
Innovation Partnership Network

University-Industry-Government Research Context

Challenges and opportunities from the university perspective

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Context –Research being outsourced to universities

- Research expenditures being limited by industry
- Focus moving even further from basic toward very applied
- Major laboratories like Bell Labs, General Electric R&D, IBM have seen a huge change in mission.
- Innovation is often encouraged in entrepreneurial ventures that can be acquired –limiting both risk and research expenditures.



How does research flow to industry

- Industry funded research on campus
- Ventures created by entrepreneurs and later acquired by established industries.
 - Moves risk and reward toward venture capital, angels, and other investors and entrepreneurs.
- Licensing research results from universities
 - MIT and UMass are both in the top 20
- Fraunhofer Institutes or similar close partnerships
- Hiring new graduates especially in the high technology disciplines
 - National Commission on Innovation, Competitiveness and Economic Prosperity, APLU –Jack M. Wilson, Chair 2009-2011.



National Advisory Council on Innovation and Entrepreneurship

- Letter to Commerce Secretary Locke on April 19, 2011
 - http://center.ncet2.org/images/files/nacie_letter-university_commercialization.pdf
 - Susan Hockfield, MIT and I were signatories to this letter from Mass.
 - Many other Presidents from across the nation.
- Promoting student innovation and entrepreneurship
- Encouraging faculty innovation and entrepreneurship
- Actively supporting the university tech. transfer function.
- Facilitating university-industry collaboration
- Engaging with regional and local economic development efforts
- Recognizing exemplary economic engagement
 - APLU has launched awards program in this area.



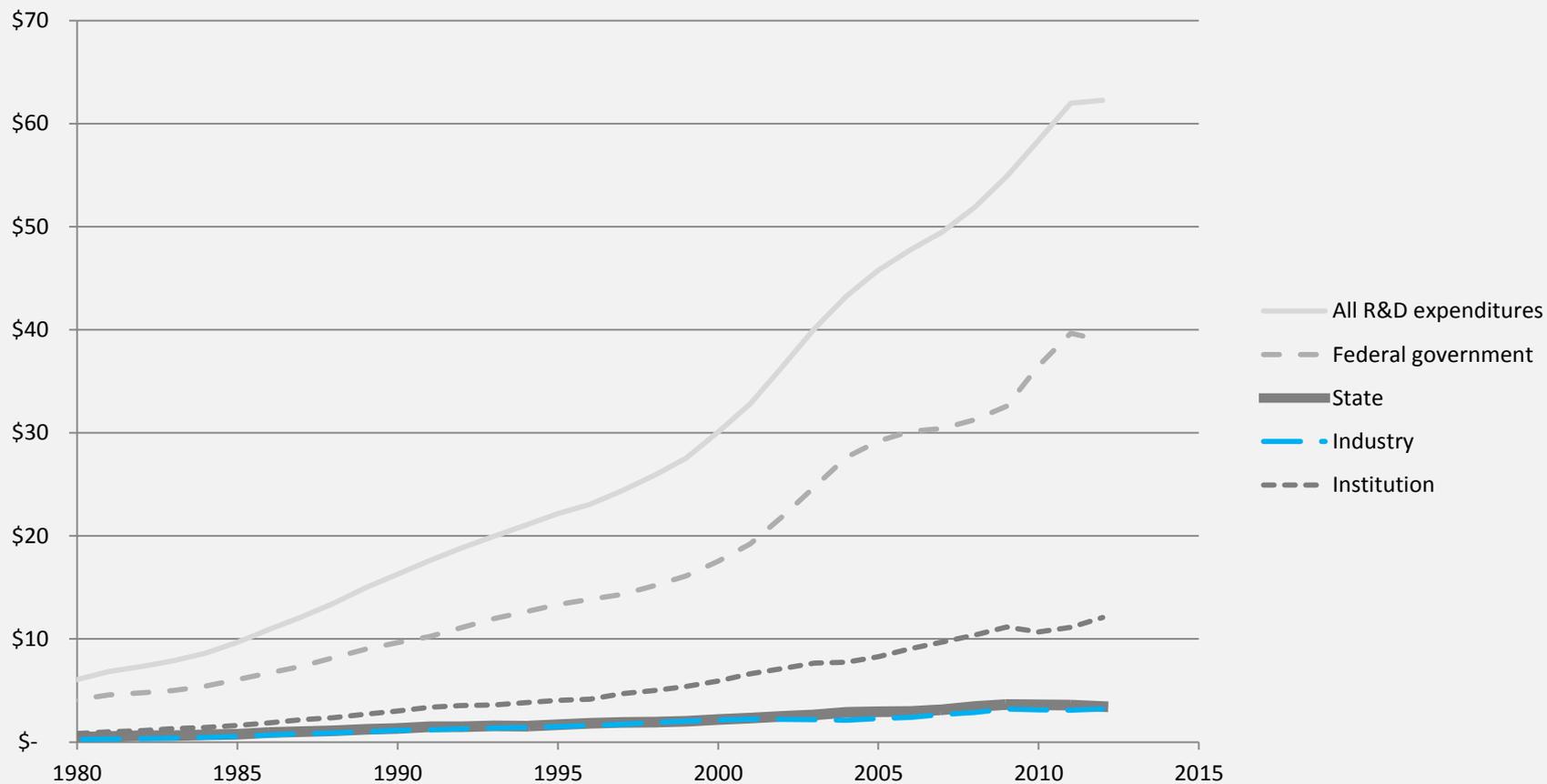
Examples

- Flexible Electronics
 - Raytheon, UMass, funded also by State through the Innovation Institute under MTC.
 - Raytheon Scientists and UMass Lowell Scientists working together in UML Saab Emerging Technologies and Innovation Center
- UMass Innovation Institute (UMII)
- Mass Green High Performance Computing Center
 - MIT, UMass, Boston University, Northeastern, Harvard, EMC, CISCO, and more.



R&D Spending

Trends in Higher Education R&D (billions of dollars)



Top 5 Universities in Industry Support (FY 12 NSF 1000's)

• 1	Duke U.	\$226,200	22%
• 2	MIT	\$119,068	14%
• 3	OH State U.	\$100,986	13%
• 4	U. CA, Berkeley	\$92,103	13%
• 5	SUNY, U. Albany	\$82,912	31%
• 6	U. CA, San Diego	\$73,443	7%
• 7	U. TX, MDACC.	\$68,414	10%
• 8	U. TX, Austin	\$67,890	11%
• 9	Stanford U.	\$62,918	7%
• 10	U. CA, San Francisco	\$59,557	6%



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• 5	U. CA, Berkeley	\$92,103	13%
• 6	U. TX, Austin	\$67,890	11%
• 7	NC State U.	\$44,032	11%
• 8	U. TX, MDACC	\$68,414	10%
• 9	Texas A&M	\$49,392	7%
• 10	Stanford U.	\$62,918	7%



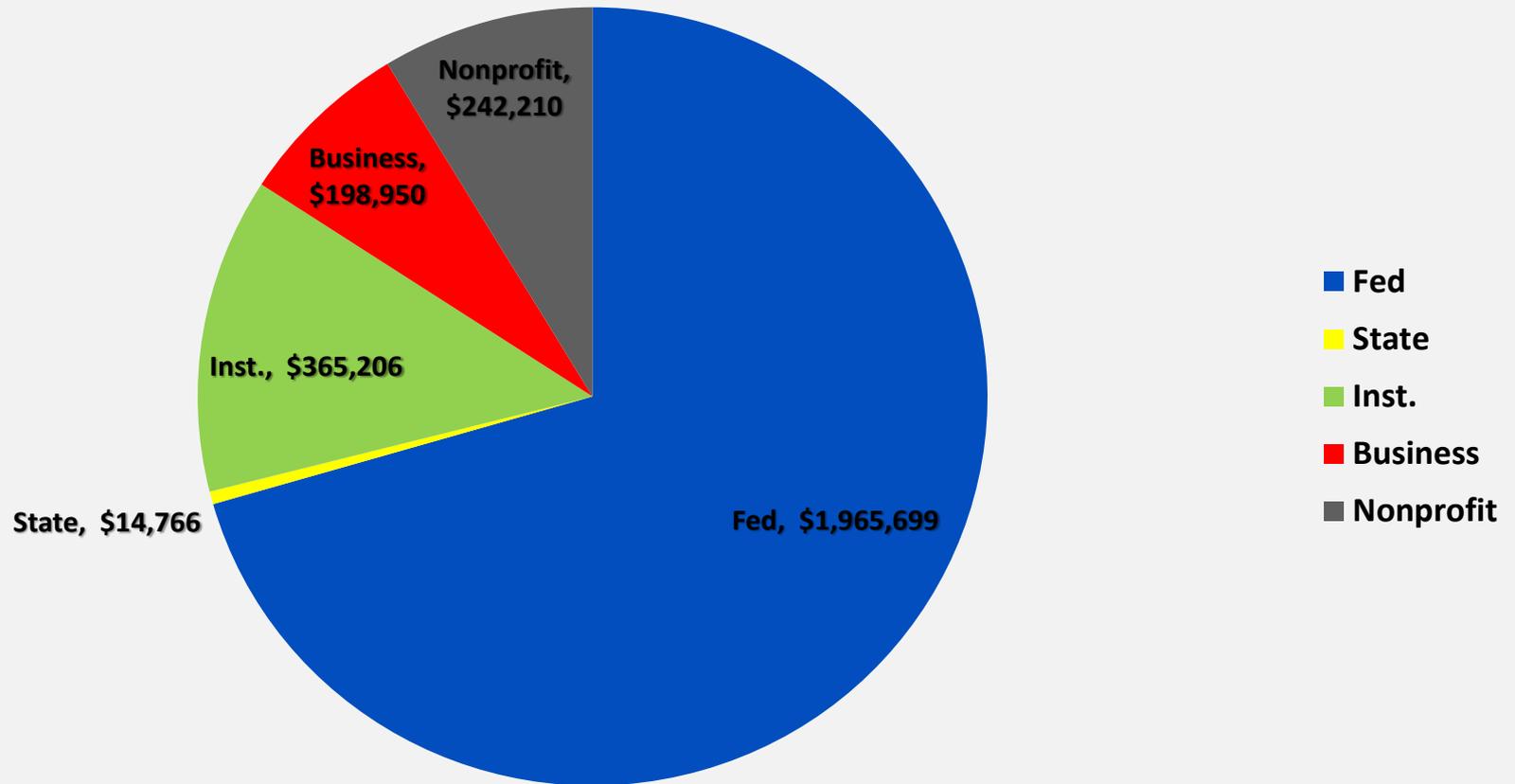
Major Massachusetts Research Institutions

Institution	All R&D expenditures	Federal government	Fed %	State and local government	State %	Institution funds	Inst %	Business	Bus %	Nonprofit organizations	NP%	All other sources	Other %
MIT	\$ 824,130	\$ 496,132	60%	\$ 163	0%	\$ 80,832	10%	\$ 119,068	14%	\$ 88,595	11%	\$ 39,340	5%
Harvard U.	\$ 799,432	\$ 589,860	74%	\$ 1,632	0%	\$ 69,386	9%	\$ 34,901	4%	\$ 91,040	11%	\$ 12,613	2%
U. MA System	\$ 597,480	\$ 390,124	65%	\$ 10,716	2%	\$ 147,941	25%	\$ 20,887	3%	\$ 26,794	4%	\$ 1,018	0%
Boston U.	\$ 332,951	\$ 277,436	83%	\$ 295	0%	\$ 26,015	8%	\$ 6,683	2%	\$ 21,588	6%	\$ 934	0%
Tufts U.	\$ 160,922	\$ 121,512	76%	\$ 705	0%	\$ 13,799	9%	\$ 11,575	7%	\$ 11,108	7%	\$ 2,223	1%
Northeastern U.	\$ 107,862	\$ 77,667	72%	\$ 1,179	1%	\$ 21,820	20%	\$ 4,971	5%	\$ 2,225	2%	\$ -	0%
WPI	\$ 20,232	\$ 12,968	64%	\$ 76	0%	\$ 5,413	27%	\$ 865	4%	\$ 860	4%	\$ 50	0%

Only 7% of Research support comes from business in FY12



Distribution of Research Support (in kilobucks)



Top Licensing Universities (FY10 –AUTM)

1. Northwestern University, \$180 million
2. New York University, \$178 million
3. Columbia University, \$147 million
4. University of California System, \$104 million
5. Wake Forest University, \$86 million
6. University of Minnesota, \$84 million
- 7. Massachusetts Institute of Technology, \$69 million**
8. University of Washington/Washington Research Foundation, \$69 million
9. Stanford University, \$65 million
10. University of Wisconsin-Madison/Wisconsin Alumni Research Foundation, \$54 million
11. California Institute Of Technology, \$52 million
12. University of Rochester, \$42 million
- 13. University of Massachusetts, \$40 million**
14. University of Michigan, \$40 million
15. University of Texas System, \$38 million
16. University of Utah, \$38 million
17. University of Florida, \$29 million
18. University of Iowa Research Foundation, \$27 million
19. Duke University, \$26 million
20. University of South Florida, \$17 million



Recent Commonwealth Initiatives intended to increase University-Industry-Government partnerships

- Mass Life Science Center (\$1 Billion programmed)
- Mass Clean Energy Center
- Mass Innovation Institute
 - under Mass Technology Collaborative



Great Expectations

- That industry partnerships will increase significantly.
- Challenges:
 - IP is always a big issue
 - Lack of focus on deliverables
 - Lack of speed and urgency
 - Some in Universities oppose such partnerships
- But really: this is why universities were founded!



Mission

- In this 152nd year since Vermont's Justin Morrill created and advocated for the passage of the Morrill Act of 1862 –creating our country's great land-grant universities, it would be good to revisit the mission that he envisioned in that seminal document. The act was passed “**in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.**” Certainly Morrill envisioned a close coupling between that needs of society and needs for workforce development.
- Thirty eight years earlier, the Dutch Patroon Stephen van Rensselaer created Rensselaer Polytechnic Institute in Troy NY “**for the purpose of instructing persons ... in the application of science to the common purposes of life.**” Reading both documents in full suggests that Morrill must have been influenced by the van Rensselaer founding statement.
- In 1640 Harvard's Founding statement known as New England's First Fruits “*After God had carried us safe to New England, and we had built our houses, provided necessaries for our livelihood, reared convenient places for God's worship, and led the civil government, one of the next things we longed for and looked after was to advance learning and perpetuate it to posterity; dreading to leave an illiterate ministry to the churches, when our present ministers shall lie in the dust.*”
 - Perhaps that was the most pressing workforce need of the time –educated ministers.



And today:

- As recently as 1980, the United State Congress affirmed the importance of Universities to the social and economic health of the country with the passage of the Bayh-Dole act **“to encourage maximum participation of small business firms in federally supported research and development efforts; to promote collaboration between commercial concerns and nonprofit organizations, including universities.”**
- From the beginning society has created and supported universities, both public and private, to serve many important needs of society. Interestingly, in each of these founding statements, it is the need of society which is placed front and center, and then the education of the students is called for to meet those societal needs.
- Contrary to the past Chronicle headline that blared **“College Leaders Resist Pull to Stray From Mission,”** it is far more accurate to suggest that those leaders are opposed to a return to the fundamental mission of a University.



Thank you

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