Maine Technology Institute
Investing in Promising Technologies

Evaluation of Maine Technology Institute Programs

For Awards Ending July 1, 2006-June 30, 2008

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Center for Business and Economic Research
A Joint Center of the School of Business and the Muskie School of Public Service

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Introduction

- The Maine Technology Institute (MTI) is charged by the Legislature to conduct an evaluation of its programs every two years addressing issues of the effectiveness of MTI's grant programs in fostering technology-based economic development. MTI has engaged the Maine Center for Business and Economic Research (MCBER) at the University of Southern Maine to conduct this evaluation. This is the fourth valuation report prepared by MCBER; previous reports were released in 2003, 2005, and 2007.

- This report covers all MTI grants that were completed between July 1, 2006 and June 30, 2008, except for grants under the Cluster Enhancement Program. Grants under that program will be evaluated in the next evaluation prepared by MCBER to be released in 2010. *All dates in this report refer to the fiscal year (July-June) in which a grant closed.*

- The assessment of MTI programs is conducted through a report by all recipients concerning their organization, the research projects, and grant awards. This report is filed through an online reporting system that is managed as part of the State of Maine's Research and Development Evaluation by Policy One Research of Scarborough. All grants which close by June 30 of a given year are required to report within one year of grant closure, and are required to provide follow-up information once a year for each of the four subsequent years following grant closure. For more information about the survey, see the Technical Information section at the end of this report.

- In fiscal years 2007 and 2008, 277 MTI grants issued to 210 recipients were completed. The grants totaled $7,632,126, which was matched by $13,322,171. Of the completed projects, 211 were seed grants (totaling $1,851,278) and 28 were development awards ($5,614,891).

- There were also 38 Small Business Innovation Research Phase Zero Awards with a total value of $165,957. Nineteen of these awards totaling $88,636 resulted in applications to fourteen different federal agencies. Of these, seven were funded receiving a total of $3,095,976 in federal grant funding.

- MTI grants to the University of Maine are included in the totals listed above, but the results are not covered in this report; they are examined in the overall evaluation of Maine Research & Development support programs.

- Dr. Charles Colgan, Professor of Public Policy and Management, was principal investigator for this project and author of this report. Dr. Bruce Andrews, Professor of Management Science, served as project director. James Damicis, President of Policy One Research coordinated data collection for this project and for the Maine R&D evaluation. Research Assistants on the project included Robin Kimball, Anil Oztuncer, Baris Sagiroglu, and Benjamin Wu.

Key Findings

- MTI continues to succeed in fulfilling its mission to catalyze research and development activities leading to commercially available products. Over 2007-2008, $7.1 million in MTI grants leveraged over $117 million in other public and private funds for research and product development, or $14.27 for every $1.00 in MTI funding.

- Research is an inherently risky activity, but MTI-funded projects have had a high rate of success. The growth in research projects resulting in new commercial projects has slowed somewhat in 2007-2008 compared with 2002-2006 reflecting a smaller number of closed grants in the last two years. The number of new products resulting from MTI research that are on sale at the time of the survey has been at a consistently high level over the last three years.

- MTI-funded companies have shown economic growth over the two-year period. MTI grantees showed overall employment growth in 2007 and 2008 faster than Maine economic growth, but employment showed a modest decline in 2008, consistent with the slowdown in the U.S. and Maine economies. However, nearly 80% of firms report stable or growing employment over the period indicating the decline in employment in 2008 was concentrated in a relatively small number of firms. MTI funds show steady revenue growth throughout the period.

- 2007-2008 MTI firms remained predominantly small, with nearly 80% having ten or fewer employees.

- MTI clients continue to indicate that a majority of the sales from their MTI-supported products will be in the U.S. and outside of Maine. Export markets outside the U.S. continue to be less than 20% of markets for MTI client companies.

- MTI research projects continue to generate a high level of successful efforts to secure intellectual property protection in the form of patents, trademarks, and registered trade secrets. There has been significant growth in the use of trade secrets , but no copyrights were secured (although copyright law may automatically cover many of the results of some types of MTI projects such as software).

- MTI development award and seed grants have been very flexible in how they can be used. Over the past two years, MTI development awards have become more focused on later-stage R&D activities and seed grants have become more focused on earlier-stage activities.

- Of the seven technology sectors, successful product development has been led by projects in Precision Manufacturing and Information Technology. Environmental Technology products indicate the greatest likelihood of having a commercially-available product within two years.

- MTI grants closing in 2007-2008 went to recipients in fourteen counties. Cumberland County was the largest recipient of grants in both numbers and in amounts per capita, although Waldo County also showed a higher proportion of MTI grant dollars per capita.

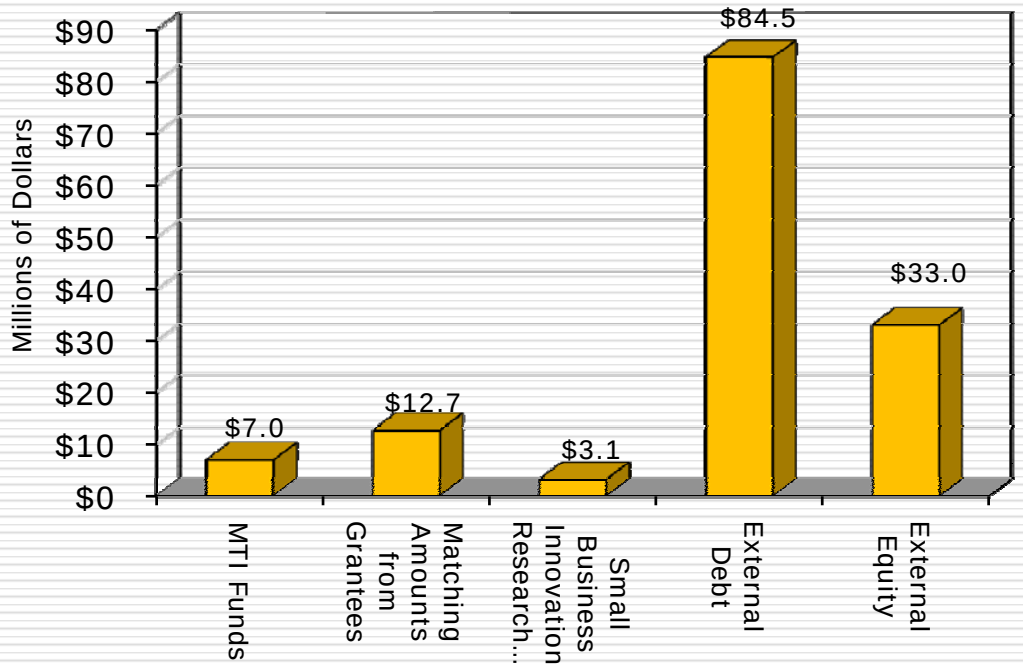
Research Products

MTI's total investment of $7 million for all five years has multiplied many-fold in the form of matching funds pledged by grantees ($12.7 million) and the attraction of debt and equity investments for expansion of MTI client companies. MTI grantees pledged or secured $117.5 million in additional funds to support research, development, and production of new products. SBIR Phase 0 grants of $88.6 thousand yielded federal grants of nearly $3.1 million. Including MTI grant funds, over $140 million was raised for research and development and for investments in businesses supported by MTI.

At an average of $70 million per year, the grants that closed in the two-year period 2007-2008 were even more productive in securing funding over and above MTI funds than the grants in the period 2002-2006, which averaged $40 million per year.

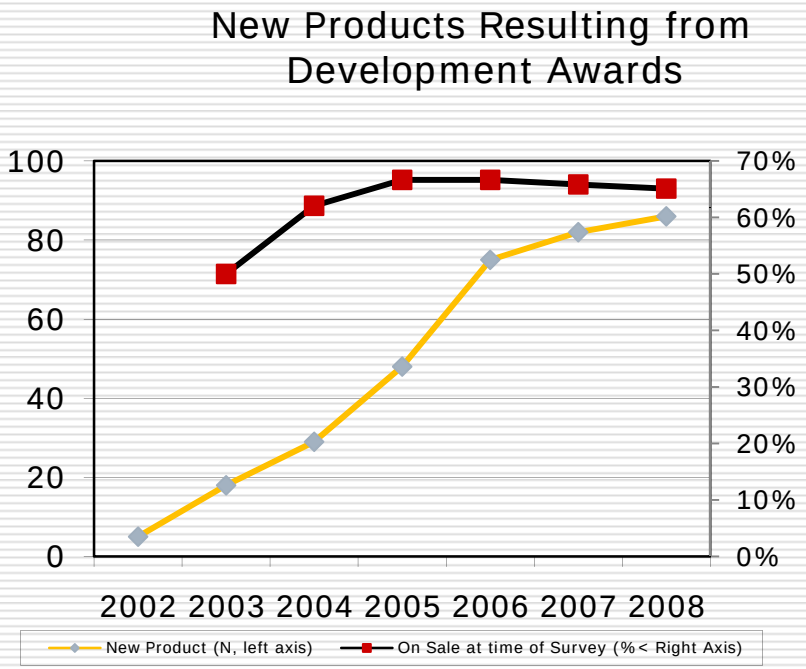
MTI projects closing in 2007 and 2008 yielded $14.27 in non-MTI funding for every $1.00 of MTI funds, up from $12.00 in 2002-2006.

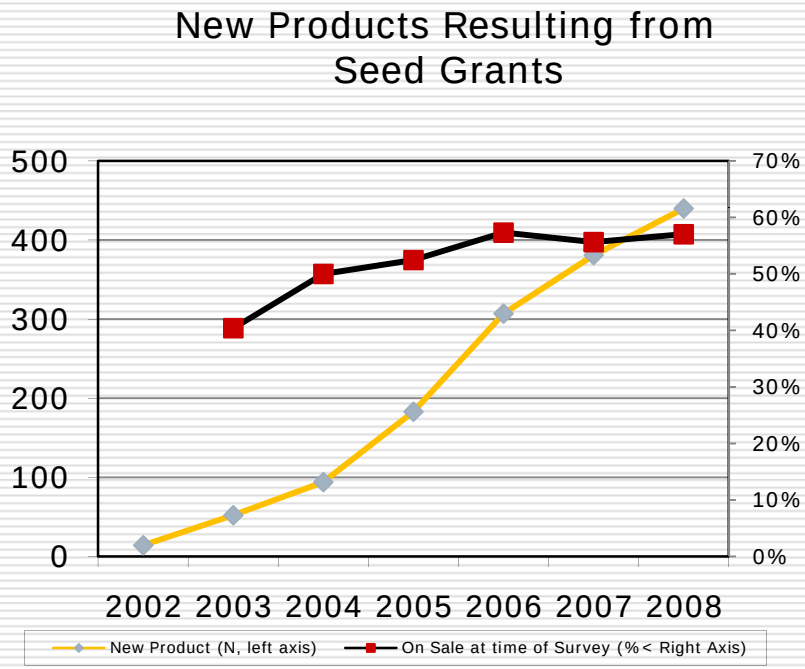
Funds for R&D and Production



NOTE: Figures do not include Cluster Enhancement Awards

MTI grant recipients report a high rate of success in developing new products. The smaller number of development awards closing in 2007-2008 (see p, 28) has resulted in a slowing in the rate of growth in new products from development awards. However, the proportion of companies that have developed a commercial product who have that product on sale at the time of the survey has remained essentially constant for both Development Awards and Seed Grants over the past three years.

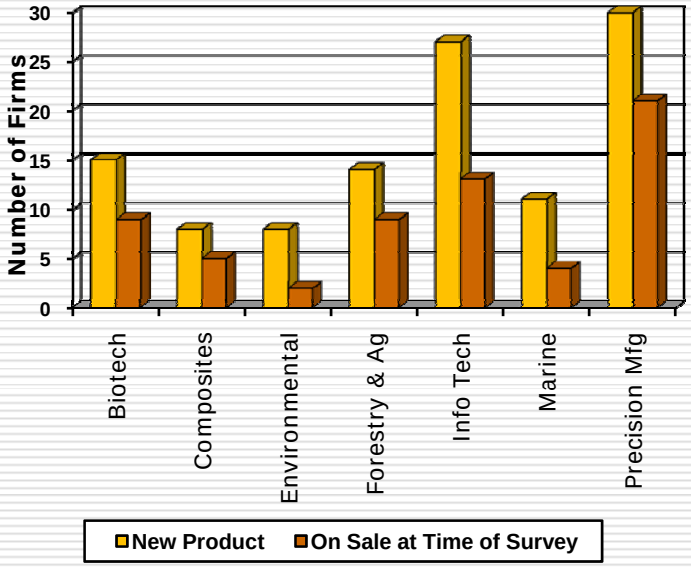




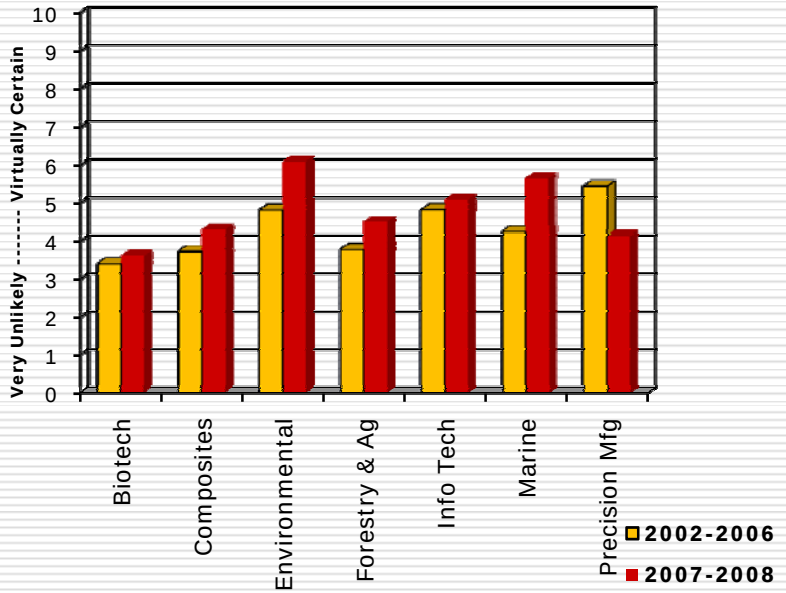
Firms in Precision Manufacturing and Information Technologies continue to be the largest generators of new product with their MTI funds. Environmental Technology firms also continue to be the lowest generators of new products. Precision Manufacturing and Forestry-Agriculture firms are the most likely to have their new products on sale at the time of the survey.

However, Environmental Technology firms are most optimistic about being able to bring their product to market within the next two years, followed by firms in Marine Technology and Aquaculture. Respondents appear to have become somewhat more optimistic about the chances of bringing products to market in the two most recent years of grant completions. Respondents were asked to estimate how likely (on a scale of 1-10) it is that their research would result in a new product for sale within two years (with 1 being least likely and 10 being most likely). From 2002-2006, Seed Grant recipients were more optimistic about their projects (mean=5.8) than Development Award recipients (mean=4.4), but this reversed in the last two years with Development Award recipients more optimistic (mean=8.0) than Seed Grant recipients (mean=4.9).

Number of Firms Indicating MTI Assistance Led to Product for Sale



Likelihood of Marketing MTI-Supported Product Within Two Years

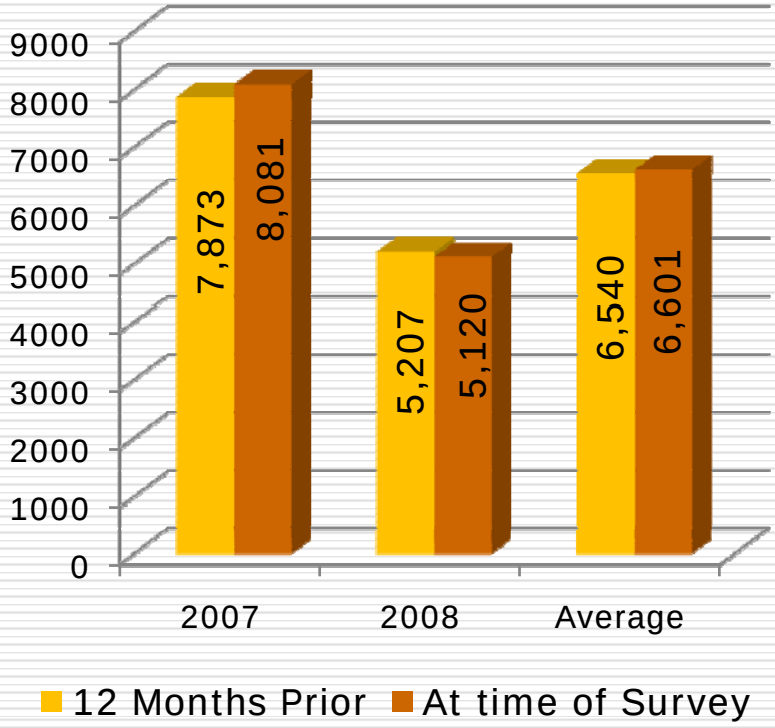


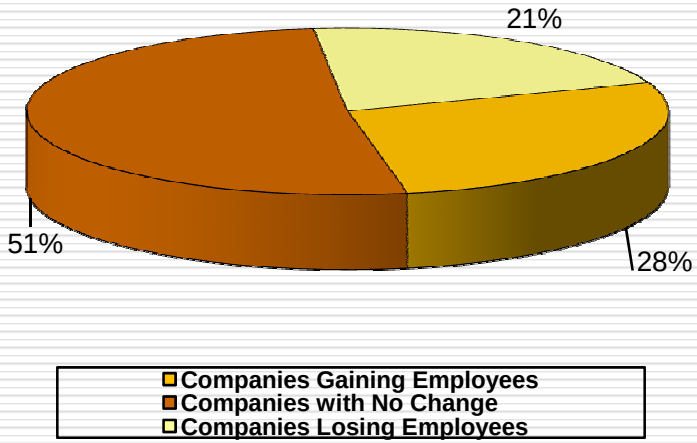
Economic Impacts

MTI-assisted companies who closed grants in 2007 increased employment by 2.6%, which compared favorably with overall Maine employment growth in 2007 of 0.8%. However, employment slightly declined in 2008-closing companies reflecting overall weaknesses in the economy. Almost four-fifths (79%) of MTI companies reported stable or growing employment from year to year.

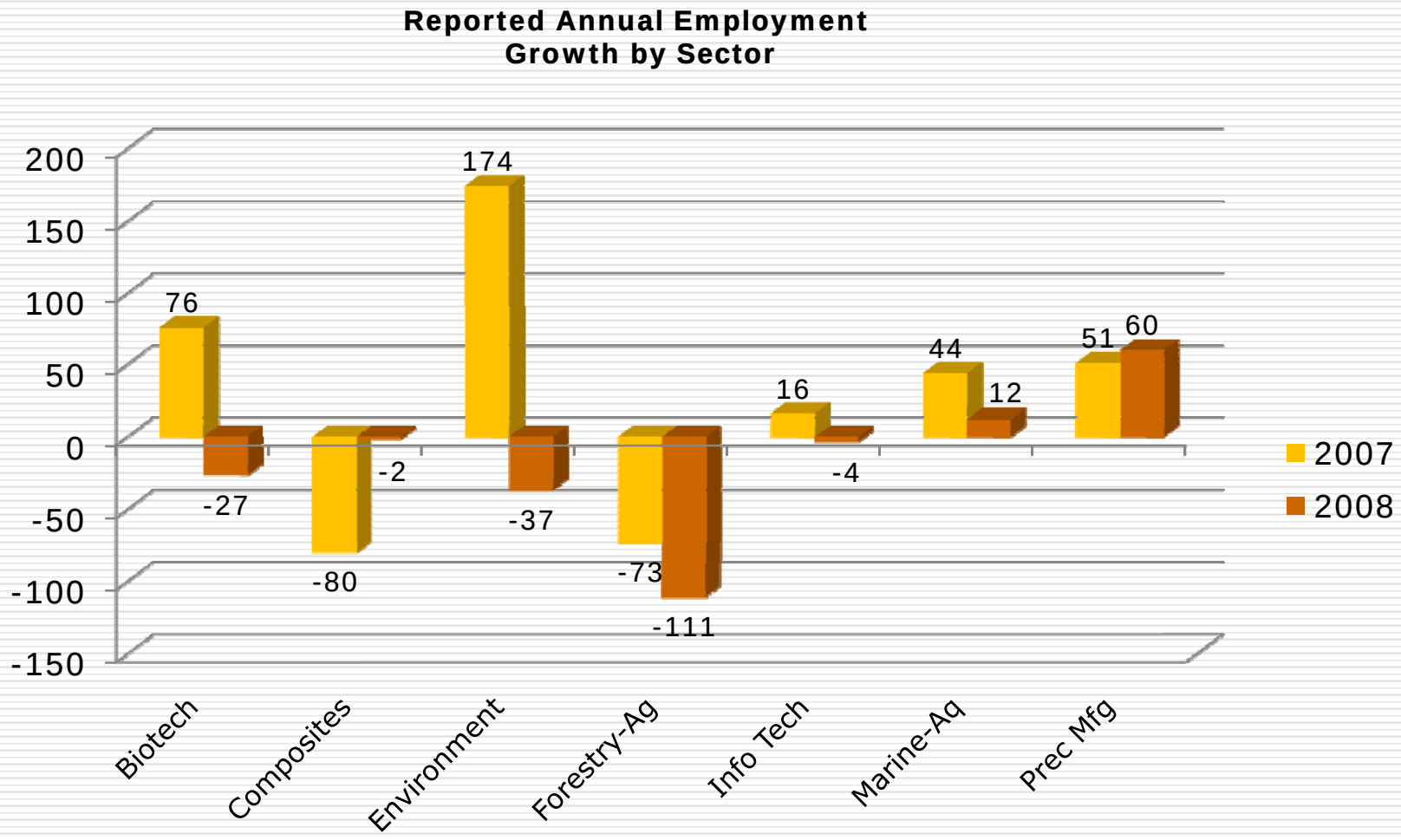
This pattern of employment growth is consistent with earlier experience with MTI companies. MTI-company employment tends to be similar to state and national trends, but MTI companies tend to outperform the Maine economy as a whole.

Employment in MTI-assisted Companies at Time of Survey and 12 Months Previous





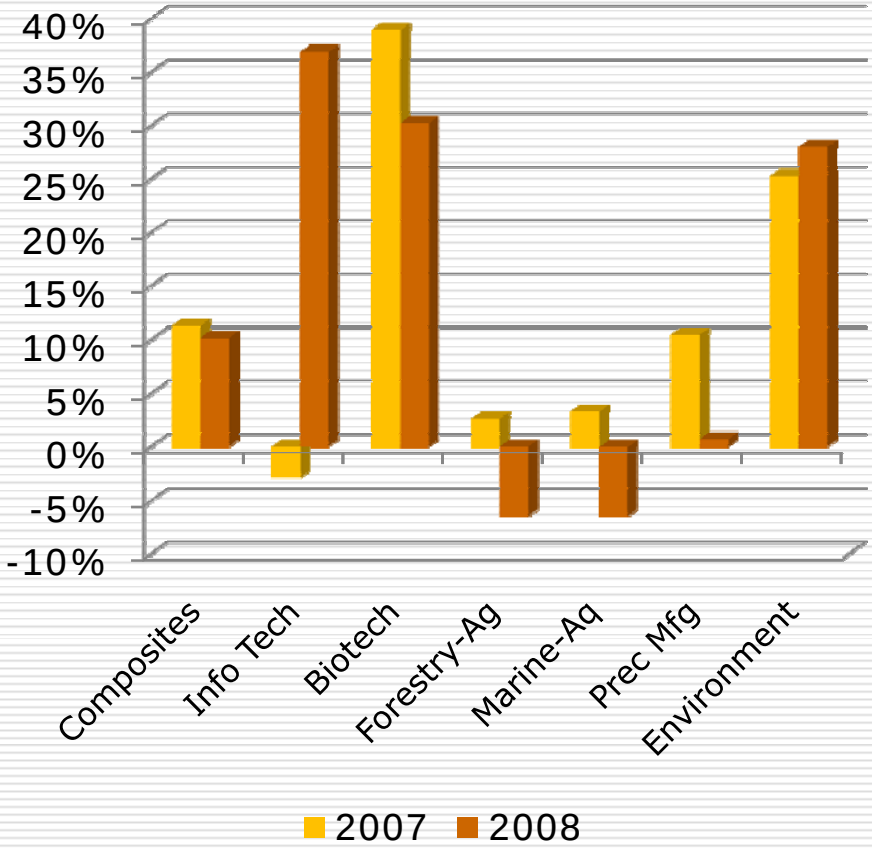
Employment growth measured on an annual basis (employment at the time of survey v. one year earlier) was led by firms in the Environmental and Energy field in 2007, with Biotechnology also showing notable growth. Forestry and Agriculture showed decline in both years, consistent with past trends. Composites also showed a slight decline in both years, a reversal of previous trends. Marine Technology-Aquaculture and Precision Manufacturing were the only two sectors showing growth in both years.



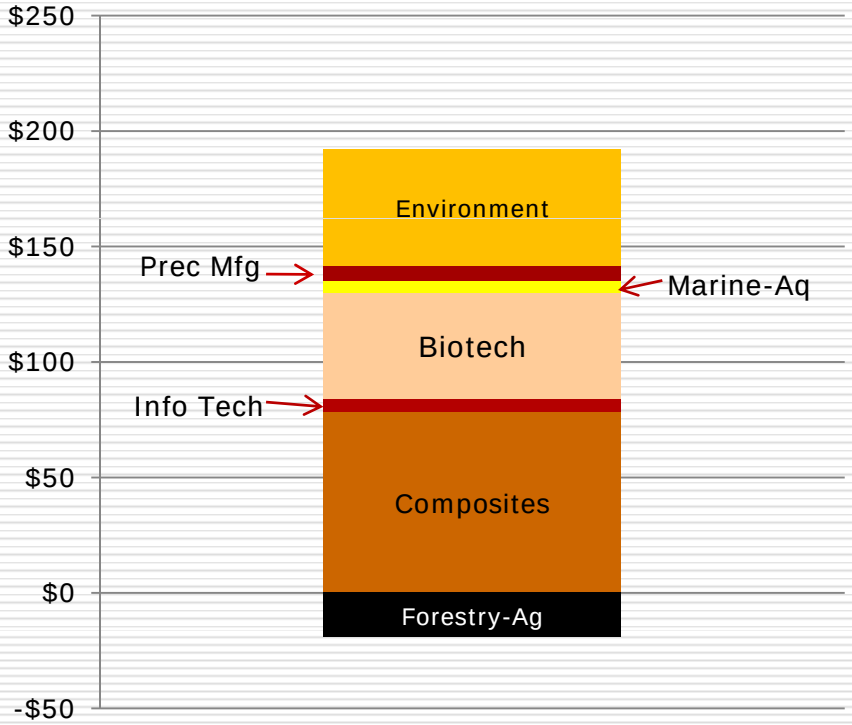
Across the two-year period of completed grants, MTI clients reported revenue growth of more than $173 million, an average revenue growth of $322 thousand per firm. Overall revenue grew by 6.5% over this period for companies closing MTI grants in 2007 and 2008.

Biotechnology and Environment firms led the way in growth rates, but Composites had the largest share of the revenue growth among MTI clients. Results were mixed for the natural resource sectors, while Information Technology had a substantial revenue growth in 2008.

Reported Annual Revenue Growth by Sector



Share of Revenue Growth in Millions (2007 and 2008)



*Revenues in prior year were not reported in 2002.

The preceding analysis of employment change focuses on grant-recipient-reported changes in employment during the year in which they are surveyed. The analysis of revenues focuses only on aggregate growth as reported each year. Another perspective on both employment and revenue growth is provided by tracing employment and revenue growth from year to year for the same company.

The following tables show the changes in employment and revenues for companies that reported in 2008 and also reported in an earlier year. The figures show the employment and revenues at the time of the survey in each year. Employment remained fairly stable over the five-year period, dipping in 2008 as suggested by the data in the analysis on the previous page. Revenue growth was fairly robust for those companies who first reported in 2004 and continued to report through 2008. Those companies which began to report in 2005 also showed a healthy revenue growth, but there was a fall off between 2007 and 2008, as was true for those companies which began reporting in 2006.

These long-term data show that MTI companies (those contained in this sample) have showed steady economic contributions to Maine, but there has not yet been a "break out" growth pattern in either employment or revenue growth.

Employment Change 2001-2006: Same Firm

2004	2005	2006	2007	2008	N Reporting
1022	1007	1047	992	930	20
	1560	1510	1552	1344	40
		3832	3936	3371	164

Revenue Change 2002-2006: Same Firm

2004	2005	2006	2007	2008	N Reporting
$161.55	$192.58	$222.54	$254.76	$269.50	13
	$232.92	$249.74	$321.02	$300.51	26
		$953.27	$1,079.51	$914.20	122

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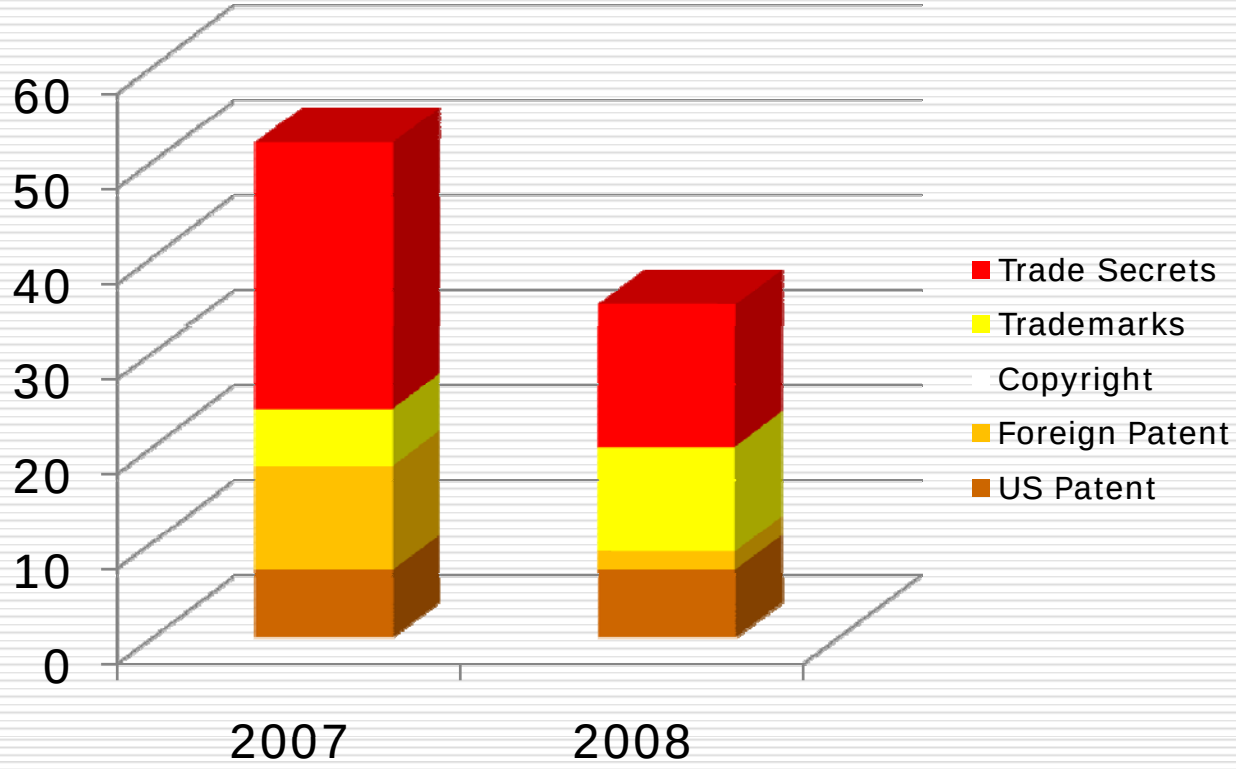
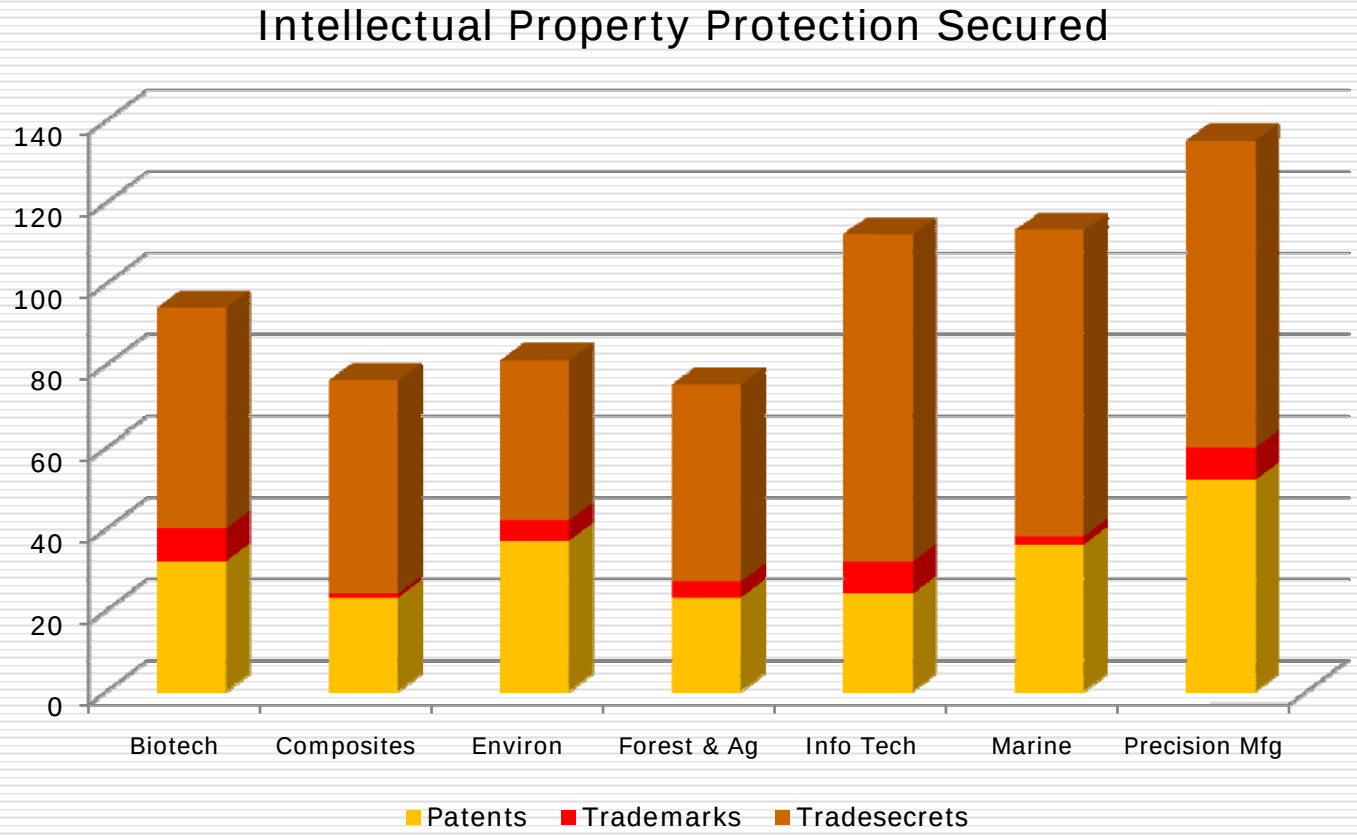
Intellectual Property

Intellectual property protection remains an important activity for MTI clients, with trade secret protection being the most popular form of IP. The number of companies securing US patents was fairly low, but foreign patent protection in 2007 was quite robust. No projects were reported as being copyrighted, though implicit copyright may cover many projects such as software.



Projects related to Precision Manufacturing are still the most likely to seek intellectual property protection, while projects in the Composites sector and in Forestry and Agriculture are the least. Precision Manufacturing, Biotechnology, and Environmental sector projects secured the most patents; Information Technology projects secured the most trade secret protection.

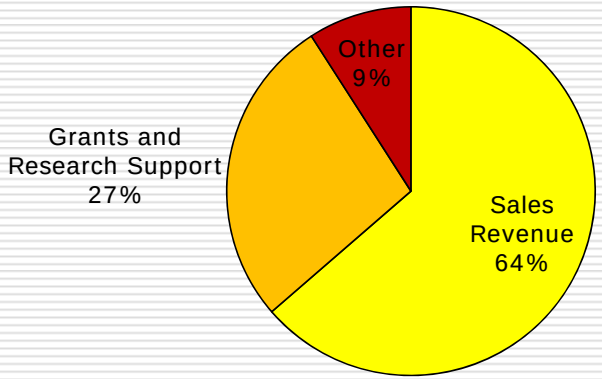


Effects on Company Finances

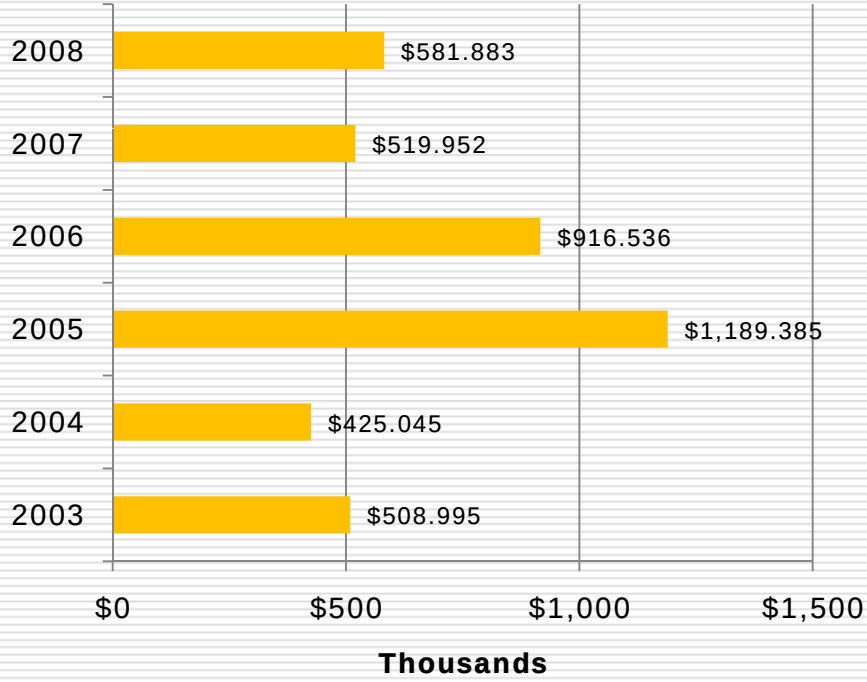
Overall, MTI recipient firms rely on sales for 64% of their revenues and on grants (from MTI and other research funders) for 27%. The proportion made up by grants and research supports increased somewhat in 2007 and 2008 compared with earlier years.

Recipients completing their MTI-assisted projects from 2003 to 2008 report a total of $4.142 million in Maine corporate income taxes. However, this figure understates the tax impacts because many MTI clients will not have paid taxes through the corporate income tax, but through the personal income tax as partnerships, Chapter S corporations, or as sole proprietorships.

Sources of Firm Revenues
All Years

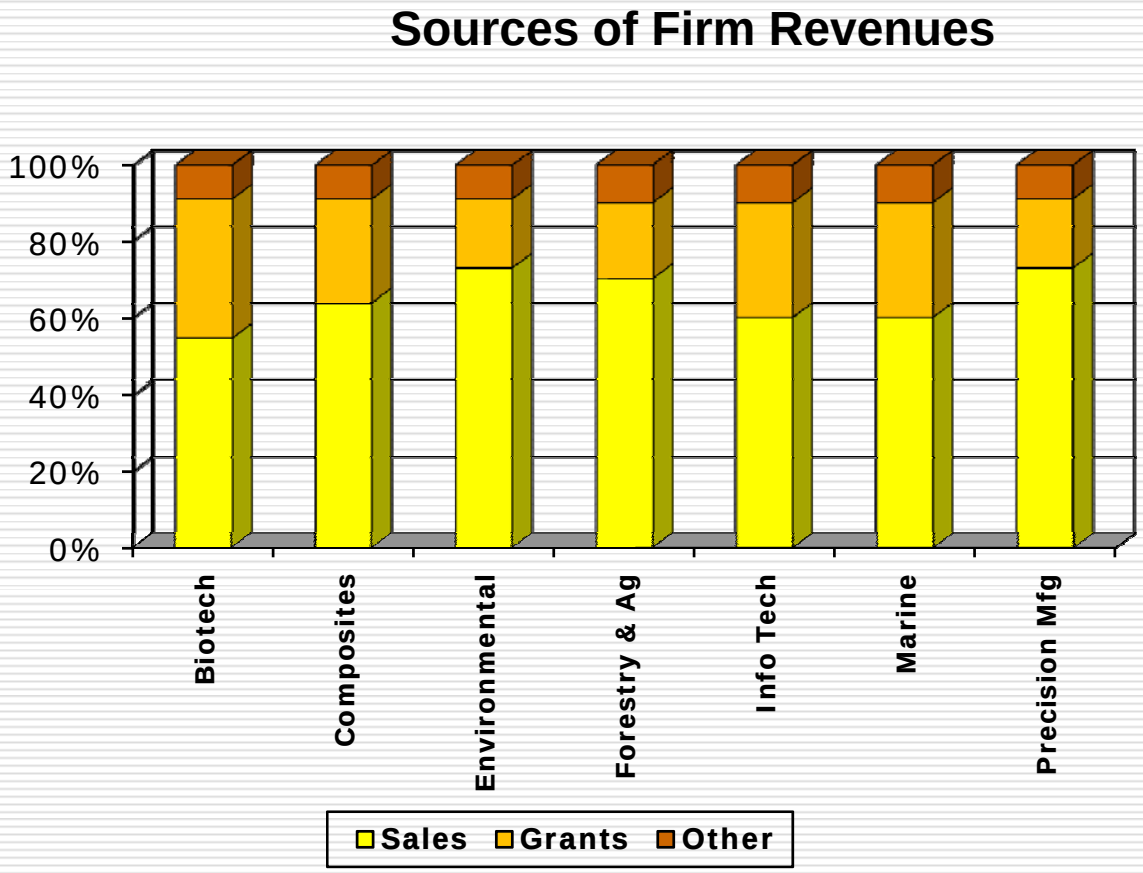


Corporate Income Taxes Paid



*Note: This question not asked in 2002

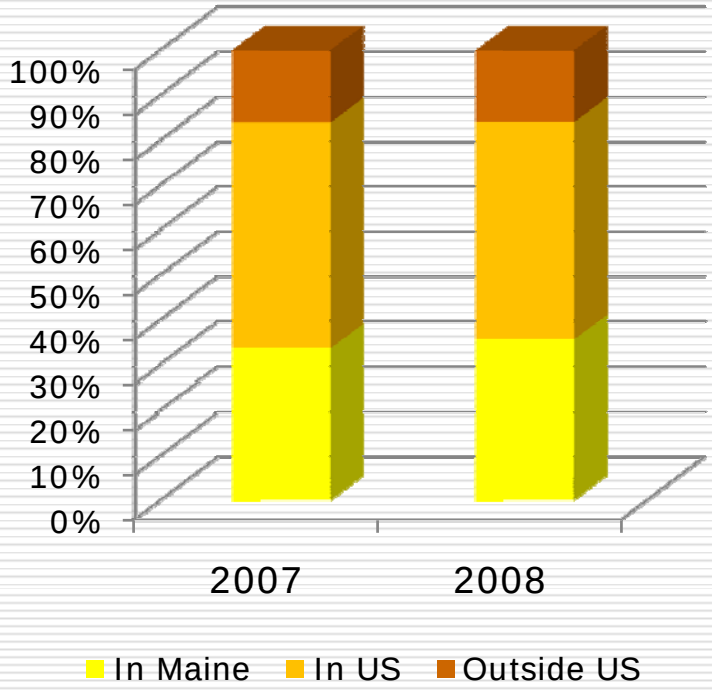
Biotechnology firms are the most dependent on grants and the least dependent on sales, as would be expected of this relatively young sector. In contrast, the more established sectors of manufacturing and forestry/agriculture have higher proportions of sales revenues. Environmental technologies also had showed a high proportion of sales revenues, which is an upward trend from the 2002-2006 period.

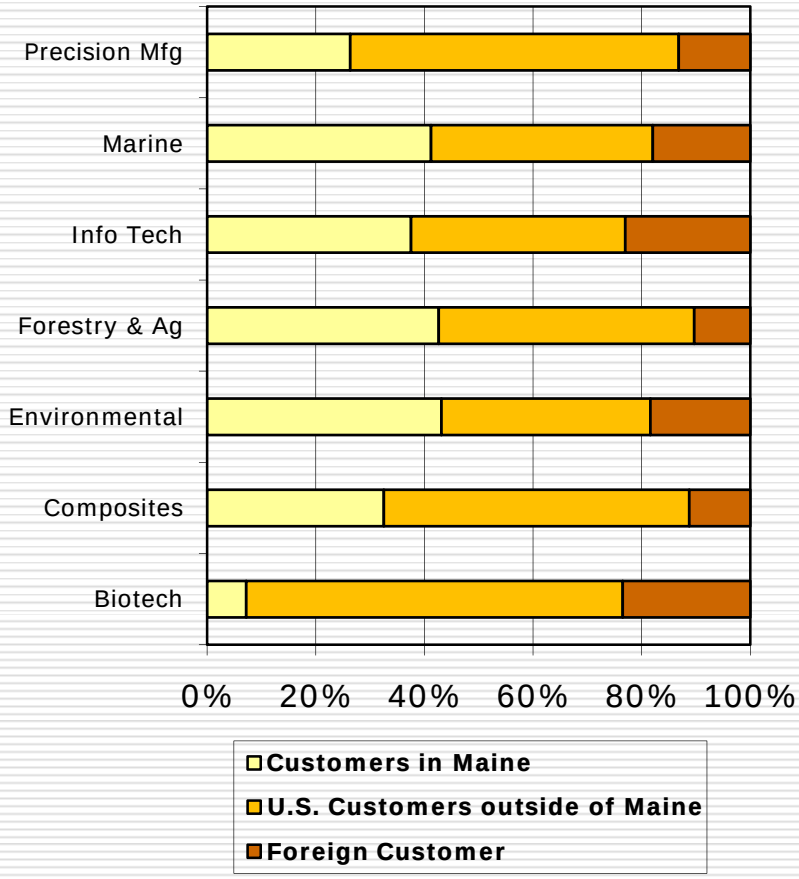


MTI clients continue to indicate that the majority of their sales are expected to be to customers outside of Maine, predominantly in the rest of the U.S. Exports outside the U.S. remain in the 15-20% range.

Firms in Biotechnology continue to expect Maine will be their smallest market for their MTI-funded projects, and also continue to have the largest expectations for exports. Composites have the smallest expectations for exports outside the U.S., along with Forestry and Agriculture firms. Firms with projects in Environmental Technologies, Forestry and Agriculture, and Marine Technologies/Aquaculture expect to have the largest proportion of their sales within Maine.

Sales Expectations for MTI-Funded Projects

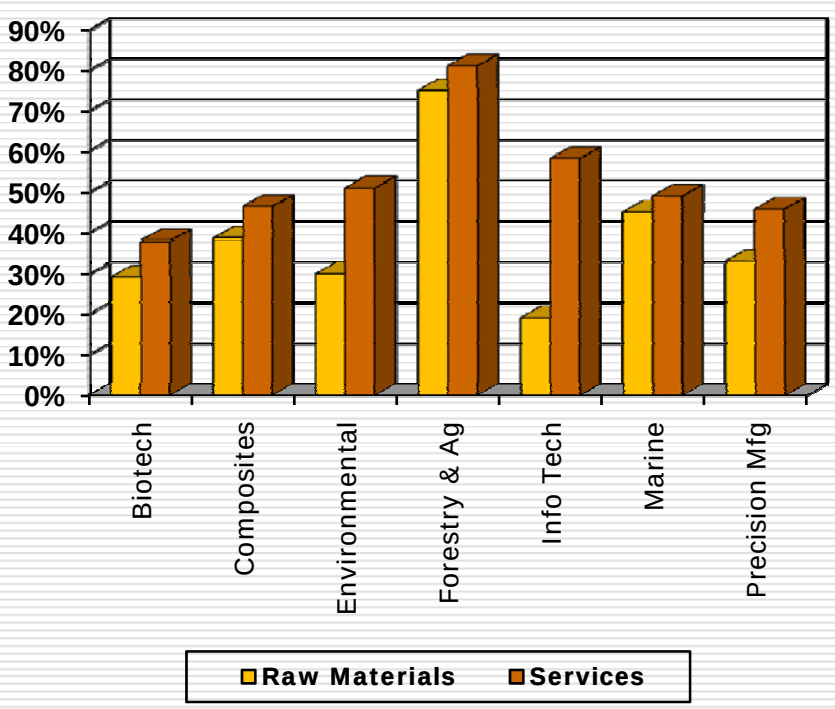


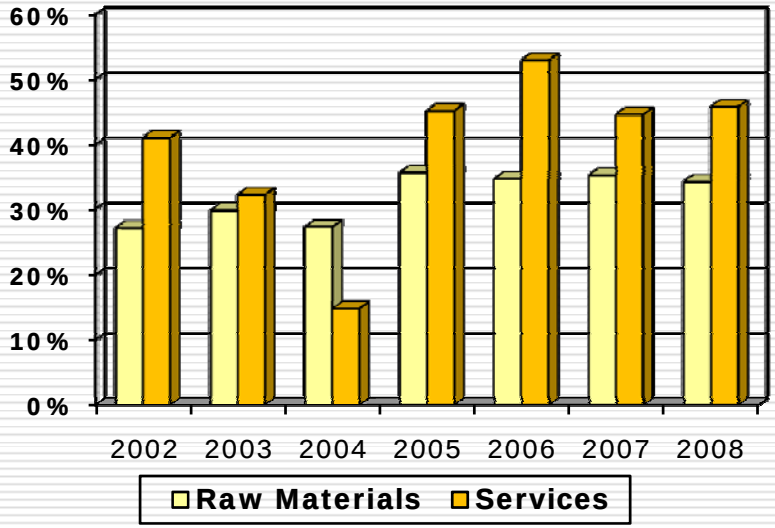


MTI clients with grants closing in 2007-2008 indicated that they expect to purchase 35% of their material inputs and 45% of their services inputs from other firms within Maine for the production of the MTI-assisted products. This was an increase from the average proportion of inputs in 2002-2006 (32% and 37%).

Forestry and Agriculture products have taken over from Environmental Technology in terms of the projects with the largest portion of raw material inputs from Maine, as Forest and Agriculture has taken over from Marine Technology in the purchase of service inputs from within Maine. Biotechnology firms continue to expect to purchase the smallest proportion of raw materials and services (30%)

Proportion of Raw Materials and Services to be Sourced within Maine



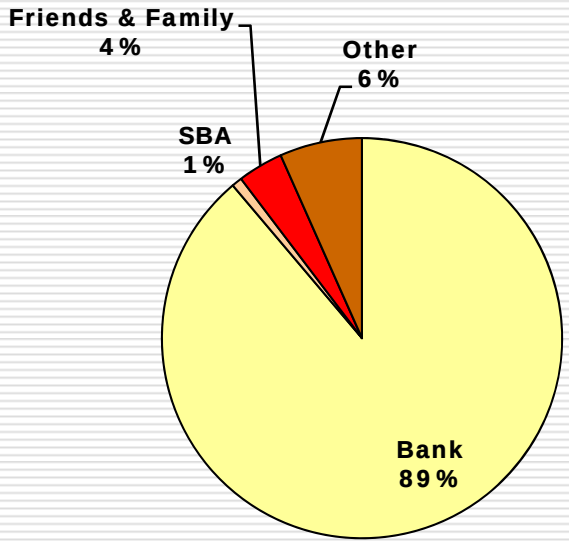


Over the past five years, MTI-assisted companies attracted $32.9 million in equity investments and $84.5 million in debt, for a total of $117.4 million in external investment. The number of firms taking on debt (90) was about three times the number securing equity investments (31).

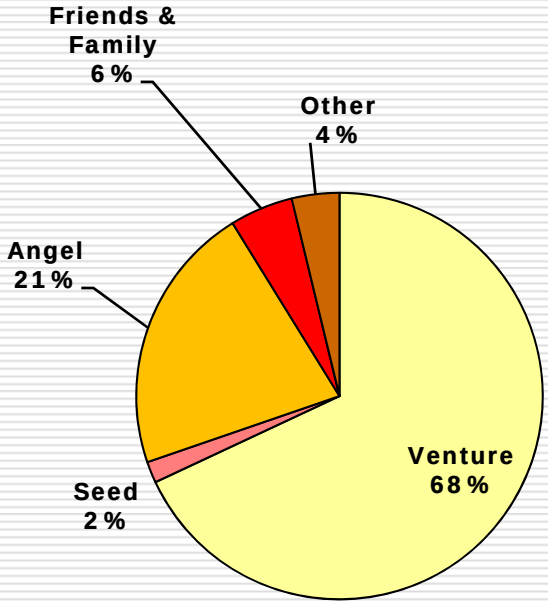
Bank debt comprises the largest source of debt financing, and this is consistent across each of the years. In 2007 and 2008, the proportion of bank debt (89%) increased from the 2003-2006 period when it was 84% SBA loans fell from 3% of borrowing to 1%.

Venture capital comprises the largest portion of equity investment, but this is concentrated in small number of companies. Angel investors increased their share of equity investment for the 2007-08 grantees to 21% from 14% for the 2002-2006 grantees.

Types of Debt



Types of Equity



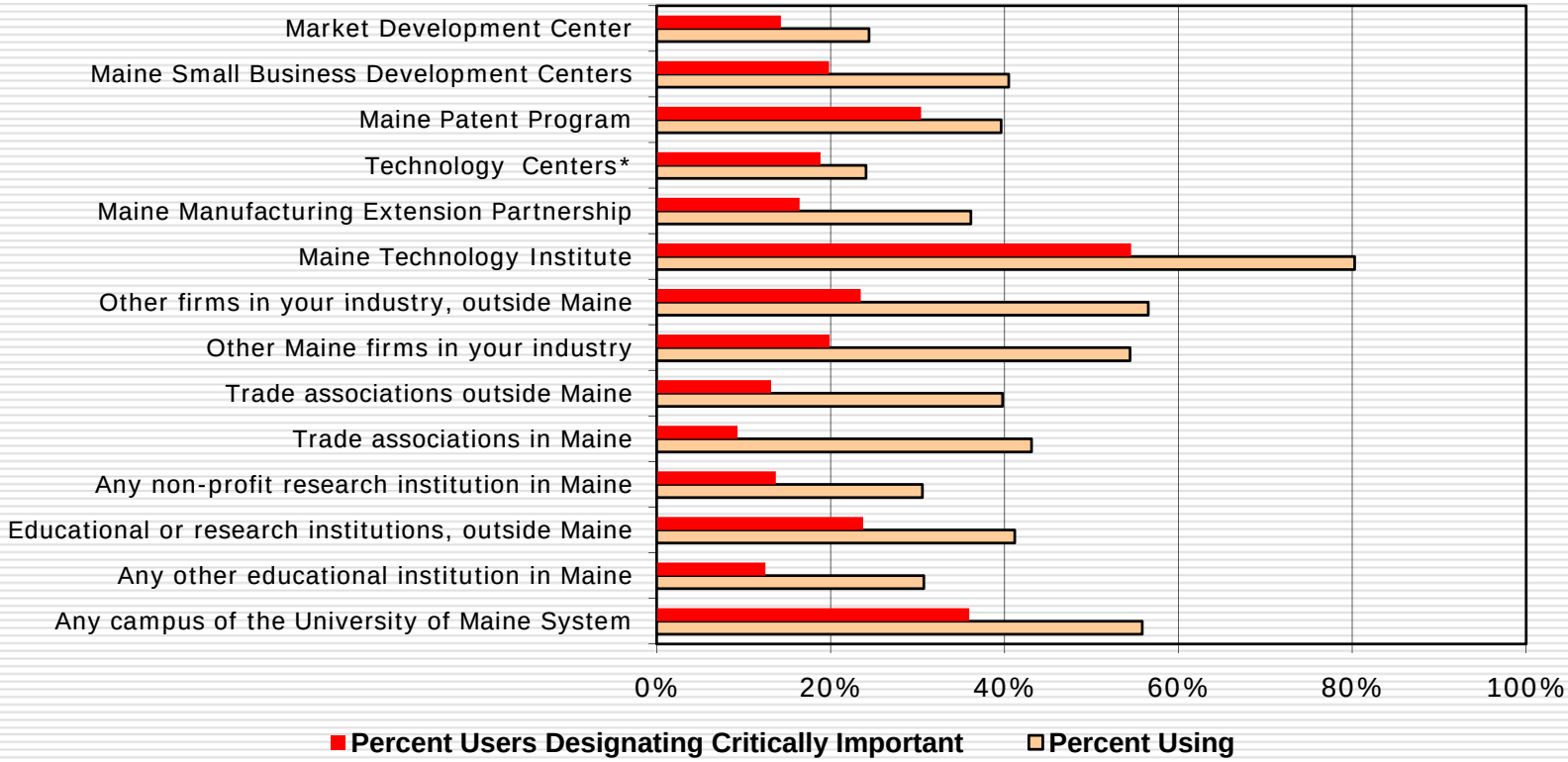
Relationships

Two types of organizations provide support and assistance to MTI firms in research and development: those supported by the public sector (both state and federal governments) and those in the private and nonprofit sectors. In terms of utilization, MTI is the most frequently mentioned organization of any type, which reflects the large degree of assistance that MTI offers beyond its funding programs. MTI is also the organization whose assistance is most frequently cited as "critically important" by those who use it. This has been consistent in all years of the evaluation process.

Campuses of the University of Maine System are the next most-used public organizations and also second in the proportion of users who rate the assistance as "critically important".

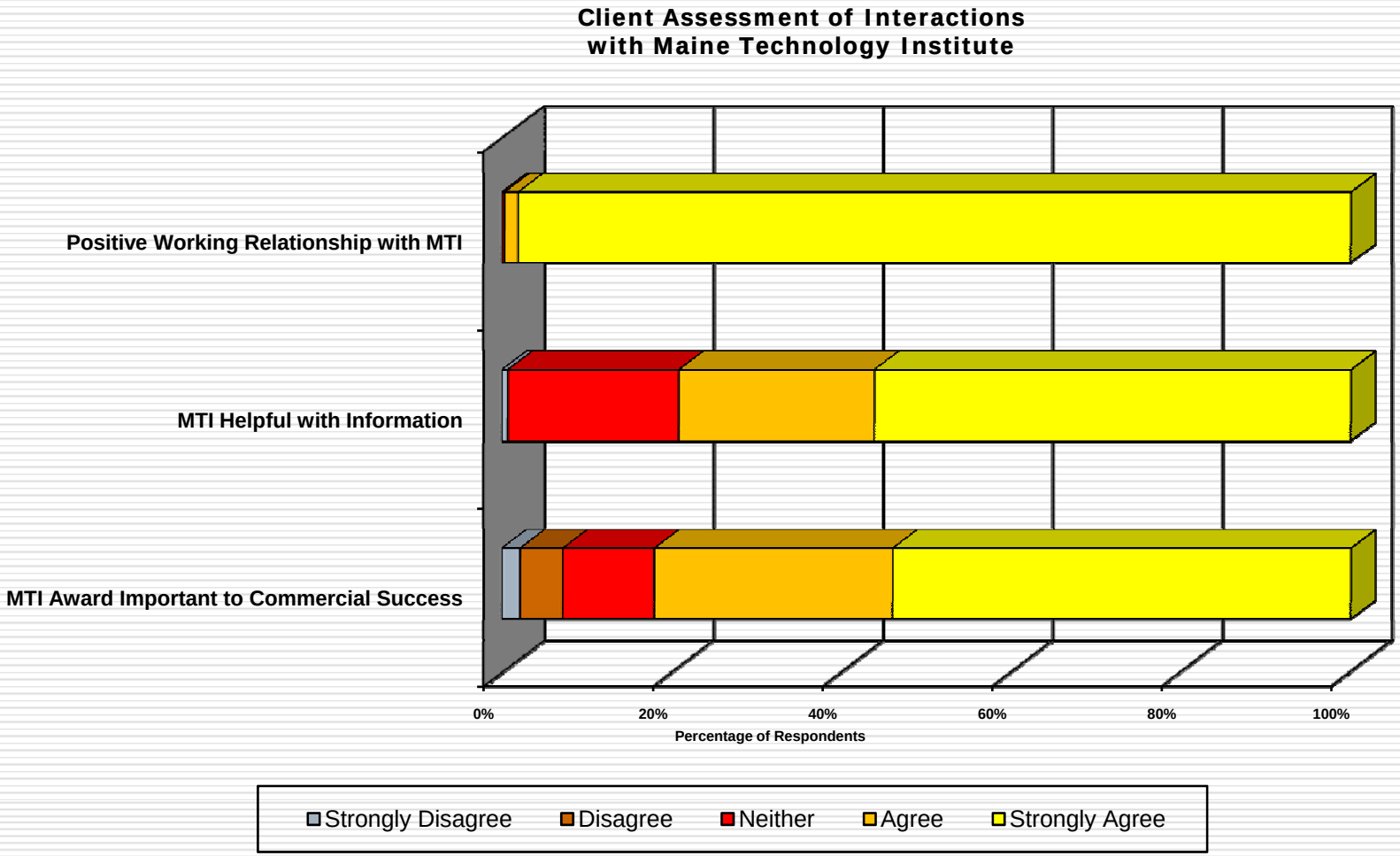
Among the private organizations, the most commonly consulted are still other firms in the same industry outside of Maine. This reflects the network of contacts among both competitors and customers in helping conduct R&D. Other Maine firms in the same industry and trade associations, from both inside and outside of Maine are the next most frequently cited.

Number of Respondents that Received Assistance from Listed Organization:
All Years



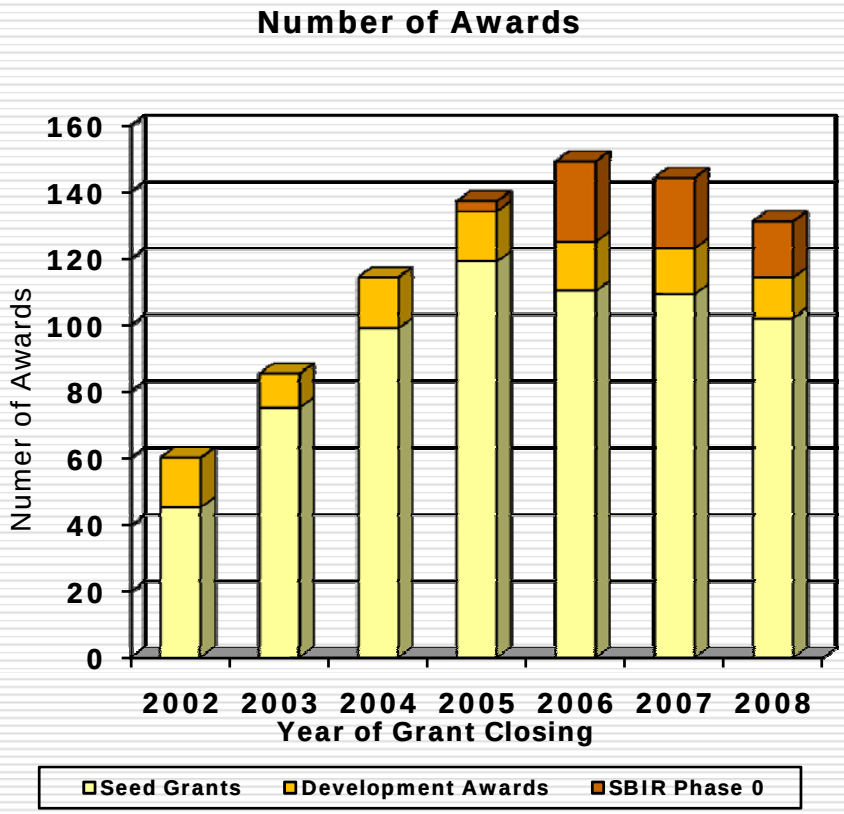
Recipient Assessment of MTI Services

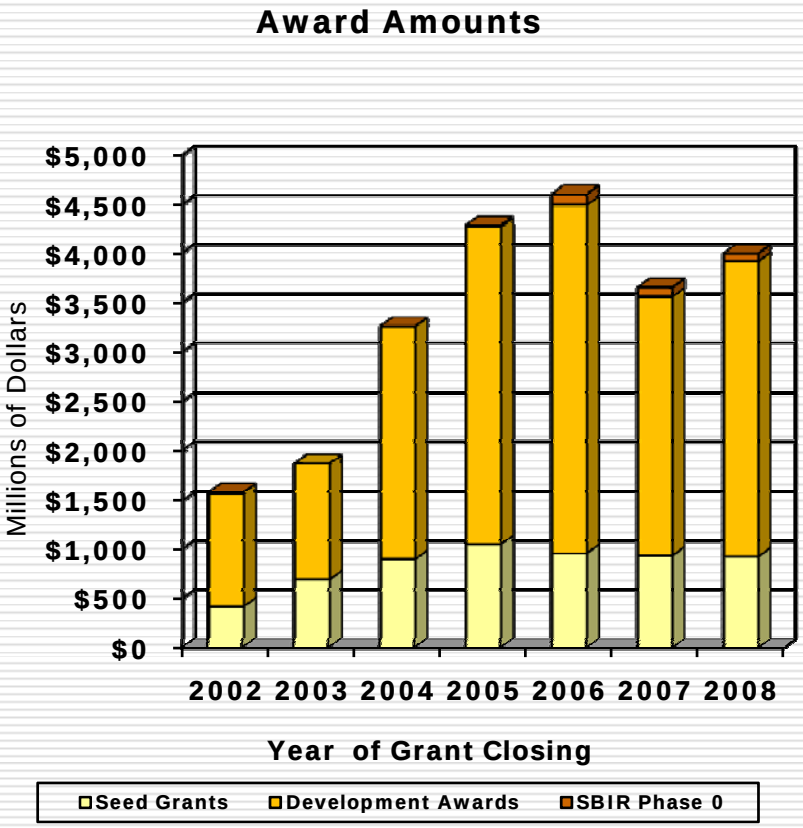
Clients continue to give MTI very high marks for the quality and usefulness of their services. Substantial majorities of MTI grant recipients agreed or strongly agreed that their working relationship with MTI was positive (>97%), that MTI was helpful (>79%), and that MTI assistance had been important to their commercial success and in finding other funding (>81%).



Characteristics of MTI Clients and Grants

Over the period from July 1, 2006-June 30, 2008, MTI closed grant awards totaling $7.03 million, of which $5.12 million was in the Development Award program, $1.7 million in Seed Grants, and $0.16 million in the SBIR Phase 0 Program.



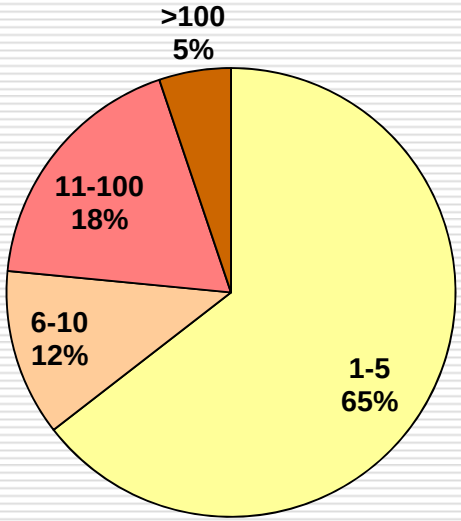


NOTE: These figures are for awards closed as of June 30 of the indicated year. For information on number and amount awarded each year, see the MTI *Annual Report*. Figures do not include Cluster Enhancement Awards.

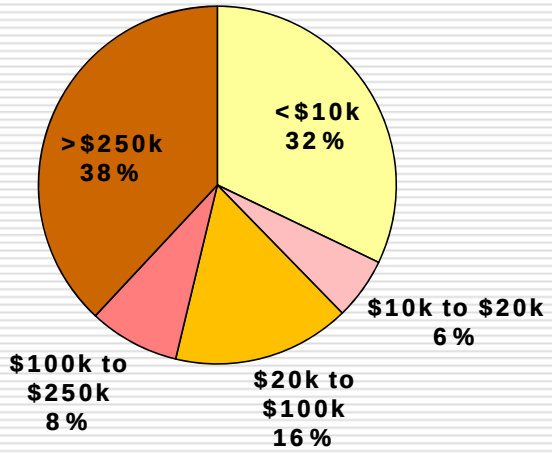
MTI grant recipients remain overwhelmingly small businesses. Over three-quarters of the companies with grants closing in 2007 and 2008 (77%) have 10 or fewer employees and only 5% have more than 100 employees. On the basis of annual revenues, the population continues to be divided between large and small firms. 38% have less than $20,000 in annual revenues, while 46% have revenues in excess of $100,000.

These proportions are essentially the same for 2007 and 2008 classes as for those companies who closed their grants between 2002 and 2006, except that the number of very small firms (less than 5 employees) grew from 60% to 65% in the most recent group.

MTI Grant Recipients by Employment Size (2007 – 2008 Classes)



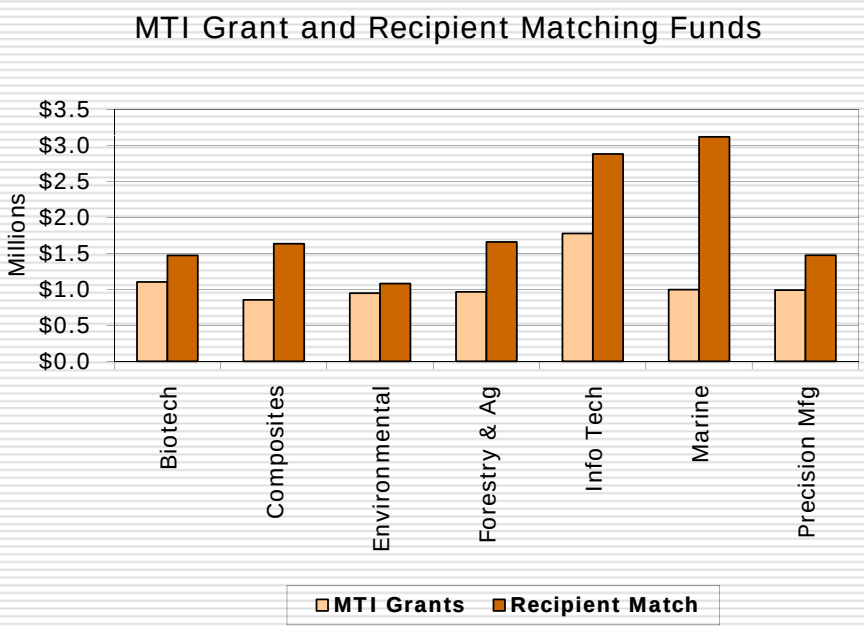
MTI Grant Recipients by Total Company Revenues (2007 – 2008 Classes)

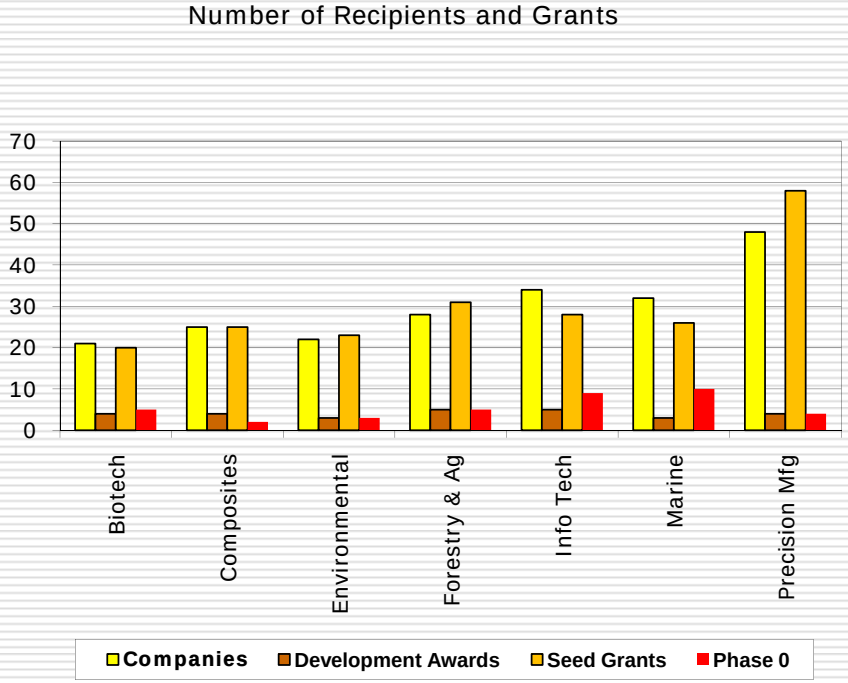


* The age of companies was not asked in 2002

Over this evaluation period, Maine grant recipients provided $1.75 in matching dollars for every $1.00 of MTI grants, which is consistent with historic averages. In the most recent period, firms in Marine Technology and Aquaculture offered the highest match ratio, in contrast with the 2002-2006 period when Biotechnology firms showed the greatest ratio of matching funds. The matching ratio for firms in Composites was also higher in the most recent period.

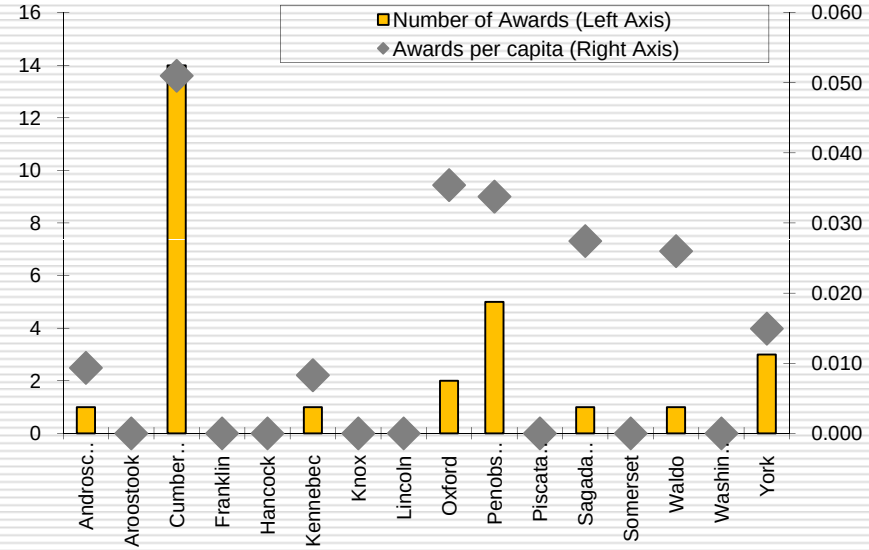
The distribution of MTI assistance among the technology sectors can be assessed on the basis of the number of companies receiving assistance and the distribution of grants under the two major grant programs. The largest number of companies and the largest number of Seed Grants remains in Precision Manufacturing. Distribution of Seed Grants and Development Awards among the other sectors was fairly even, with Forest Products and Agriculture receiving slightly more Seed Grants. Information Technology and Marine Technology/Aquaculture led slightly in SBIR Phase 0 grants.



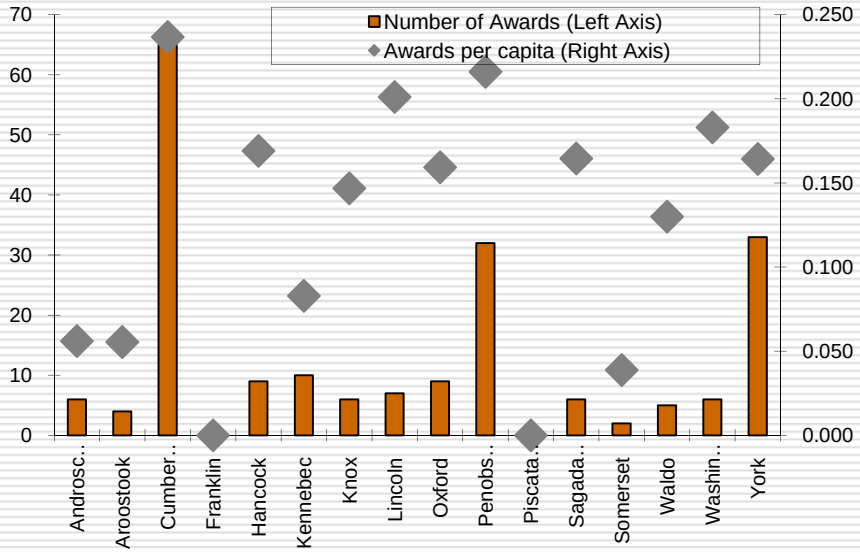


MTI grants closing in 2007-2008 were from fourteen of Maine's sixteen counties. (No grants in Franklin or Piscataquis Counties closed, although some grants in these counties may still have been active). Grants to recipients in Cumberland County led all others, with Penobscot and York Counties next. Development Award grants were concentrated on a per capita basis in Cumberland County, but Oxford, Penobscot, Sagadahoc, and Waldo counties were also high. See grants were also concentrated in Cumberland, York, and Penobscot Counties, but on a per capita basis were much more widely distributed.

Distribution of Development Awards by County



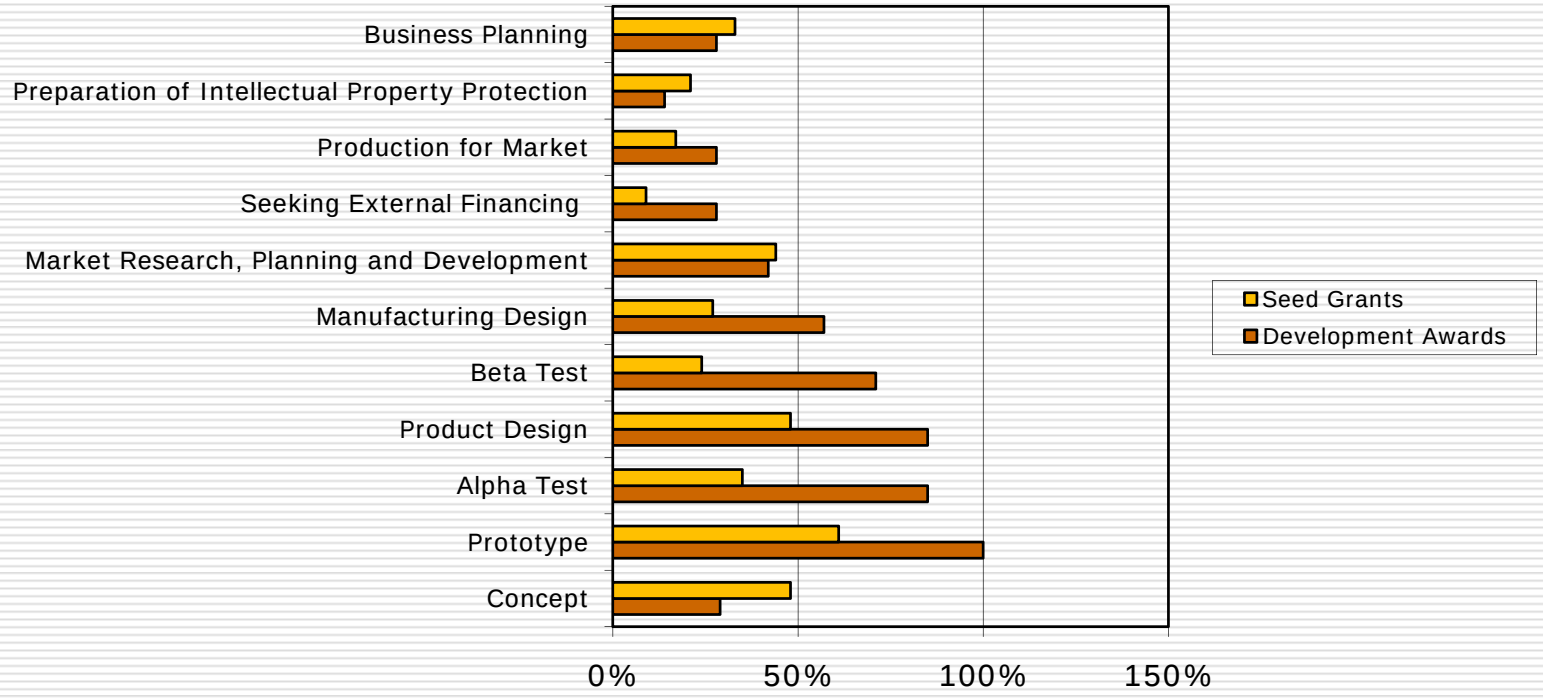
Distribution of Seed Grants by County



A vital feature of MTI's assistance is that it is flexible. Funds may be used for a variety of purposes related to research and development. Almost all grant recipients reported using the assistance for multiple purposes. Prototype development remains the most frequently cited use for both programs. The proportion of Development Award recipients indicating they use funds for market research has fallen from previous reports, but some of this activity may be taking place with Seed Grant funding (where market research is still frequently used). Seeking external financing, intellectual property activities, and production remain the least frequently cited.

Although the Seed Grant and Development Award programs are designed to support activities at different stages of the R&D process (i.e., Seed Grants are designed for earlier stages and Development Awards for later stages), it is apparent that there are not significant differences in how funds from the two programs are used. Development Awards are clearly more likely to be used for beta testing and manufacturing design, which is consistent with that program's purposes.

Use of MTI Grants by Grant Type

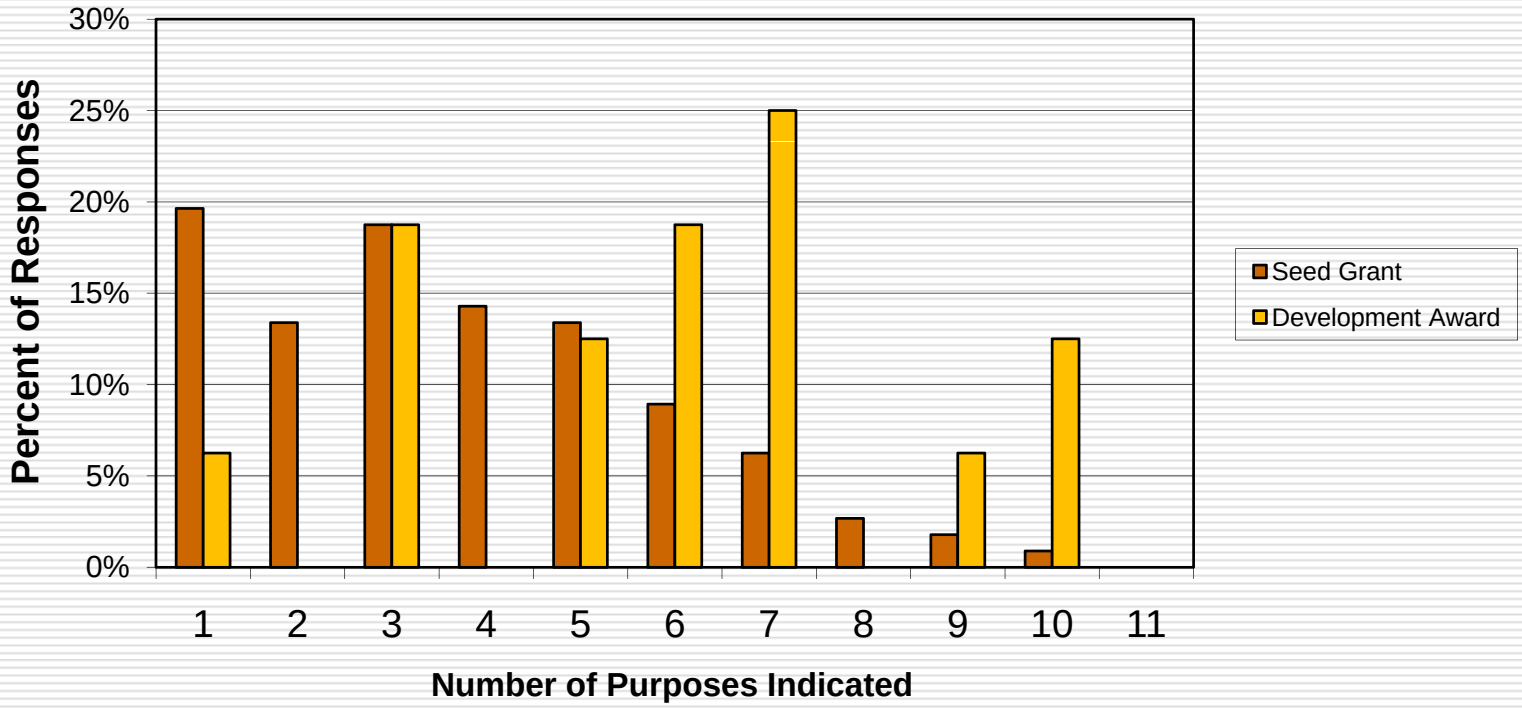


Percent of Respondents Indicating Use of Grant for Purpose Indicated
(Multiple Responses Allowed)

MTI clients are offered the opportunity to indicate up to eleven different purposes to which they may have put the funds provided. The distribution of responses for each purpose is shown on the previous page. The frequency with which one or more of the purposes are indicated is presented in the figure below. The frequency is expressed as a percentage of all responses.

Overall, the 2007 and 2008 classes showed somewhat more focus in their use of grants than those reporting in 2003-2008. Development Award grants tended to concentrate their uses in the 5-7 purpose range, while Seed Grant recipients primarily used their grants for 1-3 purposes.

Use of MTI Grants by Grant Type



Technical Notes

- Data on the Seed Grant, Development Award, and SBIR Phase 0 programs is collected by surveying all MTI grant funds recipients. The survey is conducted of recipients whose MTI grants are closed in each fiscal year (July 1-June 30). All references to years in this report are to the fiscal year in which a grant closed, not the year in which the award was made.

- The survey is conducted using an internet-based survey instrument developed in partnership with the State of Maine Research and Development Evaluation Program conducted for the Department of Economic and Community Development. Jim Damicis of Policy One Research in Portland provided liaison services to the overall evaluation process.

- All MTI clients are required to complete the evaluation as a condition of their assistance, and all clients who were still in business and could be contacted at the time the surveys were administered complied. However, not all respondents answered all questions. Interpretation of some results may be limited by small numbers of answers.

- MTI clients are assured that their individual responses will not be revealed. To protect the confidentiality of responses, no data analysis is shown in which there are three or fewer respondents or in which any one respondent can account for more than 80% of the information in business-sensitive areas such as employment and finances.

- MTI-funded projects at the University of Maine are not included in the surveys on which this report is based. Those projects are included in the general evaluation of Maine R&D programs conducted for the Maine Department of Economic & Community Development.

- Details on MTI programs including up to date information on award numbers and amounts are available from the MTI website: www.mainetechnology.org. MTI Annual Reports provide additional detail on the funding awards.