Benchmarking the Rhode Island Knowledge Economy – 2012

GREATER PROVIDENCE CHAMBER OF COMMERCE

RHODE ISLAND SCIENCE & TECHNOLOGY ADVISORY COUNCIL

December 2012

Cover: Top right - Photo by Quirky

December, 2012

Dear Friends,

Last year, the Greater Providence Chamber of Commerce and the Rhode Island Science and Technology Advisory Council joined together to produce a comprehensive benchmarking report to measure Rhode Island's current innovation capacity and to begin a process of tracking over time how our state compares with our national and regional peers in growing and sustaining a knowledge-based, innovation economy.

Innovation depends on a pipeline of ideas and capital that is linked to a talented pool of entrepreneurs who can transfer discoveries and knowledge into viable products in a marketplace. Innovation, however, faces many hurdles on the path from idea to validation and also depends on an environment that leverages public, private and non-profit resources into a vibrant network of complementary support systems.

The inaugural report showed that while we enjoyed many elements of an innovation economy such as strong R&D performance and an educated populace, we also faced certain areas of weaknesses that can limit economic growth such as net migration of new graduates and low levels of federal Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) awards. The *2012 Rhode Island Innovation Index* builds on the first benchmarking report and provides us with new data on how we are trending in both our areas of strength and concern.

Based on the 2012 analysis, areas of strength for Rhode Island include: R&D performance by academic, not for profit (including medical) institutions; venture capital; and income and education attainment of the population. Areas of concern include: net migration of the working age population; industry R&D performance; employment in science and technology industries and occupations; and math scores for 8th graders.

As the birthplace of the American Industrial Revolution, our state has a long legacy of turning ideas and knowledge into products. And today, with a dense concentration of science and technology assets and a hyper-connectivity of people and communities, Rhode Island is well situated to build on that tradition. We hope the information provided by this project will be helpful in identifying and prioritizing strategic initiatives that we as a community can work on with the goal of building a stronger innovation pipeline and support system.

Together, we can make Rhode Island a hub of innovation for years to come.

Greater Providence
Chamber of Commerce

GREATER PROVIDENCE CHAMBER OF COMMERCE

RI Science & Technology
Advisory Council

RHODE ISLAND SCIENCE & TECHNOLOGY ADVISORY COUNCIL

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INTRODUCTION & SUMMARY

A strong knowledge economy is a key component in a state's economic success in the 21st century. Exemplary research and development capacity, a strong knowledge-to-business pipeline, and an adequately prepared workforce are instrumental to creating a sustainable and cutting edge knowledge economy. The Greater Providence Chamber of Commerce, in partnership with the Rhode Island Science and Technology Advisory Council (STAC), has taken a dedicated approach to measuring how the state of Rhode Island is faring in the primary indicators that detail the relative strength of the state's knowledge economy. The results are contained here in this 2012 update to the inaugural edition of *Benchmarking the Rhode Island Knowledge Economy*.

As Rhode Island's oldest and largest business advocacy organization, the Greater Providence Chamber of Commerce fosters the development of a positive and productive business climate through economic development, business-to-business relationship building and effective public policy and government. The Rhode Island Science and Technology Advisory Council is a coalition of academic, medical, government and business leaders that recommends strategic investments that drive economic development and job creation by maximizing the economic impact of science, technology and innovation. With the emergence of a knowledge, innovation and information based economy in Rhode Island, the Chamber and STAC seek to understand and identify our state's strengths, shortfalls and opportunities in this important growth sector. The benchmarking data tracked in this Index provides a tool to evaluate Rhode Island's competitive position and informs our activities to support the generation of new ideas, technologies and jobs.

Benchmarking the Rhode Island Knowledge Economy is a compilation of twenty-three different indicators measuring Rhode Island's capacity and progress toward competing in a knowledge-driven and science and technology based economy. The indicators are organized into four categories representing key components of a knowledge-based economy:

- Rhode Island's Knowledge Economy
- The Knowledge Business Pipeline
- Research and Development
- The Workforce for the Knowledge Economy

Rhode Island's Knowledge Economy – As other states invest in science and technology, it is important that Rhode Island remain competitive through its own investments. This section includes the indicators: gross state product; per capita income; targeted science and technology sector establishments, employment, and wages; high speed internet access; net-domestic migration; as well as state funding for higher education and state funding for science and technology. Funding for higher education and particularly for science and

technology is a measure of the State's commitment to both Research and Development and to building the future knowledge-economy workforce.

The Knowledge Business Pipeline – Being able to commercialize new ideas and to access startup and early stage capital for entrepreneurial activity is the backbone of a knowledge-based economy. The indicators in this section include: patents issued per 1,000 residents; patents issued for universities and colleges; entrepreneurial climate; venture capital investments; and Small Business Innovative Research and Small Business Technology Transfer Program Investments.

Research and Development – R&D creates knowledge for innovation and serves as the basis for commercialization. The indicators in this section include: total R&D; academic R&D; industry R&D; not-for-profit R&D; and federal R&D obligations. Understanding where R&D funding is sourced and how it is expended is vital to determining the likely strength of the state's R&D capacity into the future.

The Workforce for the Knowledge Economy – The knowledge economy requires a highly skilled and educated workforce. This section assesses the state's human capital by measuring the level of science, technology, engineering, and mathematics (STEM) literacy and the concentration of workers trained in technology and the sciences. The indicators in this section include: math scores for 8th graders; science and engineering degrees awarded; education attainment (defined as the percent of the population aged 25 or older with a BA or more); and scientists and engineers in the workforce.

Within each capacity area there are two types of indicators. The first measures the relative strength of the "raw materials" or inputs essential to the growth of Rhode Island's knowledge economy. Examples include: R&D spending, education attainment, venture capital investments, and high speed Internet access - all necessary inputs that serve as the foundation for innovation-based economic growth. The second type of indicator assesses the performance of Rhode Island's knowledge-driven economic growth by measuring key outputs. Examples include: patents issued and scientists and engineers in the workforce. These indicators tell us how Rhode Island's knowledge economy is performing and the degree to which inputs may be leading to desired outputs and outcomes. In addition to the key indicators, related sub-indicators further describe Rhode Island's performance in growing and sustaining the knowledge economy.

In order to assess Rhode Island's performance relative to other states, the data for Rhode Island are compared with data for the U.S. and to New England as a whole. Additionally, Rhode Island is compared to the 27 EPSCoR states, which are those that have been designated by the National Science Foundation as part of the Experimental Program to Stimulate Competitive Research (EPSCoR) due to their lagging performance in science and technology relative to the nation. To allow for "apples to apples" comparisons, for most of the key indicators, the data are expressed in proportion to population (per capita) or economic output (percent of the state's domestic product) to account for geographic and population size differences.

As data for all of the indicators come from a variety of sources, the years for which data are available may change from one indicator to another. All of the data used in this report represent the most recently released statistics for each particular data source. We recognize that some of the available data are dated in the sense that they predate both the economic recession and also changes made within the states to address them. Thus, this report should be viewed as presenting a historical background rather than a report card on where we are today. However, these historical data are important for us to use as a benchmark as we go forward and, as the report is updated, we would expect to see positive changes in many of these indicators.

Figure 1 presents a summary of Rhode Island's performance for the twenty-three primary innovation indicators. The indicators presented are not meant to be the sole-source, definitive assessment of whether Rhode Island is succeeding in building and sustaining a knowledge economy. Like all states, Rhode Island has areas that represent strengths or assets that will serve as the building blocks for the future economy. It also has areas requiring improvement in order for the state to foster innovation, leading to commercialization and economic growth. Figure 2 details how Rhode Island compares to the other five New England states on the primary indicators. For this table, all rankings represent the ranking in the most recent year for which reliable data were available.

Existing areas of strength for Rhode Island in building and sustaining a knowledge-driven economy. The following are indicators for which Rhode Island's performance ranks it within the top 20 states in the latest year for which data are available:

- Per Capita Income
- High Speed Internet Access
- Patents Issued per 1,000 Residents
- Venture Capital Investments
- Total R&D Performance
- Academic R&D Performance
- Not-For-Profit R&D Performance
- Federal R&D Obligations
- Education Attainment – Percent of Population 25 or Older with a BA or More

Existing areas of weakness for Rhode Island in building and sustaining a knowledge-driven economy. The following are indicators for which Rhode Island's performance ranks it within the bottom 20 states in the latest year for which data are available:

- Gross State Product Growth
- Net Domestic Migration
- State Appropriations for Higher Education
- Entrepreneurial Climate

Areas in which Rhode Island has shown improvement in building and sustaining a knowledge-driven economy. The following are indicators for which Rhode Island experienced a trend of improvement during the last five years for which data are available:

- Gross State Product Growth
- Per Capita Income
- Targeted Science and Technology Sector Establishments

INTRODUCTION & SUMMARY

- High Speed Internet Access
- Patents (Utilities Only) Issued to Universities and Colleges
- Academic R&D Performance
- Not-For-Profit R&D Performance
- Federal R&D Obligations
- Math Scores for 8th Graders (4 Year Trend)
- Science and Engineering Degrees Awarded
- Education Attainment – Percent of Population 25 or Older with a BA or More

And the following are indicators for which Rhode Island experienced a trend of improvement during the last year for which data are available:

- Gross State Product
- Per Capita Income
- Targeted Science and Technology Sector Establishments
- High Speed Internet Access
- State Appropriations for Higher Education
- Patents (Utility Only) Issued to Universities and Colleges
- Venture Capital Investments
- Total R&D Performance
- Academic R&D Performance
- Not-for-profit R&D Performance
- Federal R&D Obligations
- Science and Engineering Degrees Awarded
- Education Attainment - Percent of Population 25 or Older with BA or more

Areas in which Rhode Island has shown decline in building and sustaining a knowledge-driven economy. The following are indicators for which Rhode Island experienced a trend of decline during the last five years for which data are available:

- Targeted Science and Engineering Sector Employment
- State Funding for Science and Technology
- State Appropriations for Higher Education
- Patents Issued per 1,000 Residents
- Venture Capital Investments
- Total SBIR/STTR Investments
- Total R&D Performance

And the following are indicators for which Rhode Island experienced a trend of decline during the last year for which data are available:

- Targeted Science and Technology Sector Employment
- State Funding for Science and Technology
- Entrepreneurial Climate
- Total SBIR/STTR Investments
- Industry R&D Performance

Figure 1.

Rhode Island – Indicator Summary

Indicator	1 Year Trend	5 Year Trend	Rhode Island Compared to EPSCoR	Rhode Island's Most Recent National Ranking
Rhode Island's Knowledge Economy				
Gross State Product	^	^	v	42
Per Capita Income	^	^	^	16
Targeted Science and Technology Sector Establishments	^	^	^	N/A
Targeted Science and Technology Sector Employment	v	v	^	N/A
Targeted Science and Technology Sector Wages	N/A	N/A	^	N/A
High Speed Internet Access	^	^	^	20
Net Domestic Migration	N/A	N/A	v	36
State Funding for Science and Technology	v	v	N/A	N/A
State Appropriations for Higher Education	^	v	v	47
The Knowledge Business Pipeline				
Patents Issued per 1,000 Residents	=	v	^	20
Patents (Utility Only) Issued to Universities and Colleges	^	^	^	23
Entrepreneurial Climate	v	=	v	42
Venture Capital Investments	^	v	^	5
Total SBIR/STTR Investments	v	v	^	23
Research and Development				
Total R&D Performance	^	v	^	16
Academic R&D Performance	^	^	^	7
Industry R&D Performance	v	N/A	^	29
Not-For-Profit R&D Performance	^	^	^	3
Federal R&D Obligations	^	^	^	8
Workforce for the Knowledge Economy				
Math Scores for 8th Graders	N/A	^	=	29
Science and Engineering Degrees Awarded	^	^	^	22
Education Attainment – Percent of Population 25 or Older with a BA or More	^	^	^	13
Scientists and Engineers in the Workforce	=	=	^	25

Key: ^ – Improving Trend or Higher; = – No Change or Equal; v – Decreasing or Lower; N/A – Not Applicable or Data Not Available

Figure 2.

New England Summary Table

(State Ranking on data for latest year available, where 1 = best and 51 = worst)

	CT	ME	MA	NH	RI	VT
Gross State Product	21	49	27	37	42	43
Per Capita Income	2	30	3	10	16	21
High Speed Internet Access	3	44	6	23	20	36
Net Domestic Migration	45	30	40	35	36	28
State Appropriations for Higher Education	13	37	42	50	47	48
Patents Issued per 1,000 Residents	9	37	2	8	20	1
Patents (Utility Only) Issued to Universities and Colleges	26	29	1	32	23	14
Entrepreneurial Climate	16	13	34	29	42	8
Venture Capital Investments	14	46	1	7	5	19
Total SBIR/STTR Investments	14	25	1	2	23	6
Total R&D Performance	5	40	4	9	16	22
Academic R&D Performance	32	3	2	11	7	8
Industry R&D Performance	1	26	3	N/A	29	15
Not-For-Profit R&D Performance	34	4	1	44	3	41
Federal R&D Obligations	12	41	4	18	8	20
Math Scores for 8th Graders	19	13	1	6	29	4
Science and Engineering Degrees Awarded	47	43	14	33	22	17
Education Attainment - Percent of Population 25 or Older with a BA or More	5	21	2	9	13	6
Scientists and Engineers in the Workforce	13	41	3	12	25	18

RHODE ISLAND'S KNOWLEDGE ECONOMY

OVERVIEW

Gross state product (GSP) and per capita income are the end-outcome indicators for investing in research and development and supporting technology intensive industries. In the five-year period from 2007-2011, Rhode Island experienced slower growth in its GSP than the growth experienced in all of the reference geographies. In 2011, Rhode Island's per capita income was above both the U.S. as a whole and the EPSCoR states, but below that of the New England states.

Rhode Island targets six sectors related to science and technology. They are: Advanced Manufacturing, Marine Trades & Defense, Information Technology (IT) & Digital Media, Health Care & Life Science, Wind Turbine Component Manufacturing, and Design. For these targeted sectors, the total number of science and technology-sector establishments (businesses) within Rhode Island is 35,093. As a percent of all establishments in 2011, Rhode Island had a higher concentration of these sectors than all the reference groups.

In 2011, Rhode Island employed 137,555 workers in its targeted science and technology sectors. In these sectors, Rhode Island has experienced greater declines in employment in the past five years compared to the reference geographies. This decline was driven by large declines in Marine Trades & Defense and Advanced Manufacturing. Health Care & Life Science saw an increase in employment in the five-year period.

The average wage in Rhode Island for its targeted science and technology sectors was $75,399 in 2012. This is above the EPSCoR states' average wage and behind both the U.S. average and that of the New England states. In 2012, the average wage for the Rhode Island targeted science and technology sectors was higher than the average wage for all Rhode Island

INDICATORS

RHODE ISLAND'S KNOWLEDGE ECONOMY

sectors. Among the targeted science and technology sectors in 2012, the highest average wage was in the Wind Turbine Component Manufacturing sector followed by the IT & Digital Media sector.

There have been significant increases in broadband Internet subscribers in Rhode Island since 2000 with an increase of over 688% through 2011. Relative to the reference groups in 2011, Rhode Island had fewer subscribers per 1,000 residents than the New England states as a whole, but more than both the U.S. as a whole and the EPSCoR states.

In 2011, the net domestic migration for Rhode Island was -6,273, meaning more persons moved out of Rhode Island than moved in from other states. This was better than the average for New England states which on whole saw more out-migration. The EPSCoR states had a positive net domestic migration of 1,831, meaning more people moved in than left.

Since 1997, the Slater Technology Fund has been financed by the State of Rhode Island to provide financing to technology ventures. From 2000 to 2009, there has been an annual investment of $3.0 million which decreased to $2.0 million for 2010, 2011, and 2012. Starting in 2007, there has also been a state investment in the Science & Technology Advisory Council of $1.5 million a year. From 2000 to 2011, there has been a total state investment of $44.65 million for science and technology.

On a per total population basis, Rhode Island appropriates less state funds for higher education than the reference geographies. From 2002 to 2006, Rhode Island remained fairly consistent with the New England states as a whole but since 2006 has dropped below all reference geographies. Rhode Island did see an increase from 2010-2011.

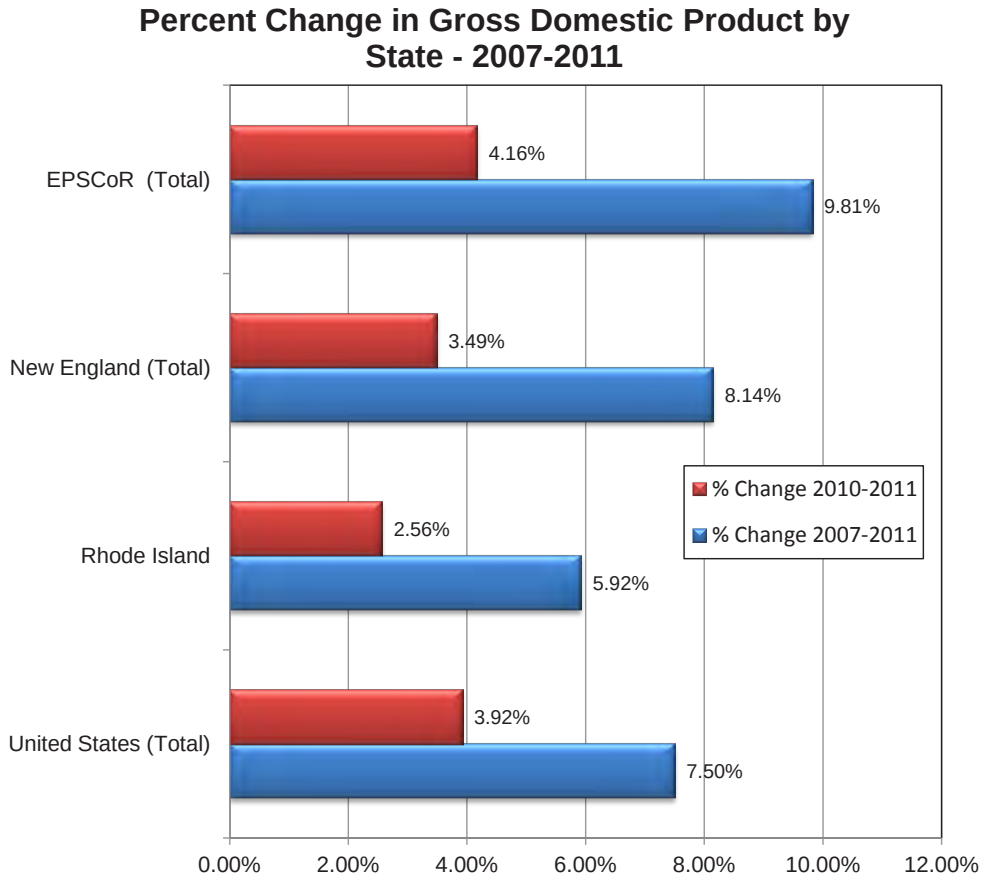
Gross State Product

Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend ^
Rhode Island Compared to EPSCoR v
Rhode Island Compared to New England v
Rhode Island Compared to U.S. v
Rhode Island's Most Recent National Ranking **42**

SUMMARY

In 2011, Rhode Island's gross state product (GSP) was $50.1 billion. In the five-year period from 2007-2011, Rhode Island experienced a 5.92% increase in gross state product, which was less than the growth experienced in the United States as a whole (7.5%), as well as the total for all EPSCoR states (9.81%) and the New England states (8.14%) (see Figure 1-1). In the last one-year period, 2010-2011 Rhode Island experienced an increase of 2.56% which also lagged that of the benchmarks. In 2011, Rhode Island was ranked 42nd nationally on this indicator.

Figure 1-1.



RHODE ISLAND'S KNOWLEDGE ECONOMY

Gross State Product

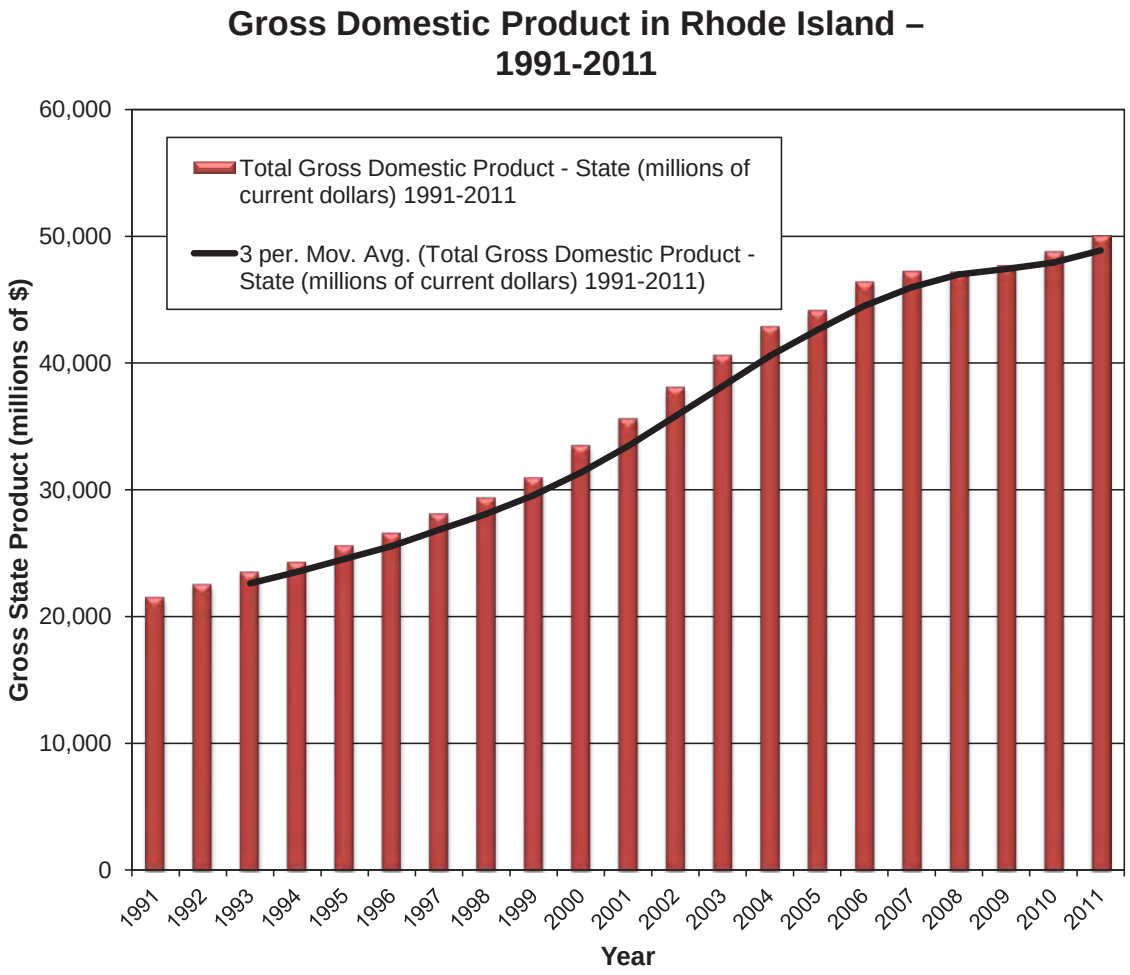
WHY THIS IS SIGNIFICANT

Gross state product is a comprehensive indicator of statewide total economic output and growth. It measures the total dollar value of all goods and services in the economy, and therefore is an indicator of overall economic health. Growth in GSP relative to other geographies indicates whether growth in Rhode Island is keeping pace with national growth in GSP over time.

RELATED

From 2010 to 2011, Rhode Island saw an increase in the amount of gross state product to $50.1 billion after remaining relatively level from 2007 to 2009 and increasing to $48.8 billion in 2010 (see Figure 1-2).

Figure 1-2.



SOURCES: Gross state product - from Bureau of Economic Analysis, U.S. Department of Commerce, New Estimates for 2011 and Revised Estimates for 1997-2010; www.bea.gov.

Per Capita Income

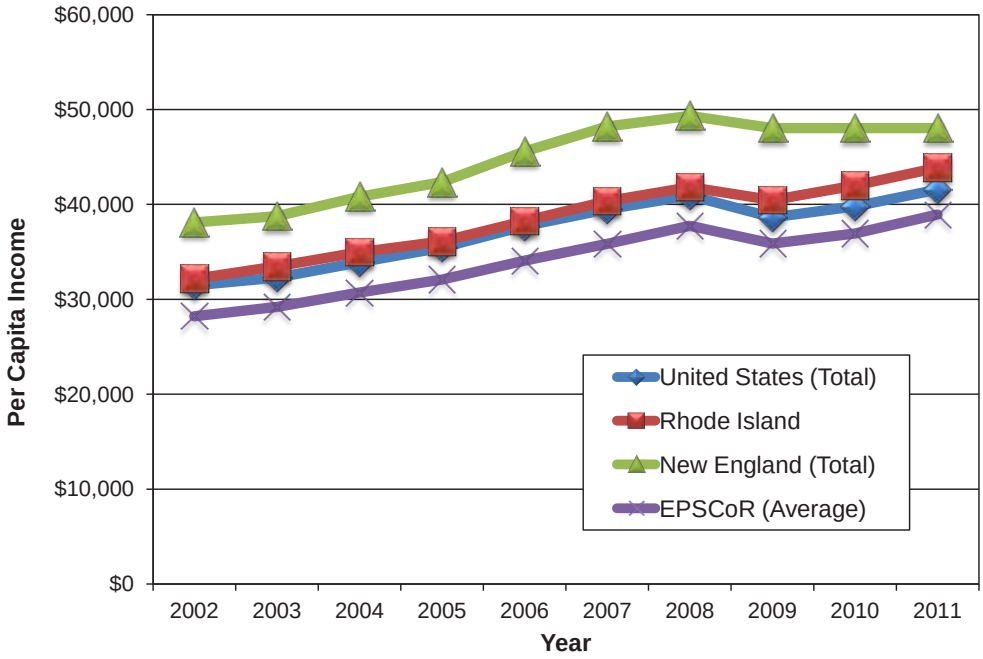
Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend ^
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England v
Rhode Island Compared to U.S. ^
Rhode Island's Most Recent National Ranking **16**

SUMMARY

In 2011, Rhode Island's per capita income was $43,875. This was greater than that of the U.S. as a whole ($41,560) and of the EPSCoR states ($38,933), but was below that of the New England states ($48,051) (see Figure 1-3). All of the reference geographies and the U.S. as a whole have experienced increases in per capita income from 2002-11, saw a decrease in 2009, and rose through 2011. Rhode Island's national ranking was 16th in 2011.

Figure 1-3.

Per Capita Income – 2002-2011



WHY THIS IS SIGNIFICANT

Per capita income is a measure of individual prosperity, which is a desired end outcome of economic development. It is one measure of the standard of living for a state's residents as it allows residents to exercise choices for desired goods and services.

SOURCES: Per capita income - Bureau of Economic Analysis, U.S. Department of Commerce, Revised estimates for 2009-2011; www.bea.gov. All dollar estimates are in current dollars (not adjusted for inflation).

Targeted Science and Technology Sector Establishments

Rhode Island 1-Year Trend ^

Rhode Island 5-Year Trend ^

Rhode Island Compared to EPSCoR ^

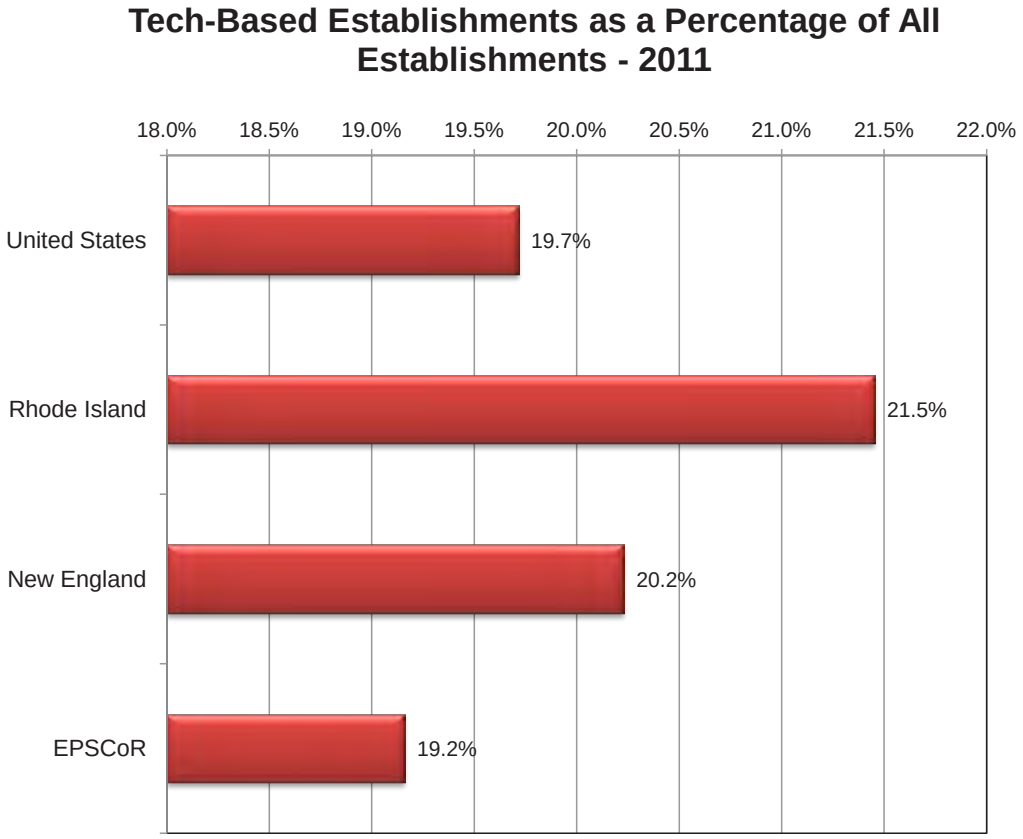
Rhode Island Compared to New England ^

Rhode Island Compared to U.S. ^

SUMMARY

Rhode Island targets six sectors related to science and technology. They are Advanced Manufacturing, Marine Trades & Defense, IT & Digital Media, Health Care & Life Science, Wind Turbine Component Manufacturing, and Design.[1] For these targeted sectors, the total number of science and technology-sector establishments (businesses) within Rhode Island is 35,093. Rhode Island had the most science and technology-based establishments as a percent of all establishments in 2011 (21.5%) when compared to the New England states (20.2%), the United States as a whole (19.7%), and the EPSCoR states (19.2%) (see Figure1-4).

Figure 1-4.



Targeted Science and Technology Sector Establishments

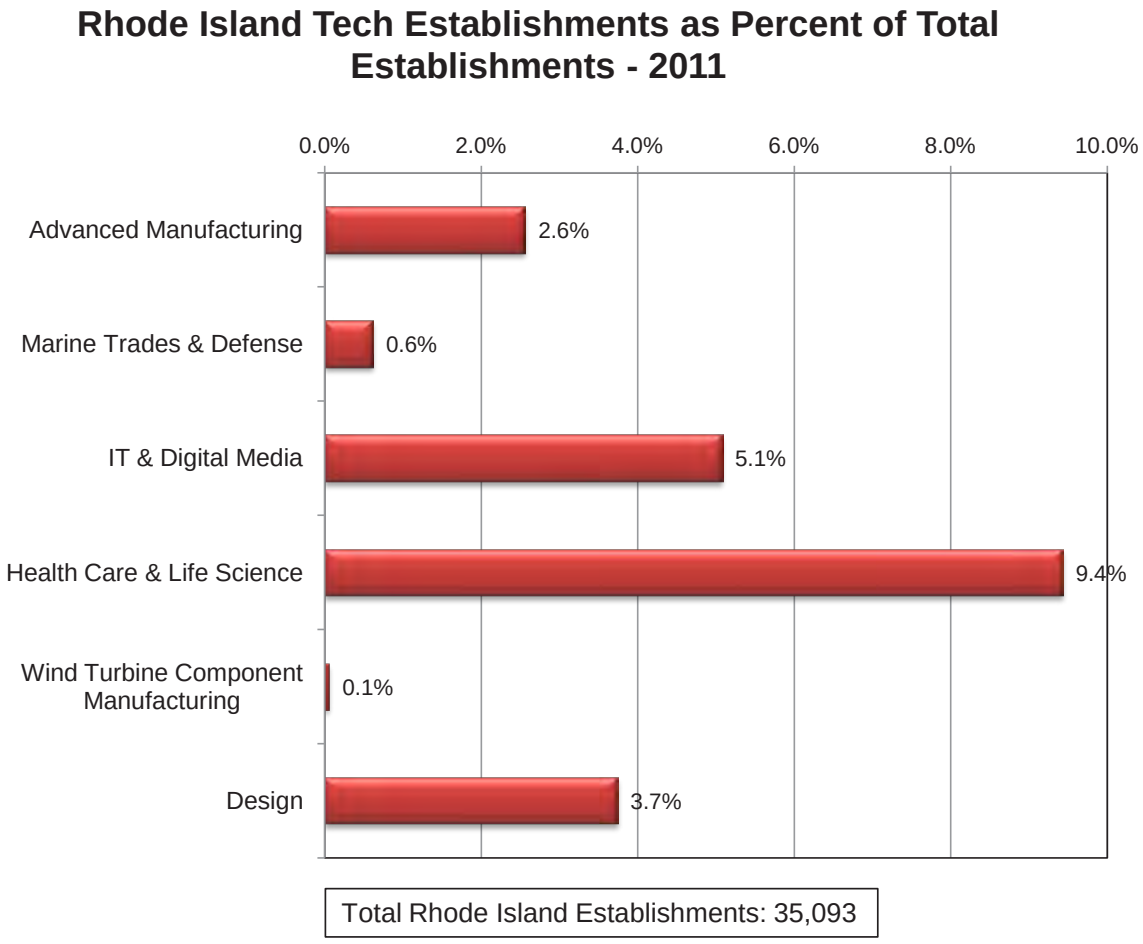
WHY THIS IS SIGNIFICANT

Establishments (businesses) currently located in Rhode Island that are science and technology-based provide employment and, therefore, income to workers and residents of the State. They are the ones that have the potential to commercialize R&D, innovate, grow, and create opportunities for the future workforce.

RELATED

Health Care & Life Science represents the largest amount of technology establishments as a percent of all establishments in Rhode Island at 9.4% (see Figure 1-5). IT & Digital Media (5.1%) represents the second highest amount of the technology-based establishments in the State. In 2011, there were a total of 7,528 targeted technology establishments in Rhode Island representing 21.5% of all establishments in the state (see Figure 1-6).

Figure 1-5.



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Targeted Science and Technology Sector Establishments

Figure 1-6.

Rhode Island Targeted Science and Technology Establishments - 2011

Rhode Island Cluster	Targeted Tech Establishments	% of Total Tech Sector	Targeted Tech as % of Total (All Sectors)
Advanced Manufacturing	897	11.9%	2.6%
Marine Trades & Defense	214	2.8%	0.6%
IT & Digital Media	1,780	23.6%	5.1%
Health Care & Life Science	3,307	43.9%	9.4%
Wind Turbine Component Manufacturing	19	0.3%	0.1%
Design	1,311	17.4%	3.7%
Total Targeted Technology Sector	**7,528**	**100.0%**	**21.5%**

SOURCES: Establishments - Economic Modeling Specialists, EMSI, www.economicmodeling.com.

Targeted Science and Technology Sector Employment

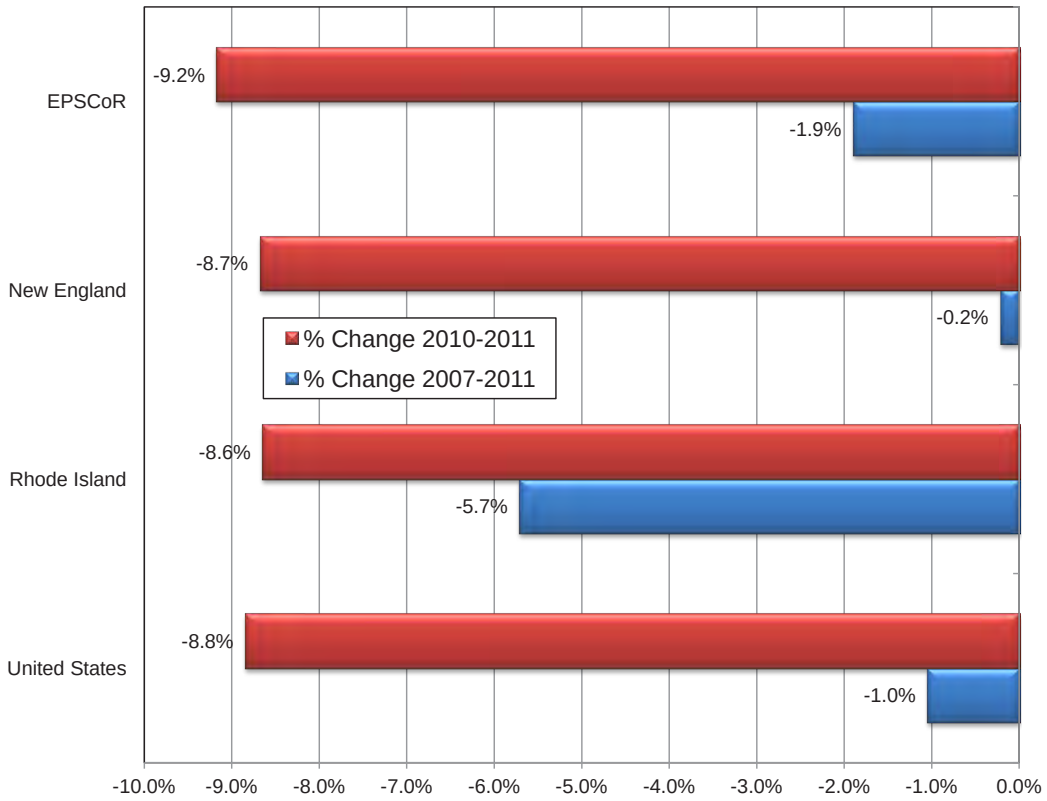
Rhode Island 1-Year Trend ⌄
Rhode Island 5-Year Trend ⌄
Rhode Island Compared to EPSCoR 1-Year Trend ⌃
Rhode Island Compared to New England 1-Year Trend =
Rhode Island Compared to U.S. 1-Year Trend =

SUMMARY

In 2011, Rhode Island employed 137,555 workers in its targeted science and technology sectors.[2] For the one-year period from 2010 to 2011 and the five-year period from 2007-2011, all of the reference groups saw a decrease[3] in target science and technology sector employment (see Figure 1-7). In the one-year period, Rhode Island's decrease of -5.7% far exceeded the decline experienced by each of the reference geographies. In terms of number of jobs this decrease was largely influenced by decreases in IT & Digital Media and Design.

Figure 1-7.

Percent Change in Employment in Tech Sectors - 2007-2011



RHODE ISLAND'S KNOWLEDGE ECONOMY

Targeted Science and Technology Sector Employment

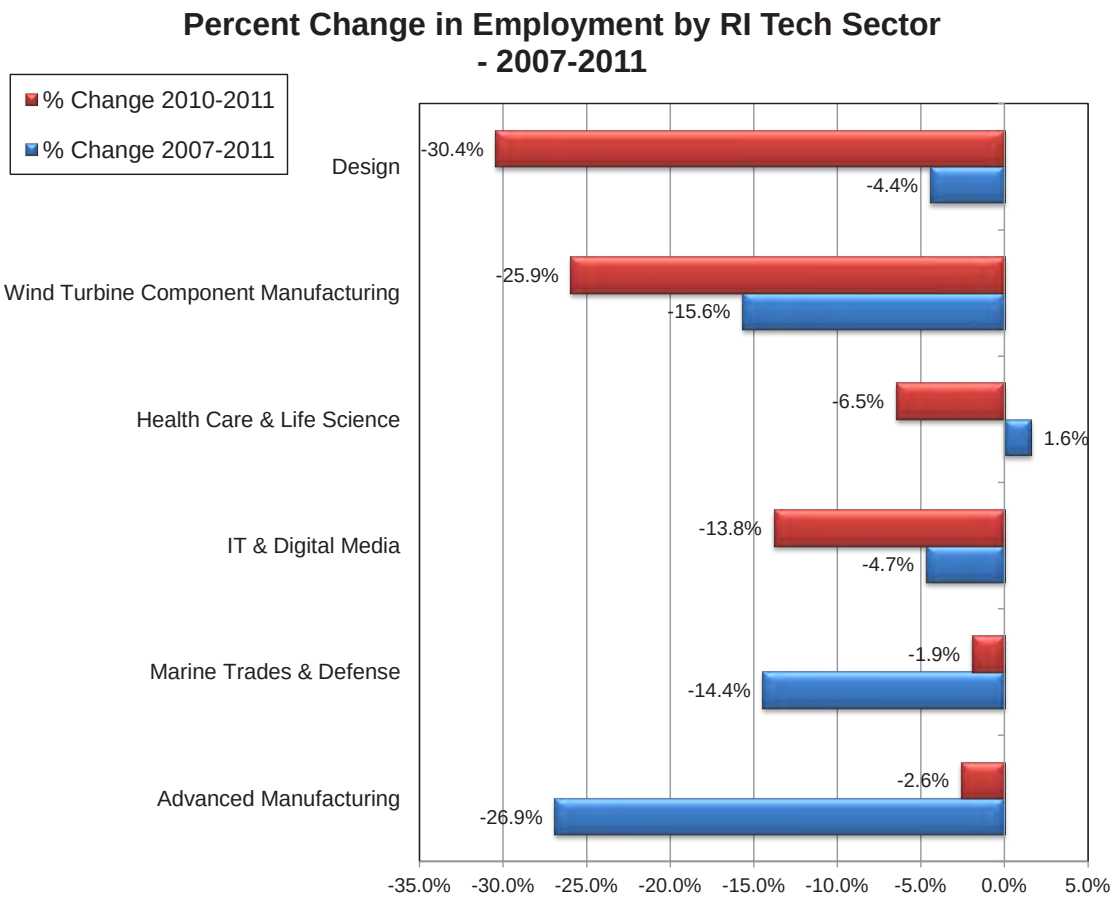
WHY THIS IS SIGNIFICANT

The number of residents currently employed by technology-based establishments within Rhode Island indicates the market strength of the current innovation and knowledge economy. Categorizing the data into science and technology sector sub-categories highlights areas that have particular strength or need for further targeting.

RELATED

For the five-year time period, the largest decrease in employment in the tech sectors in Rhode Island was in the Advanced Manufacturing sector, followed by Wind Turbine Component Manufacturing (see Figure 1-8). During the one-year time period, the Design sector experienced the largest decrease, followed by Wind Turbine Component Manufacturing. Health Care & Life Science was the only sector to increase during either the one- or five-year time periods; it increased by 1.6% from 2007-2011. This sector represents by far the largest targeted science and technology sector in Rhode Island employing 91,096 workers in 2011 and representing 61.9% of all targeted science and technology sector jobs for the state and 17.1% of all jobs statewide (see Figure 1-9). Overall, all of the targeted science and technology sectors combined represented 27.7% of all Rhode Island jobs in 2011 (see Figure 1-10).

Figure 1-8.



Targeted Science and Technology Sector Employment

Figure 1-9.

Rhode Island Targeted Technology Employment - 2007-2011

Targeted Technology Sector	2007 Jobs	2010 Jobs	2011 Jobs	% Change 2007-2011	% Change 2010-2011	2007 % of Total Tech Sector Jobs	2010 % of Total Tech Sector Jobs	2011 % of Total Tech Sector Jobs	2011 % of Total Jobs Statewide (All Sectors)
Advanced Manufacturing	26,436	19,837	19,325	-26.9%	-2.6%	18.1%	13.2%	14.0%	3.9%
Marine Trades & Defense	8,692	7,582	7,437	-14.4%	-1.9%	6.0%	5.0%	5.4%	1.5%
IT & Digital Media	17,616	19,475	16,792	-4.7%	-13.8%	12.1%	12.9%	12.2%	3.4%
Health Care & Life Science	83,843	91,096	85,210	1.6%	-6.5%	57.5%	60.5%	61.9%	17.1%
Wind Turbine Component Manufacturing	786	895	663	-15.6%	-25.9%	0.5%	0.6%	0.5%	0.1%
Design	8,499	11,675	8,123	-4.4%	-30.4%	5.8%	7.8%	5.9%	1.6%
TOTAL TARGETED TECHNOLOGY SECTOR	**145,872**	**150,560**	**137,550**	**-5.7%**	**-8.6%**	**100.0%**	**100.0%**	**100.0%**	**27.7%**

Figure 1-10.

Targeted Technology Employment - 2007-2011

Geographic Area	2007 Jobs	2010 Jobs	2011 Jobs	% Change 2007-2011	% Change 2010-2011	Total Jobs 2011 (All Sectors)	Targeted Technology Sector as a % of Total Jobs (All Sectors) 2011
United States	34,325,181	37,260,868	33,967,468	-1.0%	-8.8%	148,100,000	22.9%
Rhode Island	145,872	150,560	137,550	-5.7%	-8.6%	497,300	27.7%
New England	2,116,709	2,312,807	2,112,226	-0.2%	-8.7%	7,638,800	27.7%
EPSCoR	6,443,187	6,959,055	6,321,213	-1.9%	-9.2%	30,355,600	20.8%

SOURCES: Employment - Economic Modeling Specialists, EMSI, www.economicmodeling.com.

Targeted Science and Technology Sector Wages

Rhode Island Compared to EPSCoR ^

Rhode Island Compared to New England v

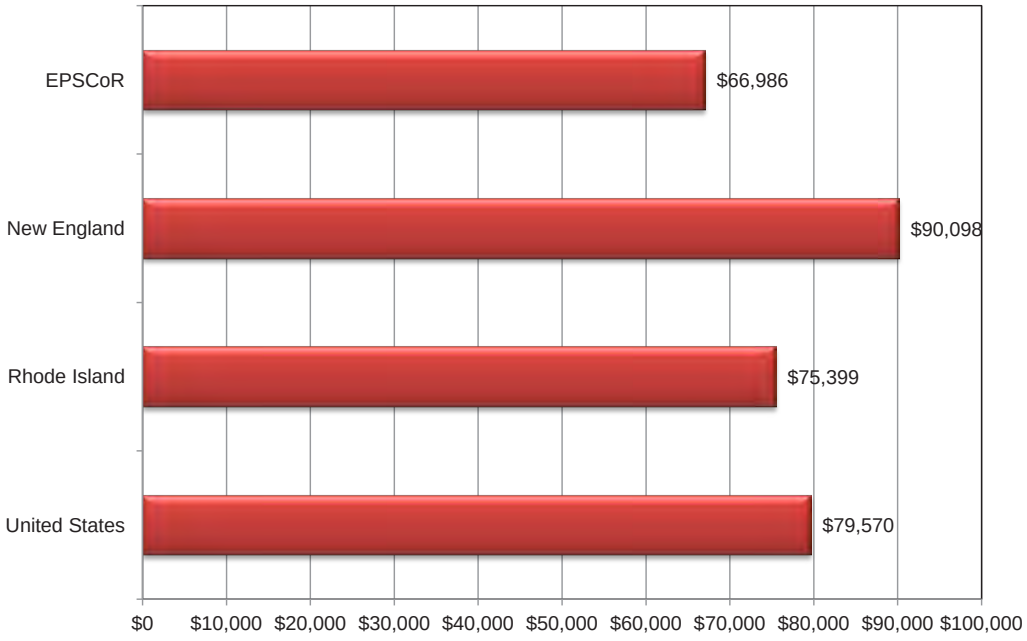
Rhode Island Compared to U.S. v

SUMMARY

The average wage in Rhode Island for its targeted science and technology sectors was $75,399 in 2012.[4] This is slightly above the EPSCoR states' average wage of $66,986 and behind both the U.S. average ($79,570) and that of the New England states ($90,098) (see Figure 1-11).

Figure 1-11.

Average Wage for Technology Sectors - 2012



WHY THIS IS SIGNIFICANT

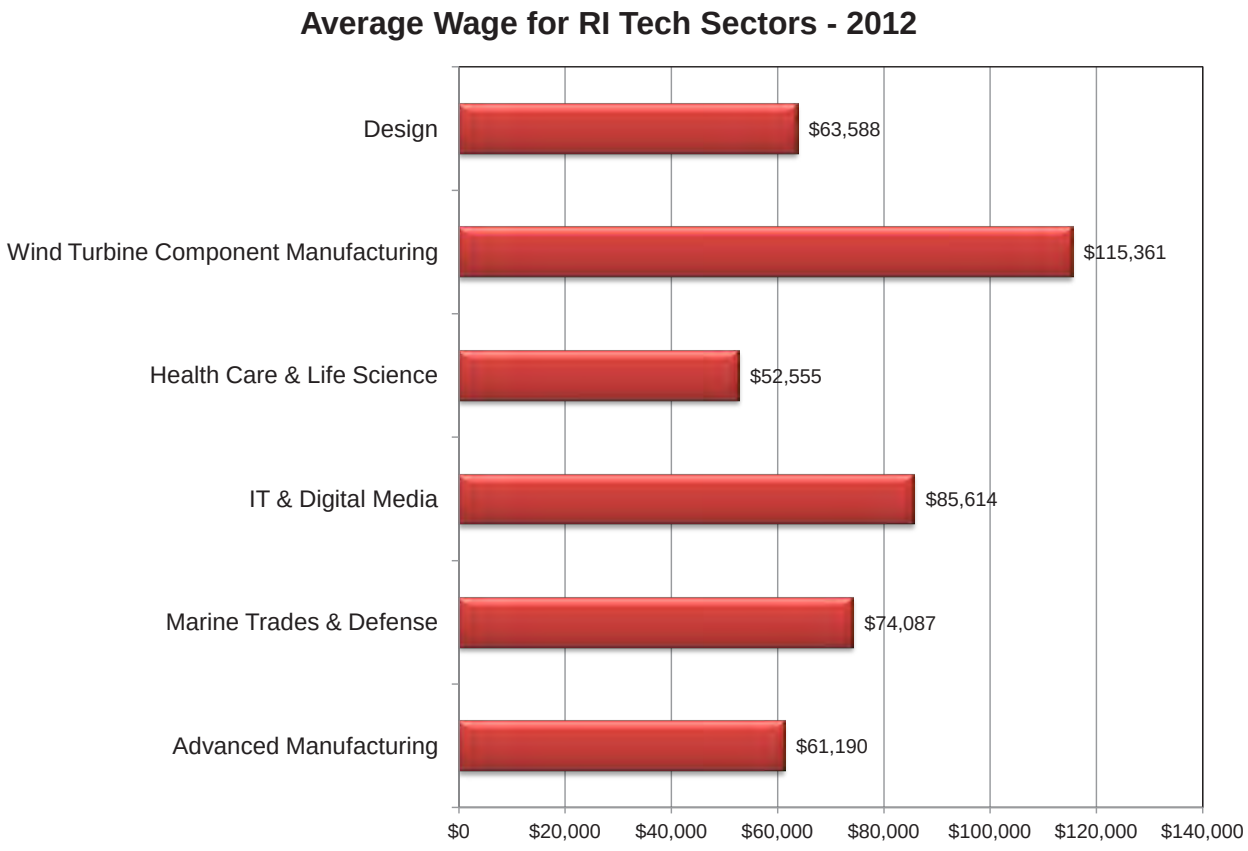
Wages provide the means for workers to support themselves, their households, and their families. Wages are strongly related to total income and quality of life by providing workers with the opportunity to make choices. Wages in technology-based sectors are typically higher than wages in other sectors.

Targeted Science and Technology Sector Wages

RELATED

In 2012, the average wage for the Rhode Island targeted science and technology sectors at $75,399 was higher than the average wage for all Rhode Island sectors ($54,568). Among the targeted science and technology sectors in 2012, the highest average wage was in the Wind Turbine Component Manufacturing sector followed by the IT & Digital Media sector. The lowest average wage of the targeted science and technology sectors was in Health Care & Life Science (see Figure 1-12).

Figure 1-12.



SOURCES: Wages - Economic Modeling Specialists, EMSI, www.economicmodeling.com.

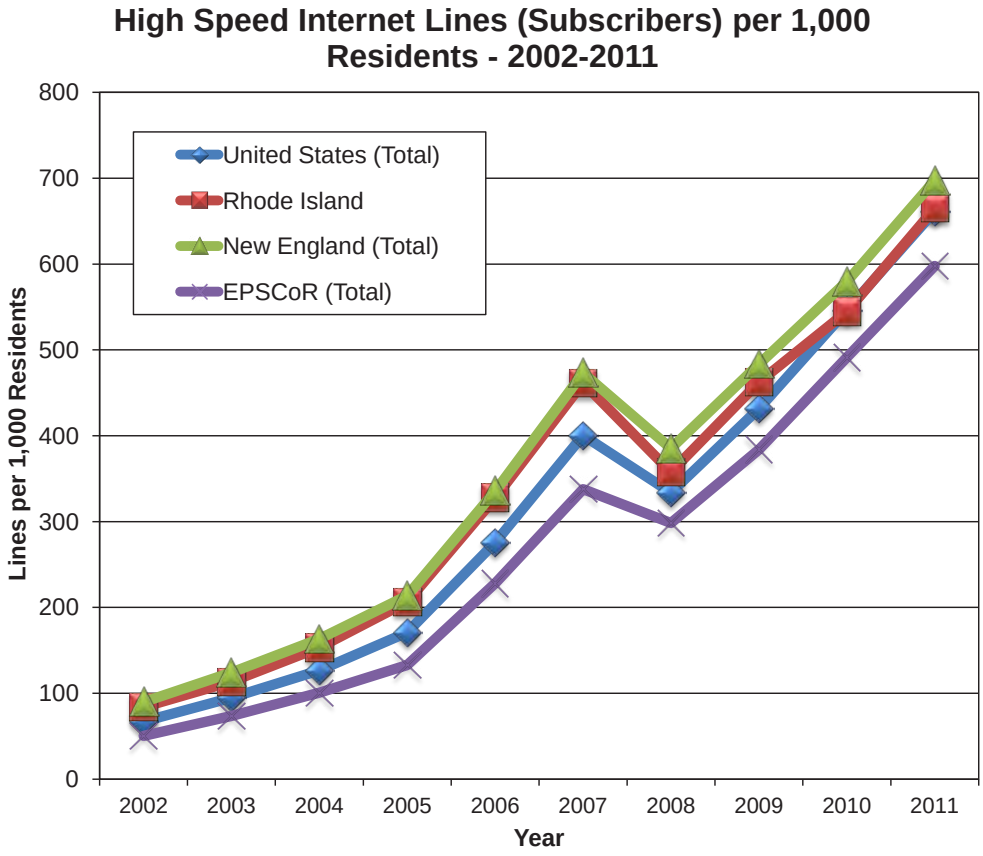
High Speed Internet Access

Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend ^
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England v
Rhode Island Compared to U.S. ^
Rhode Island's Most Recent National Ranking **20**

SUMMARY

Rhode Island has experienced significant increases in broadband[5] Internet subscribers,[6] growing from 88,701 in 2002 to 699,000 in 2011 or an increase of over 688%. This pattern is similar for the reference states. In 2011, Rhode Island had 664 subscribers per 1,000 residents, less than the New England states as a whole (697), but more than both the U.S. as a whole (661) and the EPSCoR states (597) (see Figure 1-13). Rhode Island's ranking dropped from 11th in 2007 to 20th in 2011.

Figure 1-13.



Note: Reporting instructions for mobile wireless changed in 2008

High Speed Internet Access

WHY THIS IS SIGNIFICANT

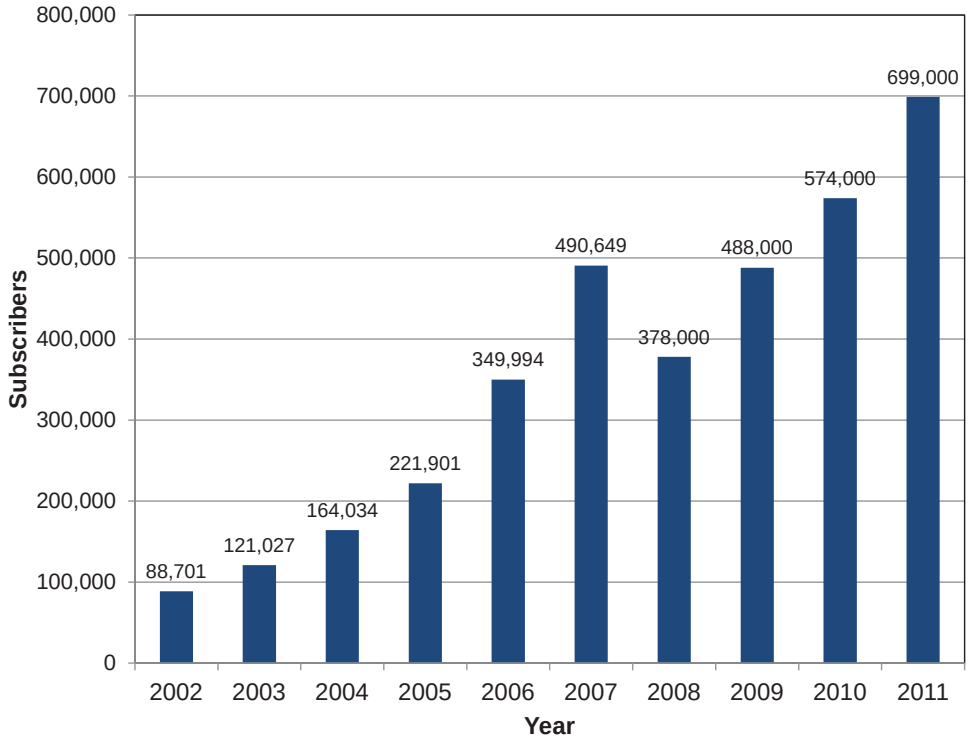
The degree to which broadband technology is available in Rhode Island determines, to a significant extent, the degree to which Rhode Island is technologically competitive. For instance, companies that rely on e-commerce for sales transactions require broadband technology. Likewise, entities engaged in research and development require high capacity communications technology. Moreover, the rise of Internet video, cloud computing, and other technologies place more demand on Internet traffic.

RELATED

In 2011, Rhode Island had 699,000 high speed internet lines. From 2008 - when the data reporting methodology changed - through 2011, Rhode Island experienced a steady annual increase of new subscribers (see Figure 1-14).

Figure 1-14.

High Speed Internet Lines (Subscribers) in Rhode Island - 2002-2011



Note: Reporting instructions for mobile wireless changed in 2008

SOURCES: High-Speed Services for Internet Access - Status as of June 30, 2011, Released June 2012, Federal Communications Commission; www.fcc.gov/wcb/iatd/comp.html; all data is based on annual reports.

Net Domestic Migration

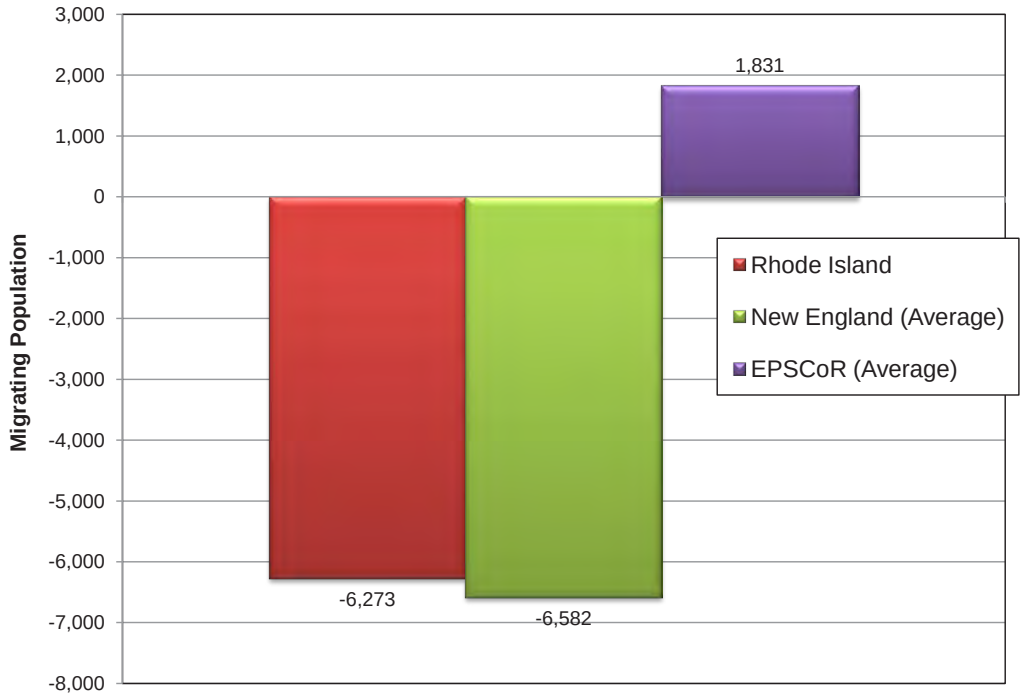
Rhode Island 1-Year Trend N/A
Rhode Island 5-Year Trend N/A
Rhode Island Compared to EPSCoR ⌄
Rhode Island Compared to New England ⌃
Rhode Island's Most Recent National Ranking **36**

SUMMARY

In 2011, the net domestic migration rate[7] for Rhode Island was -6,273, meaning more persons moved out of Rhode Island than moved in from other states (see Figure 1-15). This was above the average for New England states, which had an average net domestic migration of -6,582. EPSCoR states had a positive net domestic migration of 1,831. Rhode Island ranks 36th nationally on this indicator.

Figure 1-15.

Net Domestic Migration - 2011



WHY THIS IS SIGNIFICANT

Economic growth requires attracting and retaining workers. Regions that offer good jobs, quality of life, and reasonable costs can attract and retain workers and avoid losing existing workforce base.

SOURCES: Net domestic migration - U.S. Census Bureau via NewGeography: www.newgeography.com/content/002585-new-census-data-reaffirms-dominance-south.

State Funding for Science & Technology

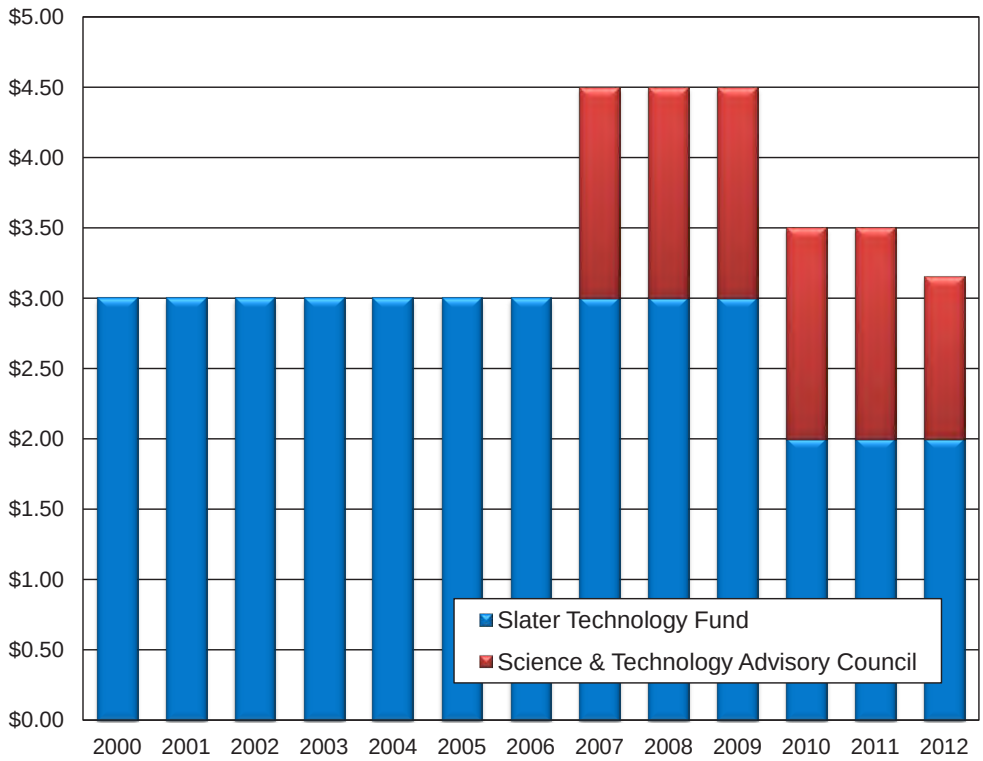
Rhode Island 1-Year Trend
Rhode Island 5-Year Trend

SUMMARY

Since 1997, the Slater Technology Fund has been financed by the Rhode Island General Assembly to provide financing to technology ventures in the state. From 2000 to 2009, there was an annual investment of $3.0 million that decreased to $2.0 million for 2010, 2011, and 2012 (see Figure 1-16). Starting in 2007, there has also been a state investment for the Science and Technology Advisory Council of $1.5 million a year; this investment decreased to $1.15 million in 2012. From 2000 to 2011, there has been a total state investment of $44.65 million for science and technology.

Figure 1-16.

State Funding for Science & Technology - FY 2000 - FY 2012 - Rhode Island (millions of $)



RHODE ISLAND'S KNOWLEDGE ECONOMY

State Funding for Science & Technology

WHY THIS IS SIGNIFICANT

State support for building innovation and supporting entrepreneurs is essential for success. The Slater Technology Fund provides seed-stage capital to companies that are committed to building their technology-based businesses in Rhode Island and the Rhode Island Science and Technology Advisory Council (STAC) works to strengthen the statewide collaborative research and development platform. STAC is the official oversight body for the EPSCoR program for the State of Rhode Island.

SOURCES: State funding - Provided by Rhode Island Science & Technology Advisory Council, http://stac.ri.gov/ and http://www.slaterfund.com.

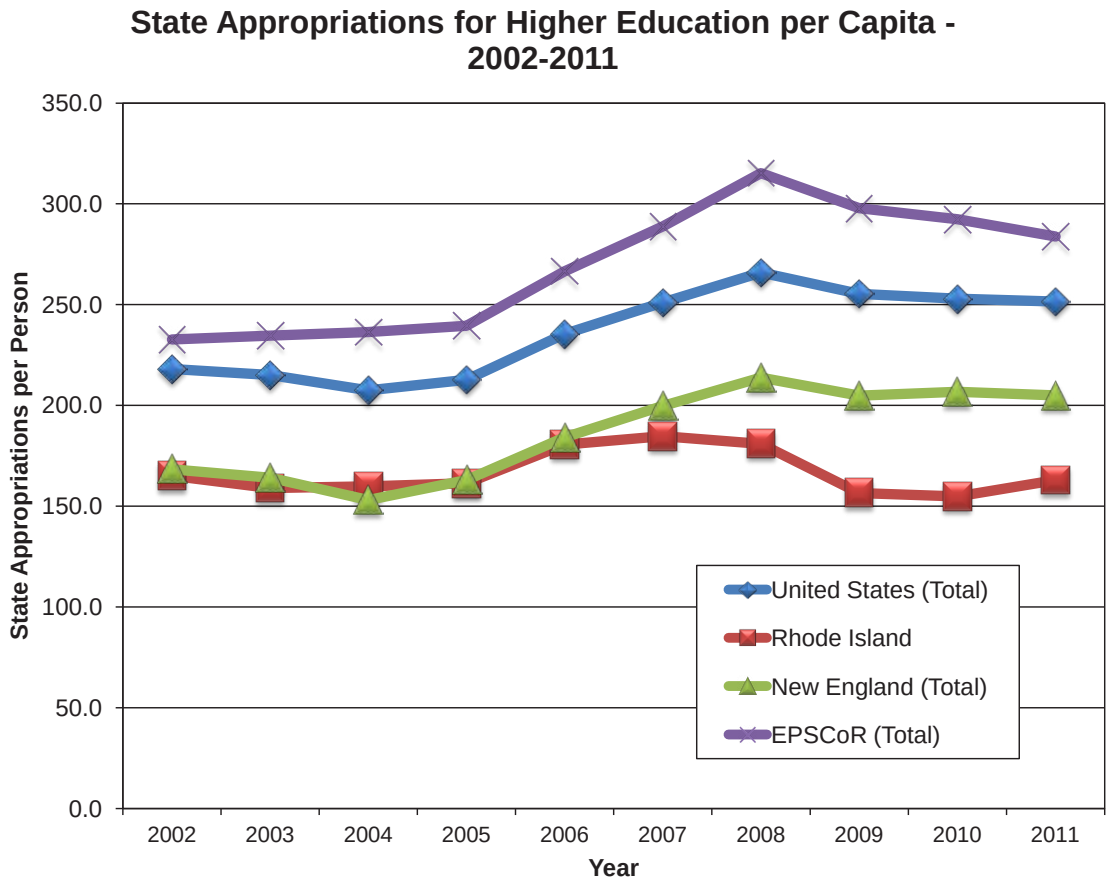
State Appropriations for Higher Education

Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend v
Rhode Island Compared to EPSCoR v
Rhode Island Compared to New England v
Rhode Island Compared to U.S. v
Rhode Island's Most Recent National Ranking **47**

SUMMARY

On a per total population basis, Rhode Island appropriates less state funds for higher education than the reference geographies. From 2002 to 2006, Rhode Island remained fairly consistent with the New England states as a whole but since 2006 has dropped below all reference geographies. In 2011, Rhode Island appropriated $163 in state funds for higher education per capita. This compares to $205 for the New England states, $251 for the U.S. as a whole, and $284 for the EPSCoR states (see Figure 1-17). In 2011, Rhode Island ranked 47th nationally on this indicator, down from its 2010 ranking of 46th.

Figure 1-17.



RHODE ISLAND'S KNOWLEDGE ECONOMY

State Appropriations for Higher Education

WHY THIS IS SIGNIFICANT

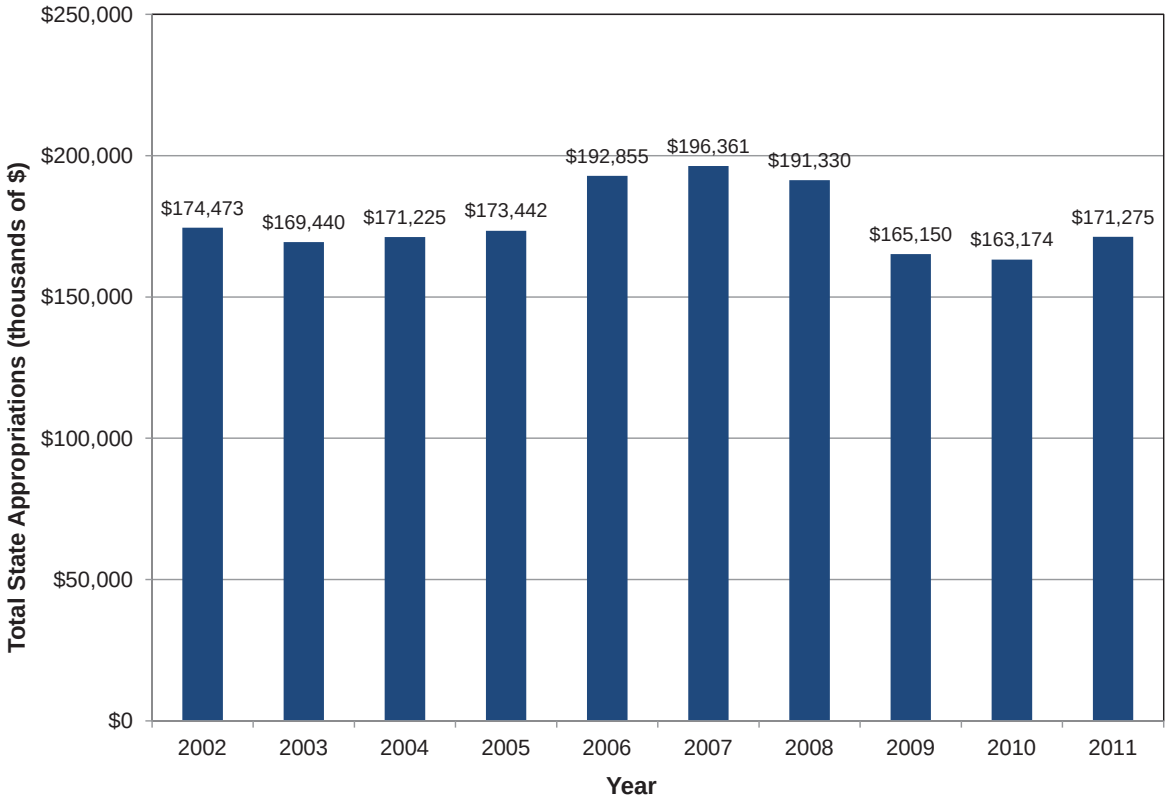
Rhode Island's investment in science and technology-based economic development is also driven by its appropriations for higher education. This indicator also relates to the importance placed on the preparedness of the Rhode Island workforce for higher-paying jobs requiring post-secondary degrees.

RELATED

In 2011, the State of Rhode Island appropriated $171 million in funds for higher education. This represents an increase of 5% from 2010 yet a decrease of 12.8% since the 2007 peak of $196 million (see Figure 1-18).

Figure 1-18.

State Appropriations for Higher Education in Rhode Island 2002-2011



SOURCES: State Appropriations - from the Center for the Study of Education Policy, "An Annual Compilation of Data on State Fiscal Support for Higher Education, 1990-2011"; http://www.grapevine.ilstu.edu/index.shtml.

Population - Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2011 (NST-EST2011-01); Release Date: December 2011; Population Division, U.S. Census Bureau; www.census.gov/popest/.

Endnotes

[1] The targeted technology sectors are as follows:

TARGETED TECHNOLOGY SECTORS IN RHODE ISLAND

ADVANCED MANUFACTURING	
NAICS Code	**Description**
313	Textile Mills
315	Apparel Manufacturing
324110	Petroleum Refineries
3251	Basic Chemical Manufacturing
3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing
3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing
3255	Paint, Coating, and Adhesive Manufacturing
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing
3259	Other Chemical Product and Preparation Manufacturing
326	Plastics and Rubber Products Manufacturing
3271	Clay Product and Refractory Manufacturing
3272	Glass and Glass Product Manufacturing
3321	Forging and Stamping
3322	Cutlery and Handtool Manufacturing
3323	Architectural and Structural Metals Manufacturing
3324	Boiler, Tank, and Shipping Container Manufacturing
3325	Hardware Manufacturing
3326	Spring and Wire Product Manufacturing
3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
3328	Coating, Engraving, Heat Treating, and Allied Activities
33291	Metal Valve Manufacturing
332992	Small Arms Ammunition Manufacturing
332993	Ammunition (except Small Arms) Manufacturing
332994	Small Arms Manufacturing
332995	Other Ordnance and Accessories Manufacturing
332996	Fabricated Pipe and Pipe Fitting Manufacturing
332997	Industrial Pattern Manufacturing
332998	Enameled Iron and Metal Sanitary Ware Manufacturing
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing
3331	Agriculture, Construction, and Mining Machinery Manufacturing
3332	Industrial Machinery Manufacturing
3333	Commercial and Service Industry Machinery Manufacturing
333411	Air Purification Equipment Manufacturing
333414	Heating Equipment (except Warm Air Furnaces) Manufacturing

RHODE ISLAND'S KNOWLEDGE ECONOMY

333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing
3335	Metalworking Machinery Manufacturing
333618	Other Engine Equipment Manufacturing
3339	Other General Purpose Machinery Manufacturing
3346	Manufacturing and Reproducing Magnetic and Optical Media
3351	Electric Lighting Equipment Manufacturing
3352	Household Appliance Manufacturing
3361	Motor Vehicle Manufacturing
3365	Railroad Rolling Stock Manufacturing
3399	Other Miscellaneous Manufacturing

MARINE TRADES & DEFENSE	
NAICS Code	**Description**
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
335311	Power, Distribution, and Specialty Transformer Manufacturing
335313	Switchgear and Switchboard Apparatus Manufacturing
335314	Relay and Industrial Control Manufacturing
33591	Battery Manufacturing
33592	Communication and Energy Wire and Cable Manufacturing
33593	Wiring Device Manufacturing
335991	Carbon and Graphite Product Manufacturing
3362	Motor Vehicle Body and Trailer Manufacturing
3363	Motor Vehicle Parts Manufacturing
3364	Aerospace Product and Parts Manufacturing
3366	Ship and Boat Building
3369	Other Transportation Equipment Manufacturing
4231	Motor Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers

IT & DIGITAL MEDIA	
NAICS Code	**Description**
3341	Computer and Peripheral Equipment Manufacturing
3342	Communications Equipment Manufacturing
3343	Audio and Video Equipment Manufacturing
3344	Semiconductor and Other Electronic Component Manufacturing
511	Publishing Industries (except Internet)
515	Broadcasting (except Internet)
517	Telecommunications
518	Data Processing, Hosting and Related Services
51913	Internet Publishing and Broadcasting and Web Search Portals
5415	Computer Systems Design and Related Services
5418	Advertising, Public Relations, and Related Services

HEALTH CARE & LIFE SCIENCE	
NAICS Code	**Description**
3254	Pharmaceutical and Medicine Manufacturing
3391	Medical Equipment and Supplies Manufacturing
54171	Research and Development in the Physical, Engineering, and Life Sciences
621	Ambulatory Health Care Services
622	Hospitals
623	Nursing and Residential Care Facilities
624	Social Assistance

WIND TURBINE COMPONENT MANUFACTURING	
NAICS Code	**Description**
331511	Iron Foundries
332312	Fabricated Structural Metal Manufacturing
332991	Ball and Roller Bearing Manufacturing
333412	Industrial and Commercial Fan and Blower Manufacturing
333611	Turbine and Turbine Generator Set Units Manufacturing
333612	Speed Changer, Industrial High-Speed Drive, and Gear Manufacturing
333613	Mechanical Power Transmission Equipment Manufacturing
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing
335312	Motor and Generator Manufacturing
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing

DESIGN	
NAICS Code	**Description**
5413	Architectural, Engineering, and Related Services
5414	Specialized Design Services
5416	Management, Scientific, and Technical Consulting Services

[2] EPSCoR percent change was small enough that it rounds to zero but represents a decrease of several hundred employees.

[3] Includes wages, salaries, & prior earnings.

[4] See endnote 1 for a description of targeted technology sectors in Rhode Island.

[5] Broadband is defined as high-speed data lines that provide the subscriber with data transmissions at speeds in excess of 200 kilobits per second (kbps) in at least one direction.

[6] Subscriber is equivalent to a line in service. An active line may have one or more users.

[7] Net migration rate equals the number of persons moving into a geography minus the number of persons moving out with the result divided by the total population. A negative rate means that geography experience out-migration (more people leaving than coming) and a positive number means the geography experienced in-migration (more people coming than leaving). Net domestic migration rate measures the number of people moving from one state to another.

THE KNOWLEDGE BUSINESS PIPELINE

OVERVIEW

The indicators in this section reflect the ability of Rhode Island to transfer knowledge into innovation and business activity. This activity forms the basis for the competitiveness of Rhode Island's economy.

The issuance of patents provides insight into the degree to which a state can commercialize research and development, and profit from expenditures in research and development. Over the past ten years, the state has outperformed the EPSCoR states as a whole and performed on par with the U.S. as a whole on this indicator. More recently, Rhode Island fell below the US as a whole.

A desired economic outcome of academic research is the transfer of new knowledge into products of commercial value and the formation of new ventures and jobs. Patenting by academic institutions is one indication of this potential. In 2008 Rhode Island performed slightly higher than the EPSCoR states combined but lags both New England and the U.S.

With regard to entrepreneurial activity in Rhode Island as measured by individuals starting businesses Rhode Island lags the reference geographies. Venture capital is an important source of funding for technology-based start-ups and companies with high growth potential. In 2010 Rhode Island outperformed the EPSCoR states, was on par with the U.S. as a whole, and lagged New England as a whole. Over the last five years, the state has experienced an increase in the amount of venture capital invested.

The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are important sources of early stage capital for technology-based entrepreneurs. In 2010 Rhode Island was on par with the EPSCoR states but lagged New England and the U.S.

INDICATORS

Patents Issued Per 1,000 Residents

Rhode Island 1-Year Trend =

Rhode Island 5-Year Trend ⌄

Rhode Island Compared to EPSCoR ⌃

Rhode Island Compared to New England ⌄

Rhode Island Compared to U.S. ⌄

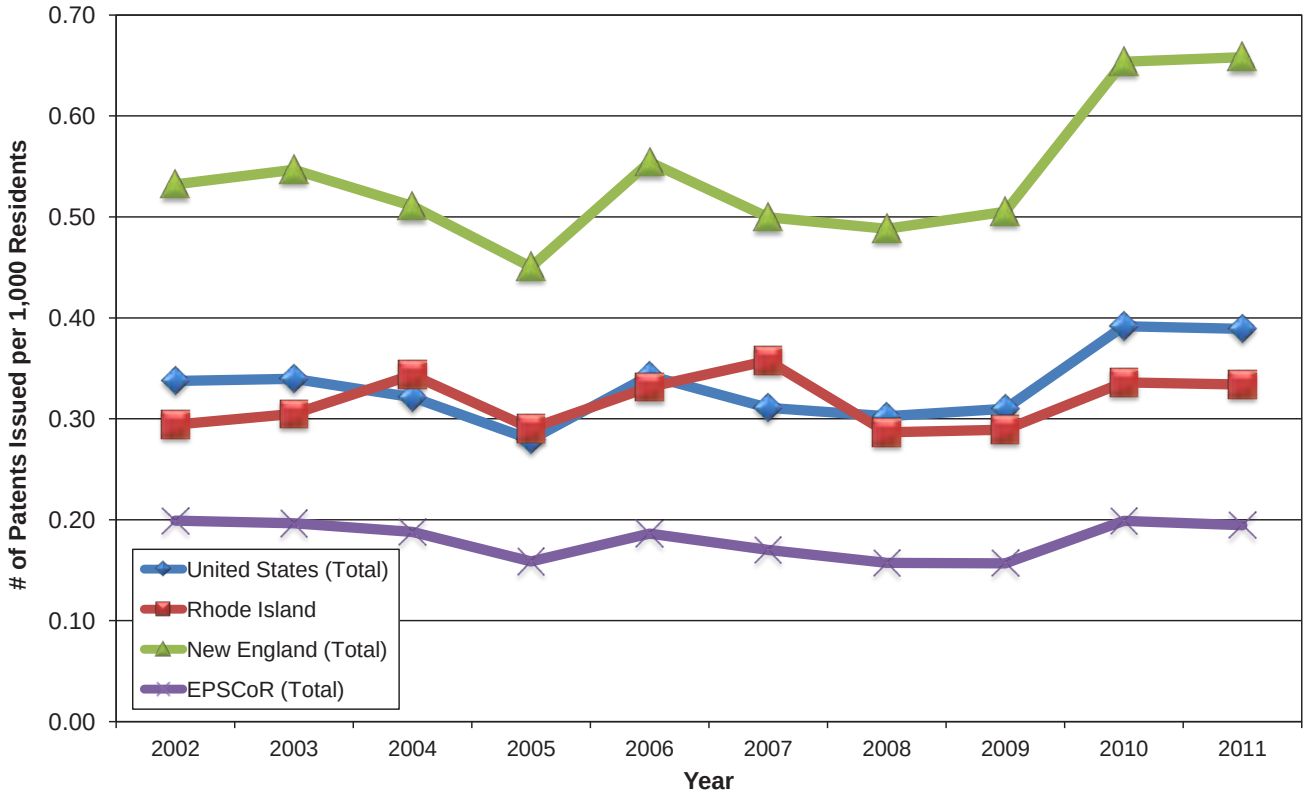
Rhode Island's Most Recent National Ranking **20**

SUMMARY

Rhode Island's pattern is mixed with regard to the number of patents issued per 1,000 residents[1] (see Figure 2-1). In 2011, Rhode Island was ranked 20th nationally on this indicator, which is down from 14th in 2007. In 2011, on this indicator Rhode Island (0.334) was slightly below the level of the U.S. as a whole (0.389), and above the EPSCoR states (0.194). Of the reference geographies, New England had the highest number of patents issued per 1,000 with 0.658.

Figure 2-1.

Patents Issued (all types) per 1,000 Residents - 2002-2011



THE KNOWLEDGE BUSINESS PIPELINE

Patents Issued Per 1,000 Residents

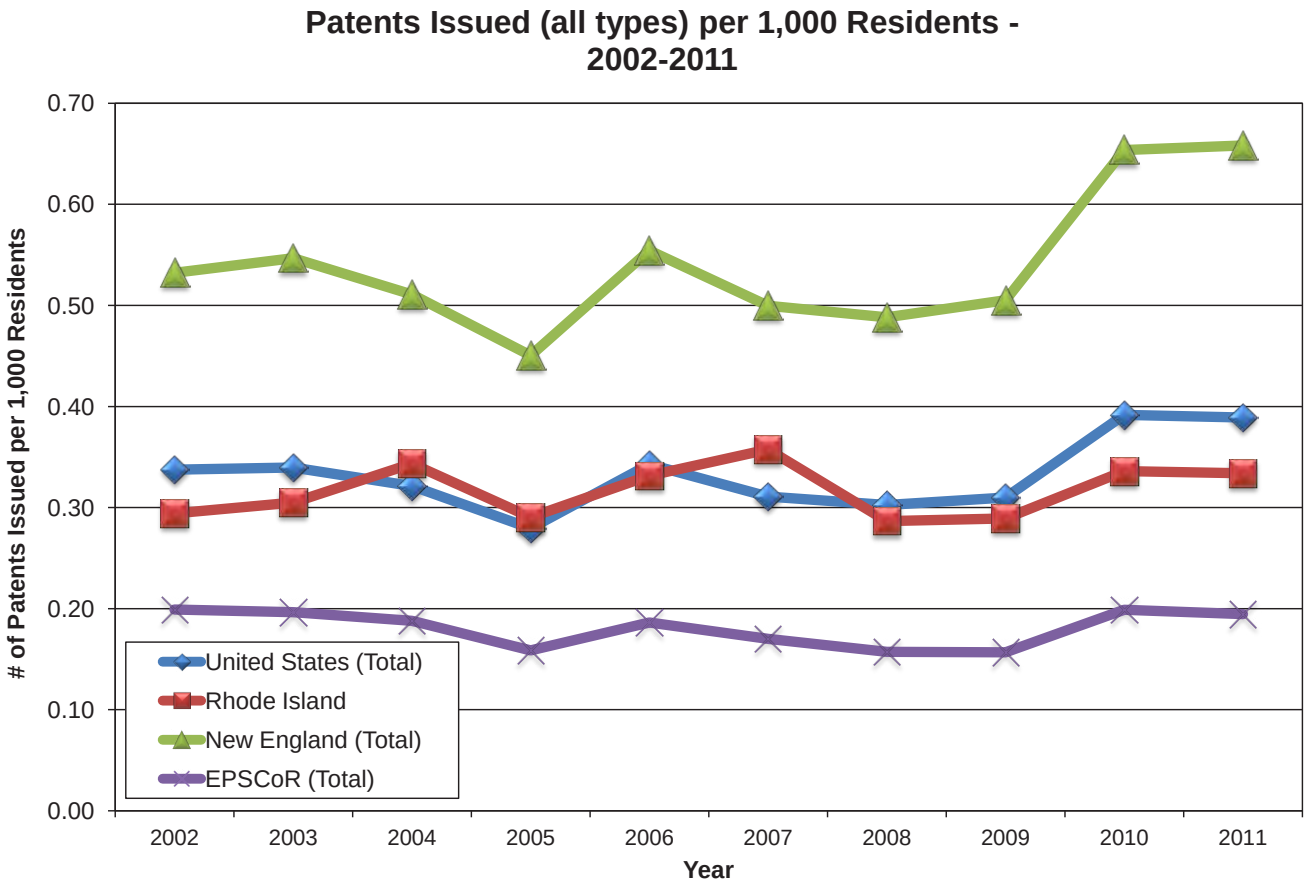
WHY THIS IS SIGNIFICANT

Patents are a measure of knowledge creation and the commercial potential of that knowledge and related research. The issuance of patents suggests that dollars expended on R&D are allowing companies and research institutions to continue towards commercialization.

RELATED

The number of patents in Rhode Island has experienced ups and downs over the past ten years, was at its highest in 2007, and had almost no change from 2010 to 2011. In 2011 the State had a level of 351 patents (see Figure 2-2).

Figure 2-2.

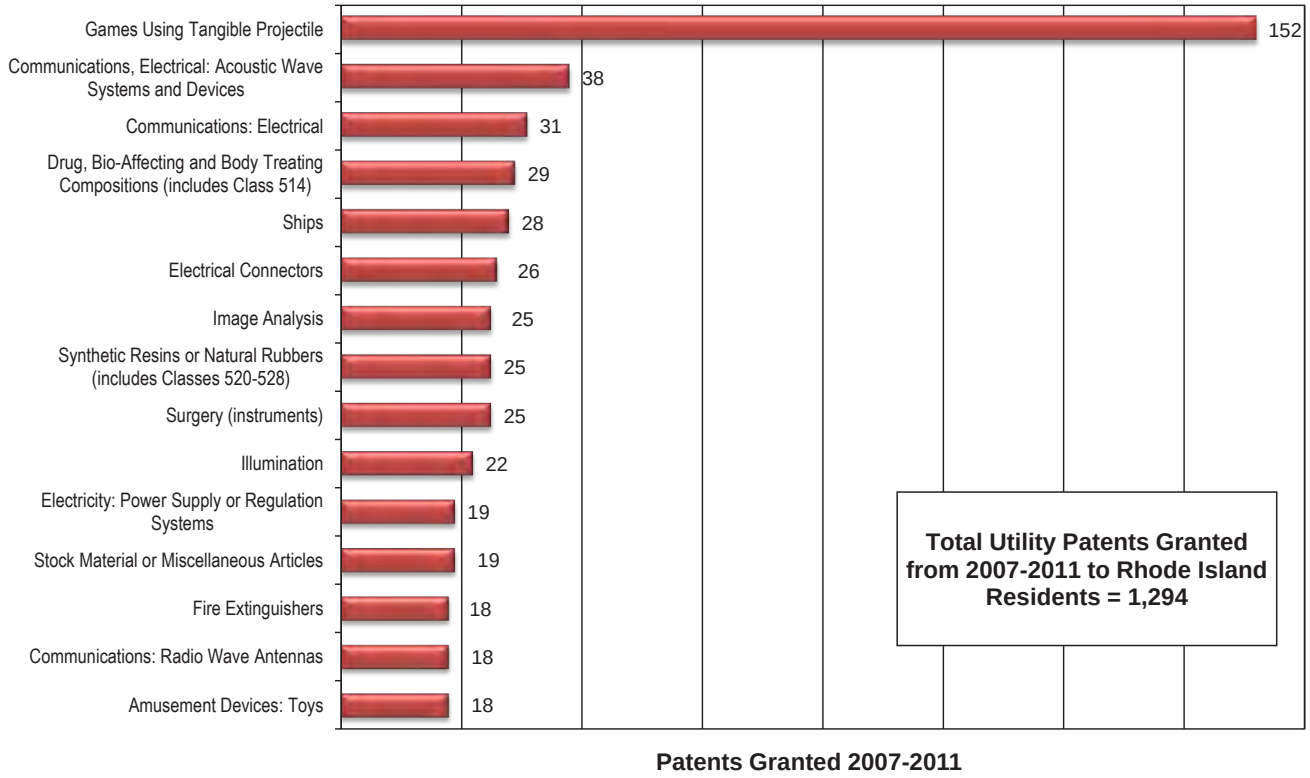


Patents Issued Per 1,000 Residents

Utility patents provide a means to analyze patents issued by technology class, and show which specific technology areas are particularly strong in the state. In the past five years, the classes related to game manufacturing, communications, and drugs exhibited the largest patent activity (see Figure 2-3).

Figure 2-3.

Utility Patents Issued by Technology Class in Rhode Island - 2007-2011 – Top 15 Classes



SOURCES: Patents - Patent Counts by Country/State and Year, All Patents, All Types, January 1, 1977-December 31, 2011; by Calendar Year; US Patent and Trade Mark Office; www.uspto.gov/.

Population - Annual Estimates of the Population for the United States and States, and for Puerto Rico: April 1, 2000 to July 1, 2010 (NST-EST2010-alldata), Population Division, U.S. Census Bureau, Release Date: February, 2011; www.census.gov/popest/estimates.php.

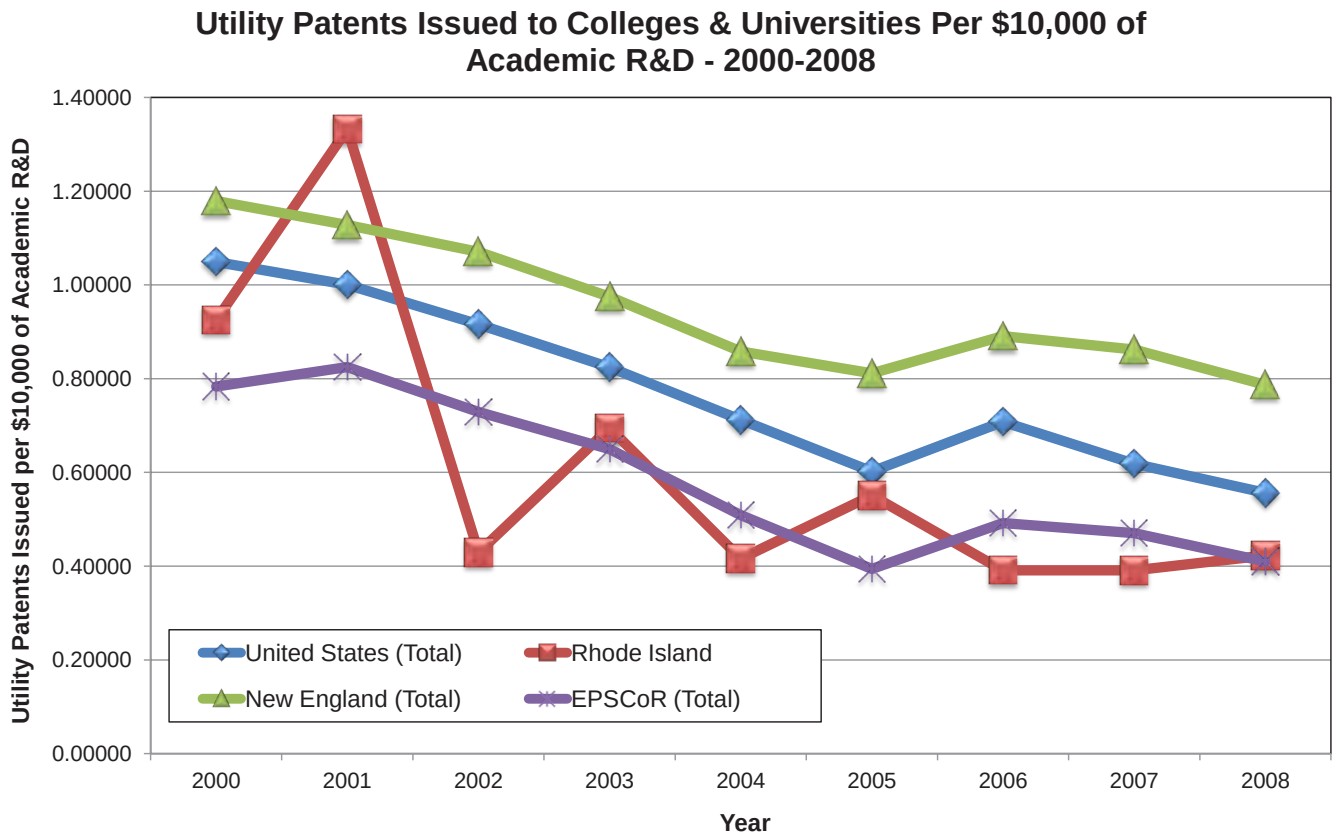
Patents (Utility Only) Issued to Universities and Colleges

Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend ^
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England v
Rhode Island Compared to U.S. v
Rhode Island's Most Recent National Ranking **23**

SUMMARY

In 2008, Rhode Island had 10 utility patents issued to universities and colleges in the state. On a per $10,000 of academic R&D dollars basis in 2008, Rhode Island (0.422) performed slightly higher than EPSCoR states combined (0.410) but lagged both the New England total (0.786) and the U.S. (0.556) (see Figure 2-4).[2] In 2008, Rhode Island ranked 23rd among all states on this indicator.

Figure 2-4.



Note: The data above is the same as what was shown in the 2011 report as updated data is not currently available.

Patents (Utility Only) Issued to Universities and Colleges

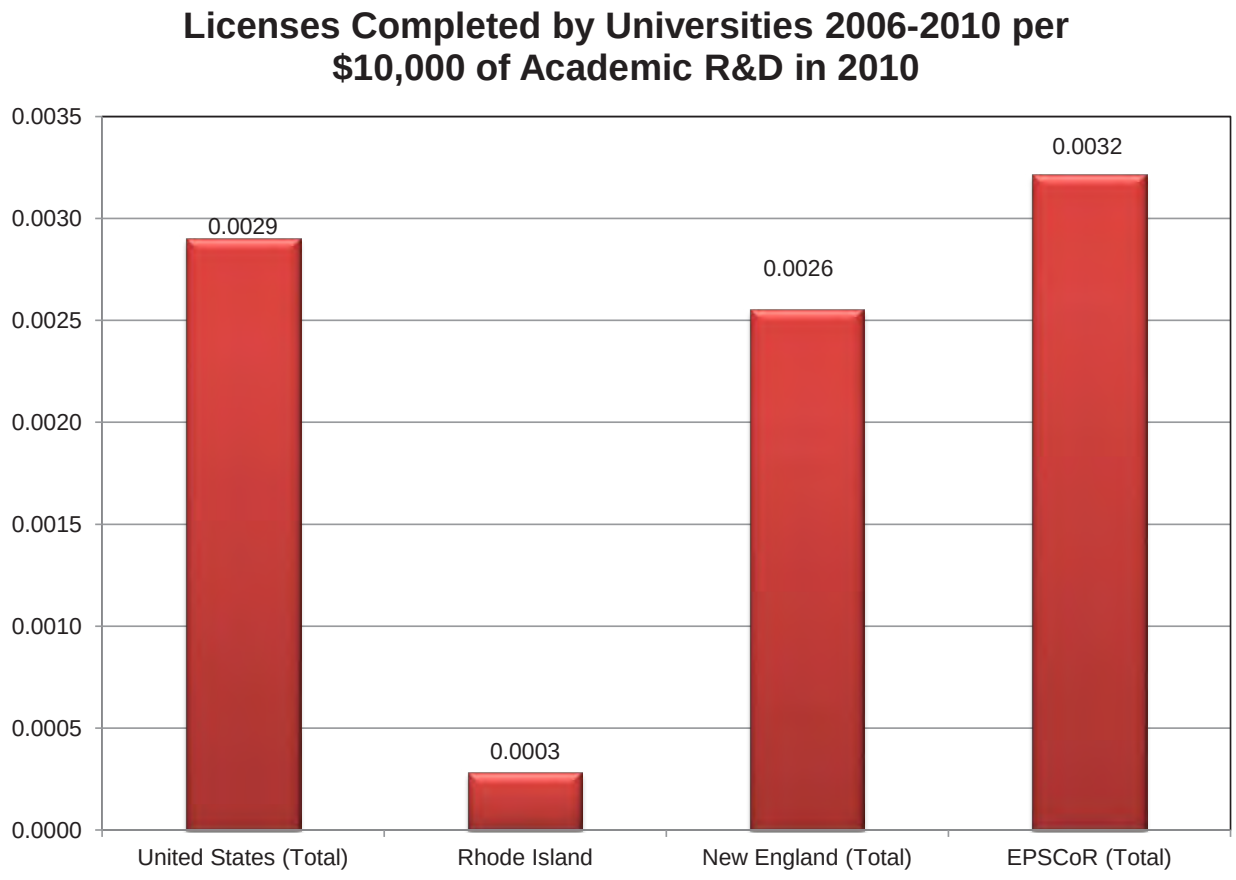
WHY THIS IS SIGNIFICANT

The capacity of universities to patent and commercialize research is one mark of the research strength of the institution and its ability to impact regional economic growth.

RELATED

Licenses are a means of transferring academic R&D into private sector commercialization. In terms of licenses completed by universities from 2006 and 2010 per $10,000 of academic R&D in 2010 Rhode Island (0.0003) lagged that of all the reference groups (see Figure 2-5). During this period, Rhode Island reported 12 licenses among universities and colleges.

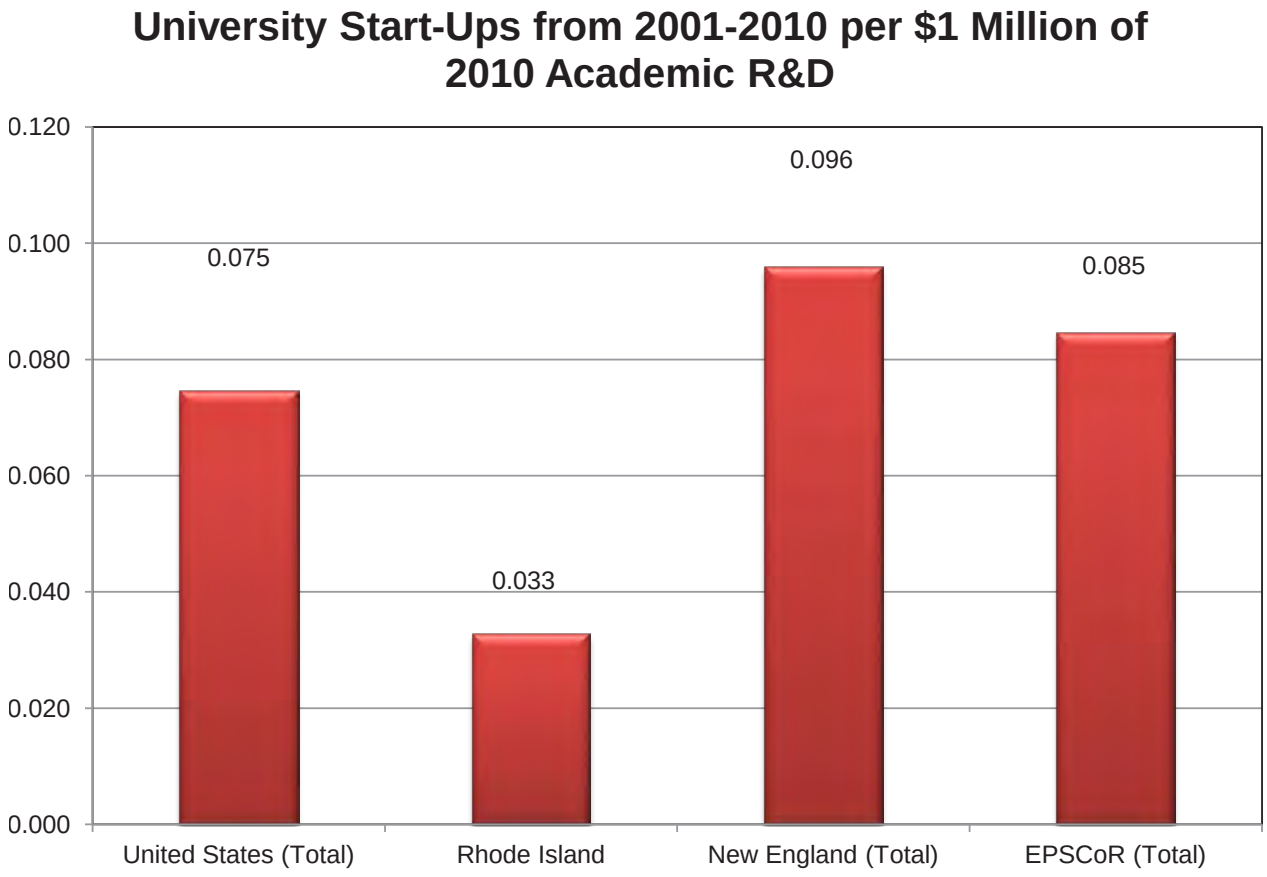
Figure 2-5.



THE KNOWLEDGE BUSINESS PIPELINE

New business start-ups emerging from academic R&D is another way in which colleges and universities impact economic growth. In terms of start-ups from 2001 to 2010 per $1 million of 2010 academic R&D, Rhode Island universities and colleges lagged the reference geographies (see Figure 2-6).

Figure 2-6.



SOURCES: Patents - US Colleges and Universities- Utility Patent Grants, 1969-Present, Patents Distributed by Calendar Year of Grant; US Patent and Trade Mark Office; www.uspto.gov/.

University & College R&D Performed - National Science Foundation/Division of Science Resources Statistics; Survey of R&D Expenditures at Universities and Colleges www.nsf.gov/statistics.

University licenses and Start-ups - Extracted from AUTM Licensing STATT database; www.autm.net/Home.htm.

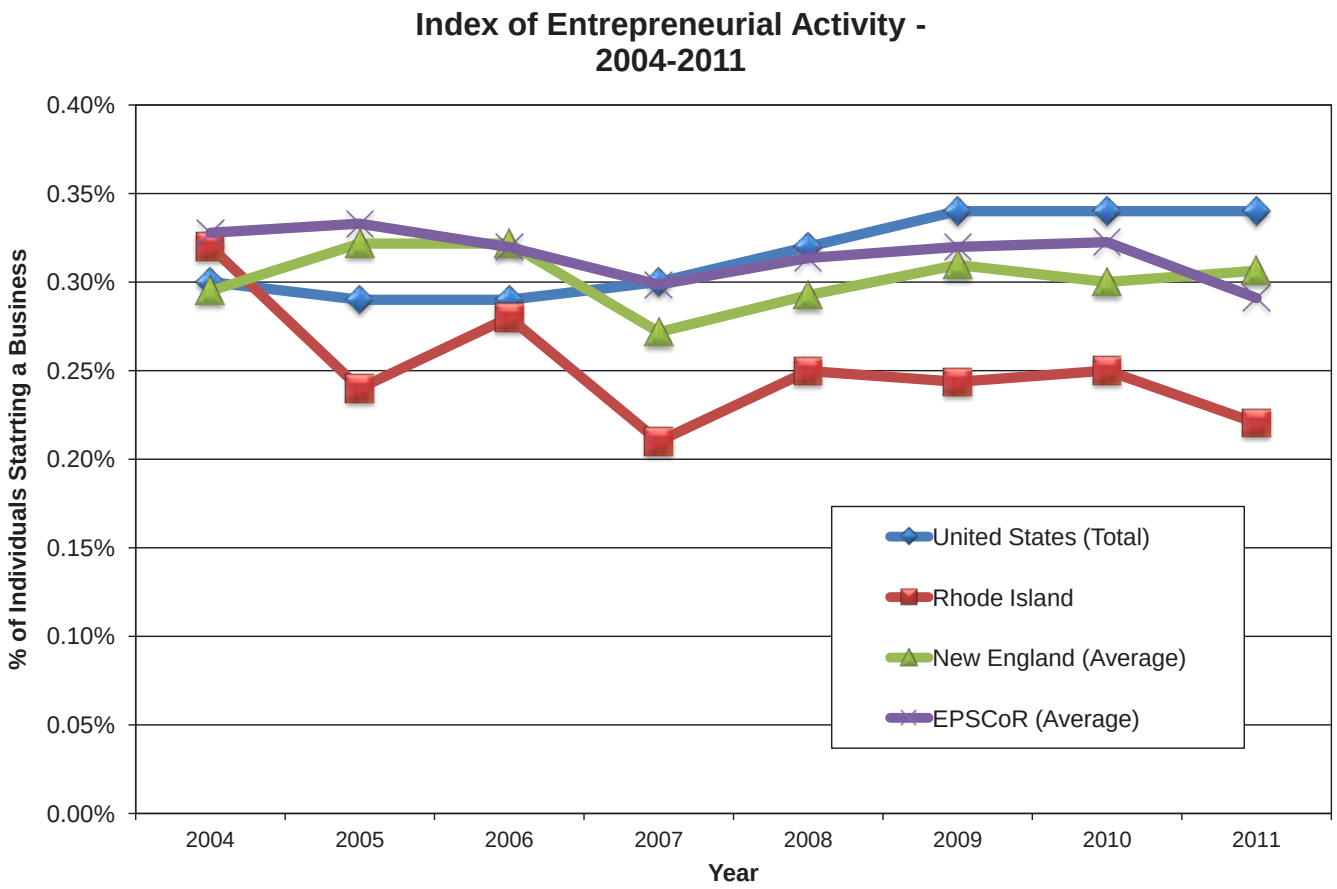
Entrepreneurial Climate

Rhode Island 1-Year Trend ⌄
Rhode Island 5-Year Trend =
Rhode Island Compared to EPSCoR ⌄
Rhode Island Compared to New England ⌄
Rhode Island Compared to U.S. ⌄
Rhode Island's Most Recent National Ranking **42**

SUMMARY

From 2010 to 2011, Rhode Island decreased its index of entrepreneurial activity[3] from 0.25% to 0.22%. This indicator measures the rate of business start-ups by individuals. From 2005 through 2011, Rhode Island lagged the reference geographies on this indicator. In 2011, Rhode Island is ranked 42nd, down from its 2010 ranking of 33rd (see Figure 2-7).

Figure 2-7.



THE KNOWLEDGE BUSINESS PIPELINE

Entrepreneurial Climate

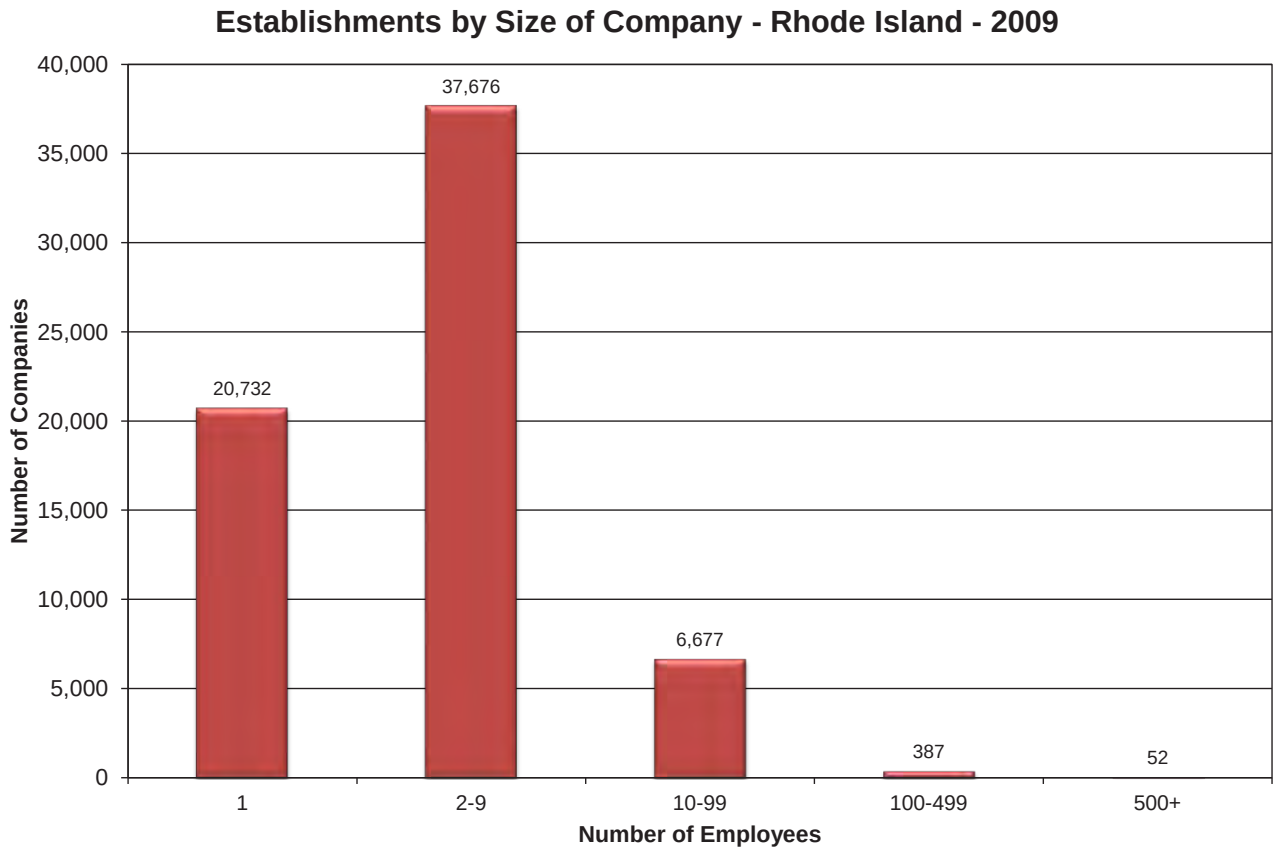
WHY THIS IS SIGNIFICANT

An active and well-connected entrepreneurial climate where innovators can take ideas to national and international markets is vital to a region's economic development. Inherent to this environment are intermediaries that serve as the node connectors for high-impact companies, linking entrepreneurs to various public and private resources through start-up, growth and expansion stages.

RELATED

In 2009, there were 20,732 establishments with one employee in Rhode Island representing 31.6% of all Rhode Island establishments. Another 37,676 establishments had 2-9 employees or 57.5% of all establishments in Rhode Island (see Figure 2-8).

Figure 2-8.



SOURCES: Entrepreneurship Index - Kauffman Foundation; www.kauffman.org/researchandpolicy/entrepreneurship-data.aspx.

Venture Capital Investments

Rhode Island 1-Year Trend ^

Rhode Island 5-Year Trend v

Rhode Island Compared to EPSCoR ^

Rhode Island Compared to New England v

Rhode Island Compared to U.S. =

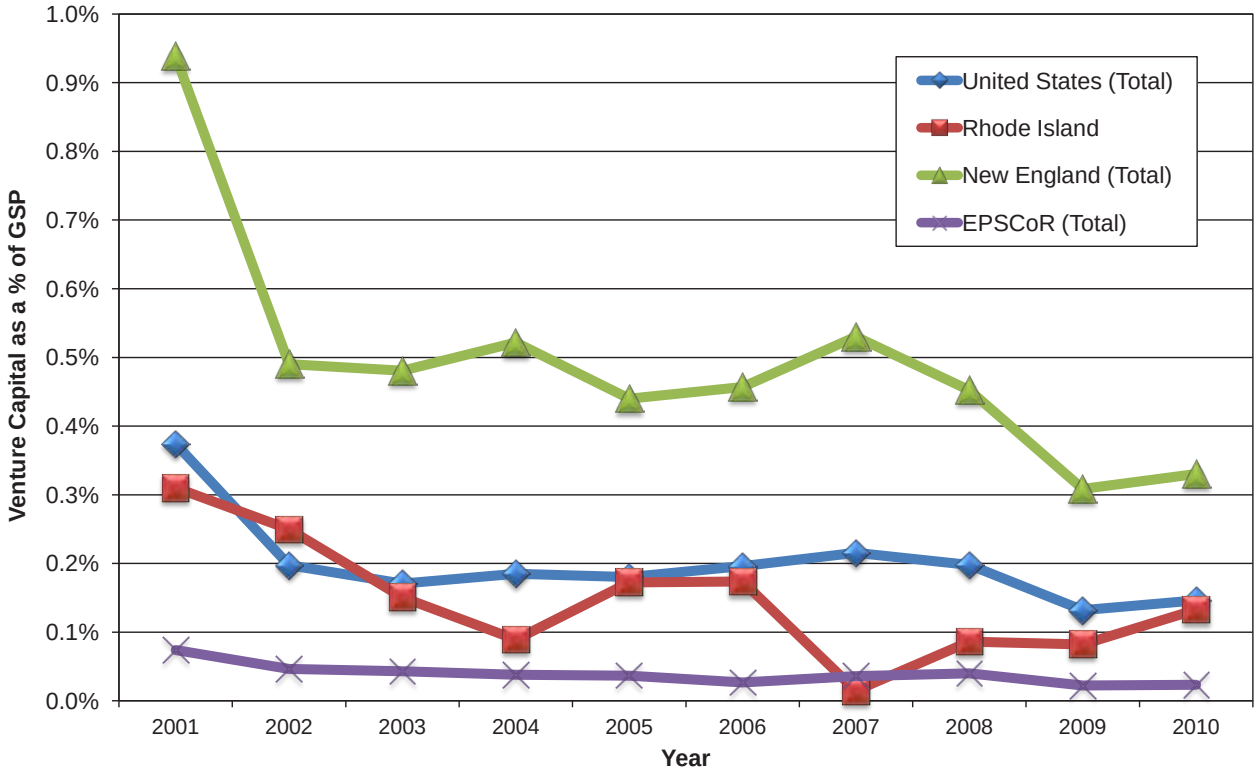
Rhode Island's Most Recent National Ranking **5**

SUMMARY

Venture capital investments as a percent of GSP in Rhode Island increased from 0.083% in 2009 to 0.133% in 2010. Compared to the reference geographies, Rhode Island lagged both the U.S. and New England, but exceeded the EPSCoR states as a whole. In 2010, Rhode Island's ranking on this indicator is 5th nationally (see Figure 2-9).

Figure 2-9.

Venture Capital Invested as a Percent of Gross State Product - 2001-2010



THE KNOWLEDGE BUSINESS PIPELINE

Venture Capital Investments

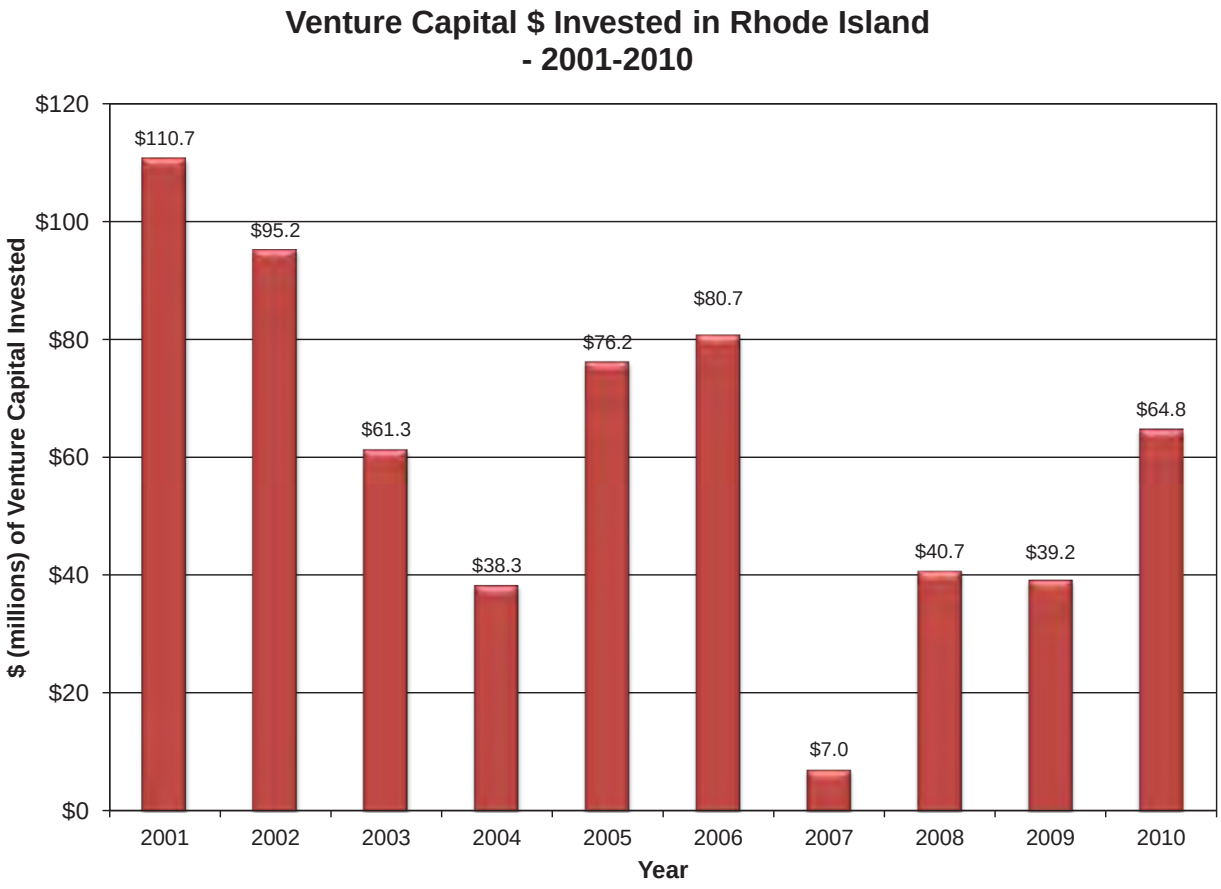
WHY THIS IS SIGNIFICANT

High-growth companies often require equity capital to develop their products and services and to expand. Therefore, the level of equity capital available in a region is one measure of the attractiveness of a state for these types of companies and growth.

RELATED

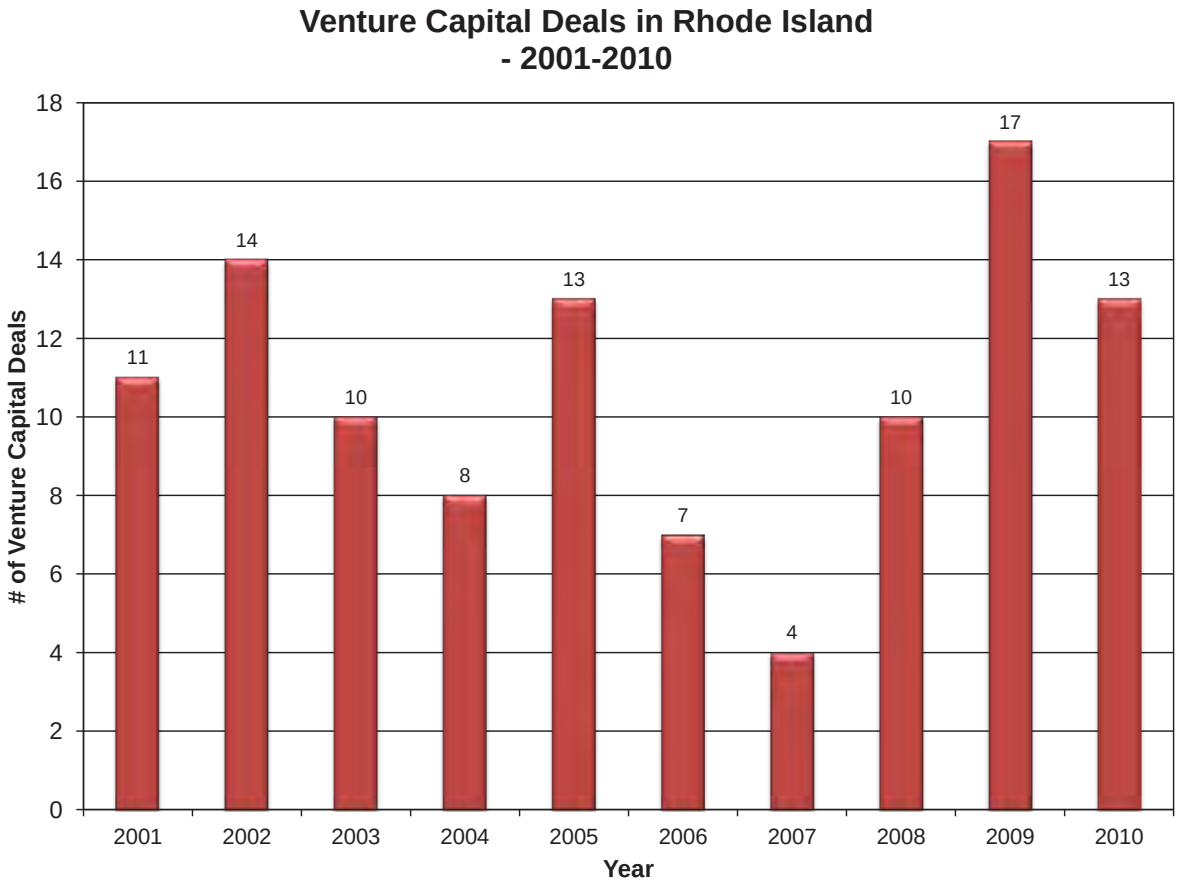
In 2010, venture capital dollars invested in Rhode Island totaled $64.8 million. The height of venture capital investments over the last ten years occurred in 2001, when total investments were $110.7 million. The lowest point over the last ten years was in 2007, where investments totaled $7.0 million (see Figure 2-10). Rhode Island had 13 deals in 2010 (see Figure 2-11).

Figure 2-10.



Venture Capital Investments

Figure 2-11.



SOURCES: Venture Capital - MoneyTree Venture Capital Profiles by State; based on PricewaterhouseCooper/Venture Economics/National Venture Capital Association Surveys; www.venturexpert.com/VxComponent/static/stats/.

Gross state product - from Bureau of Economic Analysis, U.S. Department of Commerce, New Estimates for 2011 and Revised Estimates for 1997-2010; www.bea.gov.

Total SBIR/STTR Investments

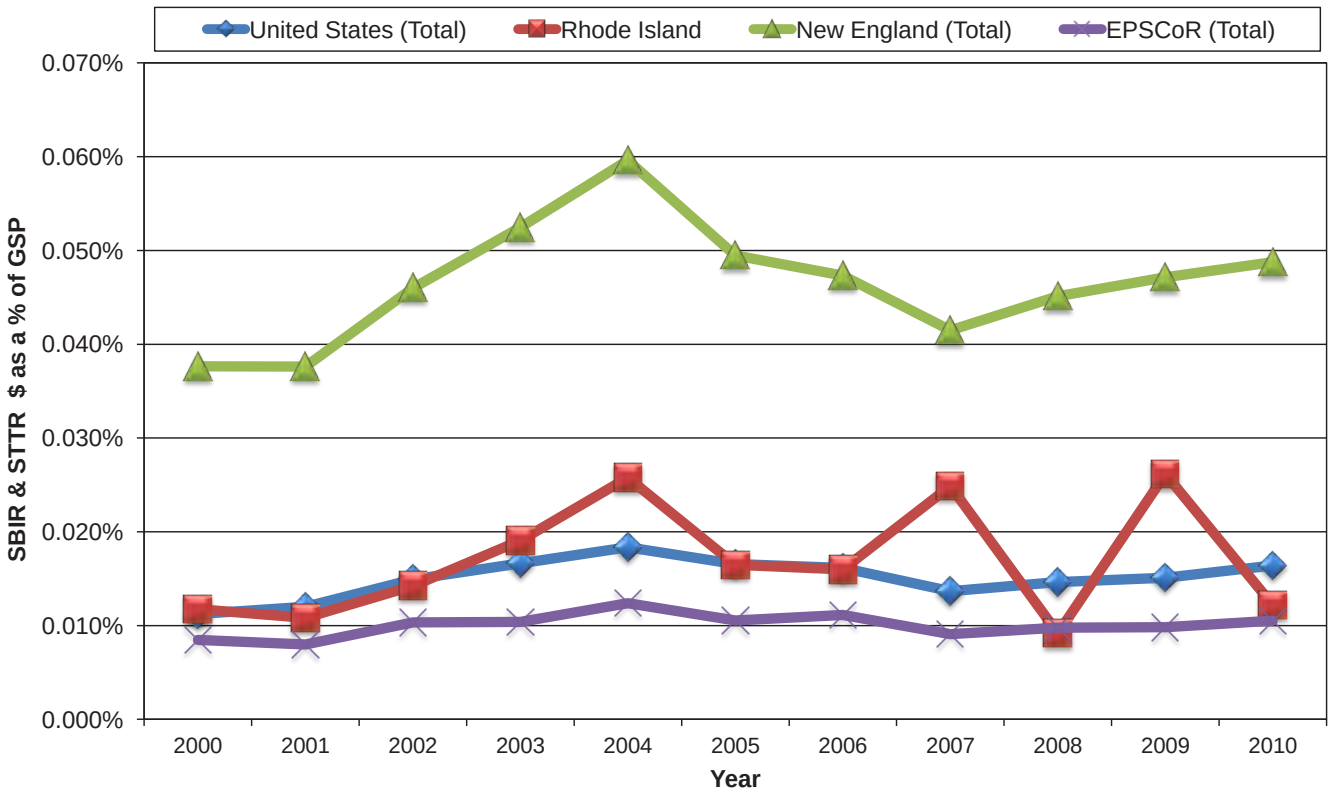
Rhode Island 1-Year Trend ⌄
Rhode Island 5-Year Trend ⌄
Rhode Island Compared to EPSCoR ⌃
Rhode Island Compared to New England ⌄
Rhode Island Compared to U.S. ⌄
Rhode Island's Most Recent National Ranking **23**

SUMMARY

The federal government provides grants to small businesses performing R&D through its Small Business Innovation Research (SBIR) program and Small Business Technology Transfer (STTR) program. From 2000 through 2010, Rhode Island's SBIR and STTR investments increased from 0.0118% of GSP in 2000 to 0.0122% in 2010. Rhode Island's 2010 ranking was 23rd, which was down from its 2009 ranking of 8th. (Note: Rank changed from 2011 report due to an update to Gross State Product data). Over the past five years this indicator has fluctuated in Rhode Island (see Figure 2-12).

Figure 2-12.

Total SBIR & STTR $ as a Percent of Gross State Product - 2000-2010



Total SBIR/STTR Investments

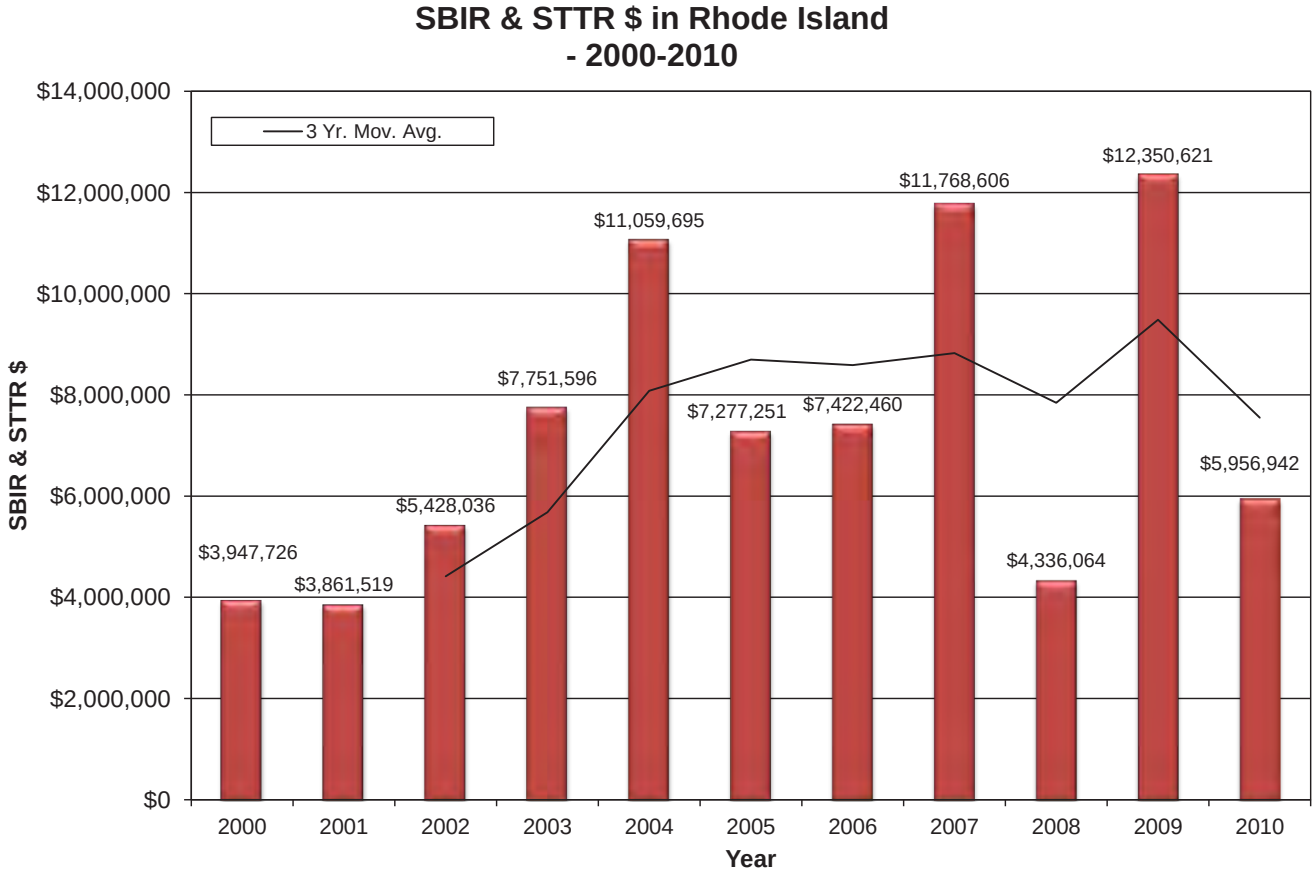
WHY THIS IS SIGNIFICANT

The award of SBIR and STTR grants to small research and development companies in a state is one measure of the quality of the R&D being performed. SBIR and STTR awards are made competitively by federal agencies using peer review. Criteria include scientific and technical quality and potential for commercialization. Venture capitalists often use SBIR and STTR awards as a proxy for high technical quality when considering new investments.[4]

RELATED

In 2010, Rhode Island received $5.9 million in SBIR and STTR funding. This was down from the 2009 level of $12.4 million, which represented the highest grossing year from 2000 to 2010 (see Figure 2-13). In 2010, Rhode Island received 20 SBIR and STTR awards (see Figure 2-14).

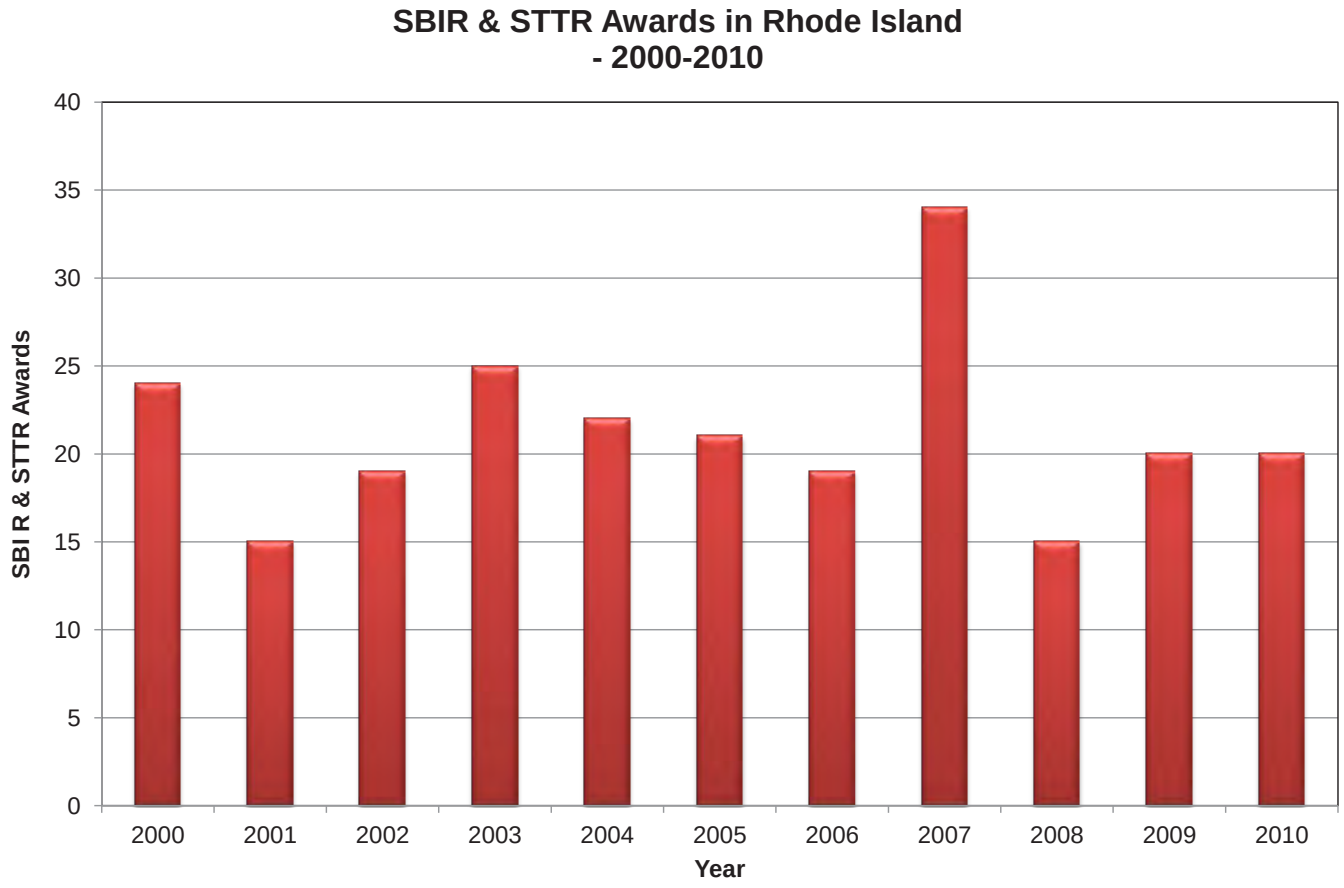
Figure 2-13.



THE KNOWLEDGE BUSINESS PIPELINE

Total SBIR/STTR Investments

Figure 2-14.



SOURCES: SBIR and STTR Awards - U.S. Small Business Administration; http://web.sba.gov/tech-net/public/dsp_search.cfm.

Gross state product - from Bureau of Economic Analysis, U.S. Department of Commerce, New Estimates for 2011 and Revised Estimates for 1997-2010; www.bea.gov.

Endnotes

[1] Includes utility patents, design patents, plant patents, reissues, defensive publications, and statutory inventions registrations. The origin of the patent is determined by the residence of the first-named inventor.

[2] All reporting completed by Brown University and University of Rhode Island.

[3] Estimated calculated by Robert W. Fairlie, University of California, Santa Cruz, using the Current Population Survey. The index of entrepreneurial activity is the percent of individuals (ages 20-64) who do not own a business in the first survey month that start a business in the following month with fifteen or more hours worked per week. All observations with allocated labor force status, class of worker, and hours worked following month within fifteen or more hours worked per week variables are excluded. Approximately 95% confidence intervals for the index for each state are reported.

[4] The SBIR and STTR dollar amounts for each year represents the total amount awarded in that year regardless of when the funds are expended.

RHODE ISLAND'S RESEARCH & DEVELOPMENT

OVERVIEW

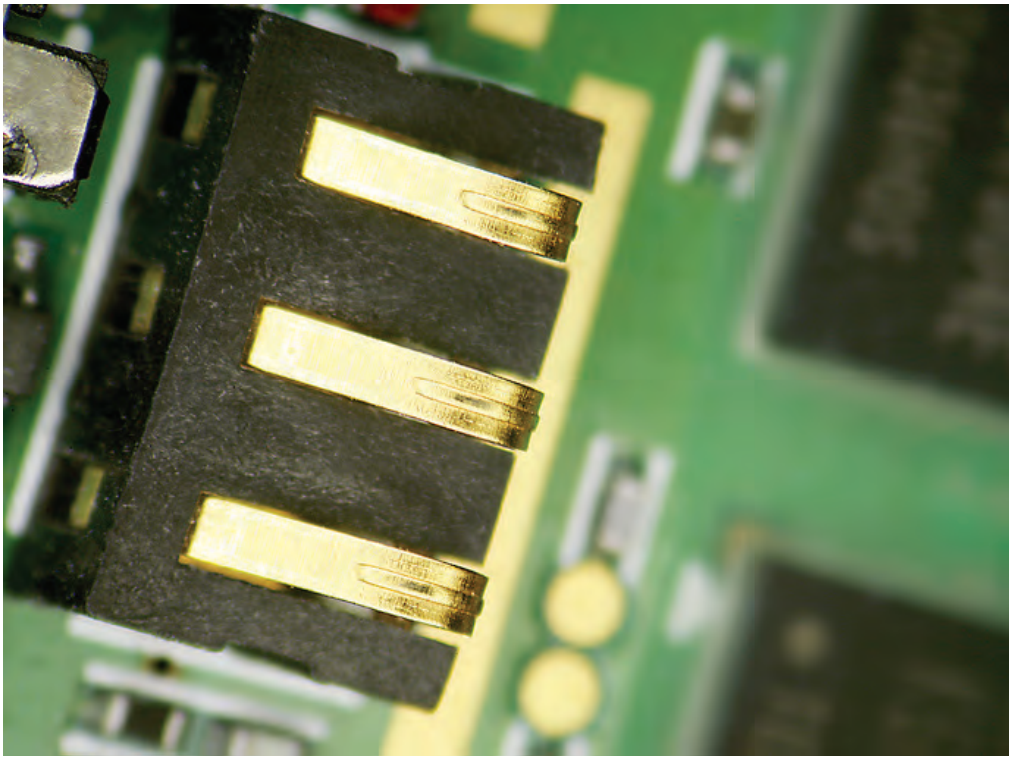
Research and development (R&D) is a driving force in business and economic growth. It fuels innovation that leads to new products, processes, technologies, and services. These innovations spawn new industries, new companies, and new jobs. R&D activity also attracts and supports a highly educated and skilled workforce which in turn continues to build a cycle of innovation.

After being a national leader in R&D performed, Rhode Island experienced a significant drop in R&D performance in 2007, a decrease of 46% from 2006 and dropping it below the U.S. as a whole. This was driven almost entirely by a drop in industry-performed R&D (and more specifically by a drop in R&D performance by industrial defense contractors). In 2008 Rhode Island experienced an increase in total R&D bringing it to a level on par with the U.S., above the EPSCoR states, and below New England.

In terms of academic R&D performance, Rhode Island has increased its performance over the last five years and in 2009, academic R&D in Rhode Island was above EPSCoR states and the U.S. but just below New England states.

For industry R&D performance, Rhode Island experienced a small decline from 2008 to 2009. In 2009 Rhode Island's level on this indicator was above that of the EPSCoR states, but below the U.S. and New England.

On the indicator of federal funding for not-for-profit organizations as a percent of GSP, in 2009, Rhode Island performed better than the EPSCoR states and the U.S., but was surpassed by New England. In total for federal funding for not-for-profit R&D, Rhode



INDICATORS

RHODE ISLAND'S RESEARCH & DEVELOPMENT

Island's hospitals account for 95.4% of all federal funding to the State with the large majority of funds coming from the Department of Health and Human Services.

After a decline in Rhode Island's federal R&D obligations as a percent of Gross State Product (GSP) in 2004, the State has experienced annual increases. In 2009, the State was slightly below the levels in New England as a whole but above U.S. and EPSCoR levels.

Total R&D Performance

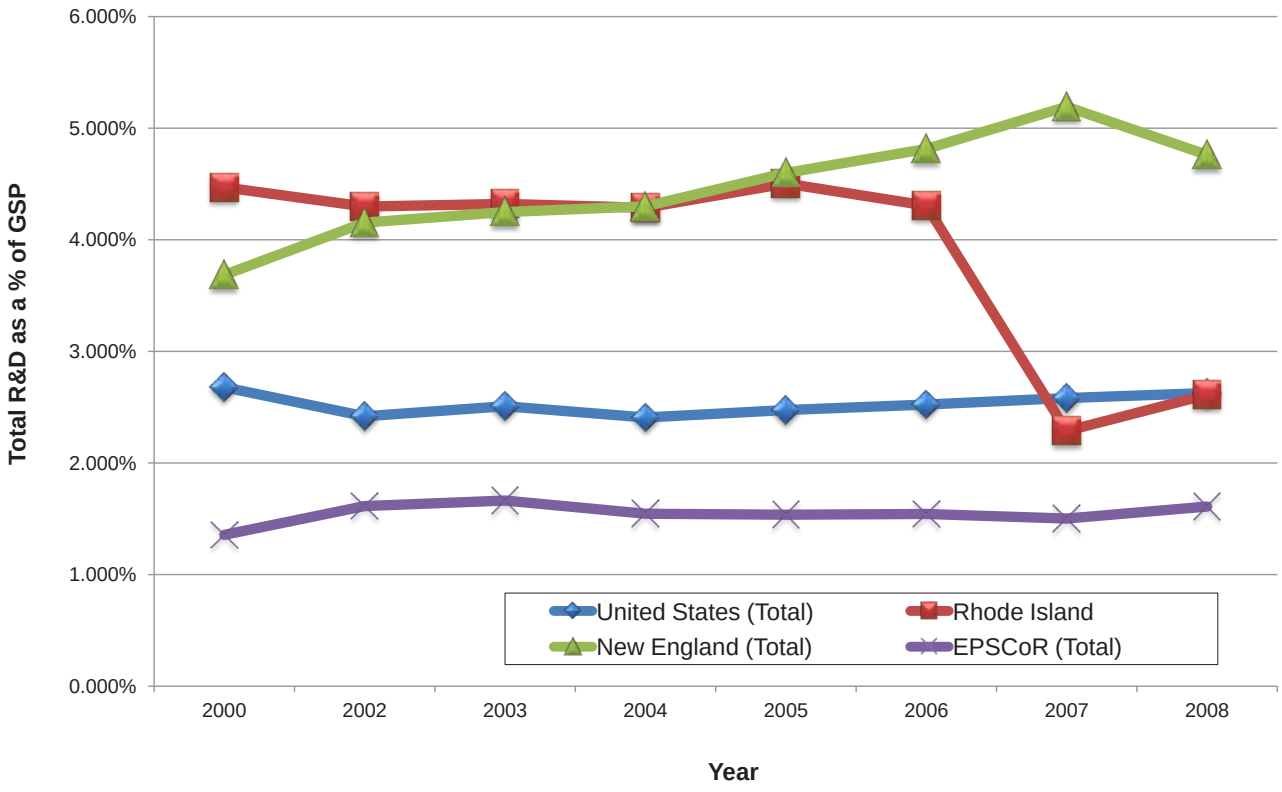
Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend v
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England v
Rhode Island Compared to U.S. =
Rhode Island's Most Recent National Ranking **16**

SUMMARY

In 2008, total R&D performance in Rhode Island represented 2.61% of gross state product (GSP) (see Figure 3-1).[1] This placed Rhode Island above the other EPSCoR states but below that of New England and just slightly below the U.S. as a whole on this indicator. The U.S. was at 2.63%, New England at 4.76%, and EPSCoR at 1.61%. From 2000 through 2006, Rhode Island was tracking with New England as a leader in R&D performed; however, it experienced a major decrease in 2007. In 2008, Rhode Island ranked 16th nationally on this indicator, a decrease from 5th since 2004.The 2008 level is an increase from that experienced in 2007.

Figure 3-1.

Total R&D Spending as a Percent of Gross State Product - 2000-2008



RHODE ISLAND'S RESEARCH & DEVELOPMENT

Total R&D Performance

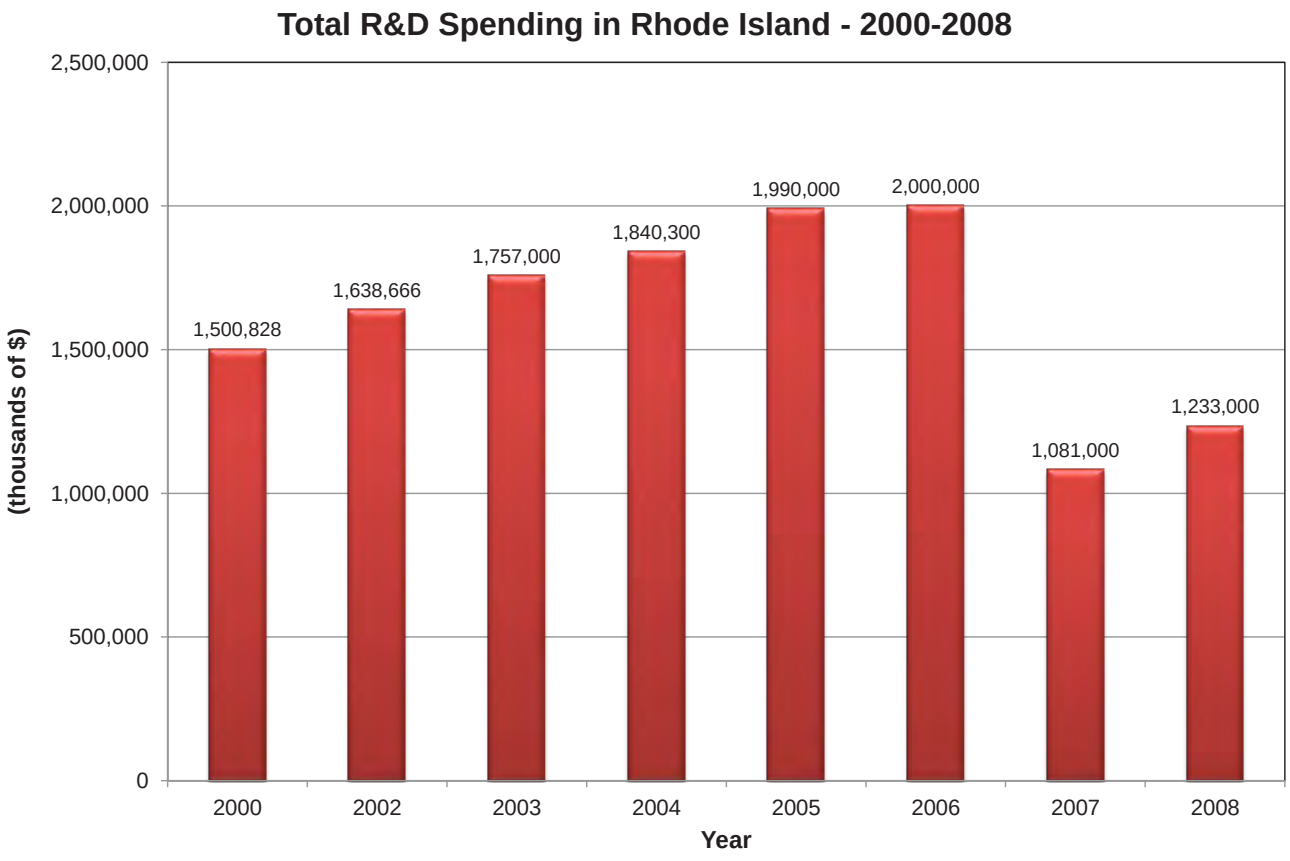
WHY THIS IS SIGNIFICANT

Research and development performance measures the creation of new knowledge and ideas within a state's economy. Since innovation and knowledge creation is one of the most important elements of productivity and economic growth, this indicator shows a state's relative competitive position. While ideas do flow between the states and around the world, there is evidence that some R&D is "sticky" and that there is value in having it performed within a region.

RELATED

From 2000 to 2006, Rhode Island experienced steady increases in total R&D spending, but saw a steep decline in 2007 and 2008 (see Figure 3-2). The decrease from 2006 to 2007 was 45.95% or $919 million. This was driven almost entirely by a drop in industry-performed R&D (and more specifically by a drop in R&D performance by industrial defense contractors) and it had a dramatic impact on Rhode Island's total R&D performance ranking. From 2007 to 2008 R&D spending increased by 14% or $152 million.

Figure 3-2.



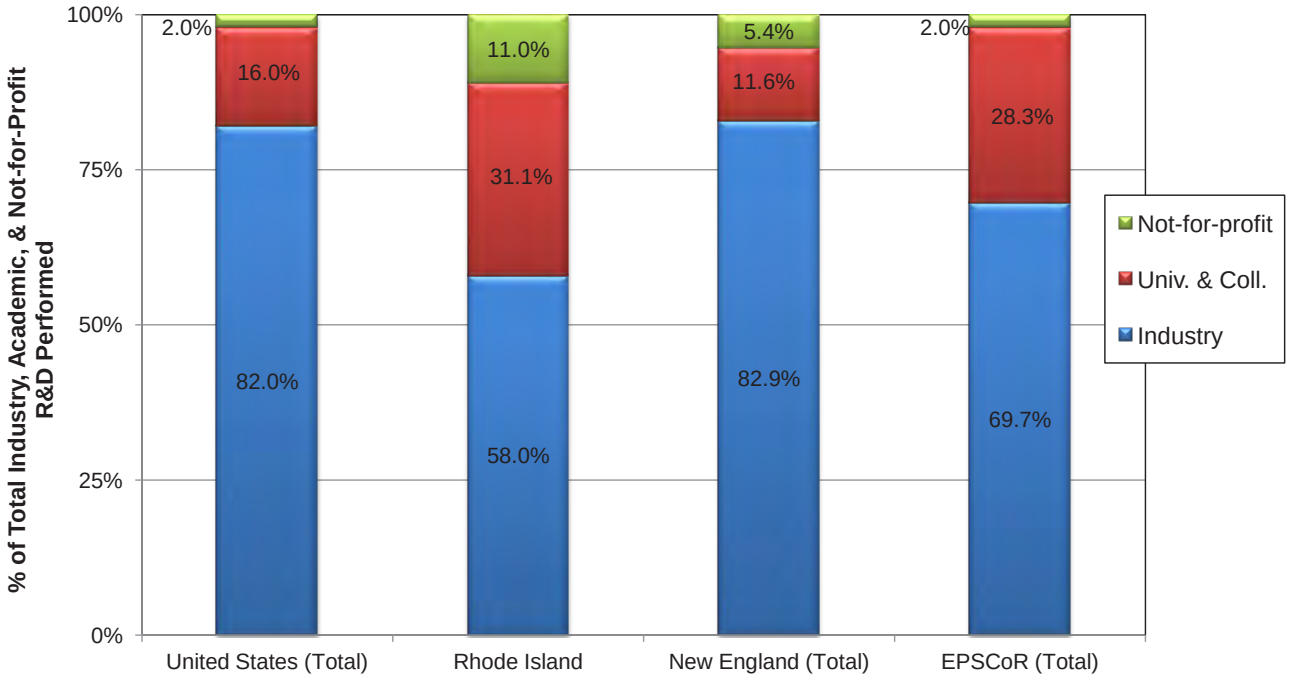
RHODE ISLAND'S RESEARCH & DEVELOPMENT

Total R&D Performance

Considering the individual sectors that make up R&D performance in Rhode Island, and the reference geographies, Rhode Island relies most on industry, followed by colleges and universities, and then the not-for-profit sector. Compared to the reference geographies, Rhode Island relies less on industry and more on not-for-profit (mostly federal intramural) R&D and University and College R&D (see Figure 3-3).

Figure 3-3.

R&D by Performance Sector – 2009



Note: Not for profit includes only that which is federally funded and, therefore, the contribution by this sector is understated.

SOURCES: Total R&D Performed - National Science Foundation/Division of Science Resources Statistics; National Patterns of R&D Resources; www.nsf.gov/statistics.

Gross State Product - Bureau of Economic Analysis, U.S. Department of Commerce, New Estimates for 2011 and Revised Estimates for 1997-2010; www.bea.gov.

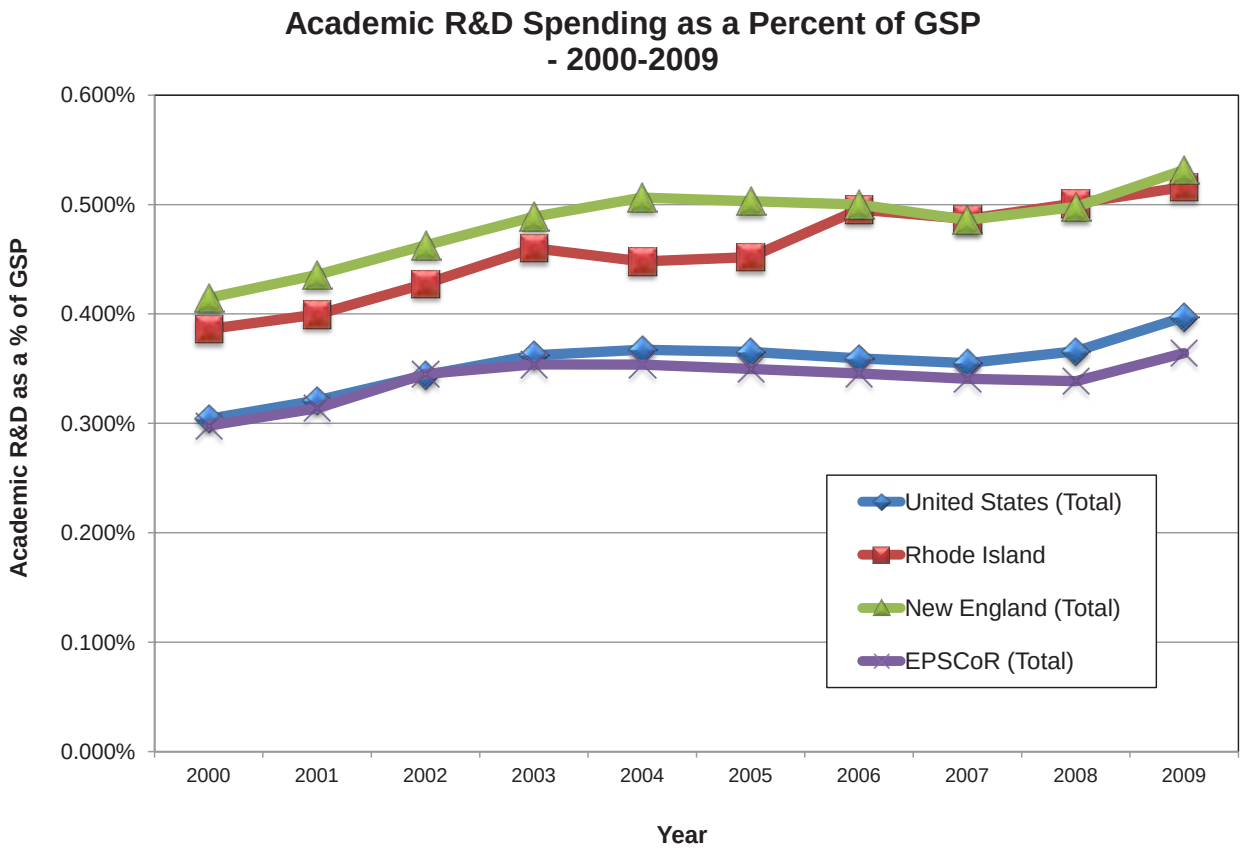
Academic R&D Performance

Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend ^
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England v
Rhode Island Compared to U.S. ^
Rhode Island's Most Recent National Ranking 7

SUMMARY

In 2009, academic R&D in Rhode Island was 0.52% of Gross State Product (GSP).[2] This placed Rhode Island above EPSCoR states (0.36%) and the U.S. as a whole (0.40%) but just below New England states (0.53%) (see Figure 3-4). In 2009, Rhode Island ranked 7th nationally on this indicator, which was up from 13th place in 2005.

Figure 3-4.



RHODE ISLAND'S RESEARCH & DEVELOPMENT

Academic R&D Performance

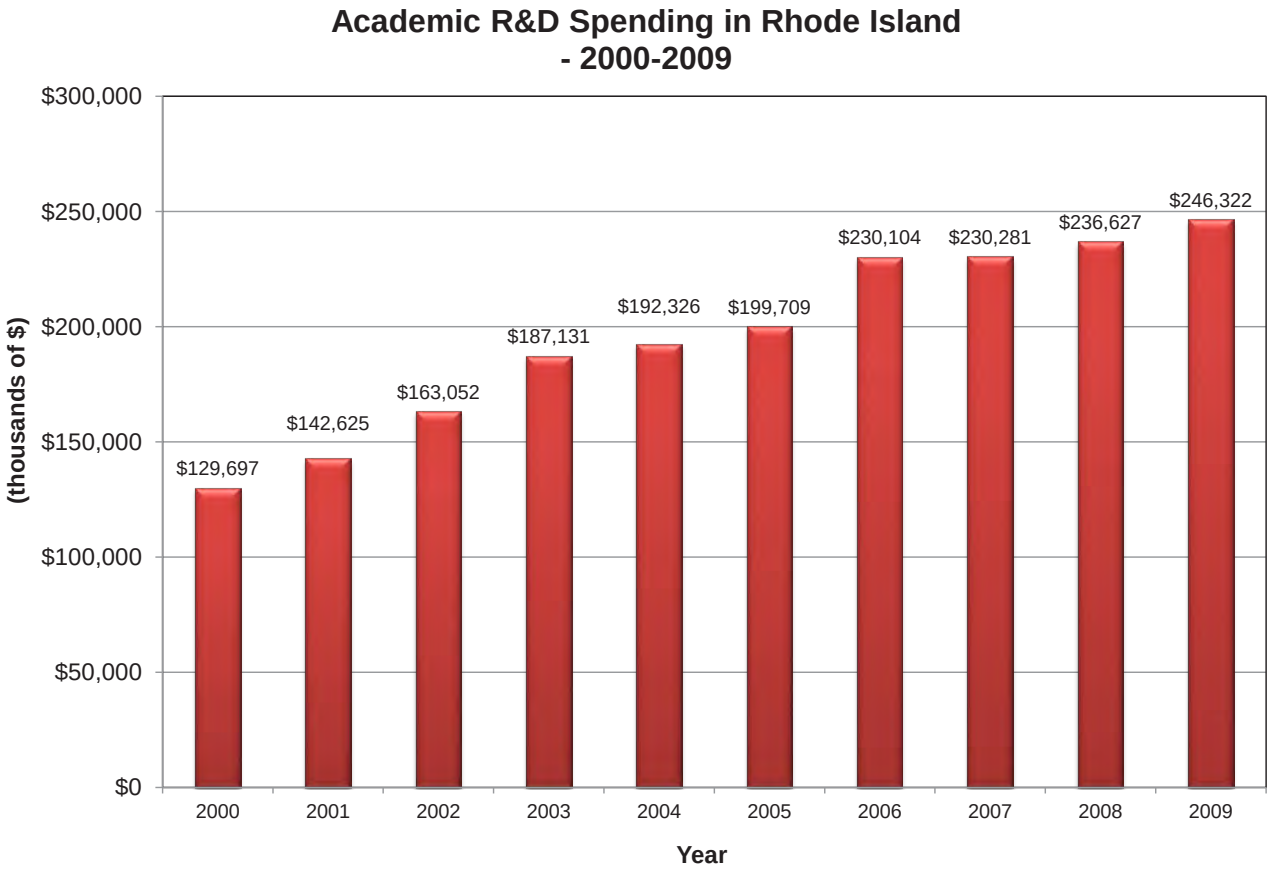
WHY THIS IS SIGNIFICANT

This is a measure of the strength of a state's academic institutions, both public and private, in providing the R&D needed to grow the state's economy. To the extent that companies are increasingly partnering with academic institutions to perform their R&D, the strength of a state's academic sector can be very influential in attracting rapidly growing businesses and growing targeted sectors. Academic R&D also provides opportunities for students to gain valuable education and career experience in the science and technology related fields.

RELATED

In 2009, R&D performed at academic institutions in Rhode Island equaled $246.3 million, which was a 4.1% increase from the 2008 level of $236.6 million (see Figure 3-5). This follows the ten-year trend of annual increases in academic R&D spending.

Figure 3-5.



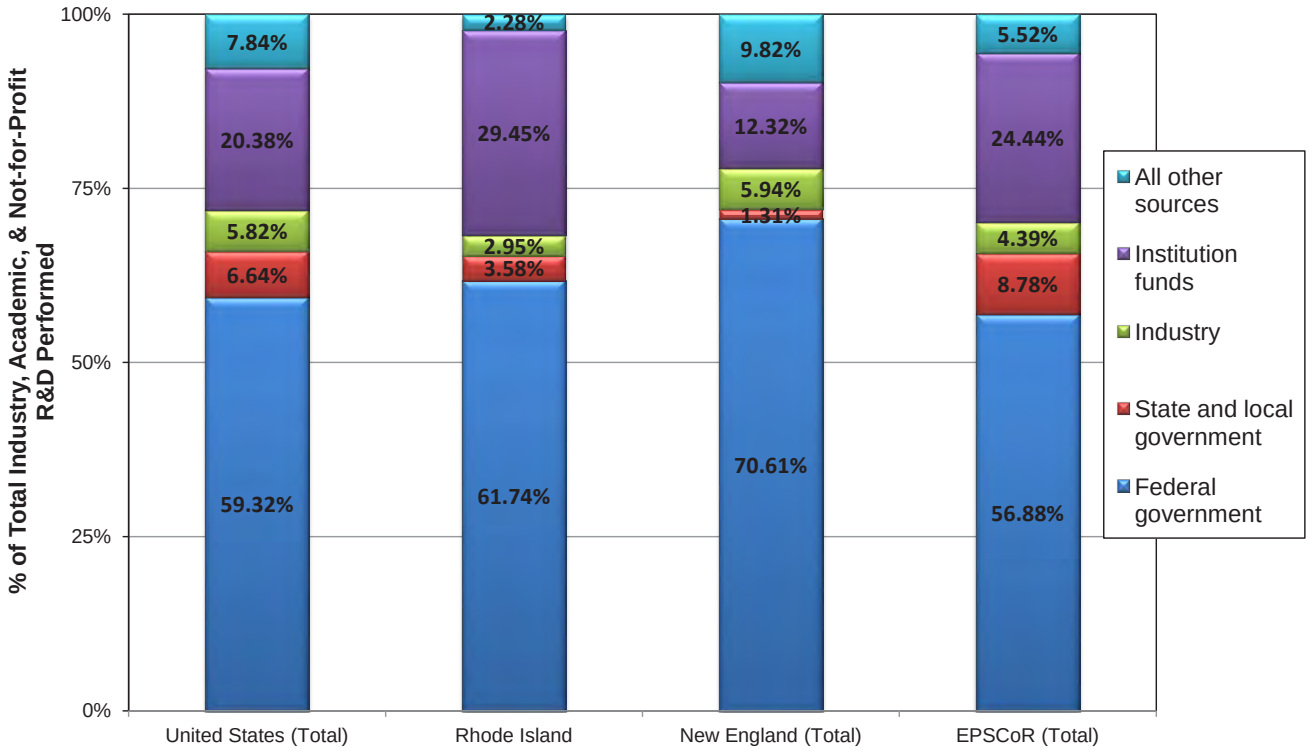
RHODE ISLAND'S RESEARCH & DEVELOPMENT

Academic R&D Performance

In 2009, the federal government was the largest source of funds for academic R&D in Rhode Island at 61.7% of the total $246.3 million performed (see Figure 3-6). This was followed by institution funds (29.5%), state and local government (3.58%), and industry (3.0%). In comparison to the reference groups on a percentage basis, Rhode Island academic institutions contribute more funding towards their own R&D and the private sector contributes less.

Figure 3-6.

Academic R&D Spending by Source of Funds - 2009

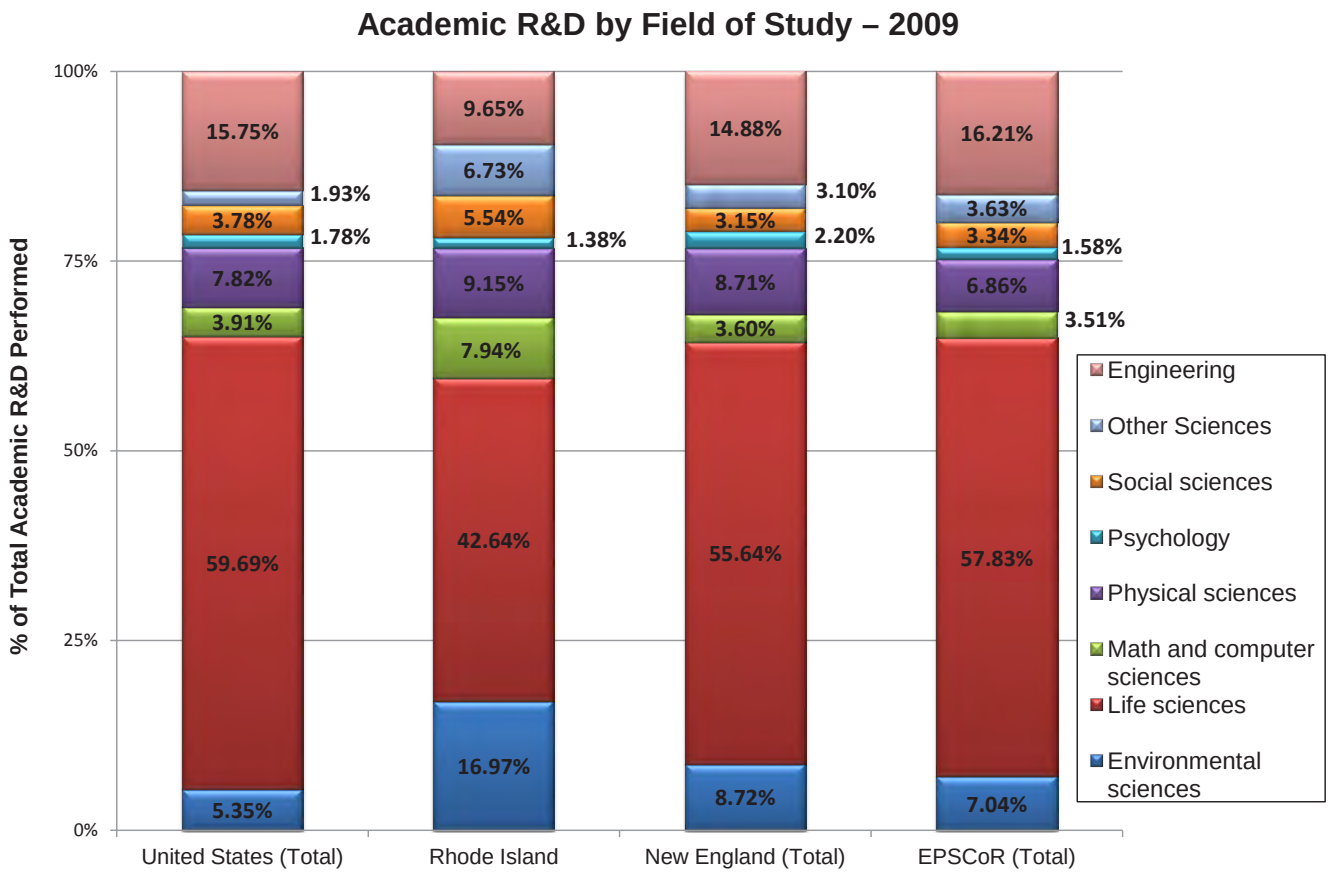


In 2009, 42.64% of all R&D performed by academic institutions in Rhode Island was within the life sciences field.[3] This was the largest field of study for academic-performed R&D in Rhode Island. Life sciences include the fields of agricultural, biological, and medical sciences. Environmental sciences followed next at 16.97%. These two areas alone accounted for 59.61% of academic-performed R&D in Rhode Island in 2009. In comparison to the reference geographies, Rhode Island performs less R&D on a percentage basis in life sciences and more in environmental, math and computer, and social sciences (see Figure 3-7).

RHODE ISLAND'S RESEARCH & DEVELOPMENT

Academic R&D Performance

Figure 3-7.



SOURCES: University & College R&D Performed - National Science Foundation/Division of Science Resources Statistics; Survey of R&D Expenditures at Universities and Colleges; www.nsf.gov/statistics.

Gross State Product - Bureau of Economic Analysis, U.S. Department of Commerce, New Estimates for 2011 and Revised Estimates for 1997-2010; www.bea.gov.

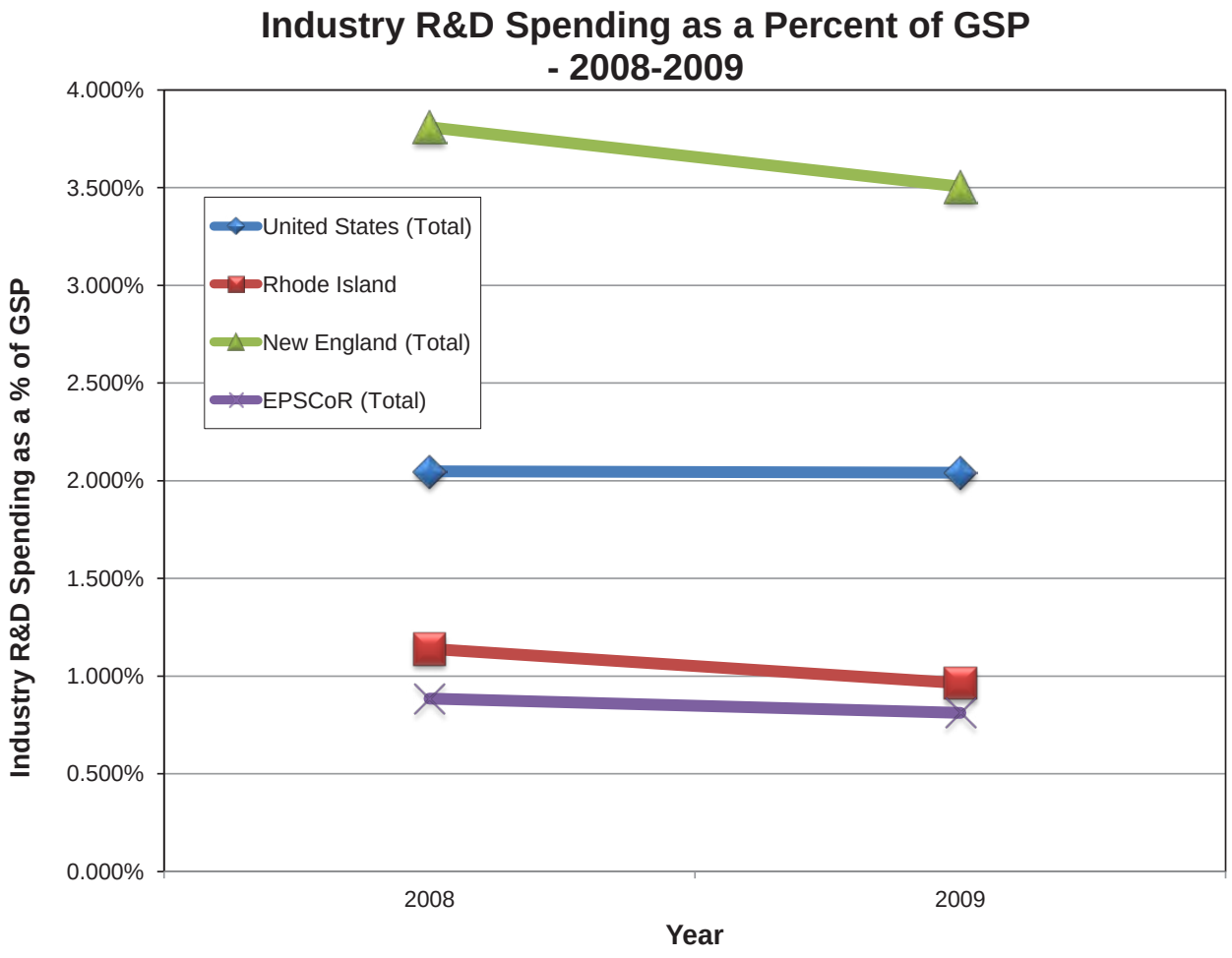
Industry R&D Performance

Rhode Island 1-Year Trend ⌄
Rhode Island Compared to EPSCoR ⌃
Rhode Island Compared to New England ⌄
Rhode Island Compared to U.S. ⌄
Rhode Island's Most Recent National Ranking **29**

SUMMARY

With 0.96% of Gross State Product (GSP) attributed to industry R&D, Rhode Island lagged New England states (3.51%) and the U.S. as a whole (2.04%) but Rhode Island had a slight lead over the EPSCoR states (0.81%)(see Figure 3-8). In 2009 Rhode Island ranked 29th on this indicator, one position down from 2008.

Figure 3-8.



RHODE ISLAND'S RESEARCH & DEVELOPMENT

Industry R&D Performance

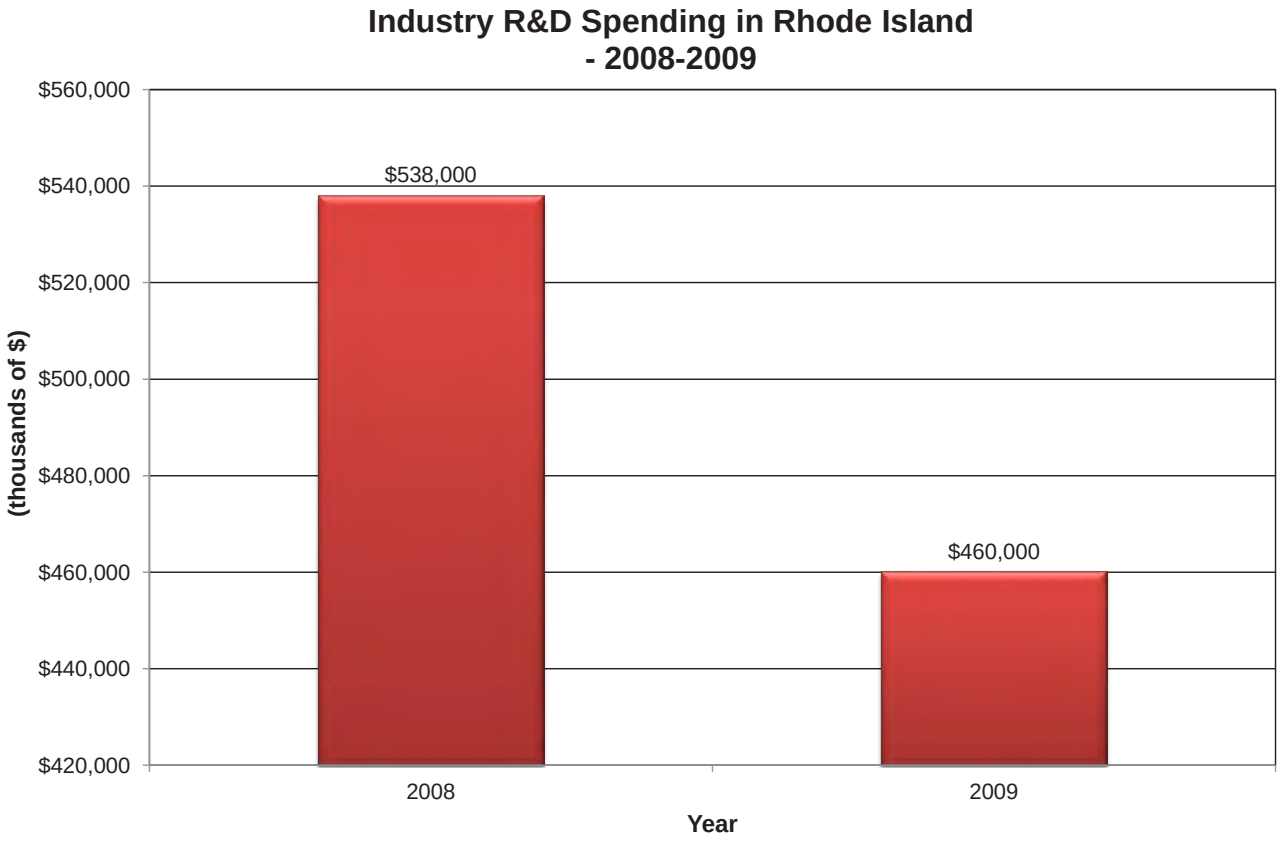
WHY THIS IS SIGNIFICANT

Businesses that are investing in R&D are sacrificing some current profits in order to develop new products and services for future competitiveness. This measure shows the aggregate level of this investment in a state. Industry R&D supports innovative companies, high paying jobs, and attracts new investment to an area.

RELATED

In 2009, industry R&D in Rhode Island equaled $460 million (see Figure 3-9). This was down from the previous year's total of $538 million.

Figure 3-9.



SOURCES: Industry R&D Performed - National Science Foundation, National Center for Science and Engineering Statistics, Business R&D and Innovation Survey: www.nsf.gov/statistics. Note: NSF methodology on collecting data on industry R&D changed in 2008 and therefore 2008 data and beyond is not comparable to data prior to 2008 on this indicator.

Gross State Product - Bureau of Economic Analysis, U.S. Department of Commerce, New Estimates for 2011 and Revised Estimates for 1997-2010; www.bea.gov.

Not-For-Profit R&D Performance

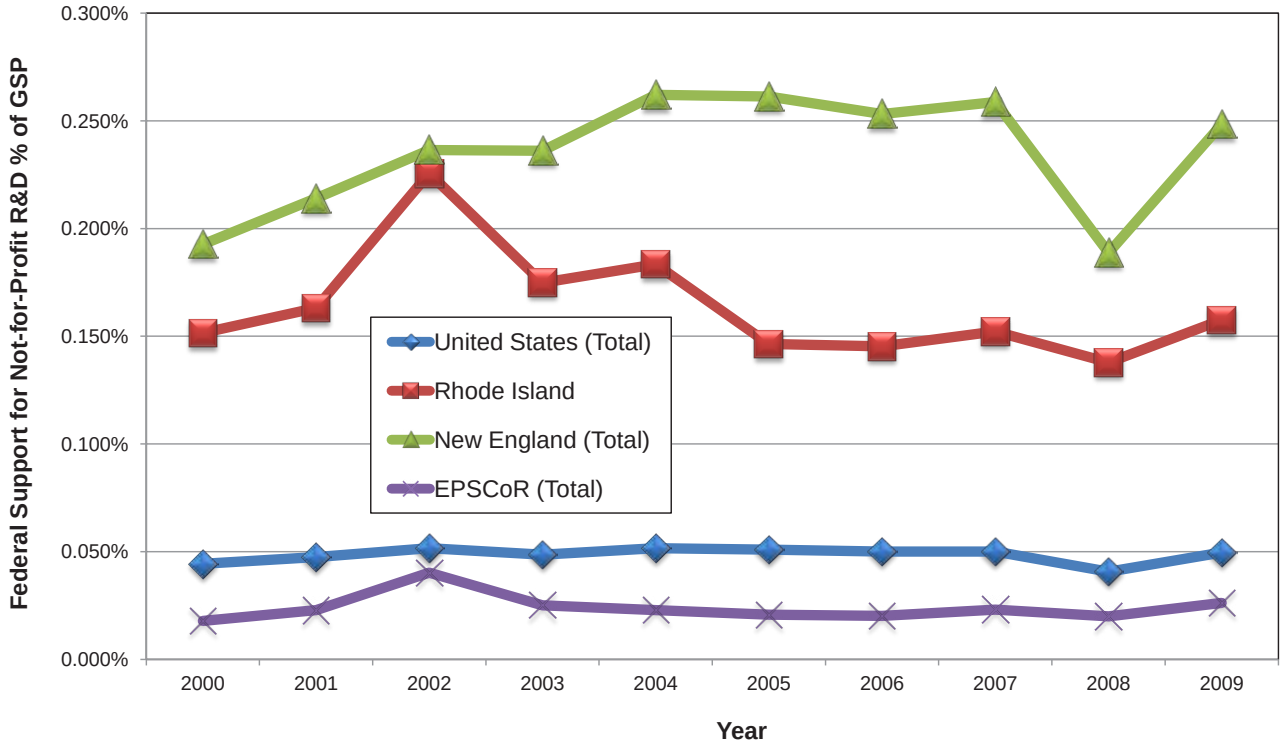
Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend ^
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England v
Rhode Island Compared to U.S. ^
Rhode Island's Most Recent National Ranking **3**

SUMMARY

In 2009, not-for-profit performance as a percent of Gross State Product (GSP) for Rhode Island was 0.16%. Rhode Island outpaced both the U.S. (0.05%) and EPSCoR states (0.03)% but lagged that of New England as a whole (0.25%) (see Figure 3-10). Federal support for not-for-profit R&D spending as a percent of GSP peaked for Rhode Island in 2002 at 0.23%. In 2009, Rhode Island was ranked 3rd on this indicator.

Figure 3-10.

Federal Support for Not-for-Profit R&D Spending as a Percent of GSP – 2000-2009



WHY THIS IS SIGNIFICANT

Federal funding for not-for-profit R&D is a vital component of an innovation economy and complements the R&D conducted at our universities, colleges and private industry. Securing federal dollars to allow not-for-profit organizations to engage in research and development increases the competitive advantage of a region within the knowledge economy.

RHODE ISLAND'S RESEARCH & DEVELOPMENT

Not-For-Profit R&D Performance

RELATED

From 2000 to 2009, federal support for non-profit R&D in Rhode Island has increased overall. The 2009 total of $86.9 million represents the highest federal contribution over the last ten years.

Figure 3-11.

Federal Support for Not-for-Profit R&D Spending in Rhode Island - 2000-2009

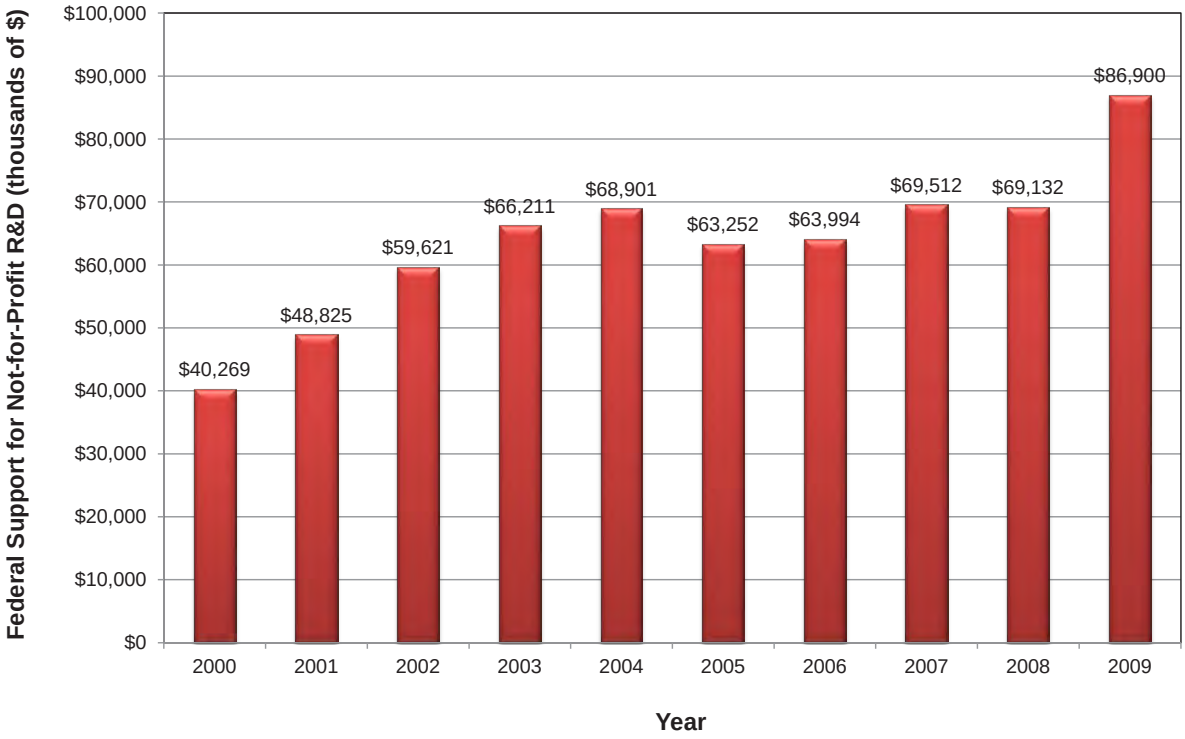


Figure 3-12 details the specific not-for-profit organizations in Rhode Island and the amount they have received in federal R&D obligations in 2008. It includes a total from all federal agencies as well as a breakout by specific agency. Rhode Island Hospital was the largest recipient of funding with $26.8 million of funds received or 42% of all federal funds to not-for-profits. In total, Rhode Island's hospitals account for 95.4% of all federal funding for R&D not-for-profits. The Department of Health and Human Services provided 97.1% of federal funding for Rhode Island not-for-profit institutions.

SOURCES: Not for Profit R&D Performed - National Science Foundation/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development; www.nsf.gov/statistics.

Gross State Product - Bureau of Economic Analysis, U.S. Department of Commerce, New Estimates for 2011 and Revised Estimates for 1997-2010; www.bea.gov.

Figure 3-12.

Federal Obligations for Research & Development and R&D plant to Selected Nonprofit Institutions in Rhode Island by Performing Institution and Agency - FY 2008 Thousands of $

INSTITUTION	All Agencies	DOC	DOD	DOE	DOI	ED	EPA	HHS	NASA	NSF	USDA	Other
RI Hospital	$26,804	$0	$0	$0	$0	$0	$0	$26,804	$0	$0	$0	$0
Miriam Hospital	$10,092	$0	$0	$0	$0	$0	$0	$10,092	$0	$0	$0	$0
Butler Hospital	$9,661	$0	$0	$0	$0	$0	$0	$9,661	$0	$0	$0	$0
Women and Infants Hospital	$9,419	$0	$0	$0	$0	$0	$0	$9,419	$0	$0	$0	$0
Roger Williams General Hospital	$2,780	$0	$0	$0	$0	$0	$0	$2,780	$0	$0	$0	$0
Gordon Research Conferences	$2,014	$0	$176	$190	$10	$0	$20	$996	$0	$576	$46	$0
Memorial Hospital (Pawtucket, RI)	$1,269	$0	$0	$0	$0	$0	$0	$1,269	$0	$0	$0	$0
Bradley Hospital	$792	$0	$0	$0	$0	$0	$0	$792	$0	$0	$0	$0
American Mathematical Society	$603	$0	$0	$0	$0	$0	$0	$0	$0	$603	$0	$0
Association for Medical Ed. and Research in Substance Abuse	$71	$0	$0	$0	$0	$0	$0	$71	$0	$0	$0	$0
American Academy of Addiction Psychiatry	$50	$0	$0	$0	$0	$0	$0	$50	$0	$0	$0	$0
Association for Symbolic Logic	$25	$0	$0	$0	$0	$0	$0	$0	$0	$25	$0	$0
RHODE ISLAND TOTAL	**$63,772**	**$0**	**$176**	**$190**	**$10**	**$192**	$20	$61,934	$0	$1,204	$46	$0

DOC = Department of Commerce; DOD = Department of Defense; DOE = Department of Energy; DOI = Department of the Interior; ED = Department of Education; EPA = Environmental Protection Agency; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation; USDA = U.S. Department of Agriculture.

Note: The above chart is a subset of the data and not fully inclusive of federal support for not-for-profit spending in Rhode Island.

RHODE ISLAND'S RESEARCH & DEVELOPMENT

Federal R&D Obligations

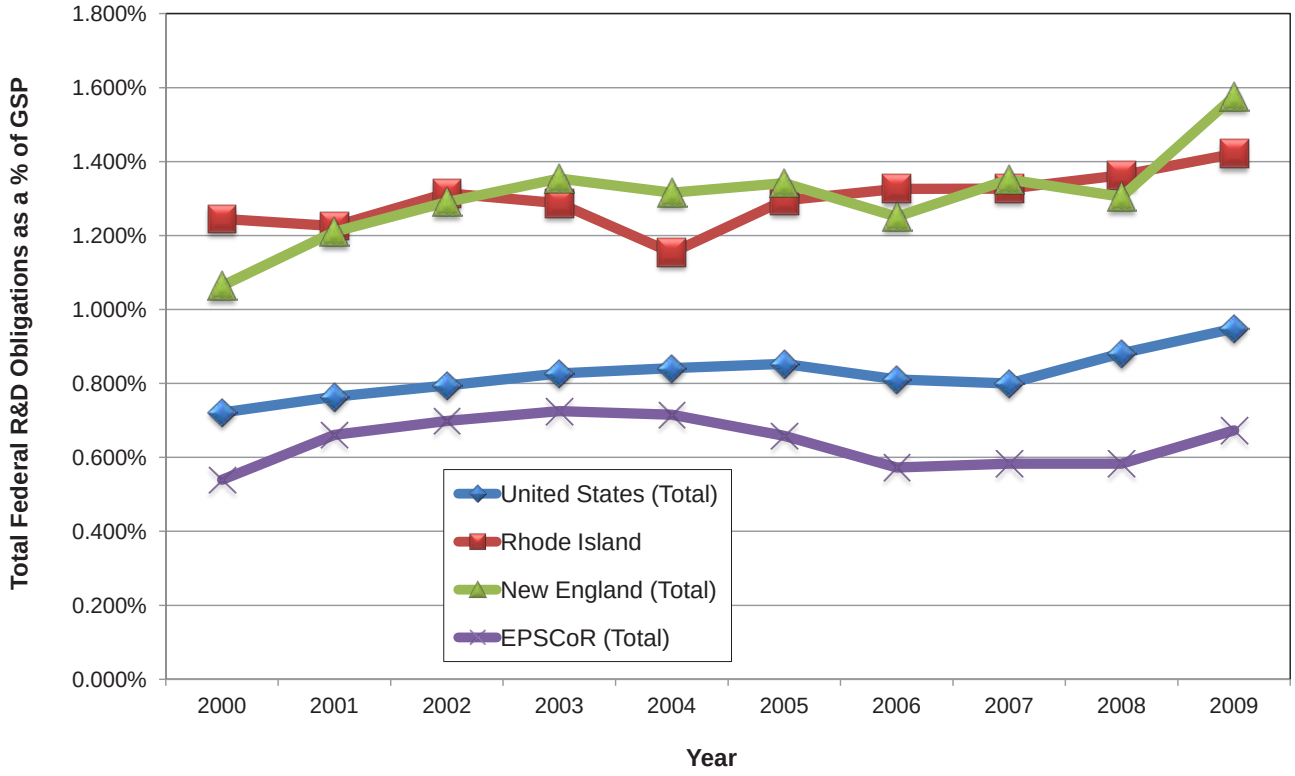
Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend ^
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England v
Rhode Island Compared to U.S. ^
Rhode Island's Most Recent National Ranking **8**

SUMMARY

Rhode Island's federal R&D obligations as a percent of Gross State Product (GSP) remained relatively constant through 2009.[5,6] During this period, the state's levels remained similar to levels throughout New England as a whole and higher than that of the U.S. and EPSCoR levels (see Figure 3-13). In 2009, federal R&D obligations in Rhode Island represented 1.42% of GSP, which is higher than the U.S. at 0.95% and the EPSCoR states at 0.67%, but below New England at 1.58%. In 2009, Rhode Island ranked 8th on this indicator nationally.

Figure 3-13.

Total Federal R&D Obligations as a Percent of GSP - 2000-2009



RHODE ISLAND'S RESEARCH & DEVELOPMENT

Federal R&D Obligations

WHY THIS IS SIGNIFICANT

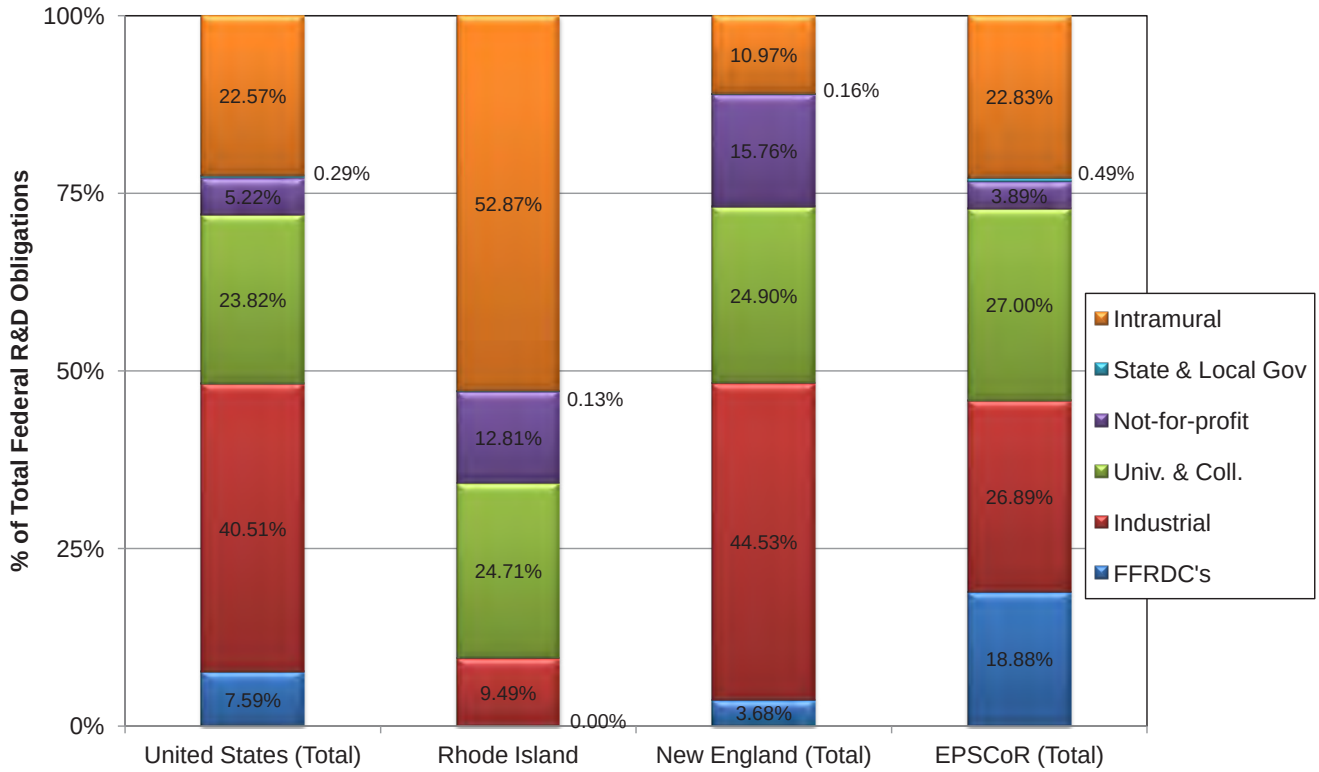
Federal grants and contracts for R&D are a significant source of funding for states and, since most federal R&D grants and contracts are competitive, the relative position of states on this measure reflects the strength of their R&D performers. They also help leverage additional R&D funding from other sources.

RELATED

In 2009, intramurals (any agency of the federal government that performs R&D) were Rhode Island's largest performer of federally-funded R&D, accounting for 52.87% of the state's federal R&D obligations (see Figure 3-14). Rhode Island is far behind the reference geographies in industrial performance at 9.49% and in federally funded research and development centers[7] (FFRDC's) at 0.00%. The percentage of university and college federal R&D obligations is similar to that of the reference geographies at 24.71%. The total federal R&D obligations for Rhode Island across all performance sectors in 2009 were $678 million.

Figure 3-14.

Federal R&D Obligations by Performance Sector – 2009



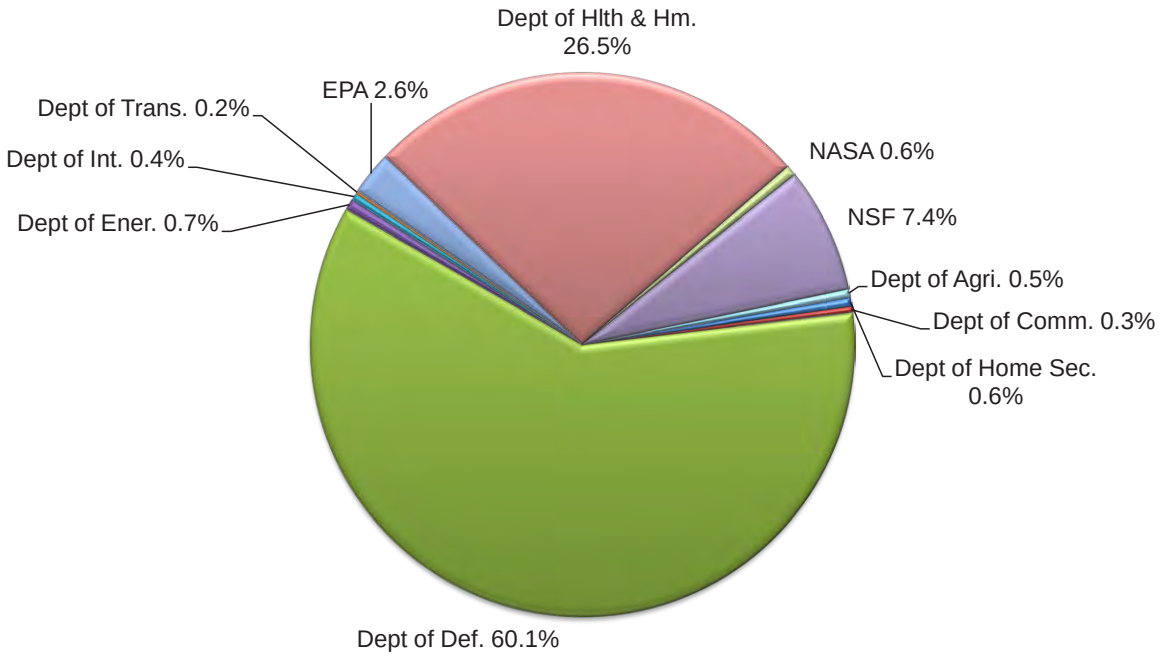
RHODE ISLAND'S RESEARCH & DEVELOPMENT

Federal R&D Obligations

For all of the reference geographies, the Department of Defense contributes the largest share of all federal R&D obligations (see Figure 3-15). The percentage attributable to the Department of Defense for Rhode Island, 60.1%, is larger than that of all the reference geographies: U.S. at 51.2%, New England at 56.9%, and EPSCoR at 44.6%.

Figure 3-15.

Federal R&D Obligations by Funding Agency – Rhode Island- 2009



Total Federal R&D Obligations: $678,416,000

Figure 3-16 details the National Institute of Health extramural research awards over the last five years. Brown University with $318 million in funding for all years combined was the largest recipient followed by Rhode Island Hospital at $158 million.

Figure 3-16.

National Institutes of Health Extramural Research Awards in Rhode Island 2007-2011						
	2007	2008	2009	2010	2011	Total 2007-10
Brown University	$59,904,576	$61,987,608	$65,157,130	$65,198,312	$66,018,213	$318,265,839
Rhode Island Hospital	$33,083,136	$28,130,907	$33,736,079	$31,632,739	$32,051,030	$158,633,891
Miriam Hospital	$13,505,524	$11,631,632	$14,147,822	$14,508,978	$15,798,189	$69,592,145
University of Rhode Island	$7,869,952	$9,842,305	$11,843,408	$12,992,878	$15,400,084	$57,948,627
Women and Infants Hospital - Rhode Island	$7,477,456	$9,518,504	$10,542,217	$9,066,092	$8,297,577	$44,901,846
Butler Hospital	$10,837,829	$9,710,348	$6,744,345	$6,247,435	$5,416,048	$38,956,005
Roger Williams Hospital	$3,497,841	$2,579,683	$2,772,325	$2,785,424	$3,138,238	$14,773,511
Memorial Hospital of Rhode Island	$806,814	$1,269,182	$3,313,603	$6,361,815	$1,799,191	$13,550,605
Gordon Research Conferences	$1,257,963	$988,032	$1,261,763	$1,303,484	$1,424,365	$6,235,607
Emma Pendleton Bradley Hospital	$155,786	$791,613	$1,335,929	$1,354,421	$1,342,458	$4,980,207
Prothera Biologics, LLC	$1,654,416			$1,000,000	$863,586	$3,518,002
QUALITYMETRIC, INC.	$2,470,017	$1,073,982	$1,362,176			$4,906,175
Epivax Inc.	$716,900	$1,406,231	$308,577	$173,764	$221,484	$2,826,956
Pro-Change Behavior Systems, Inc.	$144,116	$533,634	$1,048,511	$346,558	$205,150	$2,277,969
Myomics Inc.	$99,912	$348,137	$489,231	$502,757		$1,440,037
BCR Diagnostics	$99,930	$431,079	$267,928			$798,937
Rhode Island College	$108,000	$319,622	$108,000			$535,622
NABSYS, INC.	$249,137	$248,597				$497,734
In CYTU, Inc.				$333,214		$333,214
Foresight Science and Technology, Inc.	$300,000	$300,000	$200,000			$800,000
Providence College				$266,290		$266,290
Cellcure, Inc.	$250,001					$250,001
Assn/Medical Educ &Res in Subs Abuse	$69,369	$70,865	$34,500	$34,500	$34,500	$243,734
Lucidux					$179,894	$179,894
MJ Data Corporation, Ltd.	$129,972					$129,972
American Academy of Addiction Psychiatry	$25,000	$50,000	$50,000	$50,000	$50,000	$225,000
Latino Public Radio		$16,387	$13,265			$29,652
Neourohealth	$27,000					$27,000
Ardane Therapeutics					$352,596	$352,596
Cytosolv, Inc.					$225,683	$225,683
TOTAL	**$144,740,647**	**$141,248,348**	**$154,736,809**	**$154,158,661**	**$152,240,007**	**$747,124,104**

RHODE ISLAND'S RESEARCH & DEVELOPMENT

Federal R&D Obligations

SOURCES: Total Federal R&D Obligations - National Science Foundation, National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development; www.nsf.gov/statistics.

NIH Detail - U.S. Department of Health and Human Services, National Institute of Health, Research Portfolio Online Reporting Tools; NIH Awards by Location & Organization; http://report.nih.gov/index.aspx.

Gross State Product - Bureau of Economic Analysis, U.S. Department of Commerce, New Estimates for 2011 and Revised Estimates for 1997-2010; www.bea.gov.

Endnotes

[1] Total R&D includes R&D for all performance sectors including industry, universities and colleges, not-for-profit institutions, federal government, and federally funded research development centers from all sources of funding. Not-for-profit performed R&D as reported by NSF includes only that which is funded by the federal government. Therefore, this data understates the intensity of not-for-profit performed R&D.

[2] Academic R&D performance excludes federally funded research and development centers administered by academic institutions.

[3] Academic Fields of Study are defined as: Engineering (aeronautical and astronautical, bioengineering and biomedical, chemical, civic, electrical, mechanical, metallurgical, and materials); Physical Sciences (astronomy, chemistry, physics); Environmental Sciences (atmospheric, earth sciences, oceanography); Mathematical Sciences; Computer Sciences; Life Sciences (agricultural, biological, medical); Psychology; Social Sciences (economics, political science, sociology); unclassified.

[4] Obligations are the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when future payment of money is required. Obligations differ from expenditures in that funds allocated by federal agencies during one fiscal year may be spent by the recipient institution either partially or entirely during one or more subsequent years.

[5] Ibid.

[6] Includes the obligations of the 10 or 11 major R&D supporting agencies that were requested to report this information; together they represent 96% or more of the total R&D obligations.

[7] This includes federally funded research and development centers (FFRDC's). There are R&D-performing organizations that are exclusively or substantially financed by the Federal Government and are supported by the Federal Government either to meet a particular R&D objective or, in some instances, to provide major facilities at universities for research and associated training purposes. Each center is administered either by an industrial firm, a university, or another nonprofit institution. Intramural performers are agencies of the Federal Government. Their work is carried on directly by federal government personnel.

WORKFORCE FOR THE KNOWLEDGE ECONOMY

OVERVIEW

Math and science skills are important skills for innovative and technology-intensive industries. Success in developing math and science skills begins at the K-12 level. Rhode Island eighth grade students performed at a level below that of the reference groups. In 2011, Rhode Island math scores on average for the state were lower than New England overall but similar to the nation as a whole and for EPSCoR states. With regard to science scores, in 2011 the State trailed all the reference groups.

Today's science and technology intensive careers demand science and engineering related education beyond the high school level. In 2010 Rhode Island outperformed all reference groups in terms of science and engineering degrees awarded per 1,000 residents. On this indicator the State has consistently outperformed the reference groups since 2001.

Supporting a vibrant technology and innovation economy requires a regular supply of workers with college and advanced degrees. With regard to the percent of population 25 and older that holds a bachelor's degree, Rhode Island saw a peak and then a slump, followed by a rebound. In 2011 on this indicator, Rhode Island was below the New England states as a whole but ahead of the EPSCoR states and U.S.

Degrees and knowledge must convert to jobs to grow the State's economy. In 2010 Rhode Island performed better than the EPSCoR states as a whole in terms of scientists and engineers in the workforce but worse than the U.S. and the New England totals.

INDICATORS

Math Scores for 8th Graders

Science and Engineering Degrees Awarded

Education Attainment - Percent of Population 25 or older with a BA or More

Scientists and Engineers in the Workforce

Math Scores for 8th Graders

Rhode Island 5-Year Trend ^

Rhode Island Compared to EPSCoR =

Rhode Island Compared to New England v

Rhode Island Compared to U.S. =

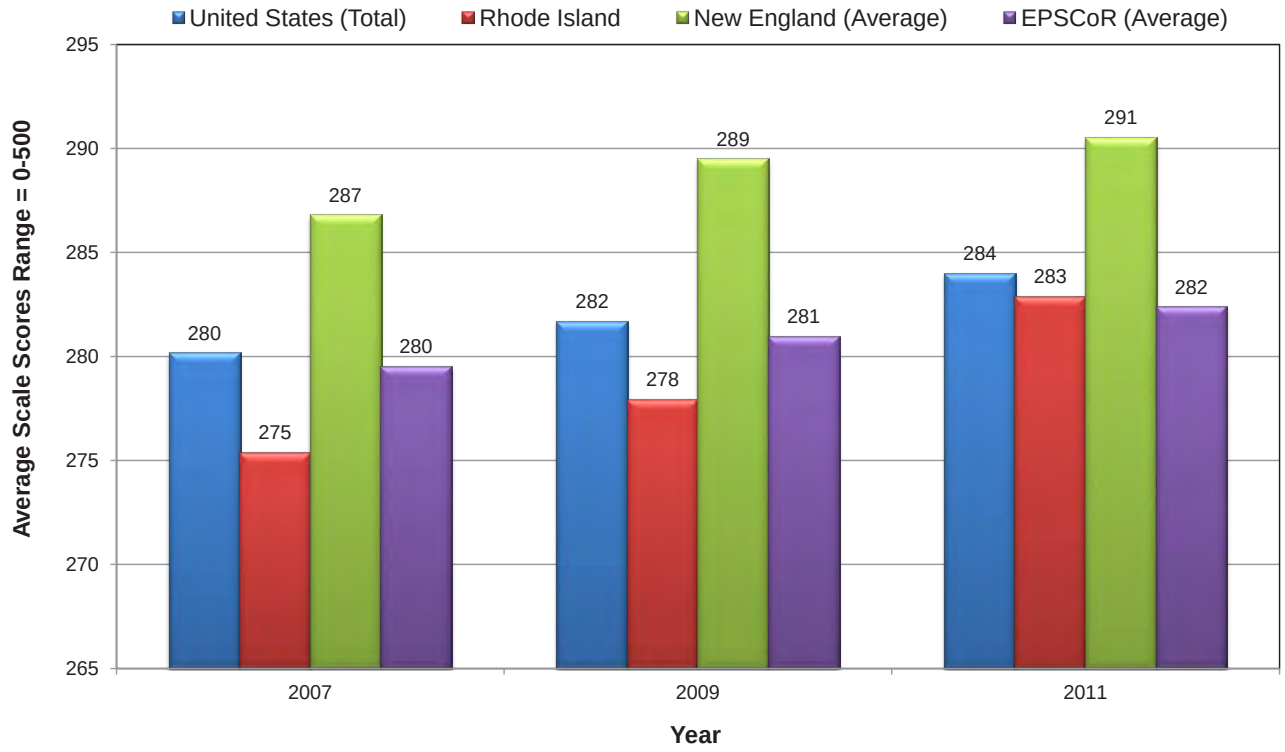
Rhode Island's Most Recent National Ranking **29**

SUMMARY

The National Assessment of Educational Progress measures academic scores among 8th grade students. Scores for states are based on a scale of 0-500. In 2011, Rhode Island math scores on average for the state were 283, which were lower than New England overall (291) but similar to the nation as a whole (284) and for EPSCoR states (282) (see Figure 4-1). All reference geographies experienced increases in scores since 2007.

Figure 4-1.

National Assessment of Educational Progress – Math Scores (Average Scale Scores) for 8th Graders – 2007, 2009, 2011



WORKFORCE FOR THE KNOWLEDGE ECONOMY

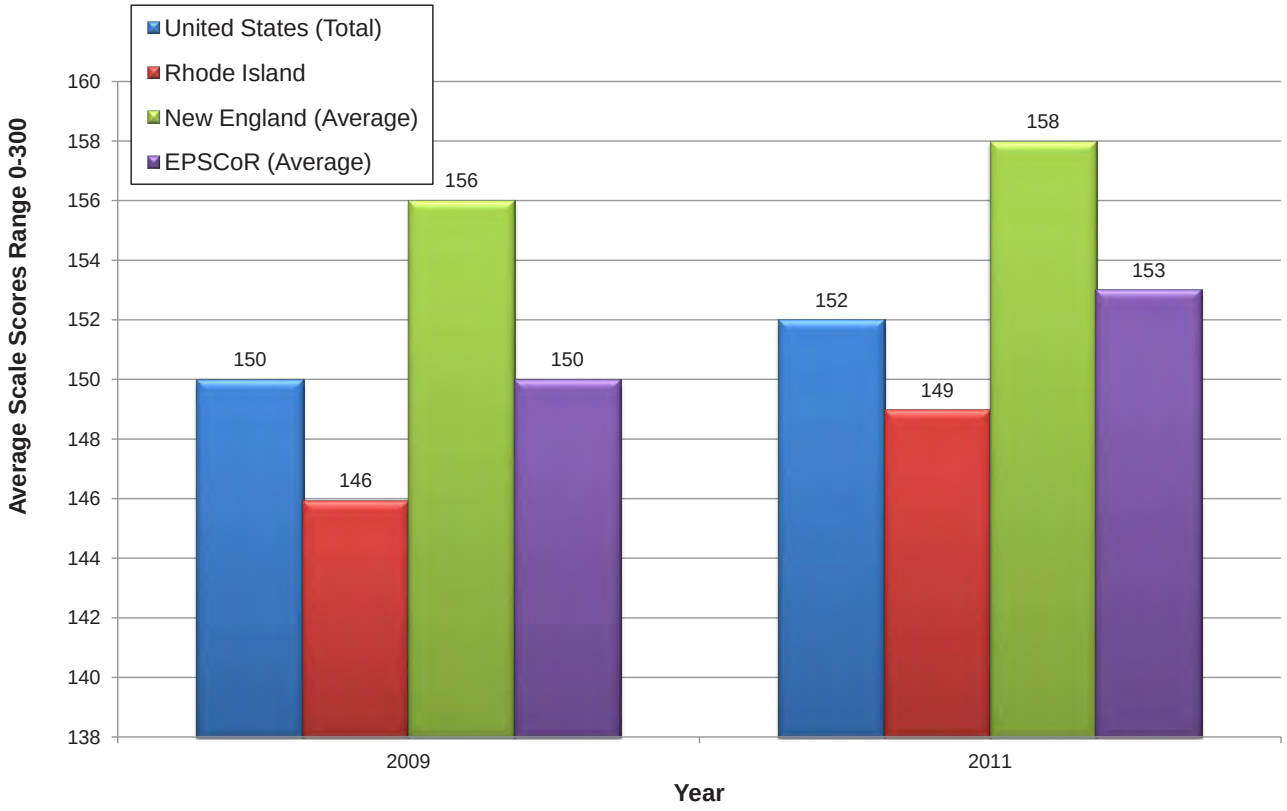
Math Scores for 8th Graders

WHY THIS IS SIGNIFICANT

Student performance on standardized tests can provide insight into the potential knowledge economy of a given state. Eighth grade students' math and science scores in particular are an indicator of a state's ability to prepare their students for jobs in the technology and research and development fields[1].

Figure 4-2.

National Assessment of Educational Progress – Science Scores (Average Scale Scores) for 8th Graders – 2009, 2011



RELATED

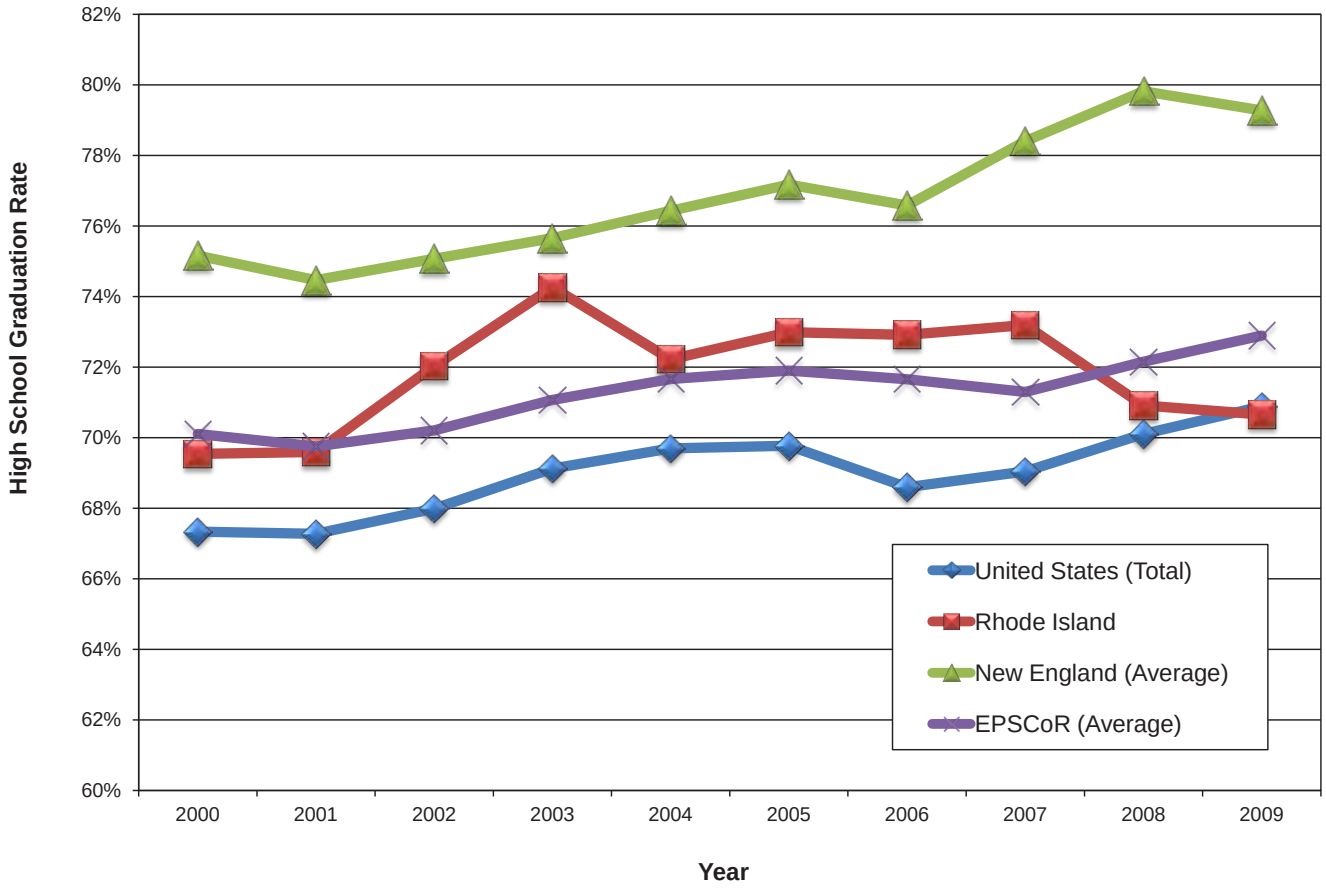
As with math scores, science scores can provide insight into the preparedness of the future workforce. In 2011, Rhode Island lagged the reference groups with an average score of 149 (see Figure 4-2). The New England states had the highest at 158, while the EPSCoR states and the United States as a whole had an average score of 153 and 152 respectively. In 2011, Rhode Island Ranked 35th among all states on this indicator.

Math Scores for 8th Graders

In addition to standardized test scores, high school graduation rates are an indicator of future workforce skills and abilities. In Rhode Island, the high school graduation rate[2] rose from 69.5% in 2000 to 74.3% in 2003 (see Figure 4-3). Since then, graduation rates in Rhode Island have declined to 70.7% in 2009, placing it below the New England states, EPSCoR states, and the nation as a whole.

Figure 4-3.

High School Graduation Rate - 2000-2009



SOURCES: Math and Science Scores for 8th Graders - U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NEAP); www.nces.ed.gov/nationsreportcard/.

Public High School Graduation Rate - Postsecondary Education Opportunity; 8/5/2010; www.postsecondary.org.

Science and Engineering Degrees Awarded

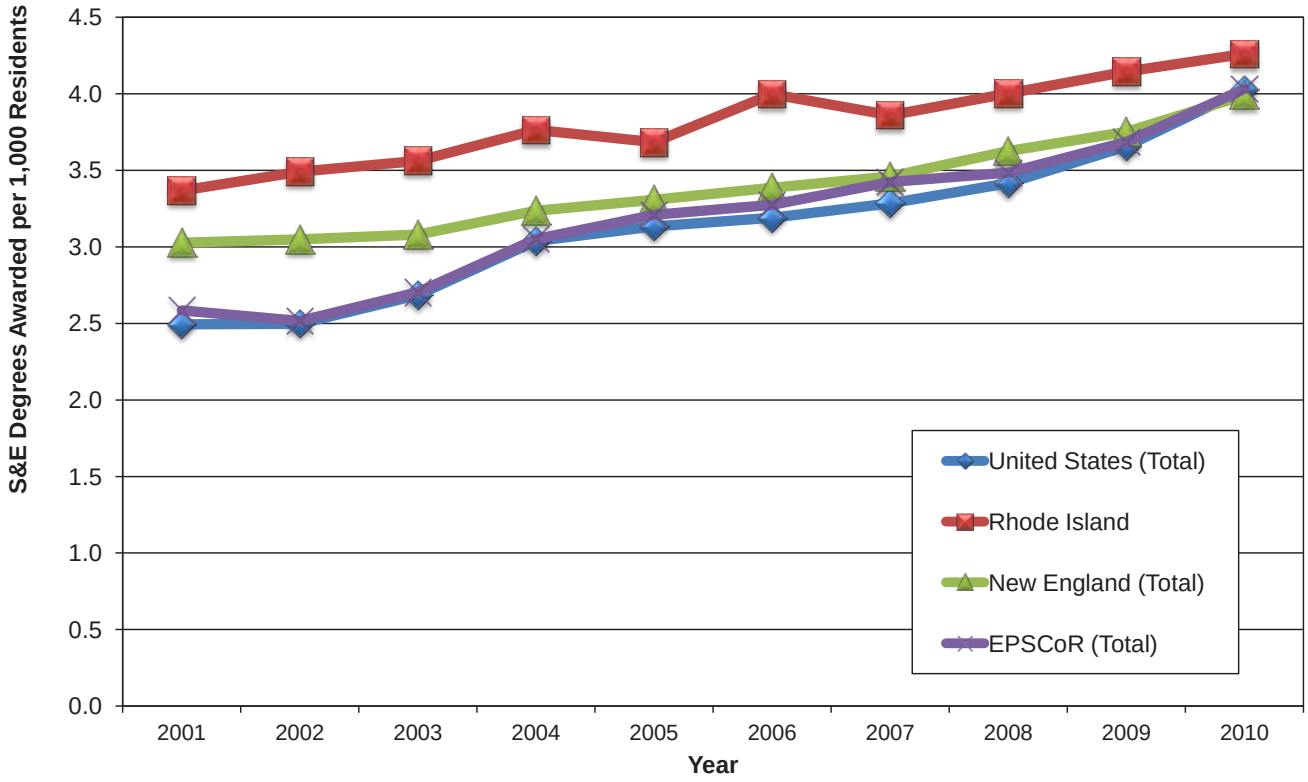
Rhode Island 1-Year Trend ^
Rhode Island 5-Year Trend ^
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England ^
Rhode Island Compared to U.S. ^
Rhode Island's Most Recent National Ranking **22**

SUMMARY

In 2010, Rhode Island awarded 4.261 science and engineering degrees for every 1,000 residents which places the state ahead of the U.S., New England, and EPSCoR comparison groups (see Figure 4-4). Rhode Island showed an increase of over 27% in the number of science and engineering degrees awarded from 2001 to 2010.

Figure 4-4.

S&E Degrees Awarded per 1,000 Residents 2001-2010



Science and Engineering Degrees Awarded

WHY THIS IS SIGNIFICANT

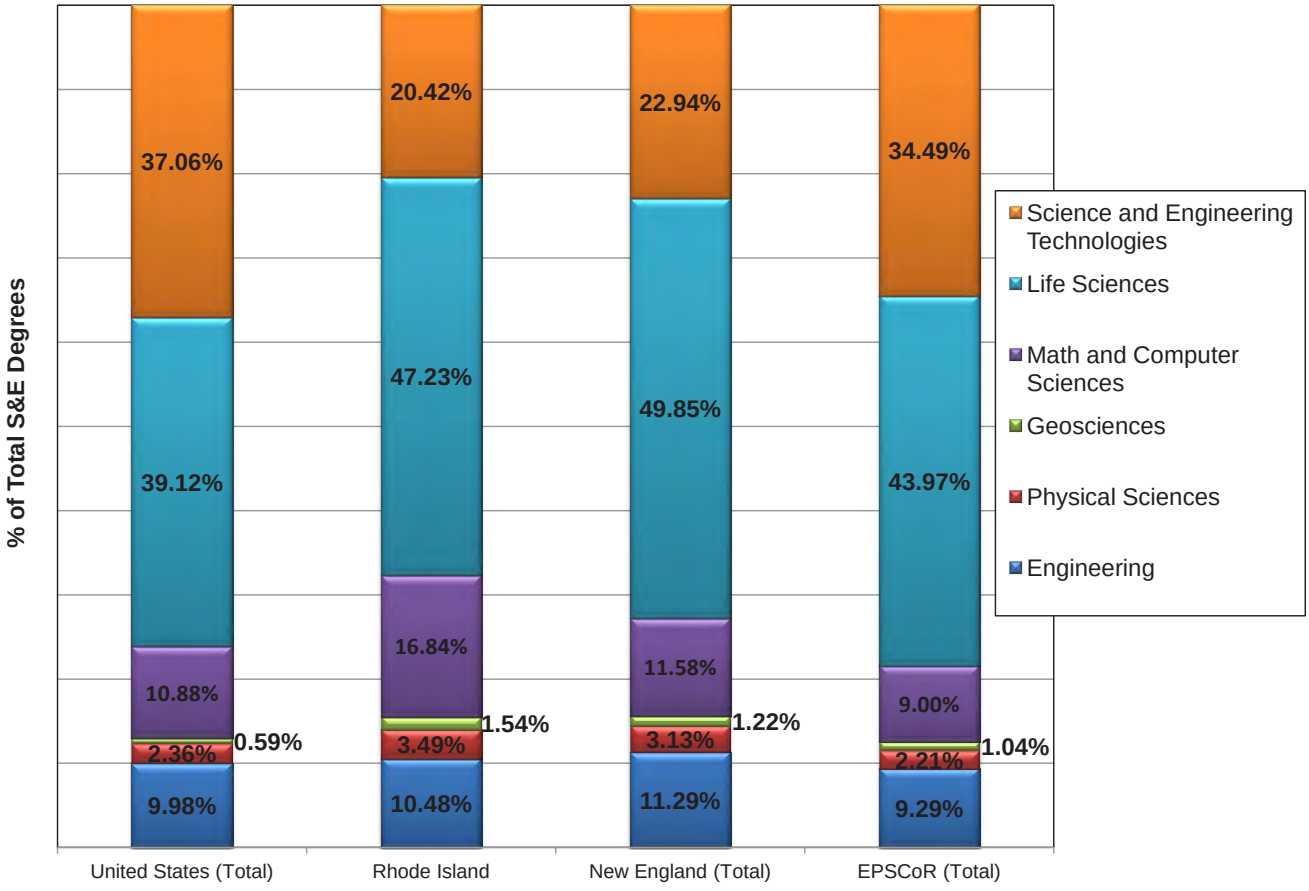
This is a measure of the state's creation of a workforce geared toward research and development and the skills and knowledge to support a technology-driven economy. The awarding of degrees in the science and engineering fields is a good determinant of whether students will enter these fields in the workforce.

RELATED

In 2010, Rhode Island had a higher concentration of degrees in Math and Computer Sciences, Geosciences, and Physical Sciences compared to all the other reference groups (see Figure 4-5).

Figure 4-5.

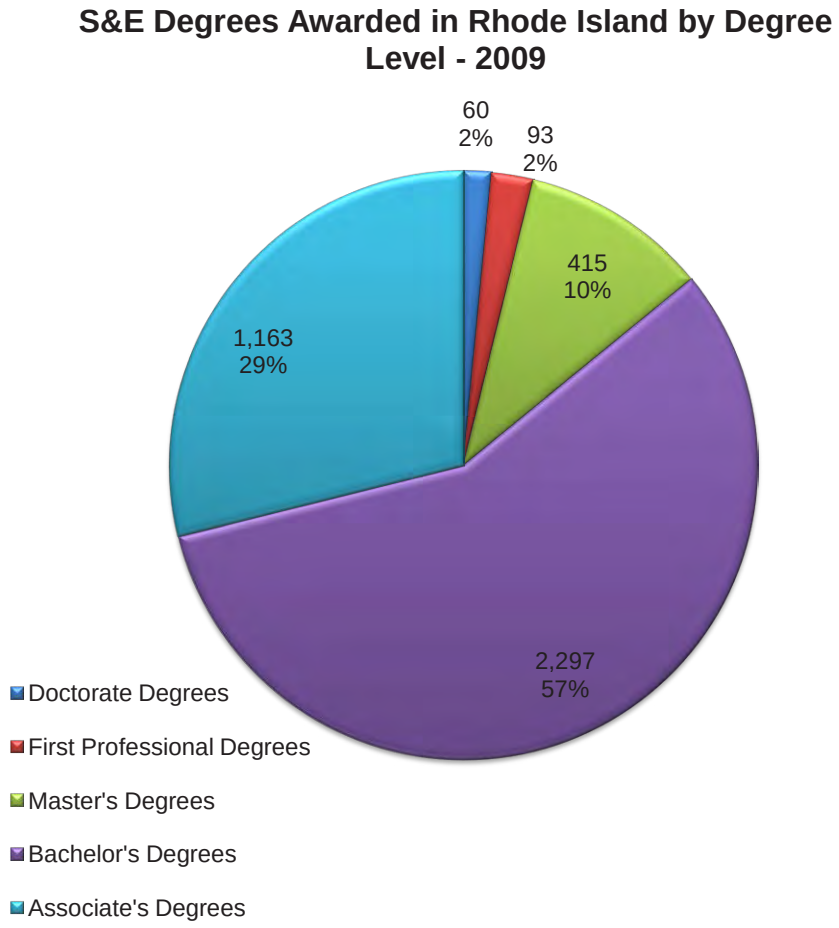
Science & Engineering Degrees by Discipline – 2010



Science and Engineering Degrees Awarded

Research and development and technology based businesses often require skilled workers with advanced degrees. Of the 4,028 science and engineering degrees awarded in Rhode Island in 2009, 568, or 14.1% were master's degrees or higher (see Figure 4-6).

Figure 4-6.

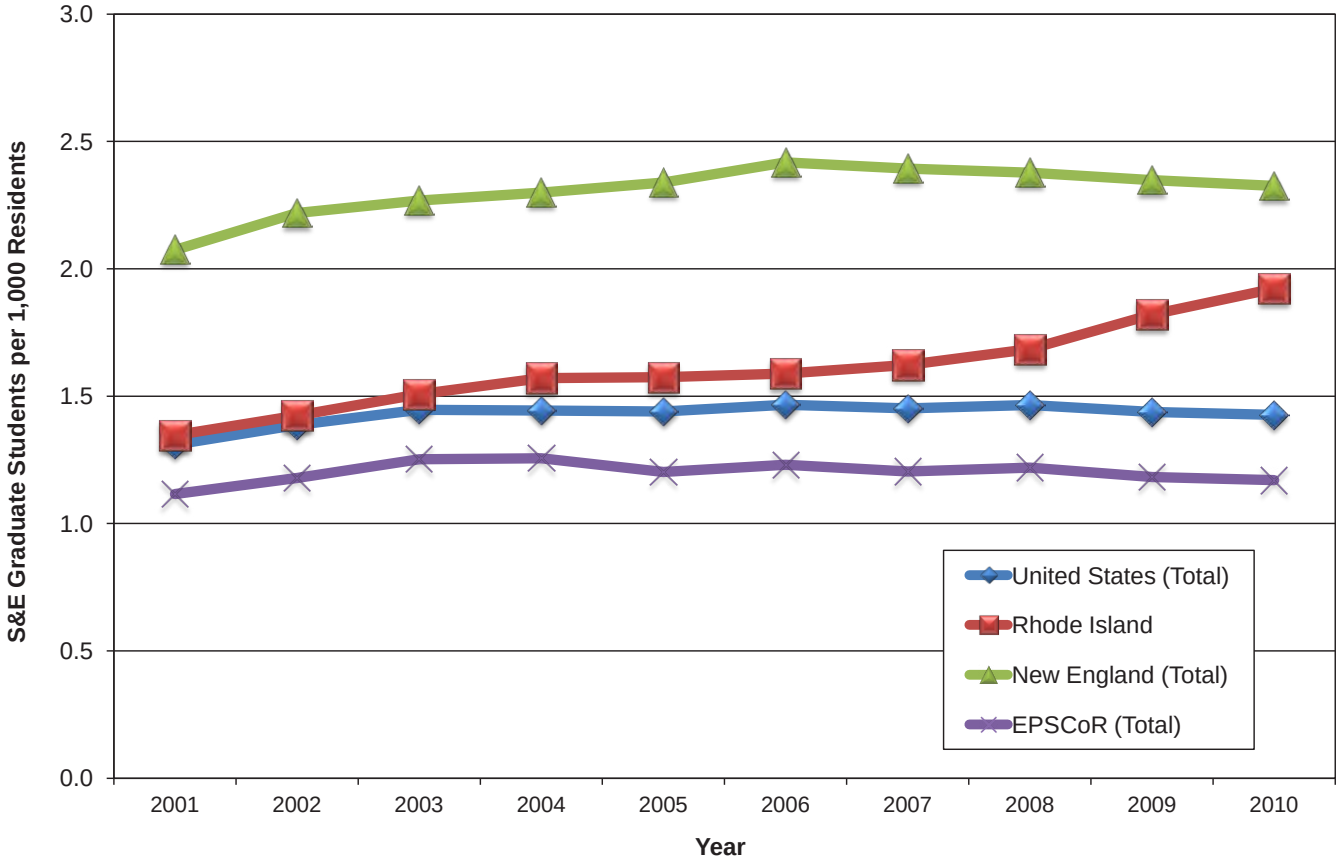


Future degrees at the graduate level are driven by existing graduate enrollments. In 2010, Rhode Island had 1.92 graduate enrollments per 1,000 residents (see Figure 4-7) ranking it 6th nationally on this indicator. In 2009, Rhode Island's level was above that of the U.S. as a whole (1.43) and the EPSCoR states (1.17), but below the New England states as a whole (2.33).

Science and Engineering Degrees Awarded

Figure 4-7.

S&E Graduate Student Enrollments per 1,000 Residents - 2001-2010



SOURCES: S&E Degrees Awarded - Extracted from NSF WebCASPAR Database System, http://webcaspar.nsf.gov, based on the Higher Education General Information Survey and Integrated Post-Secondary Education Data System, National Center for Education Statistics, U.S. Department of Education, www.nces.ed.gov.

Population - Population Division, U.S. Census Bureau; Annual Estimates of the Population for the United States and States, and for Puerto Rico; www.census.gov/popest/estimates.php.

S&E Graduate Students - NSF WebCASPAR Database System based on "Survey of Graduate Students and Postdoctorates in Science and Engineering," National Science Foundation and National Institutes of Health; http://webcaspar.nsf.gov.

Education Attainment - Percent of Population 25 or older with a BA or More

Rhode Island 1-Year Trend ^

Rhode Island 5-Year Trend ^

Rhode Island Compared to EPSCoR ^

Rhode Island Compared to New England v

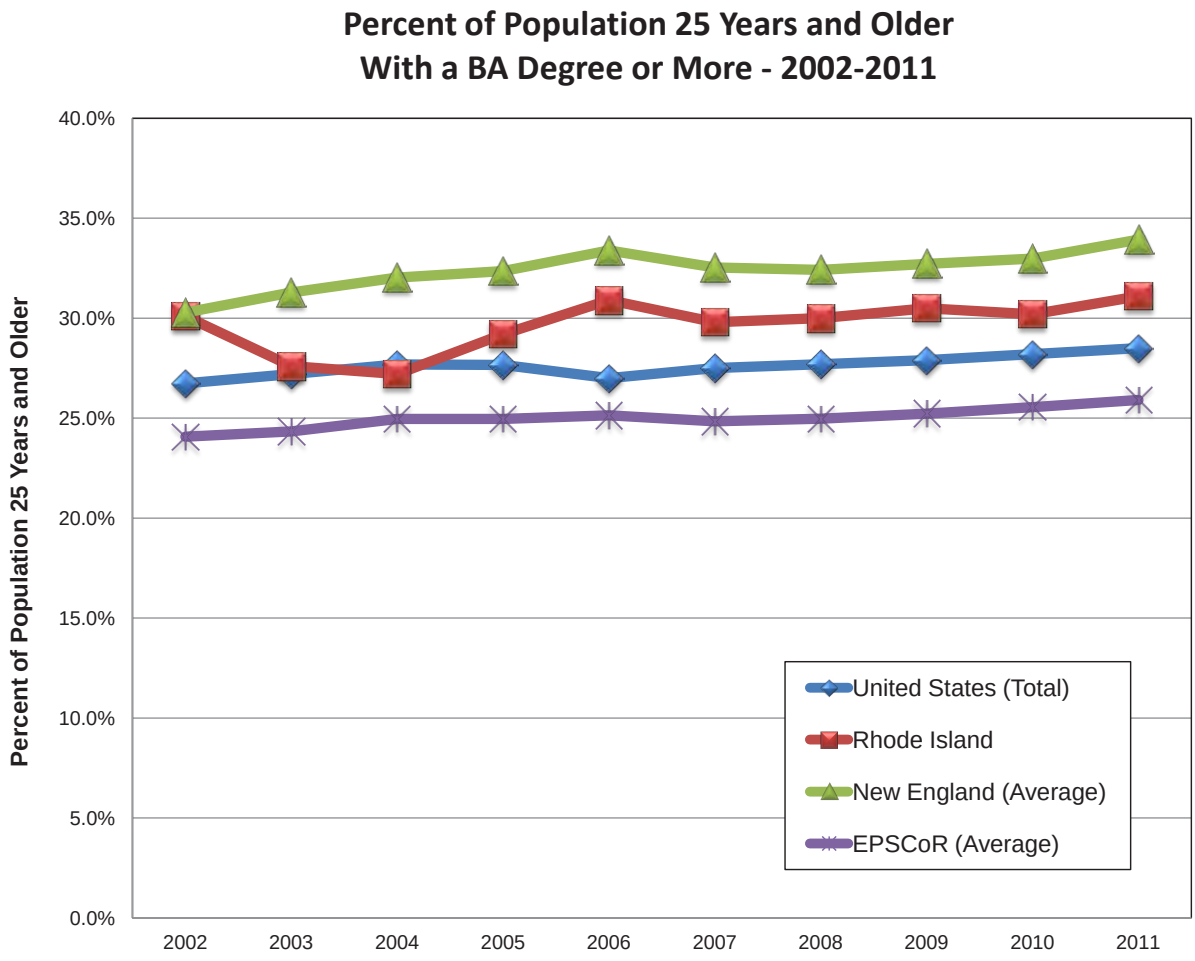
Rhode Island Compared to U.S. ^

Rhode Island's Most Recent National Ranking **13**

SUMMARY

In 2011, 31.1% of Rhode Island's population had a bachelor's degree; that was higher than the United States (28.5%) and the EPSCoR states (25.2%) but remained behind the New England states (33.9%) (see Figure 4-8). In 2011 Rhode Island ranks 13th on this indicator.

Figure 4-8.



Education Attainment - Percent of Population 25 or older with a BA or More

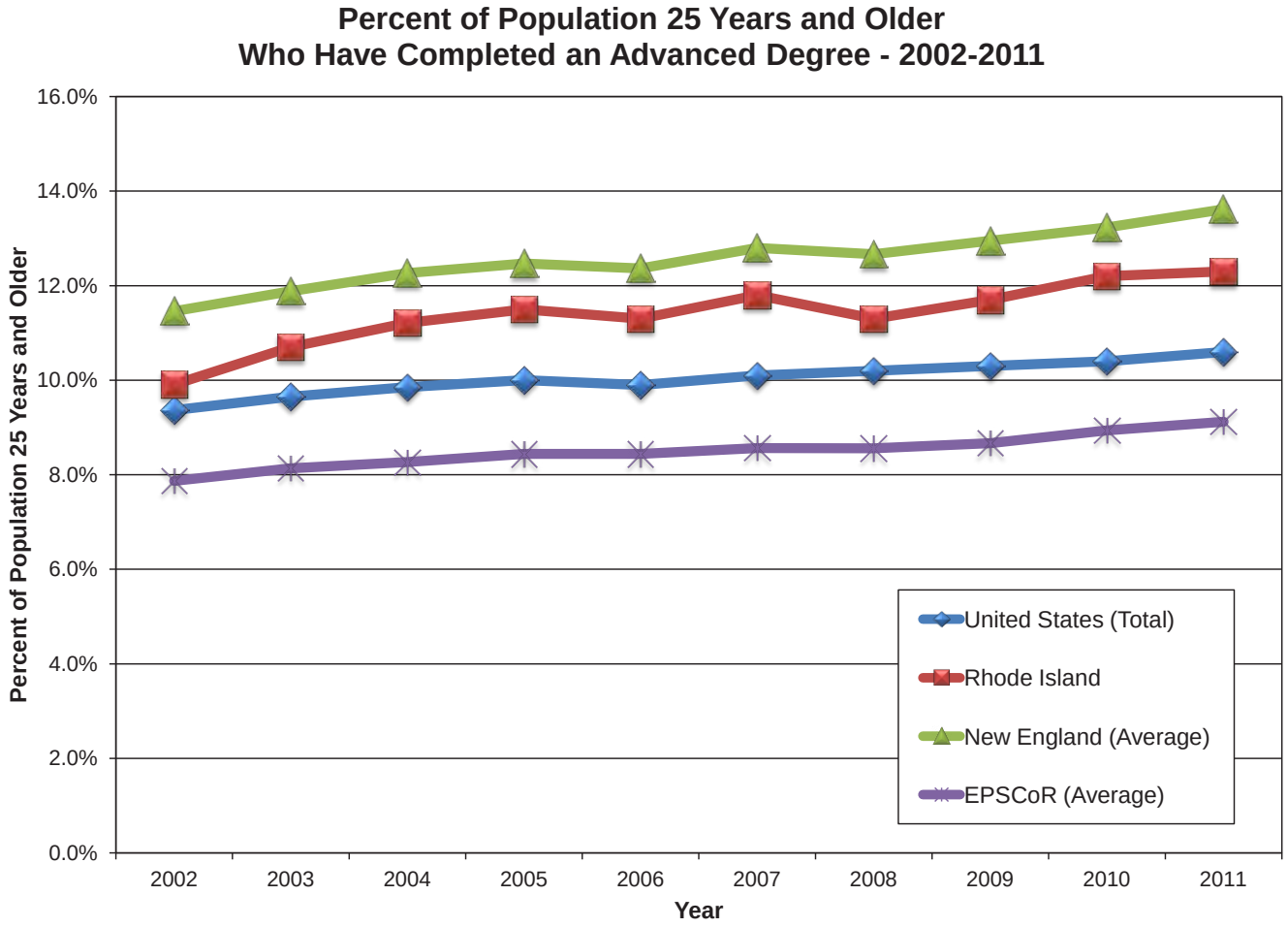
WHY THIS IS SIGNIFICANT

National research indicates that the economic well-being of a state is strongly tied to educational attainment (bachelor's degree or higher). Income levels are considerably higher for persons with college and advanced degrees. Additionally, wages are typically higher in technology-intensive industries; the same industries that increasingly require workers with postsecondary degrees.

RELATED

In 2011, 12.3% of Rhode Island's population 25 years and older held an advanced degree (masters and beyond). The state remains below New England, but above both the EPSCoR states and the U.S. (see Figure 4-9).

Figure 4-9.



SOURCES: Education Attainment - U.S. Census Bureau, American Community Survey; www.census.gov/acs/.

Scientists and Engineers in the Workforce

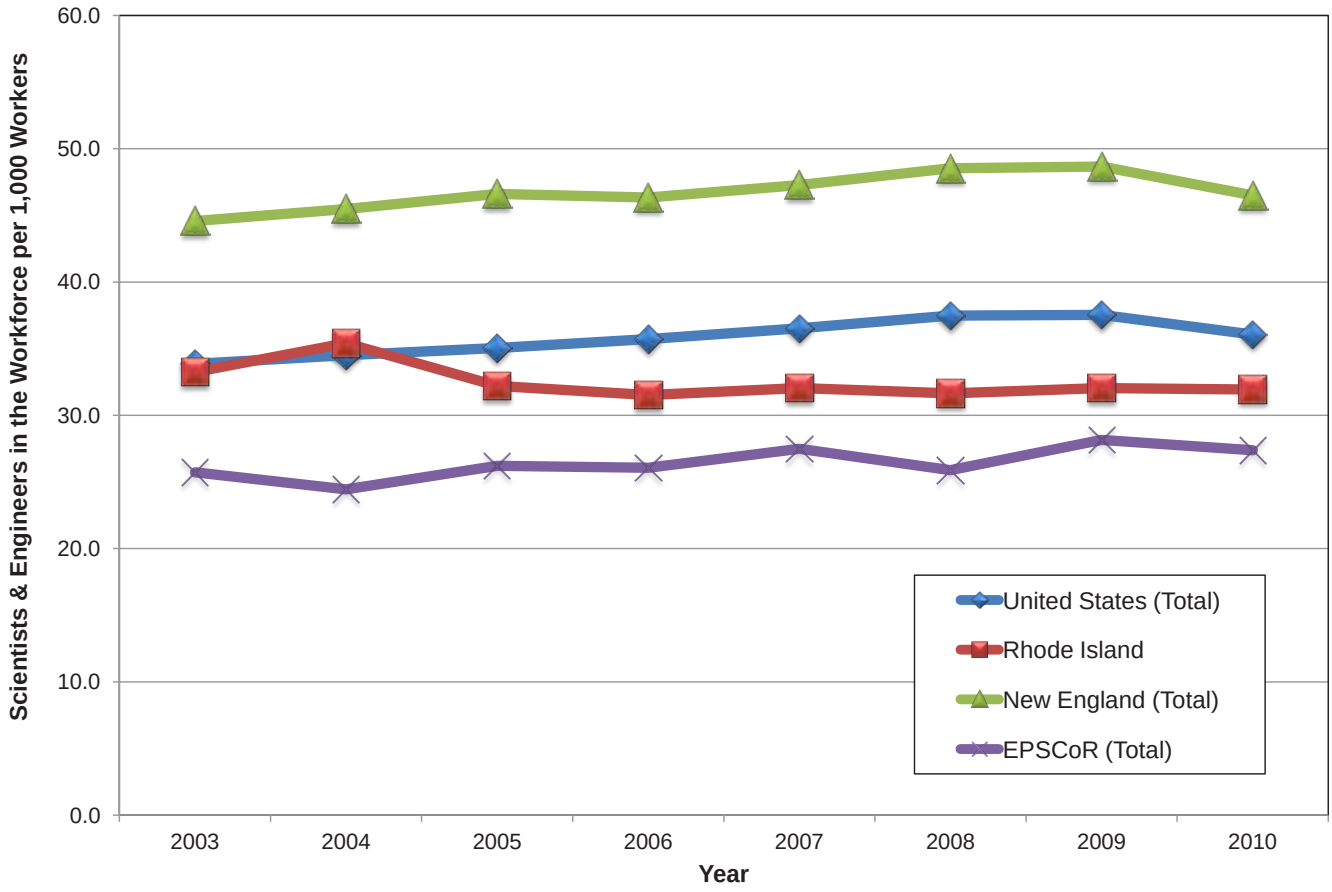
Rhode Island 1-Year Trend =
Rhode Island 5-Year Trend =
Rhode Island Compared to EPSCoR ^
Rhode Island Compared to New England v
Rhode Island Compared to U.S. v
Rhode Island's Most Recent National Ranking **25**

SUMMARY

In 2010, Rhode Island had 18,210 scientists and engineers in its workforce representing 31.93 scientists and engineers per 1,000 workers (see Figure 4-10). In 2010, Rhode Island lagged New England (46.51) and the U.S. as a whole (36.06) on this indicator, but exceeded the level of the EPSCoR states (27.37). In 2010, Rhode Island ranked 25th on this indicator.

Figure 4-10.

Scientists & Engineers in the Workforce Per 1,000 Workers - 2003-2010



Scientists and Engineers in the Workforce

WHY THIS IS SIGNIFICANT

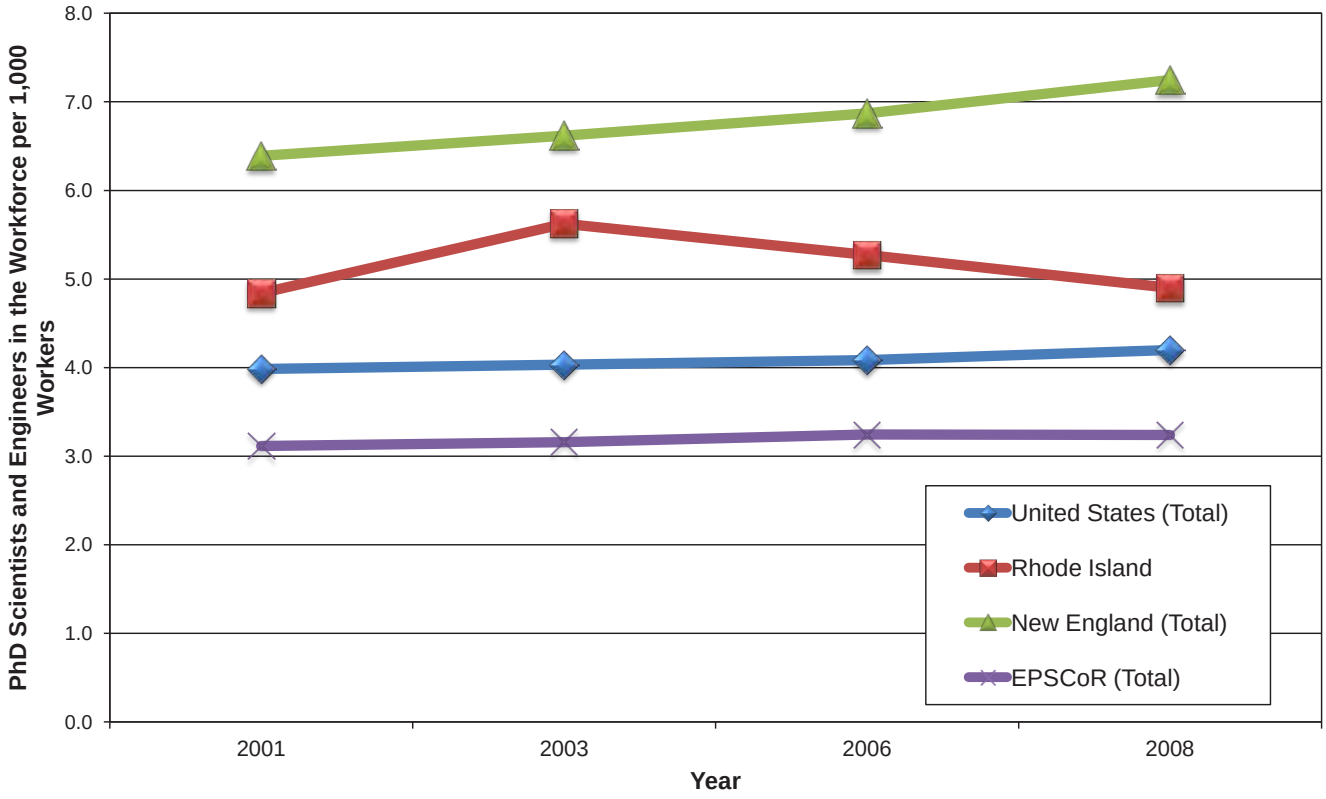
A labor market of scientists and engineers is essential to creating a vibrant research, development, and technology enterprise. There is a direct correlation between the percent of the labor force in science and engineering occupations and the growth of the innovation-based industries. This indicator is a measure of the state's ability to attract and retain highly skilled and highly educated workers who are critical to an innovation driven economy.

RELATED

Doctoral level researchers design and lead the research and development programs that generate new products, processes, technologies, and services. They also build vital linkages between Rhode Island businesses and institutions with international R&D expertise. In 2008, Rhode Island had 2,800 Ph.D. scientists and engineers in its workforce, down from the 2003 high of 3,170 (see Figure 4-11).

Figure 4-11.

PhD Scientists and Engineers in the Workforce Per 1,000 Workers - 2001-2008



WORKFORCE FOR THE KNOWLEDGE ECONOMY

Scientists and Engineers in the Workforce

SOURCES: PhD Scientists and Engineers - National Science Foundation, Division of Science Resources Statistics, Science and Engineering Indicators 2008, from the Survey of Doctorate Recipients; www. nsf.gov/statistics/seind08.

Workers - Civilian Labor Force - U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics; www.bls.gov/lau/home.htm.

Endnotes

[1] For assessment, Rhode Island uses New England Common Assessment Program (NECAP), which was developed in partnership with New Hampshire and Vermont to evaluate how well students and schools are achieving the learning targets contained in the Grade Level and Grade Span Expectations. NECAP score results for the reference time period resulted in similar student achievement levels.

[2] Pubic High School Graduation Rate equals high school graduates divided by the number of 9th grade enrollments 4 years prior. Data is based on "Public Elementary and Secondary Education Statistics," National Center for Education Statistics, www.nces.ed.gov.

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Benchmarking the Rhode Island Knowledge Economy – 2012

December 2012

GREATER PROVIDENCE CHAMBER OF COMMERCE

RHODE ISLAND SCIENCE & TECHNOLOGY ADVISORY COUNCIL