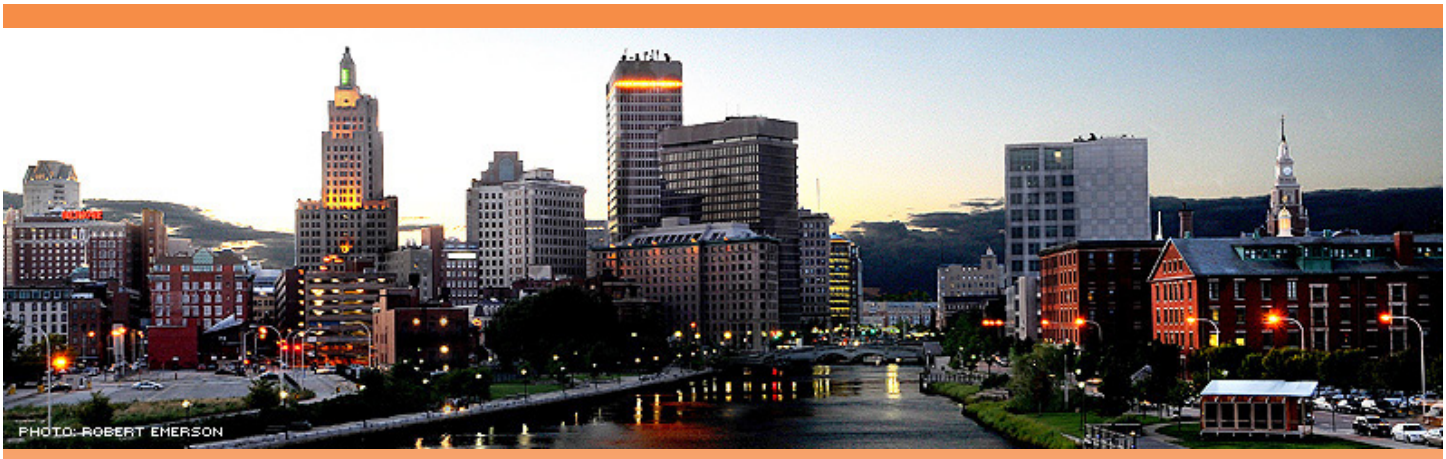

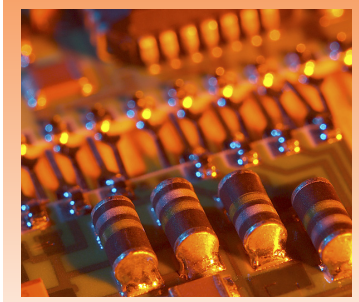

Benchmarking the Rhode Island Knowledge Economy

GREATER PROVIDENCE CHAMBER OF COMMERCE

FOUNDED IN 1868

RHODE ISLAND SCIENCE & TECHNOLOGY ADVISORY COUNCIL

November 2011

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Dear Friends,

In the 21st century, knowledge and innovation drive economic change and progress.

It's increasingly clear that states and cities which have a candid and impartial understanding of their core competencies, cluster strengths and a trajectory of key economic trends will better catalyze additional economic growth within emerging areas.

Understanding these themes, the Greater Providence Chamber of Commerce (GPCC) and the RI Science & Technology Advisory Council (STAC) have joined together to produce this report entitled "Benchmarking the Rhode Island Knowledge Economy."

The document is designed around 23 indicators that together will provide a strong foundation to benchmark Rhode Island's knowledge enterprise. The goal is not only to track the state's ability to develop its knowledge-driven, science and technology-based economy, but also to compare that development to what others are doing on the regional and national level.

As the document is updated in the coming years, there will also be an additional opportunity to gain an understanding of how Rhode Island is trending in major areas that define our capacity for creating prosperity.

Simply put, these data will better position us as a community to strategically identify and support initiatives that best leverage scarce financial resources, measure the impact of these investments and pursue the promise of a strong Rhode Island in the years to come.

The Greater Providence Chamber of Commerce and RI Science & Technology Advisory Council remain committed to fostering the evolution of Rhode Island into a major hub for high impact research and development, business incubation and entrepreneurial activity.

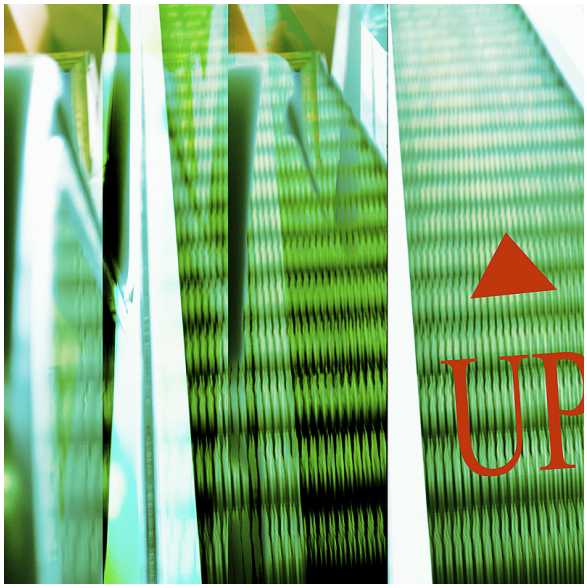
Greater Providence
Chamber of Commerce

GREATER PROVIDENCE CHAMBER OF COMMERCE
FOUNDED IN 1868

RI Science & Technology
Advisory Council

RHODE ISLAND SCIENCE & TECHNOLOGY ADVISORY COUNCIL

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 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.

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, when updated in the coming years, will provide a tool to evaluate Rhode Island's competitive position over time 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 remain competitive through investments as well. This section includes the indicators: per capita income, high speed internet access, net-migration of persons 22-39 years of age, targeted science and technology sector establishment's employment, and wages, 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.

INTRODUCTION & SUMMARY

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 activity, venture capital investments, and small business 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 performance, academic R&D, industry R&D, not-for-profit R&D performance, 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 Internet connectivity - 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 and products. 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.

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 an 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
- Science and Engineering Degrees Awarded
- Education Attainment – Percent of Population 25 or Older with a BA or More

INTRODUCTION & SUMMARY

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 Migration of Persons 22-39 Years of Age
- State Appropriations for Higher Education
- Entrepreneurial Climate
- Industry R&D Performance
- Math Scores for 8th Graders
- Scientists and Engineers in the Workforce

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
- High Speed Internet Access
- Patents (Utilities Only) Issued to Universities and Colleges
- Academic 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

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
- Entrepreneurial Climate
- Venture Capital Investments
- Total SBIR/STTR Investments
- Total R&D Performance
- Industry R&D Performance
- Not-For-Profit R&D Performance
- Scientists and Engineers in the Workforce

Figure 1.

Rhode Island – Indicator Summary

Indicator	1 Year Change	5 Year Trend	Rhode Island Compared to EPSCoR	Rhode Island's Most Recent National Ranking
Rhode Island's Knowledge Economy				
Gross State Products	^	^	v	45
Per Capita Income	v	^	^	17
Targeted Science and Technology Sector Establishments	^	^	^	N/A
Targeted Science and Technology Sector Employment	v	v	v	N/A
Targeted Science and Technology Sector Wages	N/A	N/A	v	N/A
High Speed Internet Access	^	^	^	16
Net-Migration of Persons 22-39 Years of Age	N/A	N/A	v	45
State Funding for Science and Technology	=	v	N/A	N/A
State Appropriations for Higher Education	v	v	v	46
The Knowledge Business Pipeline				
Patents Issued per 1,000 Residents	^	v	^	17
Patents (Utility Only) Issued to Universities and Colleges	^	^	^	23
Entrepreneurial Climate	^	v	v	33
Venture Capital Investments	^	v	^	10
Total SBIR/STTR Investments	v	v	v	21
Research and Development				
Total R&D Performance	v	v	^	19
Academic R&D Performance	^	^	^	7
Industry R&D Performance	v	v	v	31
Not-For-Profit R&D Performance	^	v	^	4
Federal R&D Performance	=	^	^	8
Workforce for the Knowledge Economy				
Math Scores for 8th Graders	^	^	v	37
Science and Engineering Degrees Awarded	^	^	^	15
Education Attainment – Percent of Population 25 or Older with a BA or More	^	^	^	14
Scientists and Engineers in the Workforce	=	v	^	30

Key: ^ – Improving Trend or Higher
v – Decreasing or Lower
= – No Change or Equal
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	23	44	13	42	45	51
Per Capita Income	2	31	4	11	17	22
High Speed Internet Lines Per 1,000 Residents	4	29	6	14	16	28
Net Migration of Persons 22-39 Years of Age	17	41	30	23	45	43
State Appropriations for Higher Education Per Person	10	36	45	49	46	47
Patents Issued Per 1,000 Residents	8	42	5	9	17	1
Patents (Utility Only) Issued to Universities and Colleges Per $10,000 of Academic R&D	26	29	1	32	23	14
Entrepreneurial Climate - Index of Entrepreneurial Activity	38	29	20	33	33	5
Venture Capital Investments as a Percent of Gross State Product	13	34	1	15	10	20
Total SBIR/STTR Investments	17	29	1	2	21	7
Total R&D Performance as a Percent of Gross State Product	5	40	2	10	19	22
Academic R&D Performance as a Percent of Gross State Product	30	41	2	6	7	10
Industry R&D Performance as a Percent of Gross State Product	2	38	1	7	31	16
Not-For-Profit R&D Performance as a Percent of Gross State Product	36	3	1	42	4	47
Federal R&D Obligations as a Percent of Gross State Product	13	14	5	20	9	31
Math Scores for 8th Graders	10	19	1	6	37	3
Science and Engineering Degrees Awarded Per 1,000 Residents	47	39	14	36	18	19
Education Attainment - Percent of Population 25 or Older with a BA or More	5	24	2	10	14	8
Scientists and Engineers in the Workforce	10	42	3	13	30	20