



Benchmarking the Rhode Island Knowledge Economy – 2012



**GREATER
PROVIDENCE
CHAMBER OF
COMMERCE**

RHODE ISLAND
**SCIENCE &
TECHNOLOGY**
ADVISORY COUNCIL

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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.

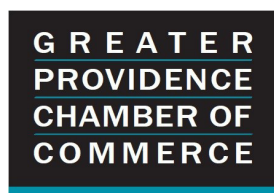
The inaugural report showed that while we enjoyed many elements of an innovation economy such as strong R&D performance and an educated populace, we also faced certain areas of weaknesses that can limit economic growth such as net migration of new graduates and low levels of federal Small Business Innovation 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



RI Science & Technology
Advisory Council



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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 inform 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 remains competitive through investments as well. This section includes the indicators: gross state product; per capita income; targeted science and technology sector establishment's 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

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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; 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 reservoir of the state's human capital by measuring the level of science, technology, engineering, and mathematics (STEM) literacy and the intensity 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. as a whole 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 as a portion of population (per capita) or state's economic output (as a percent of the state's domestic product) to account for geographic and population size differences.

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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
- 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

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- 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 one year for which data are available:

- Gross State Products
- 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 Performance
- 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
- 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 one 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

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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 Products	^	^	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	=	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 Performance	^	^	^	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

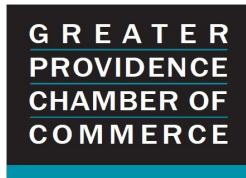
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Figure 2.

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	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



This report was produced by Camoin Associates, Inc. and Innovation Policyworks, LLC, for the Greater Providence Chamber of Commerce and Rhode Island Science & Technology Advisory Council.



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