maine Angels have invested over $3.2 million in 21 different ventures. However, more could be done to enhance the full range of start-up equity capital in Maine

Recommendation: The state should expand funding for the Small Enterprise Growth Fund, which provides early stage funding ($100,000-300,000 range) and which has a track record of attracting other private equity funds to their investments. Increasing funding for SEGF is included in upcoming bond proposals to be considered by Maine voters. A collective advocacy effort is needed to inform voters of this program's importance.

The state should enact legislation to expand angel investment. Maine does have a seed capital tax credit program that provides significant tax credits to investors (60% of the value of the investment in certain economically challenged areas of the state and 40% in the remainder of the state) in Maine start-ups and growth-oriented companies. Proposals are currently being put forward to increase the level of tax benefit to 60% statewide and the transferability of credits to extend their use. Support for this should be part of a collective advocacy effort within the technology community.

Industry groups should continue to advocate for the Maine Fund of Funds, which would create a new vehicle for equity investment in the state. While TechMaine has been advocating for this program for two years, a more coordinated advocacy approach is needed to gain attention and support for this issue.

B-2 Enhance the entrepreneurial capacity through better coordination advisory services, technical assistance, and mentoring programs

Supporting Observations: Interviews for this case study, as well as work on past versions of this evaluation, have identified some common patterns in the current support environment for Maine's entrepreneurs. While the state has many support tools and services for new start-ups, the availability of support for faster-growing "gazelle" businesses is more limited. At the same time, coordination and collaboration among business service providers could be improved.

These findings are not new. Similar conclusions and recommendations have emerged from other research, including previous editions of this evaluation. Ten years ago, then-Governor Angus King established a task force, with backing from the Ewing Marion Kauffman Foundation, to help improve Maine's entrepreneurial service delivery system. While initial work began, no follow-on implementation ever occurred.

Recommendation: The Office of Innovation should take the lead on re-visiting the reforming the entrepreneurial service delivery system in Maine. This effort should build on earlier work sponsored by the Kauffman Foundation as well as ongoing research into entrepreneurship education that has been sponsored by the Governor's Quality of Place Council.

B-3 Systematically address workforce skills and availability issues that cut across all Maine Technology Industry Sectors

All of Maine's technology industry associations have identified talent development as a major concern, and each has attempted to address these problems in some fashion. For a variety of reasons, each industry has sought to ad-

dress its own unique challenges through its own unique industry lens or perspective. To date, most of these efforts have fallen far short of expectations and appear to have had limited impact on reforming Maine's workforce service delivery system.

Recommendation: Explore the feasibility of establishing a cross-industry collaboratives or workforce development partnerships that would take a systematic look at building a healthier pipeline of technology-savvy talent, including strengthening workforce development activities in Maine's higher education system, Career Centers, Department of Labor, Workforce Investment Boards, and among other non-profit workforce-related service providers.

C. Enhance advocacy vehicles and the improve engagement between state government and the private sector

Supporting Observations: Industry representatives indicated in interviews that they would welcome enhanced opportunities to engage in policy and program discussions at the state level if such discussions were more interactive and took a systematic look a state policy and programs. While they currently provide input into state plans and review proposed programs, they delineated "input" from "engagement." In states with effective legislative coordination among industry groups there was a common thread—they had a body/committee in which regular, interactive (not periodic) discussions occurred between the private sector and government officials.

Many pointed to the Maine Innovation Economy Advisory Board (MIEAB) as the logical vehicle to expand private sector engagement. The perception among those interviewed is that MIEAB has significantly increased awareness for the innovation economy among state programs and universities. MIEAB's work could be further enhanced by engaging the private sector in proactive and ongoing conversations about innovation and industry clusters. Currently Maine industry views MIEAB more as a coordinating body for research institutions and state programs, with less interaction with the private sector. Private sector interviews note a difference between being asked about a specific issue or idea and having a real systems discussion about innovation. With relatively modest modifications, industry leaders thought MIEAB could be a more effective conduit between government and the private sector.

Recommendations: Establish a technology committee within MIEAB. Building on suggestions from interviews and best practices of other states, a technology committee within MIEAB could be established that would consist only of private sector members—expanding beyond council members to other business and executive directors or chairs of key technology groups. This committee would be instrumental in defining shared needs among industry clusters and acting as a communication channel to both the broader council and the array of science and technology associations throughout the state. It would provide a vehicle by which technology organizations could quickly align around policy issues or make recommendations to program development and funding allocations.

Convene an annual innovation roundtable: Maine lacks an event or vehicle by which technology groups and related organizations like angel networks can convene to identify shared business development and policy issues. Holding an annual summit where various industry groups discuss their cluster development and R&D needs with MIEAB, key state agencies and selected members of the assembly could accomplish two goals. First, it could identify key business development issues facing science and technology companies in Maine, and examine ways in which collaboration among organizations would be beneficial. Secondly, it could identify leading policy and program issues in advance so that organizations could better anticipate and respond to policy debates that might affect the technology sector.

APPENDICES

APPENDIX A – MAINE'S TECHNOLOGY RELATED INDUSTRY ASSOCIATIONS

APPENDIX B - TIMELINE OF SIGNIFICANT MILESTONES IN MAINE'S INNOVATION AND R&D PROGRAMS AND INVESTMENT

APPENDIX C - INTERVIEWS CONDUCTED FOR THIS CASE STUDY

Appendix A – Maine's Technology Related Industry Associations

Biotechnology Association of Maine

Established: 1989

Website: www.mainebiotech.org

Primary Contact:

Gary Goodrich
President of Biotechnology Association of Maine and President of Bioprocessing Inc.
1045 Riverside St
Portland, ME 04103
Phone: 207-457-0025
Email: gary@bioprocessinginc.com

Primary Sectors Served: biotechnology/bioscience

E2 Tech Council

Established: Created through a merger of the Environmental Business Council of Maine and the Maine Environment & Energy Center in 2002

Website: www.e2tech.org

Primary Contact:

Samuel C. Townsend, Executive Director
P.O. Box 2253, Portland, ME 0411
Phone: 207-767-5283
Email: director@e2tech.org

Primary Sectors Served: energy and environment

Maine Aquaculture Association

Established: 1976

Website: www.maineaquaculture.com

Primary Contact:

Sebastian Belle, Executive Director
P.O. Box 148
Hallowell, ME 04347
Phone: 207-622-0136
Email: info@maineaquaculture.com

Primary Sectors Served: aquaculture

Maine Composites Alliance

Established: 1999

Website: www.mainecompositesalliance.org

Primary Contact:
Steve Von Vogt, Executive Director
Maine Composites Alliance
P.O. Box 129
Portland, ME 04112
Phone: 207-828-1414
Email: svonvogt@mainecompositesalliance.org

Primary Sectors Served: advanced materials and composites

Manufacturers Association of Maine

Established: Maine Metal Products established in 1964 and became Manufacturing Association of Maine in 2006

Website: www.maine-metals.org

Primary Contact:
Lisa G. Martin, Executive Director
386 Bridgton Road
Westbrook, Maine 04092
Phone: 207-854-2153
Email: lisa@mainemfg.com

Primary Sectors Served: manufacturing

Technology Association of Maine, TechMaine

Established: Established as Maine Software Developers Association (MESDA) in 1992 and became Technology Association of Maine (TechMaine) in 2008

Website: www.techmaine.com

Primary Contact:
Joe Kumiszcza, Executive Director
506 Main Street
Westbrook, Maine 04092
Phone: 207-857-3003 x101
Email: joe@techmaine.com

Primary Sectors Served: information technology

Appendix B - Timeline of Significant Milestones in Maine's Innovation and R&D Programs and Investment

- Maine Metal Products Association started – 1964
- Maine Aquaculture Association started – 1976
- The Maine Science and Technology Commission created by State Statute – 1987
- Maine Seed Capital Tax Credit program established – 1987
- Maine Agricultural Market Research and Development Fund established – 1987
- The Maine Technology Investment Fund started (pre-cursor to the Maine Technology Institute) – 1987
- The Maine Aquaculture Innovation Center established – 1987
- The Maine Manufacturing Extension Partnership established – 1987
- Maine Marine Research Grants established (predecessor to Maine Marine Research Fund program) – 1989
- Center for Innovation in Biotechnology started – 1989
- Biotechnology Association of Maine started – 1989
- The "original five" (group of UMaine faculty) develop and present R&D agenda to legislature – early to mid 1990's – led to eventual creation of R&D funds to University and eventual annual amount in the form of the Maine Economic Improvement Fund
- Maine Investment Tax Credit created – 1991
- State Investment in R&D support and related programs equals $2 million – 1991
- The Maine Space Grant Consortium established – 1992
- First Maine Science and Technology Action Plan Published by Maine Science and Technology Commission – 1992
- Maine Software Developers Association (MESDA) Started – 1992
- Maine Research Internships for Teachers and Students (MERITS) program established – 1992
- Maine Science and Technology revised and incorporated in statute as the Maine Science and Technology Foundation – 1993
- Center for Entrepreneurship School of Business University of Southern Maine established – 1996
- Research Expense Tax Credit created – 1995

- State Investment in R&D support and related programs equals $28 million – 1996
- Super Tax Credit for Substantially Increased Research and Development created – 1997
- High Technology Investment Tax Credit established – 1997
- Second Maine Science and Technology Plan Published – 1997
- Maine Economic Improvement Fund established by legislature – 1997
- First Science and Technology Report Card (now the Innovation Index) published – produced annually since 2001 as the Innovation Index – 1998
- Joint Select Committee on Research and Development established in legislature – 1998
- The Maine Small Business Innovation Research (SBIR) Assistance Program started – 1999
- Science Works for Maine established –1999
- Governor's Marine Studies Fellowship Program established – 1999
- Raymond H. Fogler Library at the University of Maine designated as the State Research Library for Business, Science and Technology – 1999
- The Center for Law & Innovation established (known at that time as the University of Maine System, Center for Advanced Technology Law & Management) – 1999
- Maine Patent Program established – 1999
- Maine Technology Institute established – 1999
- Applied Technology Development Centers established – 1999
- Maine Biomedical Research Program established – 1999
- Maine Composites Alliance started – 1999
- Mainescience.org created (on-line science and technology clearinghouse) – 2000
- Maine's Comprehensive Research and Development Evaluation established by State Statute – 2000
- Maine Cluster Grant Program of MTI established – 2000
- First Comprehensive Economic Development Evaluation conducted and published – 2001; conducted and published annually since
- State Planning Office publishes 30/1000 report and boosts case for investment in R&D and education – 2001
- State Investment in R&D support and related programs equals $40 million – 2001
- The Maine Centers for Innovation program established which includes the Center for Excellence in Biotechnology and Maine Aquaculture Innovation Center- 2001

- Small Enterprise Growth Fund established - 2001
- Maine Venture Investment Revolving Loan Fund established - 2001
- First EPSCoR funding received by state -2001
- Entrepreneurship Working Group established and works with Kaufman Center -2001
- First study conducted of Maine's Technology Clusters – 2002
- E2 Tech Council started through a merger of the Environmental Business Council of Maine (EBCM) and the Maine Environment & Energy Center (Maine E2 Center) - 2002
- Maine Science and Technology Foundation eliminated by Governor and Legislature and Maine Office of Innovation within the Department of Economic and Community Development created – 2003
- Science and Technology Advisory Board created – 2003
- National Accreditation of the Maine Small Business Development Center (SBDC) as a Technology Development - 2003
- Maine Innovation Economy Advisory Board formed by Executive Order (originally the Science and Technology Advisory Board) – 2004
- State Investment in R&D support and related programs exceeds $60 million - 2004
- Third State Science & Technology Action Plan published – 2005
- EMHS, The Jackson Lab, and University of Maine charter the Maine Institute for Human Genetics and Health - 2005
- Maine Metal Products become Manufacturers Association of Maine– 2006
- Maine North Star Alliance Initiative established – 2006
- Foster Student Innovation Center opened at UMaine – 2006
- Maine Innovation Economy Advisory Board established in statute – 2007
- Maine Technology Asset Fund Grant program established - 2007
- MESDA becomes TechMaine – 2008
- Maine Technology Asset Fund established – 2008
- Second Study of Maine's Technology Clusters conducted – 2008
- Top Gun Entrepreneur program started – 2009
- Fourth State Science and Technology Plan Drafted by Maine Office of Innovation and Maine Innovation Economy Advisory Board – 2010

Appendix C - Interviews Conducted for this Case Study

Interviewee	Affiliation
Tim Brooks	Technology Association of Maine
Roger Brooks	Maine Technology Institute
Joe Kumiszcza	Technology Association of Maine
Steve Bazinet	Maine Center for Enterprise Development
Todd Keiller	Technology Transfer
Chris Seph	Maine Angels
Entrepreneur Forum	Group created on Linked-In
Lisa Martin	Manufacturing Association of Maine
Steve Von Vogt	Maine Composites Alliance
Sam Townsend	E2 Tech Council
Dana Connors	Maine State Chamber of Commerce
Meriby Sweet	Ropewalk Consulting
Tony Perkins	TechVentures Group
Tony Paine	Kepware
Dana Huchins	ImageWorks
Sebastian Belle	Maine Aquaculture Association
Deb Cook	Cook Consulting
Chris Hall	Portland Regional Chamber of Commerce
Peter Murray	Quantrix
Gary Goodrich	Bioprocessing Inc.
Jim Atwell	Sevee & Maher Engineers
Gary Hamer	Nebraska Dept of Economic Development
Deborah Clayton	Kentucky Department of Commercialization and Innovation
Sandra Watson	Arizona Dept of Commerce, Governor's Council on Innovation and Technology
John Hardin	North Carolina Board of Science & Technology
Renee Winsky	Tech Council of Maryland
Harvey Mathews	Software Association of Oregon, Former lobbyist, Association of Oregon