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A Comparative Analysis of Innovation and Technology

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Introduction

This report assesses Connecticut's capacity and trends relative to other states in areas related to competitiveness and innovation in the knowledge economy.

The analysis conducted for this report reveals a state that is at a critical juncture. On the one hand, Connecticut is in an enviable position, possessing a wealth of attributes essential to innovation and global competitiveness, such as high productivity, an educated workforce and more. On the other hand, the state's long-term economic viability is threatened by several factors. Many states are outpacing Connecticut in key areas. Urban-suburban disparities; lack of business and job growth; an aging, shrinking population and other forces are undermining our prospects for a prosperous future.

Not all of the factors negatively affecting Connecticut's competitive position are within the state's control. But many are. It is essential that public- and private-sector leaders take decisive action today so that the Connecticut of tomorrow may offer all its citizens opportunity, prosperity and a high quality of life.

It is hoped that the analysis set forth in this report will serve as a catalyst to inform discussion, provoke dialogue, and lead to thoughtful and effective policies and programs that can help Connecticut's economy remain strong and competitive.

Consider these two possible scenarios for the Connecticut of 2020:

Scenario I:
Connecticut, the "land of steady habits," continues with microscopic growth in both population and jobs. Recent college graduates, faced with high housing costs and few job opportunities, leave the state in search of greener pastures. Traditional assets such as college attainment, per capita personal income, venture capital, patents and foreign students remain strong, but a number of states surpass us and don't look back. Connecticut's entrepreneurial culture exhibits sluggish activity, and most people perceive the state as just a highway between Boston and New York.

Scenario II:
Connecticut experiences an economic renaissance. Inventors prefer Connecticut because of the dramatic increase in R&D and SBIR grants since the early 2000s. Entrepreneurs are lured to the state because financing and mentoring assistance is available. The companies they create generate jobs that entice recent Connecticut and foreign graduates to stay in the state. People perceive the state as bustling with activity, complementing the activities in Boston and New York.

Chances are you prefer the second scenario. Like so many other people in Connecticut—citizens, policy-makers, business leaders and more—you hope that Connecticut will have a prosperous future, made possible by a vibrant economy. In the 21st century, economic prosperity such as you envision is linked to a region's ability to compete in a global economy in which knowledge, technological skills and innovation are the critical foundations. States and regions that are strong in these assets are the ones that will prosper in the coming decades.

This benchmark report is intended to measure Connecticut's current economic situation and to propose steps so that Connecticut has an even better tomorrow. While pride in Connecticut's past is justified, action on behalf of its future is imperative.

Is There a Problem?

A superficial consideration of statistics might lead one to conclude that Connecticut has nothing to worry about. With the highest per capita income in the country and one of the most productive economies in the world, Connecticut enjoys a level of economic success most states and many countries would envy. Indeed, the 2004 edition of the *Development Report Card of the States* (CFED, 2004) gives Connecticut straight A's, the only state in the nation to achieve that distinction.

So then, if everything is fine, why should we be concerned? Won't growth and prosperity remain a Connecticut birthright? Won't business as usual lead us in the right direction with growth and opportunity for all? Unfortunately, the answer to the last two questions is "no." A number of slow-moving, long-term structural changes have had a pronounced impact on the Northeast and on Connecticut in particular, and if we are to

flourish in the future, complacency is not an option. Significant challenges, discussed in the next section, include:

- Population shifts;
- Declining influence;
- Slow job growth;
- Other structural changes; and
- Urban-suburban disparities.

The reader might question the reason for weaving these topics into a discussion of Connecticut's knowledge economy. But there is good reason to do so, because these challenges constitute the context in which the state's innovation economy must operate. Each of these issues has a direct bearing on our long-term economic success. Crafting technology policies and investments based on the findings of this report or others of its kind without considering these broader forces can only result in sub-optimal performance and outcomes. There are no simple, inexpensive solutions, but unless the state starts confronting these challenges today, the long-term cost of doing so will only increase.

An analogy might be drawn between these issues and the problems incurred by deferred maintenance of our infrastructure. The tragic collapse of the Mianus River Bridge on I-95 in 1983 was ultimately found to be caused by the failure to provide routine maintenance. The expense associated with annual maintenance was deferred for budget-balancing purposes, but in the end the cost was many times greater than the "savings" realized by deferred maintenance. Although it is *highly unlikely* that the state economy will collapse in such a dramatic fashion as a result of deferred economic development and social maintenance, it is *highly likely* that deferring investments and maintenance in these critical areas will cost the state many times more in the long run.

1. Population Shifts

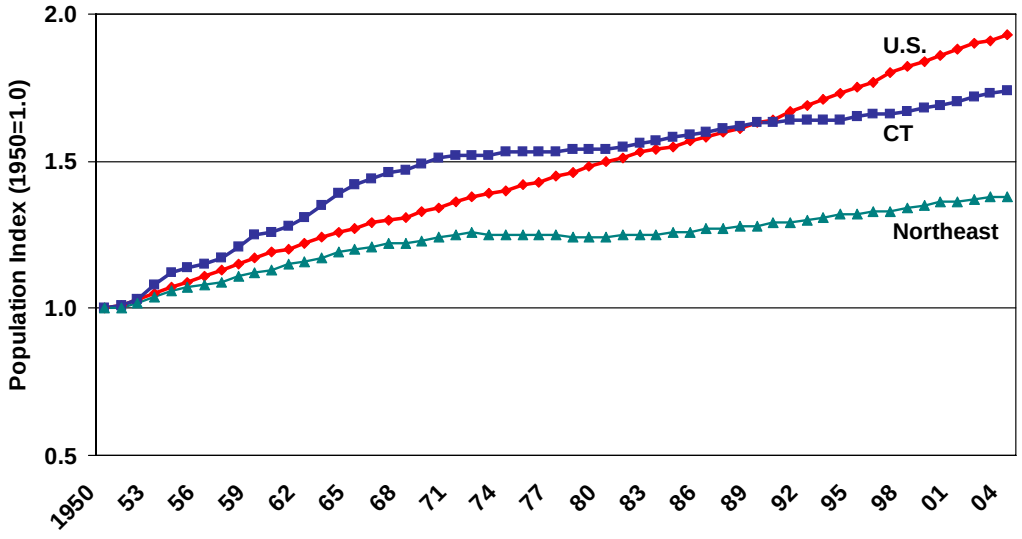
Like many other states in the Northeast, Connecticut's population is older and growing more slowly when compared to the rest of the country. With a median age of 38.5 years, Connecticut was the eighth oldest state in the nation in 2003, according to the U.S. Census Bureau. With the exceptions of Florida, Wyoming and Montana, seven of the 10 oldest states in the country are in the Northeast. In 2003, Maine was the oldest, with a median age of 40.2 years.

Between 1990 and 2000 Connecticut ranked 47th in terms of population growth—3.4 percent vs. 13.1 percent nationally. Again, seven of the 10 slowest growing states were in the northeastern region of the country.

Of particular concern is the shrinking 18-34-year age group during the 1990s. Connecticut had the greatest relative loss of any state, with a 23 percent decline, or more than 200,000 fewer people in this age bracket at the end of the decade. Population loss in this age group has significant implications for labor force growth and new household formation. These shifts suggest that business will find it increasingly difficult to find sufficient workers to meet their needs—effectively dampening economic growth and development in this region of the country.

The changes noted between 1990 and 2000 are symptomatic of changes that have been occurring over the past few decades, as the figure below illustrates. Population growth in the Northeast and in Connecticut has been lagging the U.S. since the late 1960s.

Index of Population Growth, 1950-2004



Source: U.S. Bureau of Economic Analysis; Calculations by CERC

Although the differences in annual population growth rates between the region and the country may be only a percentage point or so, over time the cumulative impact of these

differences has become quite pronounced with the result that this region of the country has achieved less than 40 percent of the U.S. growth.

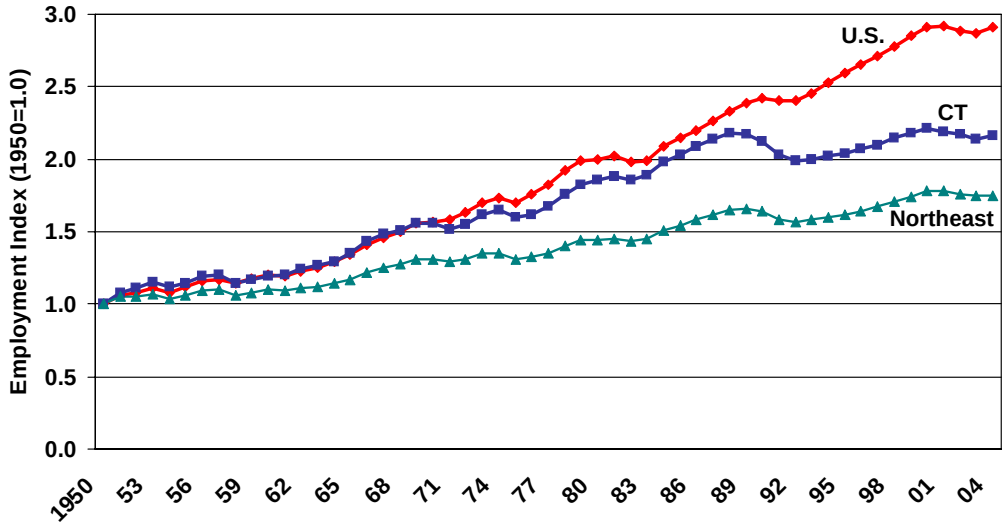
2. Declining Influence

As a consequence of these long-term differences in population growth rates, the northeastern part of the country carries less weight in the U.S. House of Representatives than it has historically. For example, in 1950 the nine northeastern states, with a combined 115 representatives, accounted for 26 percent of the House. In 2000, these same states now have a total of 83 representatives representing 19 percent of the House total. Given the regional differences in population growth rates, it is almost a certainty that this region of the country will continue to lose congressional seats over the next couple of decades.

3. Slow Job Growth

As with population, job growth in the northeastern part of the country has been lagging the U.S for the past few decades, as the figure below shows.

Index of Employment Growth, 1950-2004



Source: U.S. Bureau of Labor Statistics; Calculations by CERC

For reasons that are not clear, job growth in this area of the country began lagging the U.S. in the late 1960s, and the differences have widened over time. The Connecticut job growth rate is slightly better than the overall Northeast rate, but clearly much closer to

the Northeast than the national growth path. On average, the Northeast added two jobs for every three that the U.S. added over the past half-century.

In and of itself, slower growth in an older, more mature economy is not necessarily bad, as long as forward momentum is maintained. The fundamental problem in Connecticut is that there has been no job growth for the past 15 years or so. While there have been changes in the type and quality of available jobs, overall the net number of jobs has not increased. The Connecticut jobs machine is in neutral as the data in the chart below show. During the most recent 15-year period (1989 to 2004), Connecticut was the only state in New England not to add any jobs—an unfortunate distinction that presents a significant challenge to state policy-makers.

Average Annual Employment Growth (Total non-agriculture, NSA)

	1947 to 1959	1959 to 1974	1974 to 1989	1989 to 2004
U.S.	1.63	2.60	2.16	1.32
New England	0.75	1.87	2.10	0.29
Connecticut	1.25	2.31	1.86	-0.06
Massachusetts	0.71	1.51	1.87	0.15
Rhode Island	-0.31	1.65	1.55	0.37
Maine	0.33	1.88	2.74	0.84
New Hampshire	1.18	2.88	3.85	1.13
Vermont	0.68	2.81	3.22	0.98

Source: U.S. Bureau of Labor Statistics; Calculations by CERC

There are no easily identifiable reasons why Connecticut has performed so poorly relative to neighboring states. Until the root causes of this slow/no growth trend are identified, policy-makers will be hard-pressed to craft effective programs and policies to accelerate job creation.

The employment situation in the state has clearly worsened over the past few years. From certain perspectives (especially in comparison to the 1989-1992 recession) this latest business downturn was both shallow and short as dated by the National Bureau of Economic Research; however, from an employment perspective it is a different story. Connecticut began losing jobs several months before the official onset of the recession and continued losing jobs for almost three years after the recession ended. Since September 2003, the turning point in the employment cycle, Connecticut has gained

back about one-half of all jobs lost since July 2000. In other words, in a five-year period, the state has recovered only about one of every two jobs lost. At the current rate of job growth it will be 2007 or 2008 before the state fully recovers the 60,000 jobs lost in this downturn. This pattern is generally true for the balance of New England as well.

These job growth statistics raise a fundamental question: Can there be economic development without economic growth?

4. Other Structural Changes

In addition to the changes noted above, other long-term structural forces at work in the Northeast and in Connecticut are gradually reshaping the state's economy. These include the shift from a manufacturing to a service economy, productivity growth, and globalization.

Manufacturing to Services

Changes in the industrial composition of the regional and state economies have had an impact on job growth. Over the past half-century there has been a fundamental shift from a manufacturing-based economy to one that is now dominated primarily by service sector jobs, and the impacts in Connecticut have been pronounced.

The decline in manufacturing jobs in the state dates back to 1984, which was the last peak in the employment cycle. Since that point Connecticut has lost more than half of its manufacturing jobs in a fairly linear trend—one without any obvious sign of business cycles. Although there were brief periods during the late 1990s when manufacturing job losses took a bit of a breather, the long-term trend is clearly down.

In addition to the direct and indirect effects that these manufacturing losses are having on the state economy, one should not lose sight of the pivotal role the industrial sector has played in Connecticut's technology growth and competitiveness over the long term. According to the U.S. Department of Labor, the technology sector is made up of industries identified on the basis of both the concentration of scientific and technical personnel as well as the level of research and development expenditures. Of these technology industries, most are found in manufacturing—a somewhat surprising figure

for many perhaps, but understandable in light of the contributions made by the industrial sector in the area of innovation.

Innovation and technology are central themes in the knowledge economy. The most competitive regions, nationally and globally, are those distinguished by high rates of innovation and technical strengths. Innovation is often measured in terms of new patents per capita, an area in which Connecticut excels—consistently ranking in the top five among all states. And in Connecticut, manufacturing accounts for almost two of every three new patents awarded—strong testimony indeed to the link between innovation and the industrial sector.

Given the critical role of manufacturing in the nation's and the state's technical preeminence, one must be concerned about our long-term competitiveness. Can Connecticut or even the U.S. continue to maintain a technological leadership position with a manufacturing sector that is in long-term decline?

Productivity Increases: A Two-Edged Sword

The loss of manufacturing jobs is mitigated somewhat by the fact that real manufacturing output has increased almost three-fold in the same period that has seen the greatest job losses. The story of increased output and a declining manufacturing job base is one of productivity growth: firms are producing more goods with fewer workers. Although productivity growth is essential to the success of any business and to overall regional competitiveness, it can be accompanied by significant costs in terms of lost jobs and declining regional economies.

Globalization

Even though there are benefits to globalization, many people are frustrated with the globalization process, particularly with the economic aspects.[1] In the U.S., local workers, particularly in manufacturing industries, have seen their previously well-paid and stable jobs leave for factories built in low-cost areas. Companies want to take advantage of low-cost labor, but many workers are left with few opportunities for jobs at similar pay.

[1] Joseph Stiglitz, *Globalization and its Discontents*, page 10.

5. Urban-Suburban Disparities

Connecticut, the most affluent state in the most affluent country in the world, is also home to three of the nation's poorest cities: Hartford, Bridgeport and New Haven. These three cities, together with Waterbury and New Britain, represent just 16.5 percent of the state's population but account for 44.5 percent of individuals in poverty. The poverty and income situation in the poorest towns has deteriorated over the past decade or more, and the gap between Connecticut's most affluent and least affluent communities is steadily widening. For example, there is as much as a five-fold difference in average family income between the top five and bottom five towns. The median family income of the least affluent communities is similar to Mississippi and West Virginia, the states with the lowest median family incomes.

The differences are even more pronounced with regard to educational test scores. In grade four there is a three-fold difference between the most-affluent and the least-affluent communities in the percent of students meeting goal on the Connecticut Mastery Test. By grade 10 the gap has grown such that there is more than a five-fold difference in the percent of students meeting goal, 56.9 percent versus 10.5 percent. The story is similar with respect to SAT scores where the affluent communities, on average, score more than 50 percent higher than the bottom 10 communities. The unweighted average of the five poorest communities in Connecticut is more than 150 points lower than the worst-performing state in the country, Georgia, with an average SAT of 984. With educational performance like this, it is hard to imagine how residents in these communities at the bottom can successfully participate in the old economy, never mind the new economy.

While there has been some limited progress on a few fronts (e.g., declining teen pregnancy rates) the fact remains that most of Connecticut's older, industrial cities continue to face numerous impediments to growth and prosperity. The state will find it difficult to remain competitive with disadvantaged and low-skilled urban youth constituting a significant proportion of its future labor force. In addition, Connecticut's reliance on property taxes to fund local education and other services tends to exacerbate the disparity between the urban centers and suburban municipalities.

The Importance of Innovation

In a fundamental sense, all economic growth, even the growth directly caused by capital accumulation, can ultimately be attributed to technological change[2].

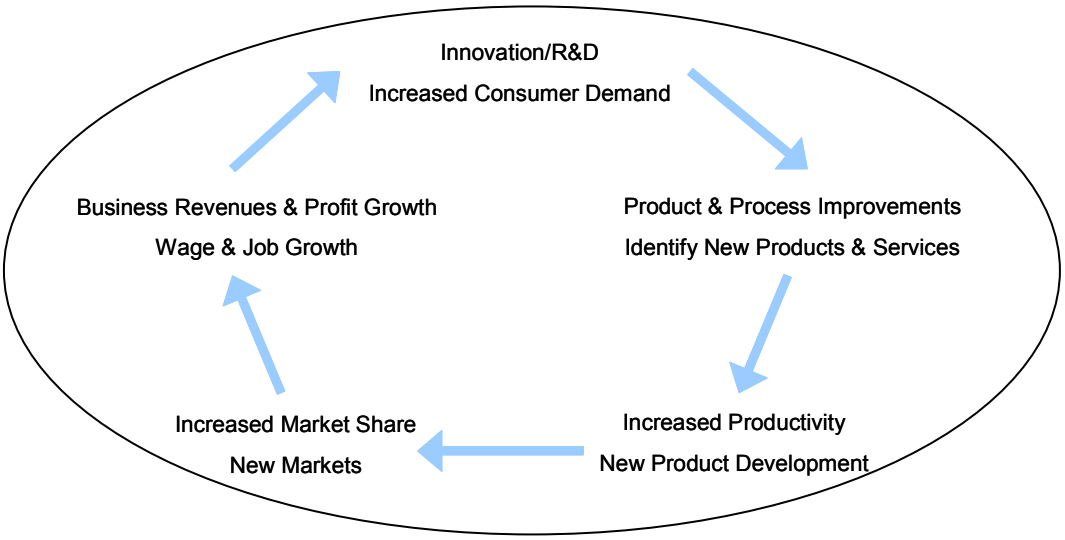
Innovation, most economists agree, is an essential element in national and regional economic growth and prosperity. A look back at the first and second Industrial Revolutions (1760-1830 and 1870-1914), periods of significant economic expansion, reveals that significant innovations in power generation, mass production, transportation and other technologies provided the catalysts that drove each of these historic periods. Technological developments, both large and small, have also been the catalysts for the most recent economic expansion of the 1990s.

Connecticut's rich and varied economic history is evidence of its concentration of innovation and Yankee ingenuity. From the first insurance company to the cotton gin to the helicopter to the atomic submarine, our history is one based on innovation, technology and new product development. These innovations have formed the basis for our legacy industries, financial services and manufacturing, which have formed the foundation of our growth and prosperity. Even though these legacy industries remain the bedrock of our economy, they are not necessarily the engines of growth that they once were. That is to say, they are not *industry drivers,* those industries that represent the *new or emerging* sources of job creation, wealth formation and market expansion that will propel the rest of the economy over the next few decades.

Over time, successful legacy industries will evolve and change to become more technologically sophisticated in their products and processes. This is necessary simply to remain in business. Today's emerging industries may become the state's legacy industries over time.

[2] *Science, Growth and Public Policy*, Richard R. Nelson and Paul M. Romer, "Technology, R&D and the Economy," Bruce L. R. Smith & Claude E, Barfield, eds.

The contributions of innovation, technology and knowledge can be illustrated by a circle.



While it does not do justice to the complexities and nuances of technological growth and innovation, this circular diagram presents a straightforward conceptual model of the innovation process from both the consumer/worker and business perspectives. At the top of the circle we see that public and private research and development (R&D) investments in basic and applied research will frequently lead to the development of new products, processes and services. These, in turn, can result in productivity improvements for business and new product development for both business and consumers. Productivity growth reduces business costs, thereby increasing market competitiveness, which in turn enables businesses to maintain or increase market share. Improved productivity also allows businesses to increase worker wages without increasing their market prices (both workers and business benefit from productivity growth).

New product development opens up new consumer and business product markets. In addition, productivity growth generally increases business revenues and profit growth, which theoretically frees up more capital for R&D investments. Growth in worker wages stimulates increased consumer demand for newer or improved products.

It is important to note that improvements in technology and innovation benefit not only business, but also workers and consumers in general. The business and consumer forces in our simple model are completely intertwined and interdependent. Business

relies on a skilled and productive work force to develop and implement advances arising from innovation, while workers need wages sufficient to have a comfortable lifestyle and create demand for new and improved products. This is a symbiotic relationship in which the success of one component is necessary for the success of the other.

Clearly, supporting technology innovation must be one of the key components of Connecticut's comprehensive economic development strategy.

In Conclusion: The Time to Act is Now

Connecticut has enjoyed more than two centuries of economic prosperity and leadership, and it still possesses many of the attributes that fueled that prosperity. But it is losing ground. Other states are outpacing Connecticut in areas that have been its traditional strengths. If we merely stand in place and hope for the best, they will almost certainly surpass us. And if they do, we may never recover. Now, while the state is still strong, is the time to take action to enhance our strengths, reduce our vulnerabilities and shape a more promising future for the people of our state.

Assessing Connecticut's Technology Industry

The vitality of a state's technology industry is linked to its ability to compete successfully in the knowledge economy. Connecticut is experiencing employment declines in its technology industry.

Technology applies knowledge and tools to create efficient processes and innovative products that improve the quality of life. It is thanks to technology that we have better communications equipment, powerful vaccines, faster travel options, stronger buildings and more. These advances have improved the human condition and spurred further research and innovations.

The first step in analyzing Connecticut's technology industries is to develop an operational definition so that data can be gathered. There is no standard or official definition of technology industries. The broadest definition of technology encompasses virtually every North American Industry Classification System code (NAICS), because every industry either produces technology or uses it to improve processes or products. In order to have a useful industry definition for this report, we reviewed a variety of published lists. A detailed comparison of these NAICS industry definitions, including the industry definition used for this report, are found in Appendix A. There is overlap among these definitions because most of the selected industries are within the manufacturing or information sectors.

Connecticut's Technology Base: A Closer Look

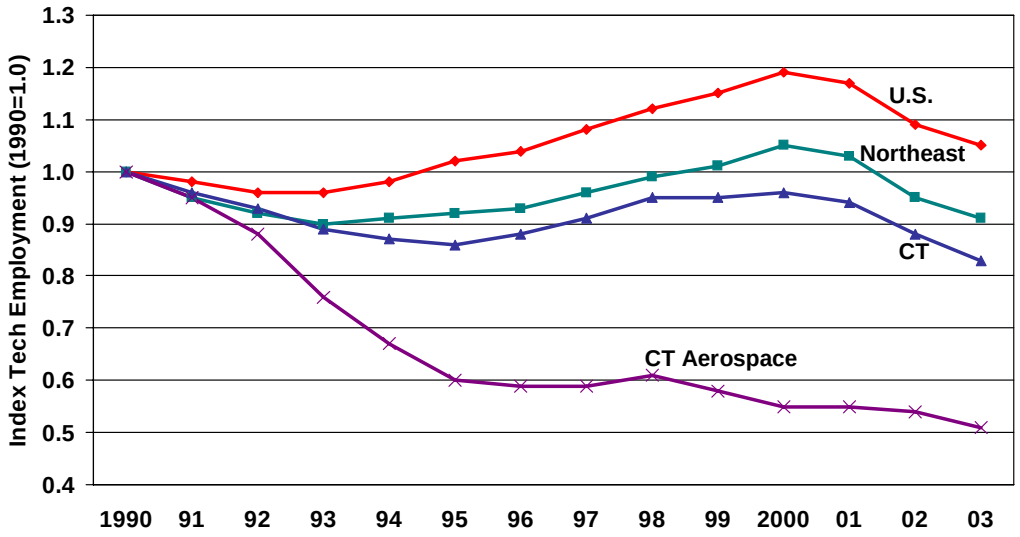
Technology industries contribute significantly to Connecticut's economy, providing more than 16 percent of the state's 2003 nonfarm employment. However, this sector saw steep employment declines between 1990 and 2003 while the nontechnology sector grew slightly. Since 2000, Connecticut's total private employment has lost all of the gains made since 1990, and is currently at an employment level that is lower than the base year more than one decade ago (Figure T(ech)1). Much of the decline in employment is due to aerospace, which lost more than 29,000 jobs between 1990 and 2003.

Figure T1: Connecticut Private Employment Change, 1990-2003

Private Employment Type	Private Employment (1000s)			1990-2003	
	1990	2000	2003	Abs Change (1000s)	% Change
Technology	273.3	262.3	227.6	-45.7	-16.7%
Aerospace (NAICS 3364)	59.6	32.5	30.3	-29.3	-49.2%
Non-Technology	1,164.0	1,208.8	1,188.6	24.6	2.1%
Total Nonfarm	1,437.2	1,471.1	1,416.1	-21.1	-1.5%

Source: Economy.com; Calculations by CERC

Figure T2: Index of Technology Employment Change, 1990-2003



Source: Economy.com; Calculations by CERC

At the U.S. level technology industries' employment grew 5 percent between 1990 and 2003, but declined sharply (lost more than half of its 1990-2000 growth) since it peaked in 2000, as seen in Figure T2. The Northeast and Connecticut fared more poorly. The region has lost nine percent of its employment since 1990, and the state declined by 17 percent.

The trend in technology employment follows a cyclical pattern similar to total employment growth. However, in the three geographies compared, nontechnology and total nonfarm employment fared better. In the U.S., total employment growth was quite strong between 1990 and 2003, as shown in Figure T3. In the Northeast, it grew by almost 6 percent while technology employment faltered. And in Connecticut, total employment dipped slightly while the technology sector took a bigger hit.

Figure T3: Technology vs. Non-Technology Employment: Similar Trends, but Non-Tech Fares Better

Geography	Employment Type	Private Employment		Abs Change 1990-2003	% Change 1990-2003
		1990	2003		
CT	Technology	273,253	227,569	-45,684	-16.7%
CT	Non-Technology	1,163,979	1,188,557	24,578	2.1%
CT	Total Nonfarm	1,437,232	1,416,126	-21,106	-1.5%
Northeast	Technology	3,171,209	2,877,453	-293,756	-9.3%
Northeast	Non-Technology	16,957,686	18,430,104	1,472,417	8.7%
Northeast	Total Nonfarm	20,128,896	21,307,557	1,178,661	5.9%
U.S.	Technology	14,006,450	14,722,620	716,170	5.1%
U.S.	Non-Technology	77,749,620	94,344,710	16,595,090	21.3%
U.S.	Total Nonfarm	91,756,070	109,067,330	17,311,260	18.9%

Source: Economy.com; Calculations by CERC

Now, let us focus on how technology employment in each region has performed since 1990. Figure T4 shows employment levels for each of the regions in 1990 and 2003. Then the technology employment change is broken down into three parts, according to the shift-share method, an industry segmentation analysis of all the 3-digit NAICS industries in the regions compared to the nation's industries. The steps of the shift-share analysis include:

1. National Growth: Estimates the technology employment change due to the overall national trend for employment between 1990 and 2003
2. Industry Mix: Estimates the technology employment change due to changes in the national industry profile
3. Competitive Share: Estimates the technology employment change due to specific regional factors

The shift-share method is useful because it identifies whether a region is growing due to national trends or because it has a competitive edge over the others.

While the results of all three steps of the shift-share analysis are interesting, the results pertaining to national growth and industry mix show employment changes that have taken place because of overall national trends. The results of the competitive share portion of the analysis shows differences in regions due to specific factors in those areas.

The Northeast and Midwest have negative competitive shares. That is, the regions are not keeping pace with national trends. Appendix B has the detail for all of the states. One interesting finding from the appendix is that of all the states in the Northeast, the best ranking is Maine, which comes in 30th. So the decrease in technology employment in Connecticut is part of a larger regional trend.

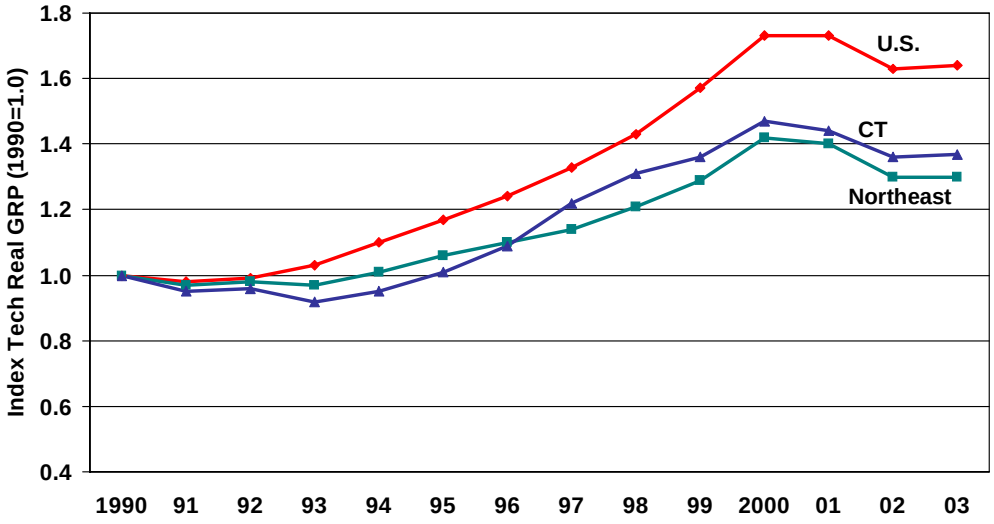
Figure T4: Shift Share Analysis, Technology Industries by Region

State	Tech Emp (1000s)		National	Industry	Competitive
	1990	2003	Growth	Mix	Share
Northeast	3,171.2	2,877.5	598.3	-436.2	-455.9
South	3,905.1	4,649.5	736.8	-537.1	544.7
Midwest	3,775.3	3,724.8	712.3	-519.2	-243.5
West	3,085.0	3,384.4	582.0	-424.3	141.7

Source: Economy.com; Calculations by CERC

However, in terms of real gross regional product (GRP), all of the regions have seen increases since 1990 (Figure T5). Connecticut's real GRP has climbed almost 40 percent since 1990, even with a bit of a cooling off since 2000.

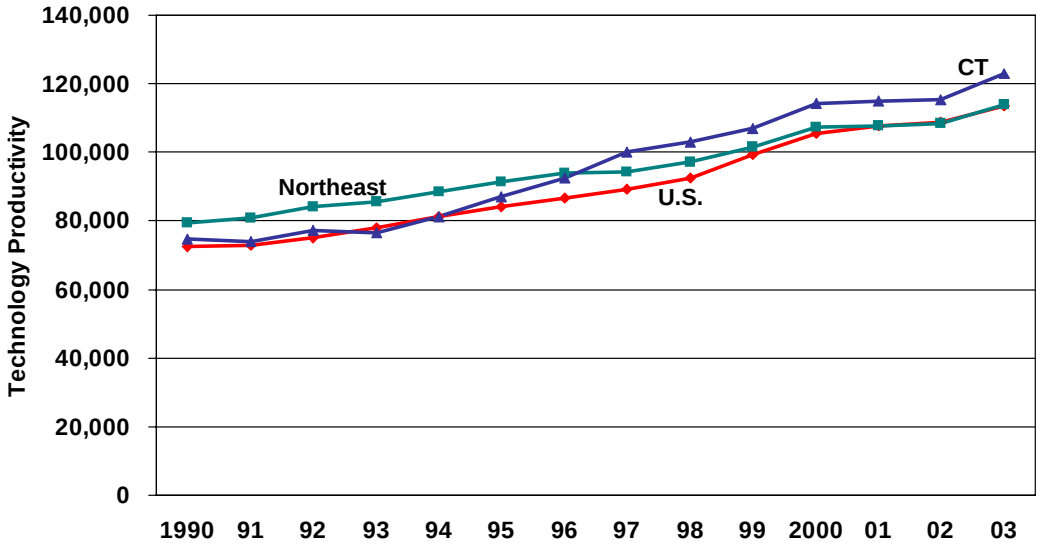
Figure T5: Technology GRP Gains Are the Norm, 1990-2003



Source: Economy.com; Calculations by CERC

Even though technology employment has decreased since 1990 in Connecticut, its productivity (GRP per worker) level increased 65 percent to almost $123,000 in 2003 because GRP has increased substantially, as seen in Figure T6. Connecticut's productivity level since 1997 has surpassed both the Northeast and the U.S. This is true of the manufacturing sector as a whole, which makes up a substantial portion of this technology industry definition.

Figure T6: Technology Productivity, 1990-2003



Source: Economy.com; Calculations by CERC

Figure T7 shows the 10 Connecticut technology industries with the largest employment levels in 2003. Aerospace is the clear front-runner, representing 13 percent (30,300 workers) of the technology employment in the state. The next three industries are all within the Professional, Scientific and Technical Services sector (Computer Systems, Architectural and Engineering, and Management Services) and contribute an additional 18 percent to the state's technology employment. The top 10 industries contain almost 122,000 technology jobs, which is more than half of the technology employment in Connecticut. These same industries in the U.S. make up 44 percent of its technology employment.

Figure T7: Top Ten CT Technology Industries with Largest Employment Levels, 2003

NAICS	Industry Description	Employment (1000s)	
		2003 CT	2003 U.S.
	Technology Employment	227.6	14,722.6
3364	Aerospace Product & Parts Mfg	30.3	422.8
5415	Computer Systems Design & Related Services	18.2	1,100.1
5413	Architectural, Engineering & Related Services	12.2	1,224.1
5416	Management, Scientific & Technical Consulting Services	11.0	763.9
3363	Motor Vehicle Parts Mfg	9.6	736.8
5111	Newspaper, Periodical, Book & Directory Publishers	9.6	674.8
3254	Pharmaceutical & Medicine Mfg	9.1	282.1
5418	Advertising & Related Services	7.8	433.8
3329	Other Fabricated Metal Product Mfg	7.6	265.4
5171	Wired Telecommunications Carriers	6.6	554.6

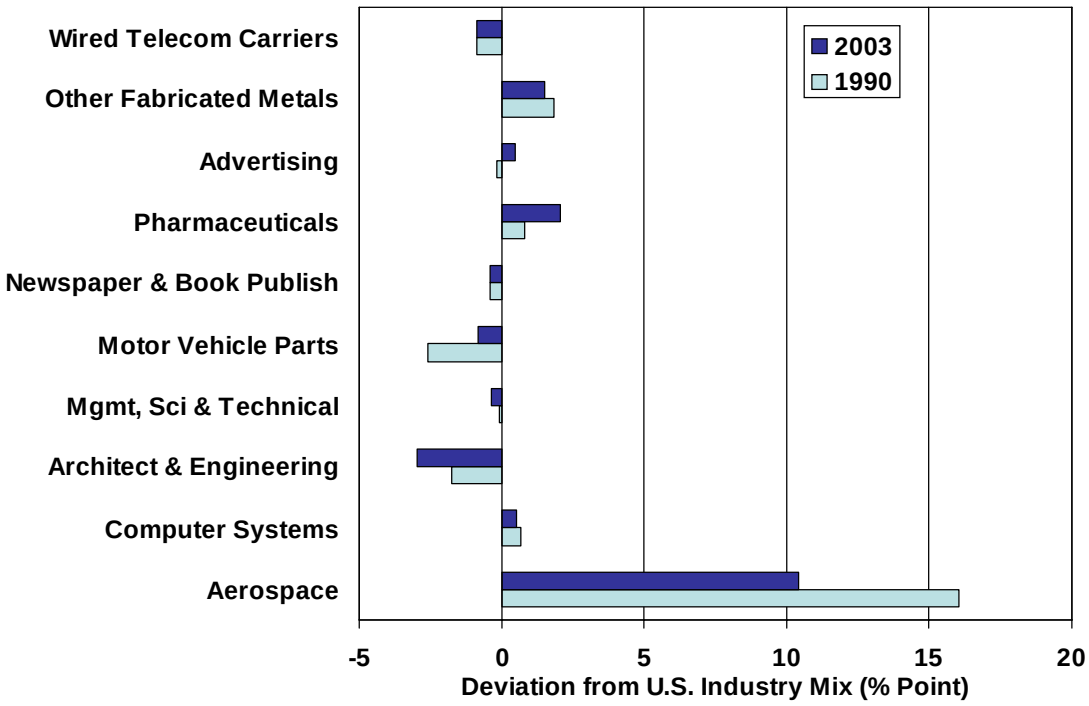
Source: Economy.com

How does Connecticut's industry profile compare to the national pattern? Figure T8 shows the 10 largest industries in Connecticut in 2003, and how the state's industries' shares of total technology employment differ from the U.S. industries' shares of total technology employment.

Aerospace is the dominant technology industry in Connecticut, and its share of technology employment is more than 10 percentage points above the nation's share of employment in this industry. This difference has decreased over time. In 1990, Connecticut's Aerospace employment share was 16 percentage points above the U.S. share.

Pharmaceuticals has the second largest relative employment concentration in the state. In 1990, employment in Pharmaceuticals roughly mirrored the U.S. employment share, but by 2003, pharmaceuticals had an employment share that was more than two percentage points above the nation's share of employment in this industry.

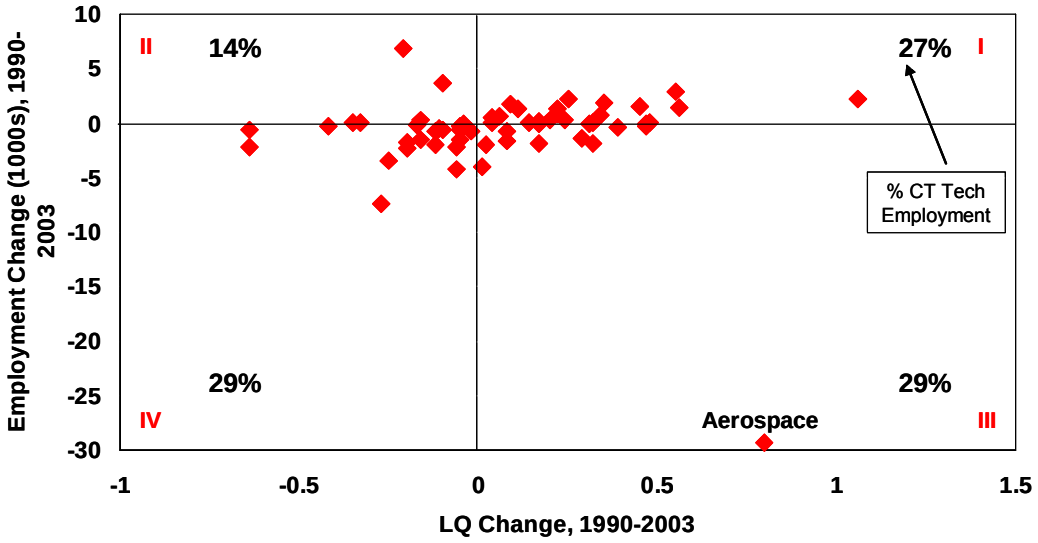
Figure T8: Connecticut 10 Largest Technology Industries & Deviations from U.S. Industry Mix



Source: Economy.com; Calculations by CERC

Each point in Figure T9 represents a technology industry and shows changes in employment and location quotient (LQ) (relative concentration) between 1990 and 2003. Twenty-one of the technology industries, representing 27 percent of technology employment, experienced employment and LQ growth during the 1990s in Connecticut. However, industries representing 29 percent of technology employment saw both employment and relative concentration decreases during the past decade.

Figure T9: Twenty-One of the 61 Tech Industries Saw Employment and LQ Growth During the 1990s



Source: Economy.com; Calculations by CERC

In summary, this sector has seen steep employment declines between 1990 and 2003 while the nontechnology sector has grown. Since 2000, Connecticut's total private employment has lost all of the gains made since 1990 and is currently at an employment level that is lower than the base year more than one decade ago. However, since the sector has seen GRP gains, productivity levels are also elevated.

Aerospace is the largest technology industry in Connecticut, employing more than 30,000 people in the state. However, this industry has seen its workforce decrease by about 50 percent since 1990.

Benchmarks Overview and Structure

Two principles guided this analysis. The first was to select only those indicators that reflect the technology and innovation economy, leaving more traditional indicators for those groups already reporting them. The second was to work with a limited number of indicators—be selective rather than inclusive—to respect the time of the audience.

In defining the data categories, the goal was to combine variables into logical groupings that focused on one aspect reflective of the innovation economy. Five categories were identified that provided the best framework for measuring key attributes among states:

- Technology (six indicators)
- Financing (five indicators)
- Entrepreneurial and Business Vitality (nine indicators)
- Human Capital (seven indicators)
- Global Links (eight indicators)

Altogether there are 35 indicators grouped into the five categories. For each indicator, two separate scores are calculated: one highlights each state's average annual growth, while the other focuses on the current level or concentration. In total there are 70 scores for each state, reflecting 35 measures of a state's level or concentration and 35 measures of growth. Additional information about the scoring method is in Appendix D.

The following sections of the report provide overviews and detailed analyses for each of the five categories, along with how Connecticut is performing relative to the other states. Each category starts with a statement about Connecticut's performance in the category, why the category is important, a list of variables and a detailed overview. Then, there are detailed analyses for each variable, including two charts highlighting Connecticut's standing relative to the other states in terms of concentration and growth. The red horizontal line on each of the graphs indicates the national average.

A number of additional issues are recognized as critical in today's economy, but data constraints do not allow some of them to be quantified within the structure of this report. In order to touch upon these issues, you will notice quotes and "spotlights" throughout the variable analyses, which are meant to stimulate further discussions among business leaders and policy-makers.

Technology Benchmarks

Connecticut's Standing

From a concentration standpoint, Connecticut is exceptionally strong in this critically important measure. But most states are outpacing Connecticut in key measures of technology growth.

Why It's Important

Technology fuels economic growth and prosperity. Technological developments were the catalysts of the Industrial Revolution, and they are critical to competing in today's global economy. Some economists estimate that one-quarter to one-half of productivity growth over the past few centuries can be attributed to technology and innovation.

Technology is an integral part of life and work today. Businesses utilize technology to streamline production processes and develop new products and services. Researchers make discoveries such as pharmaceuticals and nanotechnologies that improve the quality of life for many. Workers employ a variety of technological tools for communications and data processing. And many households use technology for communications and entertainment. Even children are sophisticated users of technology, since it is quite common to have computers both at school and home. The variables in this category include:

- **Worker productivity in technology industries**
  Technology output per worker
- **Output (value added) from technology industries**
  Technology share of gross state product
- **Employment in technology industries**
  Technology share of total nonfarm employment
- **High-speed lines**
  ADSL, wireline, fiber, satellite and fixed wireless lines per 1 million people
- **Computers in households**
  Percent of households with computers
- **Internet access in households**
  Percent of households with Internet access

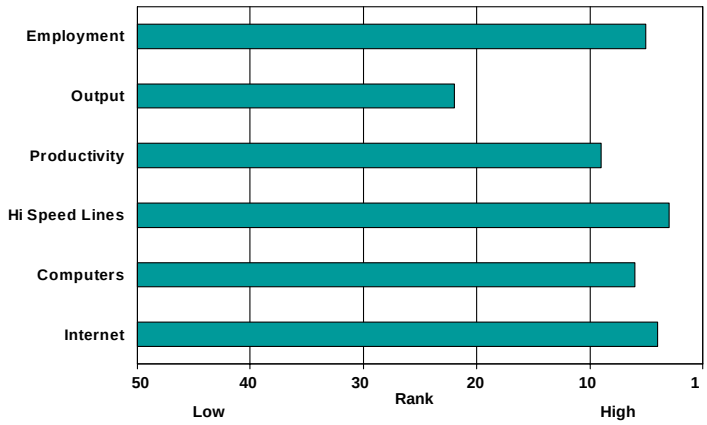
Detailed Overview

This section looks at the extent to which technology is being integrated into households, as well as the growth of technology industries. Even though it can be argued that all industries use technologies in some way, the list of industries has been narrowed down for the analysis. In 1999, the U.S. Bureau of Labor Statistics (BLS) identified 32 high-technology industries based on high levels of scientific and technical occupational employment, and research and development. This BLS definition is based on the Standard Industrial Classification (SIC) system, which has now been replaced by the North American Industry Classification System (NAICS). Since a revised BLS definition for the NAICS industries was not available for this analysis, CERC created a technology definition of 61 four-digit NAICS industries, which bridges between the SIC and NAICS systems and includes industries in the newly defined NAICS Information sector.

Technology industries in the U.S. saw overall employment growth of 5 percent between 1990 and 2003. But Connecticut has not fared as well. The state's technology employment decreased by 17 percent in the same period. Much of the decline in employment was in Aerospace. The nation lost 384,000 Aerospace jobs between 1990 and 2003, while Connecticut lost 29,000. However, even excluding Aerospace, the overall trend for technology employment in Connecticut, the Northeast and the U.S. since 2000 is down. Even though technology employment has decreased since 1990 in Connecticut, its productivity (gross state product per worker) level increased 65 percent to almost $123,000 in 2003. Connecticut's productivity level since 1997 has surpassed both the Northeast and the U.S.

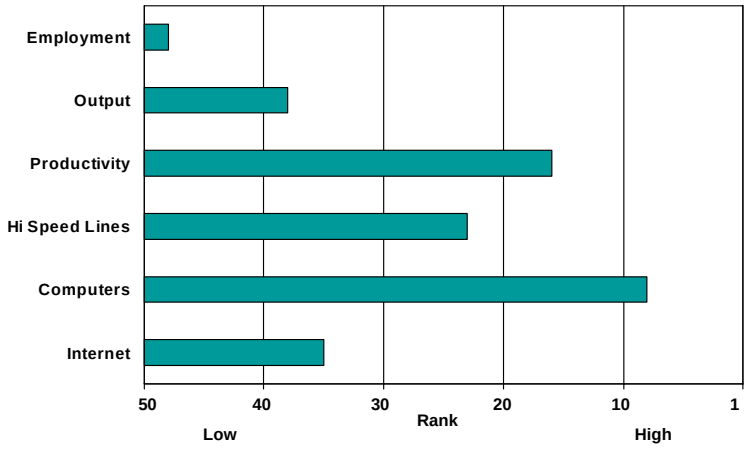
Connecticut's overall performance in technology concentration, or level, is excellent. The state ranked 2nd among all states on its composite technology concentration score. The state's performance in each of these indicators was uniformly strong, as illustrated by the chart below. The data show that Connecticut has a strong high-technology foundation to build on and a greater potential than other states to be globally connected.

Connecticut's Technology Competitiveness: Concentration



The growth dimension of this category shows mixed results. Connecticut ranked 36th among the states based on its composite growth score. Some indicators posted very strong growth while others were noticeably weak. As with other indicators of growth throughout this report, the older industrial states in the Northeast tend to grow more slowly than other regions of the country. Despite the pronounced regional influence, Connecticut's policy-makers and leaders can and should explore options for stimulating growth in this area. The areas with the strongest growth may be the most important. Productivity is a key to economic competitiveness, while infrastructure elements such as high-speed lines and households with computers suggest the state is well positioned to support future growth.

Connecticut's Technology Competitiveness: Growth



Worker productivity in technology industries

Technology output per worker

Source: Economy.com

Productivity is the single most important indicator of a state's economic competitiveness. Higher productivity enables employers to pay higher wages while simultaneously increasing company profits. Higher company profits translate into potentially greater expenditures on research and development. Increased R&D, in turn, generates more innovation.

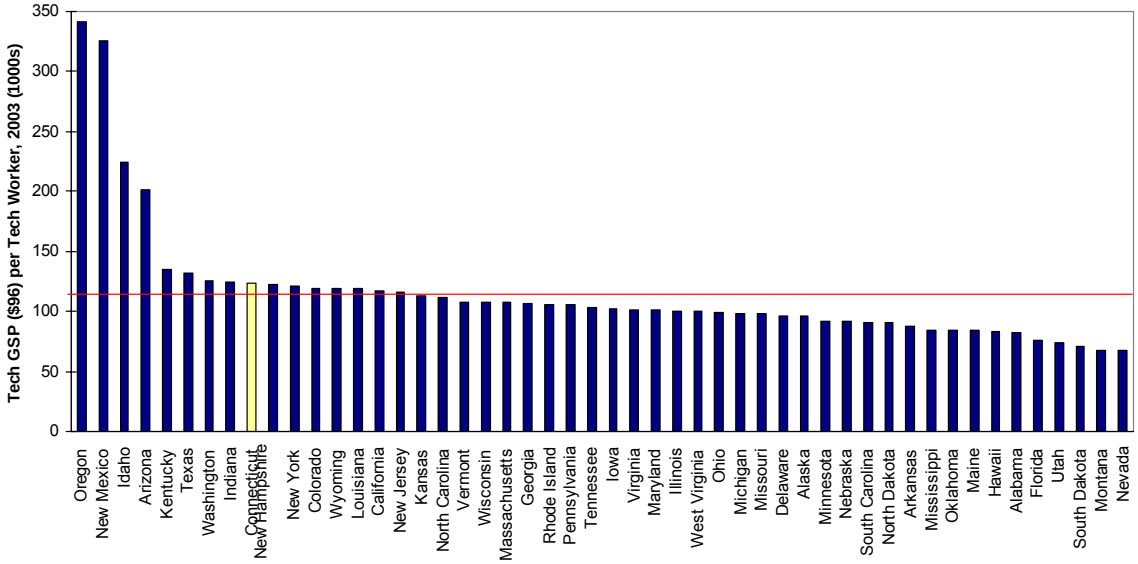
Connecticut's technology productivity is the 9th highest in the nation, at almost $123,000. But the top four states outshine the rest. Oregon, New Mexico, Idaho and Arizona all saw tremendous gains in productivity in the same industry: Semiconductor and Other Electronic Component Manufacturing (NAICS 3344). Semiconductor manufacturing happens to be a dominant industry in the technology economies of these states, so the productivity growth made these states stand out from the rest of the pack.

In terms of average annual growth through the 1990s, Connecticut's technology productivity outpaces the nation at just under 4 percent per year, but the four Western states once again rise to the top of the list.

Other countries are adopting and utilizing technology to enhance their economic growth and competitiveness … a host of countries are catching up to the United States. [1]

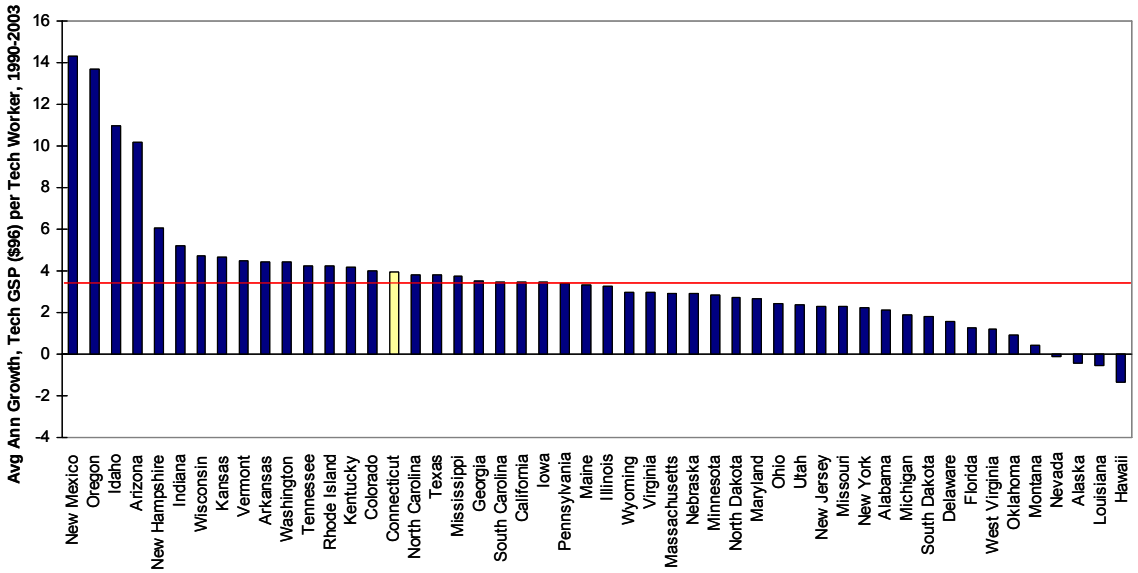
[1] American Electronics Association, *Losing the Competitive Advantage? The Challenge for Science and Technology in the United States*, February 2005, page 4.

Connecticut's technology productivity is the 9th highest in the nation, but the top four states outshine the rest.



Source: Economy.com; Calculations by CERC

Connecticut's technology productivity growth rate outpaces the nation.



Source: Economy.com; Calculations by CERC

Output (value added) from technology industries

Technology share of gross state product

Source: Economy.com

Technology's contribution to total state output reflects the extent to which a state has integrated this sector into the economy.

Connecticut has a slightly higher concentration of technology-related value added than the U.S. (18.9 percent versus 18.5 percent), but the top four Western states (Oregon, New Mexico, Idaho and Arizona) are clearly the front-runners.

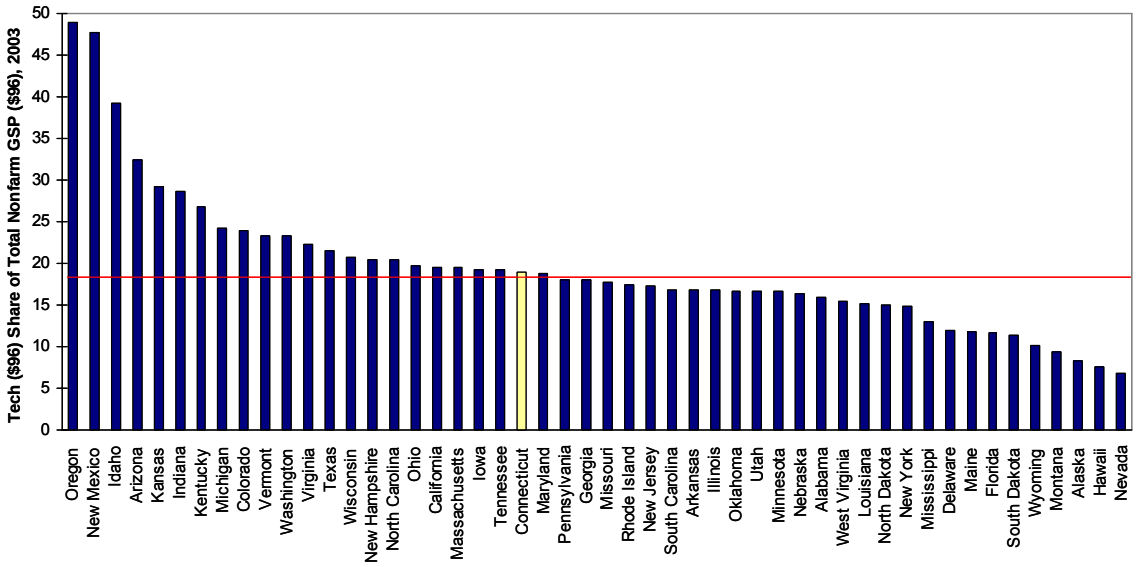
In terms of average annual growth, Connecticut's technology-related value added is positive but lagging behind many states and the nation. Again, the four Western states have seen tremendous growth due to the Semiconductors industry.

SPOTLIGHT: U.S. & Asian Output Growth

According to a paper from the Task Force on the Future of American Innovation, U.S. high-tech output doubled between 1989 and 2001 from $423 billion to $940 billion, while China's high-tech output increased more than eight times, from $30 billion to $257 billion. The definition of high-tech in this paper includes aerospace, computers and office machinery; communications equipment; pharmaceuticals; and medical, precision and optical instruments. [2] If this trend continues, China will catch up and surpass the U.S. in terms of high-tech output within the next decade.

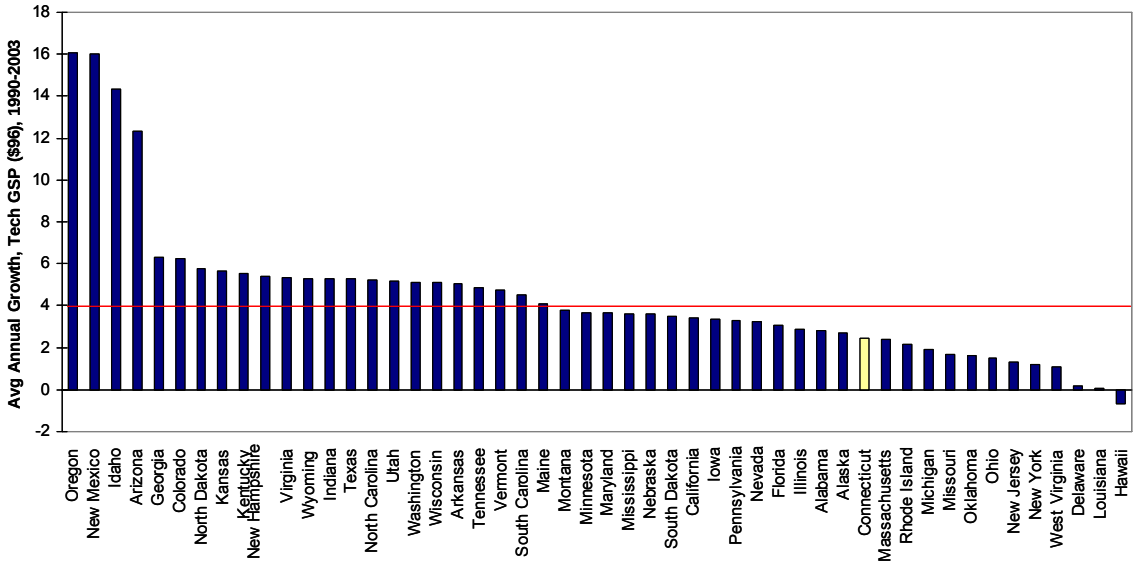
[2] Task Force on the Future of American Innovation, *The Knowledge Economy: Is the United States Losing Its Competitive Edge?* February 16, 2005, page 12, www.futureofinnovation.org

Connecticut has a higher concentration of technology-related value added than the U.S. average but the top four western states are clearly the frontrunners.



Source: Economy.com; Calculations by CERC

Growth in Connecticut's technology-related value added is positive but lagging behind many states and the nation.



Source: Economy.com; Calculations by CERC

Employment in technology industries

Technology share of total nonfarm employment

Source: Economy.com

The concentration of technology employment measures the relative strength of that sector in a given state. A high concentration suggests that certain competitive advantages exist.

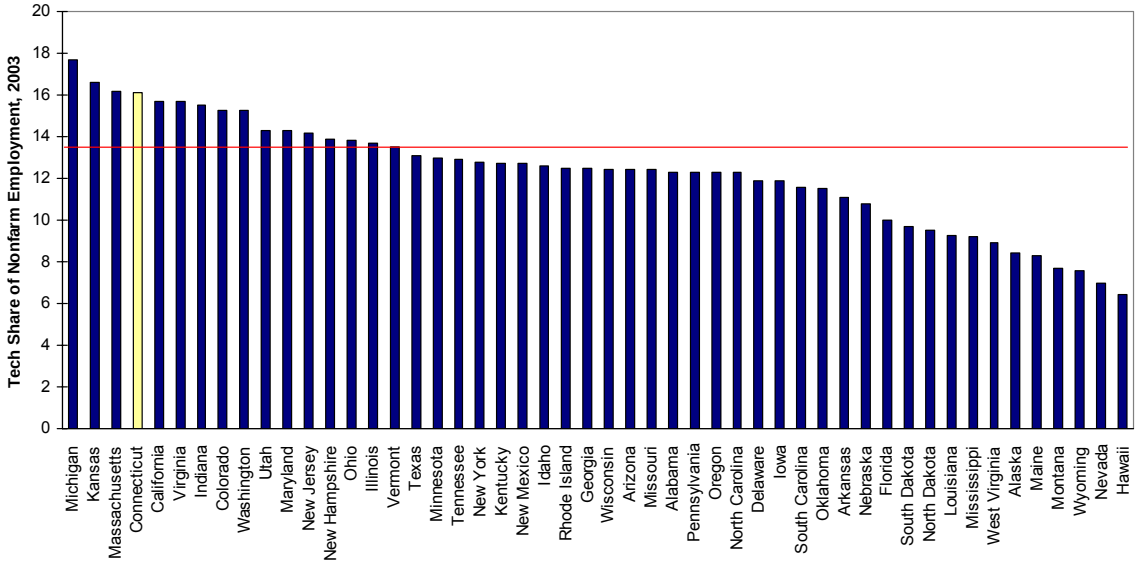
Connecticut ranks 4th in its concentration of technology employment, with the sector comprising 16.1 percent of nonfarm employment. The dominant industry in Connecticut is Aerospace, with more than 30,000 employees in 2003.

Since the Aerospace industry has seen substantial employment decreases in Connecticut since 1990, the state did not fare well in this category in terms of average annual growth. At -1.4 percent per year, Connecticut ranked 48th compared to the other states. The national average growth rate for technology employment was essentially flat, at 0.38 percent per year between 1990 and 2003.

For more than half a century, the United States has led the world in scientific discovery and innovation. It has been a beacon, drawing the best scientists to its educational institutions, industries and laboratories from around the globe. However, in today's rapidly evolving competitive world, the United States can no longer take its supremacy for granted. Nations from Europe to Eastern Asia are on a fast track to pass the United States in scientific excellence and technological innovation. [3]

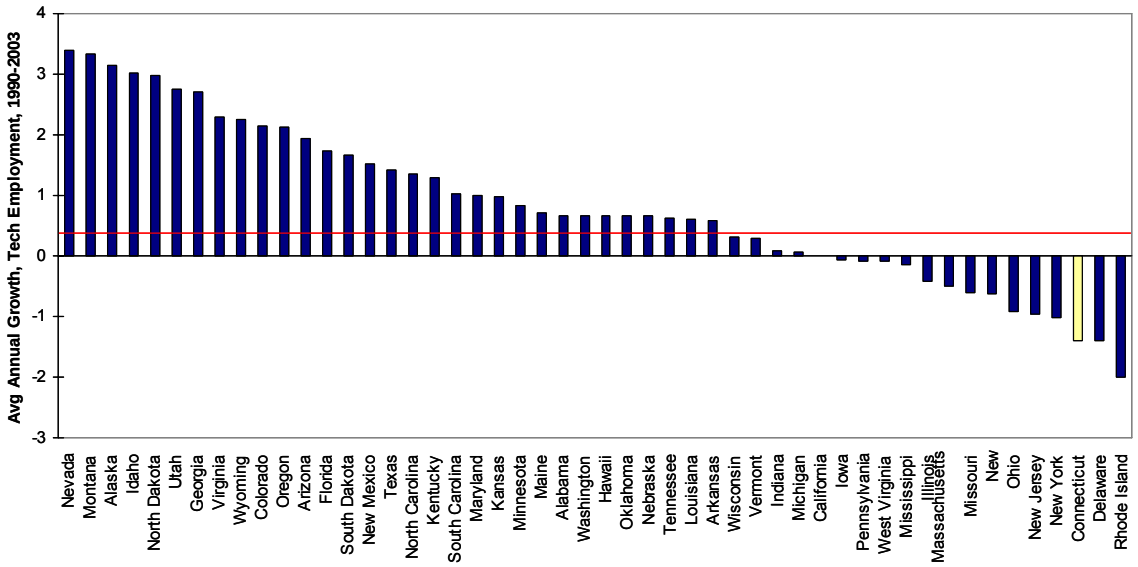
[3] Task Force on the Future of American Innovation, *The Knowledge Economy: Is the United States Losing Its Competitive Edge?* February 16, 2005, page 1, www.futureofinnovation.org

Connecticut has a higher concentration of technology industry employment than the U.S.



Source: Economy.com; Calculations by CERC

However, Connecticut, on average, has been losing tech employees annually since 1990.



Source: Economy.com; Calculations by CERC

High-speed lines

High-speed lines (ADSL, wireline, fiber, satellite, fixed wireless) per 1 million people

Sources: Federal Communications Commission, U.S. Census

High-speed lines are to the information economy what rail lines were during the transition from an agricultural to an industrial economy. They form the infrastructure that enables businesses and citizens to participate fully in today's economy.

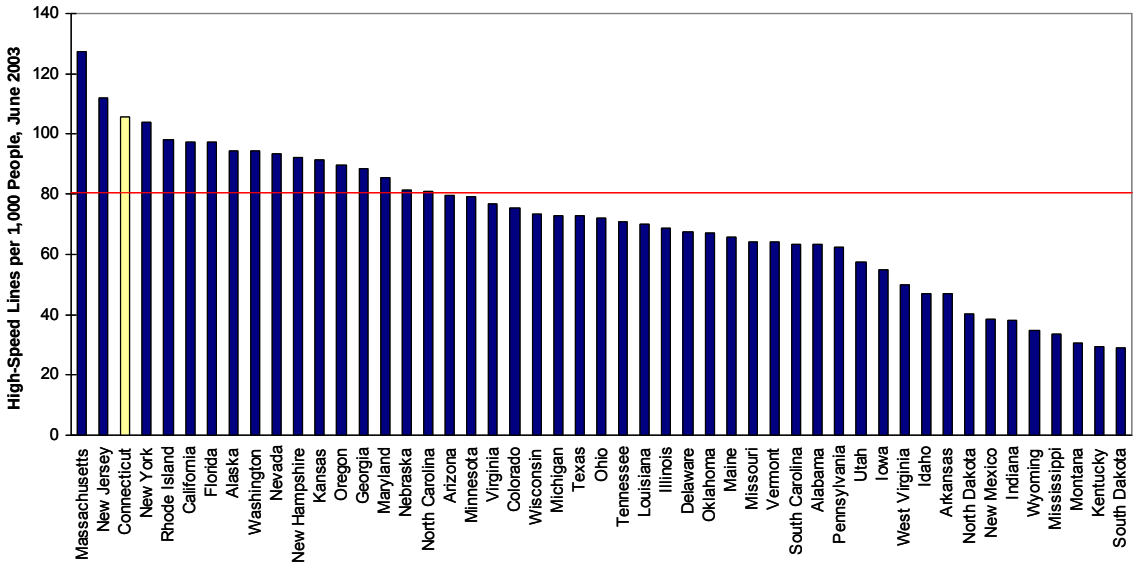
Connecticut is a leader in high-speed lines per 1 million people, ranking 3rd with 105,700. The national average in 2003 was 80,670.

Connecticut's annual average growth in high-speed lines is above the national average, but a number of states are catching up. The top five states, West Virginia, Delaware, Vermont, New Mexico and Wisconsin, have more than doubled their numbers of high-speed lines every year since 1999.

As more and more places get Internet access, the percentage of Internet users in rural areas is now almost even with the national average. [4]

[4] The Progressive Policy Institute, *The 2002 State New Economy Index*, http://www.neweconomyindex.org/states/2002/04_digital_02.html

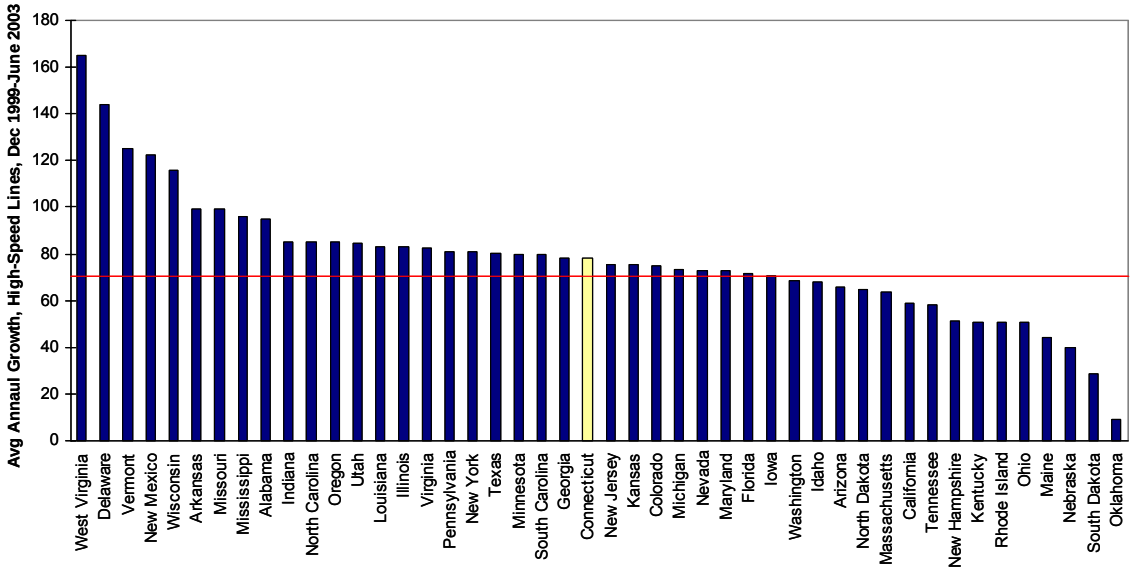
Connecticut is a leader in high-speed lines per person.



Sources: FCC, Industry Analysis Division, Common Carrier Bureau; U.S. Census

*Hawaii did not report 2003 lines; therefore it is not included in this chart.

Connecticut's growth in high-speed lines is above the national average, but a number of states are catching up, as would be expected.



Source: FCC, Industry Analysis Division, Common Carrier Bureau

*Some states did not report high speed lines over time; therefore they are not included in this chart.

Computers in households

Percent of households with computers

Source: National Telecommunications and Information Administration

The extent to which a state's households and citizens have ready access to computers provides a measure of digitization, which is a vital attribute of today's economy.

Connecticut's concentration of households with computers (69 percent) in 2003 ranks 6th relative to the other states. Computer use is the norm for most households, except for Mississippi, where computers are not yet in half of the households.

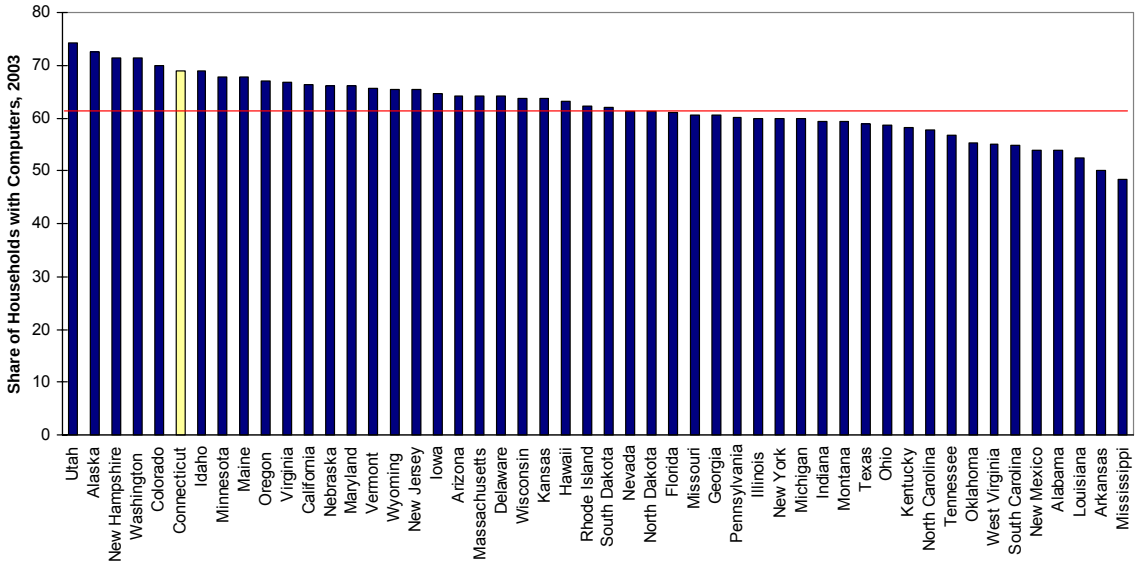
Computer use in Connecticut is growing faster than the national average. Its average growth is 11.3 percent per year, ranking the state 8th.

SPOTLIGHT: High-Minority Schools with Internet Access

Edweek.org, the Web site for *Education Week* and *Teacher Magazine*, provides state comparisons related to Internet access in high-minority schools. Ninety-six percent of high-minority schools in Connecticut had Internet access in 2003, which is consistent with most other states. However, in terms of the percent of high-minority schools with Internet access from one or more classrooms, Connecticut's 79 percent ranks the state last. [5]

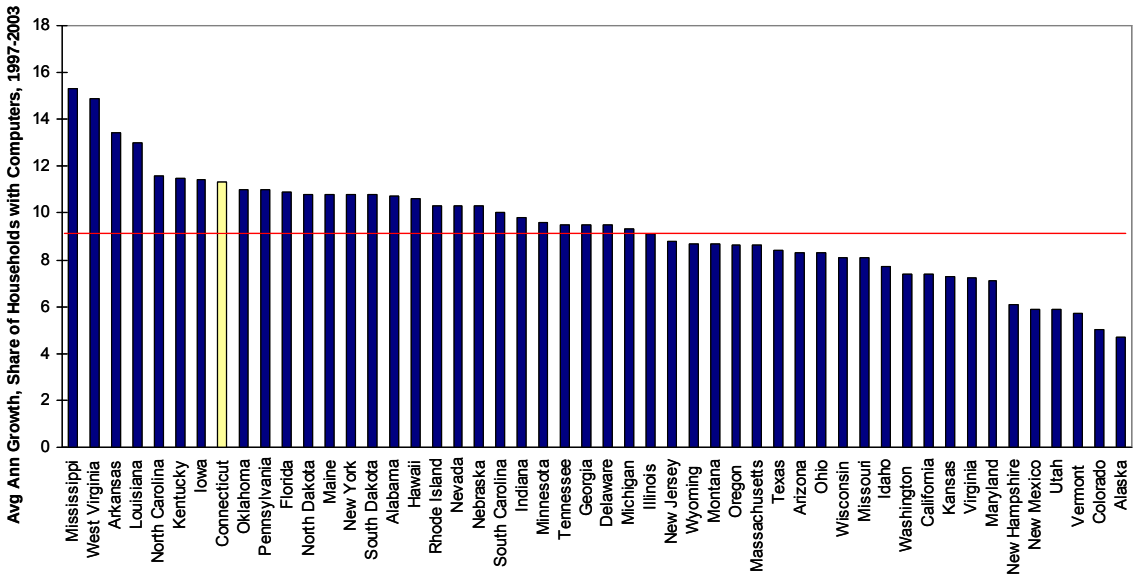
[5] http://edcounts.edweek.org/createtable/step1.php

Computer use in Connecticut is the norm for most households.



Source: National Telecommunications and Information Administration

Computer use in Connecticut is growing faster than the national average.



Source: National Telecommunications and Information Administration

Internet access in households

Percent of households with Internet access

Source: National Telecommunications and Information Administration

Household access to the Internet provides another measure of digitization, and familiarity with these tools is critical in today's economy.

Sixty-three percent of Connecticut's households have Internet access, which is the 4th highest in the country.

Even though Internet use in Connecticut is growing at a brisk pace, that pace is slower than that of most states and the nation. Therefore most other states are catching up to Connecticut's level.

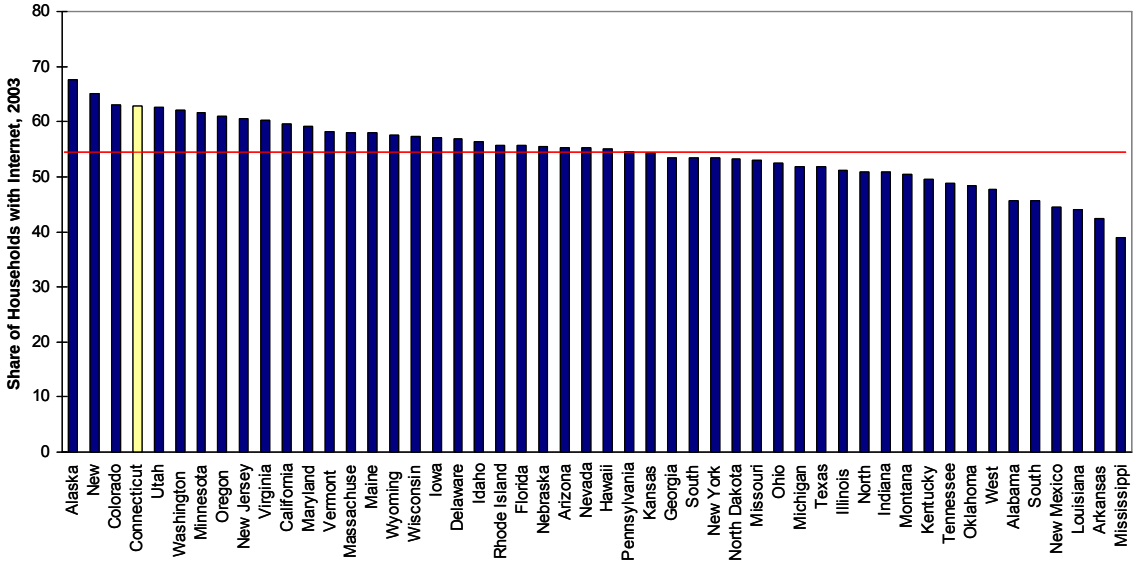
SPOTLIGHT: Government Use of Technology

The Progressive Policy Institute, in its *2002 State New Economy Index*, compares the "utilization of digital technologies in state governments." [6] The rationale is that state governments that use technology increase the quality of services while cutting costs to residents and businesses.

In this metric, Connecticut ranks 25th, with a score of 3.11 that is just above the national average of 3. The top states in this category are Michigan, Utah and Washington, because they are further along in the process of digitization. However, it is noted that many states that perform well in this category do so because of one leader such as a governor who believes that government digitization is a priority.

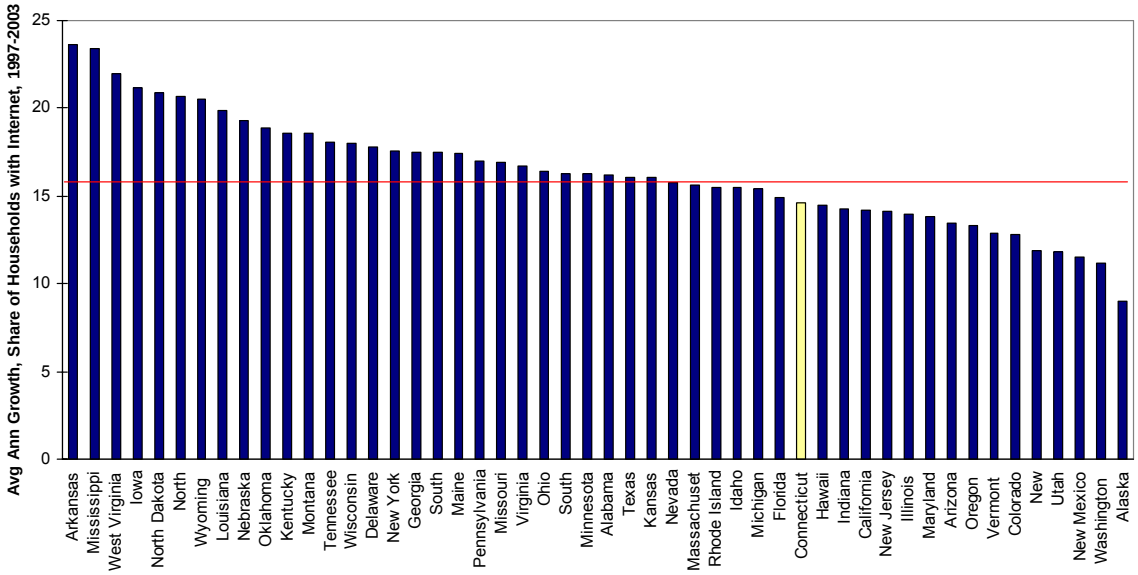
[6] The Progressive Policy Institute, *The 2002 State New Economy Index*, http://www.neweconomyindex.org/states/2002/04_digital_05.html

Similarly, Internet use in Connecticut is the norm for most households.



Source: National Telecommunications and Information Administration

Internet use in Connecticut is growing briskly, but at a lower pace than most states.



Source: National Telecommunications and Information Administration

Financial Benchmarks

Connecticut's Standing

The state scores well fairly well overall in terms of concentration, but lags far behind almost every other state in the pace of growth in this area.

Why It's Important

Capital is the lifeblood of businesses. Businesses can start, succeed, and grow—and generate jobs and wealth in a state—only if they have sufficient access to financial resources.

The variables included in this category include:

- **Small Business Innovation Research (SBIR) Phase I awards**
  SBIR Phase I awards per worker
- **Small Business Innovation Research (SBIR) Phase II awards**
  SBIR Phase II awards per worker
- **Small Business Technology Transfer Program (STTR) awards**
  STTR awards per worker
- **Initial public offerings (IPOs)**
  IPOs per 10,000 employer firms
- **Venture capital**
  Venture capital per worker

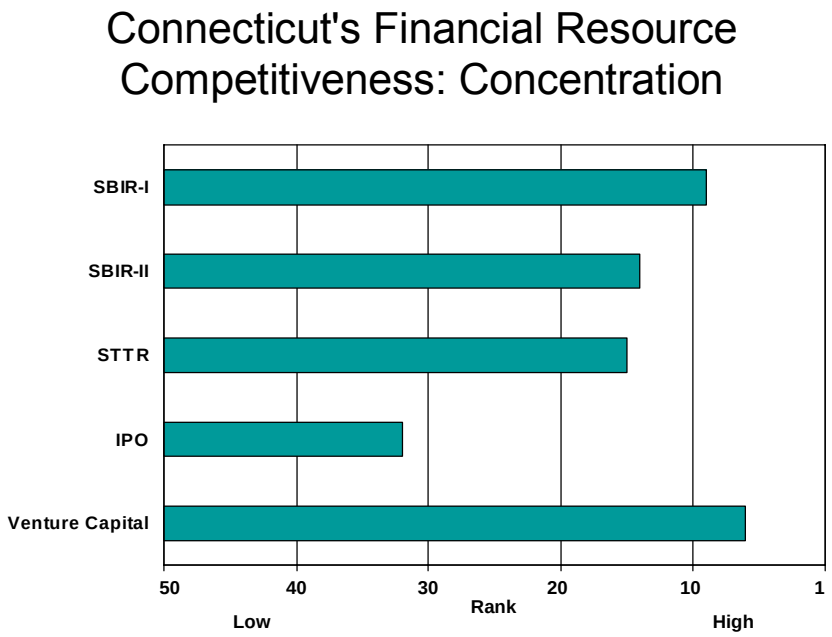
Detailed Overview

Businesses, both large and small, require sufficient financing to cover the costs of daily operations and production processes. While some entrepreneurs may succeed by "bootstrapping," or building a business largely with funds from family and friends, most entrepreneurs, small businesses and large companies require external sources of capital. Creating an atmosphere where capital is available and business owners know how to access it is an important component of a vibrant economy.

What are some of the external sources of capital available to businesses? Banks and commercial finance companies are among the most commonly used. Venture capitalists

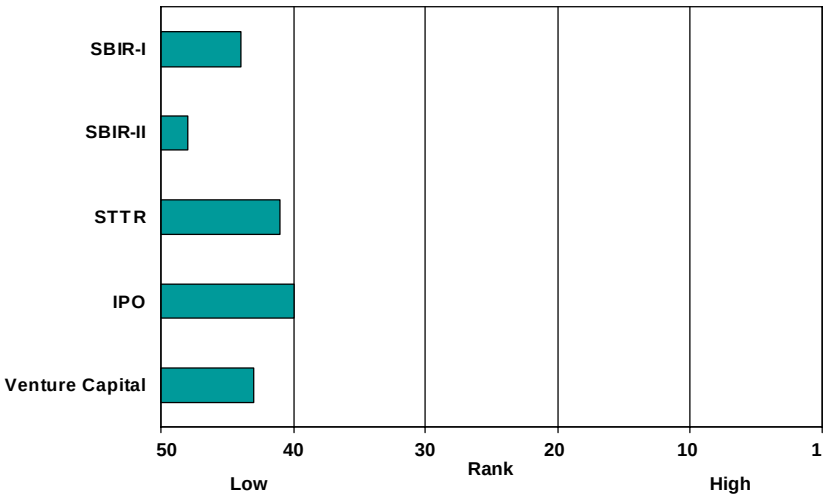
are also available, but generally prefer to invest in later stages of business growth, rather than in startup companies. Government loan programs and grants are also available. Seed capital and angel investments are also quite important to a number of small, start-up companies.

So how does Connecticut fare in this category? The state's overall concentration rank is 13th, and it ranks in the top 10 for both venture capital and SBIR Phase I awards. Connecticut places 14th in SBIR Phase II awards and 15th in STTR awards. The variable with the lowest concentration rank in this category is IPOs, at 32nd.



However, in terms of growth, Connecticut does not perform well, coming in 45th among all states. The variable with the best growth ranking is IPOs, at 40th.

Connecticut's Financial Resource Competitiveness: Growth



Small Business Innovation Research (SBIR) Phase I awards

SBIR Phase I awards per worker

Sources: U.S. Small Business Administration, U.S. Bureau of Labor Statistics

The SBIR Phase I program encourages small businesses to assess the potential of their innovations. This program enhances small businesses' R&D efforts, which, in turn, intensifies innovation and enhances the economy.

SBIR Phase I grants per worker are typically higher in Connecticut[1] ($4.37 per worker) than in the U.S. as a whole ($3.18 per worker), but Massachusetts is the clear front-runner in this category, with an average of $18.35 per worker.

Connecticut's growth in SBIR Phase I awards averaged 2.6 percent per year between 1997 and 2002, which is below the national average of 8.6 percent per year. Rhode Island is the outlier in the group, with growth of almost 200 percent per year. In 1997 the Ocean State received $6,000 in SBIR Phase I awards, and the program grew to more than $1.4 million in 2002.

SPOTLIGHT: The SBIR Program

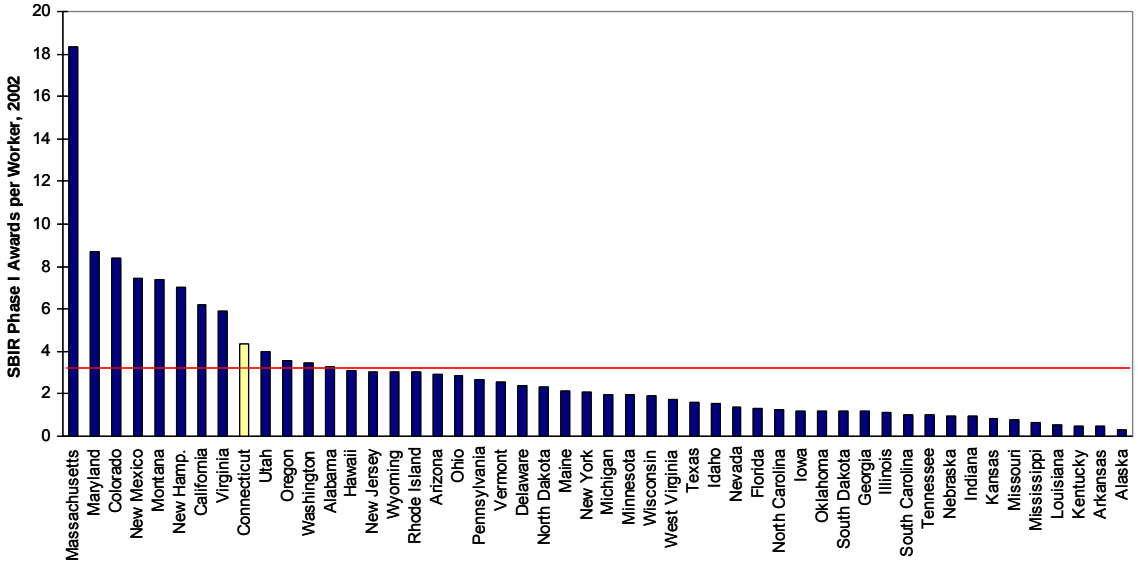
The SBIR program was created in 1982 and is administered by the Small Business Administration. Each year, 10 federal departments are required to use a portion of their funds for this program. They are: Department of Agriculture, Department of Commerce, Department of Defense, Department of Education, Department of Energy, Department of Health and Human Services, Department of Transportation, Environmental Protection Agency, National Aeronautics and Space Administration, and National Science Foundation.

Companies that employ fewer than 500 workers and wish to participate must first apply for Phase I. Awards of up to $100,000 are distributed so that the company can test the feasibility of a technology or idea within six months. The company can then apply for a Phase II award of up to $750,000 for up to two years. During this time, the company can create a prototype and assess their business model for the technology. In Phase III, when the innovation moves to the market, no SBIR funds are granted. This is the time where the company must find alternate funding.[2]

[1] 2004 data show that SBIR Phase I awards per worker are up to $4.81 in Connecticut (2004 data are not yet available for every state).

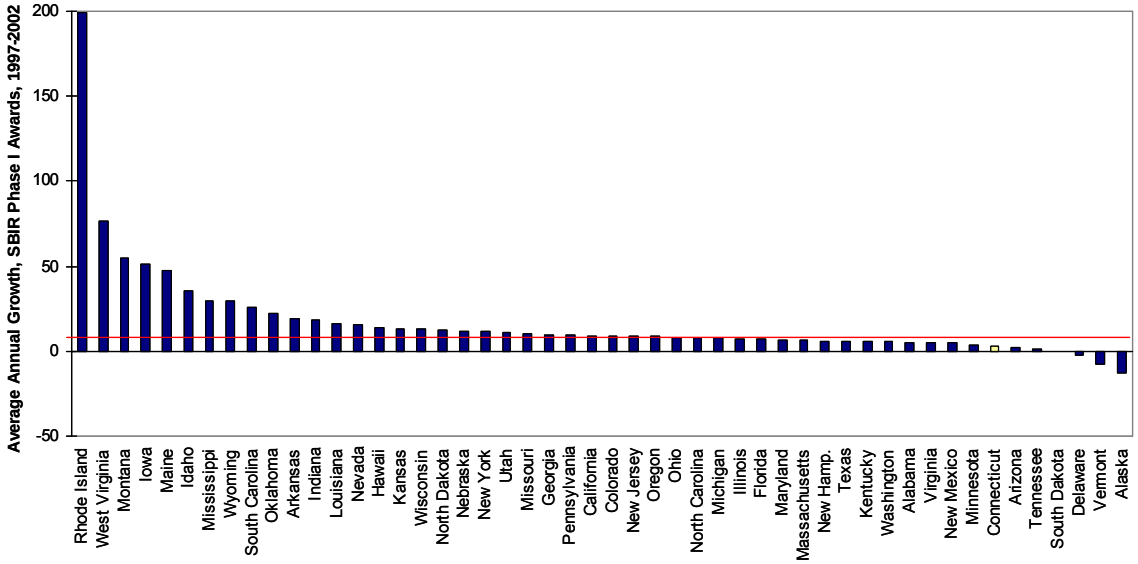
[2] U.S. Small Business Administration, Office of Technology, *Description of the Small Business Innovation Research Program (SBIR)*, http://www.sba.gov/SBIR/indexsbir-sttr.html#sbir.

SBIR Phase I grants per worker are typically higher in Connecticut and the Northeast.



Sources: U.S. Small Business Administration, U.S. Bureau of Labor Statistics

Connecticut's growth in SBIR Phase I awards has averaged 2.6 percent per year, slower than most states and the nation.



Source: U.S. Small Business Administration

Small Business Innovation Research (SBIR) Phase II awards

SBIR Phase II awards per worker

Sources: U.S. Small Business Administration, U.S. Bureau of Labor Statistics

The SBIR Phase II program allows small businesses to create a prototype and assess their proof of concept. Favorable results create new companies and build the economy.

The level of SBIR Phase II grants to Connecticut firms, at $9.69 per worker,[3] is above the national average of $8.33 per worker, and places Connecticut 14th among the states. However, Massachusetts is way ahead of the pack at $47.95 per worker.

In terms of growth Connecticut ranks 48th with a rate of -8.01 percent per year. SBIR Phase II grants to Connecticut firms declined by 50 percent between 1997 and 2001, but since 2001 the grants have picked up. However, the 2002 award amount is still far below the 1997 level.

STATISTICS: SBIR Phase I Awards to Proposals Ratios

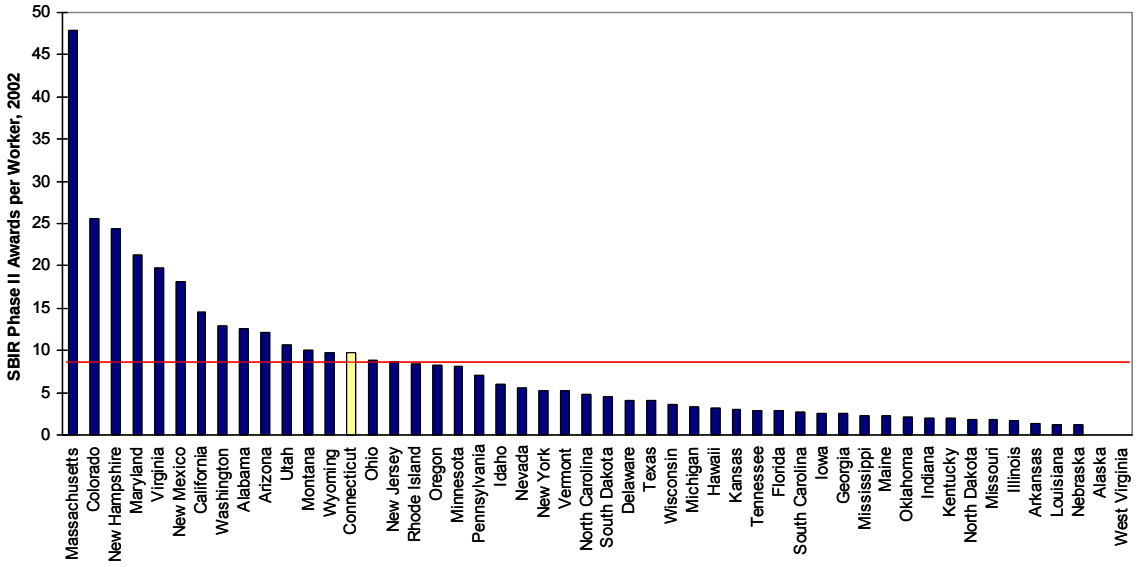
The State Science and Technology Institute compiled the numbers of SBIR Phase I awards and proposals by state, which is a measure of the success or need for SBIR technical assistance and outreach in states. The data below are for FY 2004, where Connecticut was more effective in obtaining Homeland Security and NASA awards relative to the U.S.[4]

	CT			U.S.
	Awards	Proposals	Awards to Proposals Ratio	
U.S. Dept of Agriculture (USDA)	1	5	20.0	17.0
Dept of Commerce, Ntl Institute of Standards & Tech (NIST)	0	8	0.0	11.4
Dept of Commerce, Ntl Oceanic & Atmospheric Admin (NOAA)	NA	NA	NA	NA
Dept of Defense (DoD)	21	202	10.4	15.2
Dept of Education (ED)	0	0	0.0	11.5
Dept of Energy (DOE)	8	38	21.1	18.1
Environmental Protection Agency (EPA)	0	8	0.0	12.0
Dept of Homeland Security (DHS)	1	3	33.3	22.8
Dept of Transportation (DOT)	0	1	0.0	11.8
Ntl Aeronautics & Space Administration (NASA)	5	26	19.2	13.5
Ntl Institutes of Health (NIH)	16	71	22.5	19.5
Ntl Science Foundation (NSF)	1	6	16.7	24.5

[3] SBIR Phase II grants per worker in Connecticut drops to $8.31 in 2004 (2004 data are not yet available for every state).

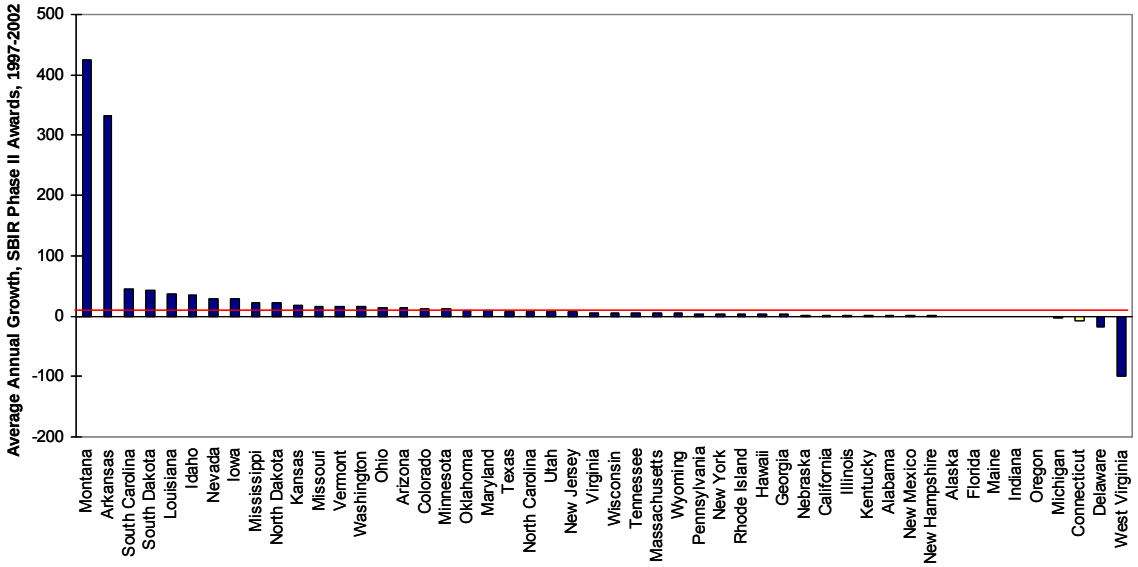
[4] State Science and Technology Institute, *SBIR Awards, Proposals by State for FY 2004*, http://www.ssti.org/Digest/Tables/042505t.htm.

SBIR Phase II grants to Connecticut firms are now above the national level.



Sources: U.S. Small Business Administration, U.S. Bureau of Labor Statistics

SBIR Phase II grants to Connecticut firms declined by 50 percent between 1997 and 2001, but since 2001 the grants have picked up.



Source: U.S. Small Business Administration

Small Business Technology Transfer Program (STTR) awards

STTR awards per worker

Sources: U.S. Small Business Administration, U.S. Bureau of Labor Statistics

The STTR program promotes public/private partnerships and joint ventures for small businesses and nonprofit research institutions. The program facilitates technology transfer and commercialization, which stimulates new business growth and, in turn, the economy.

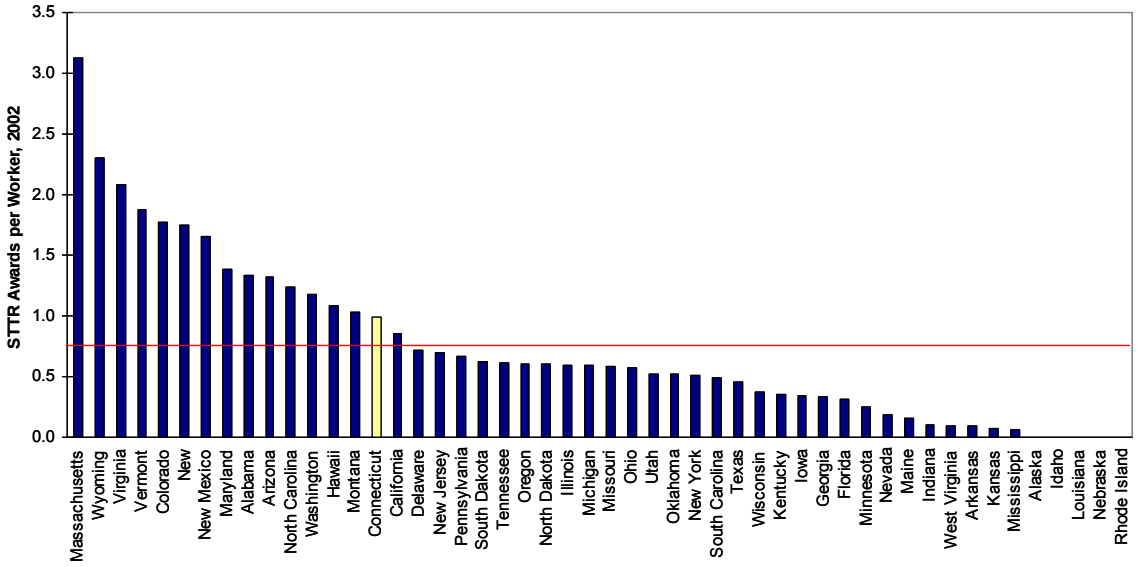
At just less than one dollar per worker, Connecticut's STTR awards per worker outpace the national average of $0.73 per worker, placing the state 15th in the country. However, the top state, Massachusetts, receives $3.12 per worker.

Connecticut's STTR dollars dipped sharply during the 1990s but have recently begun to increase. However, the state's growth in this category is 41st in the nation, with an average annual growth rate of 9.2 percent, much slower than the national average of 22.8 percent.

An analysis by Coleman Management Services Inc. found that less than 17 percent of the reasons cited for business failure are due to outside influences such as inflation and economic reasons, or union problems. Eighty-three percent of the reasons a business fails are within the control of business owners and managers…What can CEOs and organizations do to ensure they will survive and flourish? Where do successful companies invest their funds and attention? One area proven to result in long-term stability and expansion is business training. There is a direct correlation between the level of investment in company training and increased levels of productivity and profitability.[5]

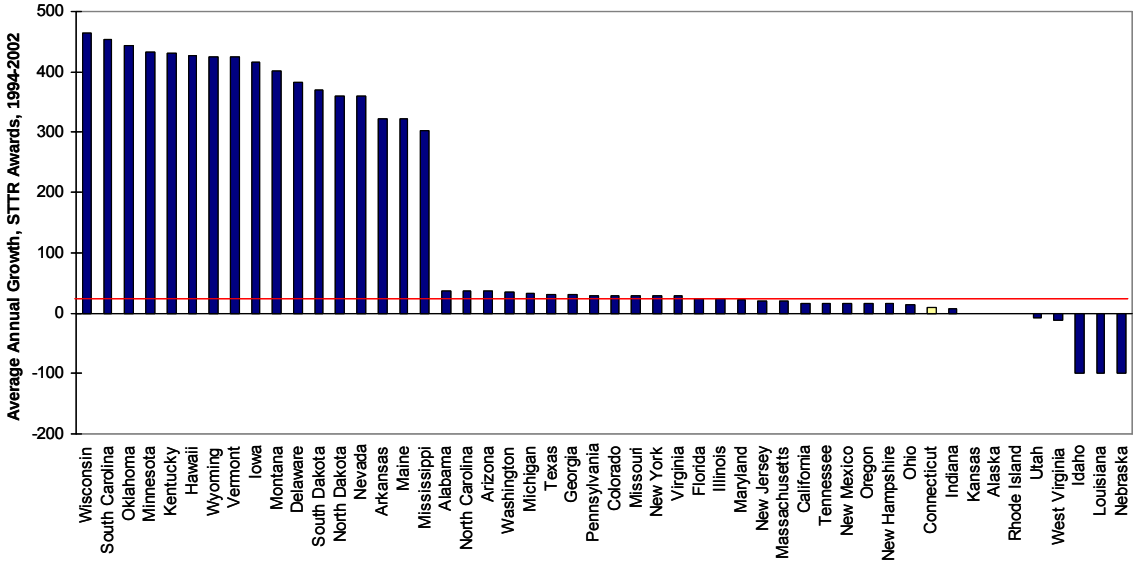
[5] Chief Learning Officer, *Lack of Business Training Contributes to Small Business Failures*, January 12, 2005, http://www.clomedia.com/common/newscenter/newsdisplay.cfm?id=3576.

Connecticut's STTR awards per worker outpace the nation.



Sources: U.S. Small Business Administration, U.S. Bureau of Labor Statistics

Connecticut's STTR dollars dipped sharply during the 1990s (but has recently begun to increase).



Source: U.S. Small Business Administration

Initial public offerings (IPOs)

IPOs per 10,000 employer firms

Sources: Renaissance Capital, U.S. Small Business Administration

IPOs, which are public sales of ownership interests, produce working capital for the company. Investors can also benefit from IPOs because they create the potential for an increase in market value for shares investors already own. IPOs are signals that companies are willing to increase their visibility and continue to grow.

There was a significant decrease in the number of IPOs nationally after the dot-com craze of 1999-2000. However, as of 2004, IPOs were beginning to rebound nationally. Connecticut has 0.1 IPO per 10,000 firms, which is the 32nd best ratio in the country.

In terms of growth, Connecticut's overall trend is downward with an average of -20 percent per year between 1999 and 2004. This rate places the state 40th in terms of growth in this variable relative to the other states.

SPOTLIGHT: Deloitte Technology Fast 500 North America

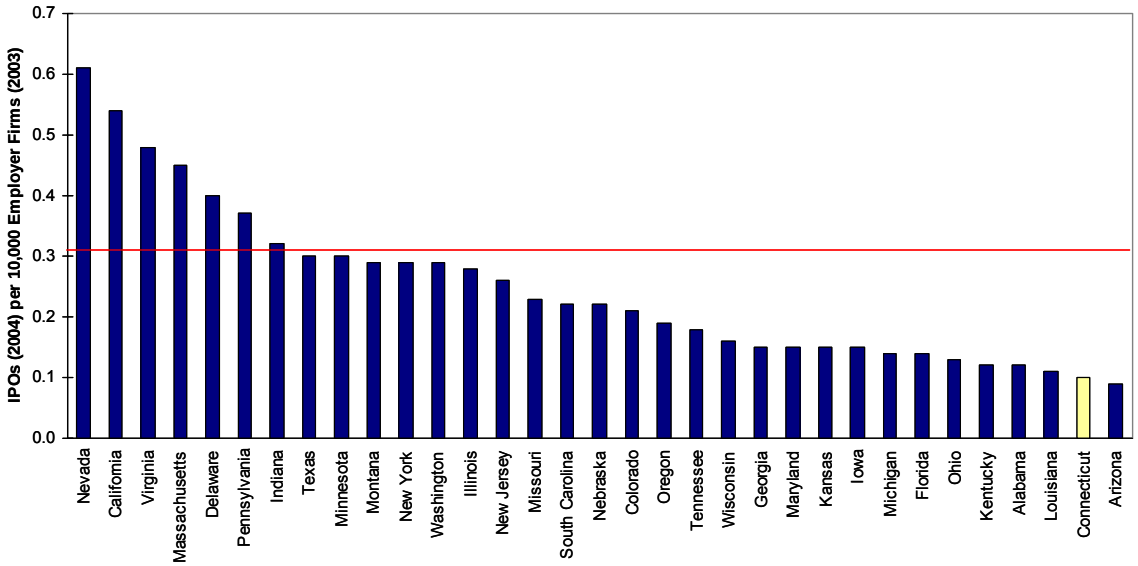
This business list, published annually since 1995, acknowledges the fastest-growing technology companies in the United States and Canada through nominations and research.

	U.S.	CT
1997	500	11
1998	500	14
1999	498	17
2000	452	16
2001	451	11
2002	439	10
2003	432	9
2004	447	13

In 1997, all of the Fast 500 businesses were located in the U.S. Since 1998, the number of Fast 500 companies in the U.S. decreased to a low of 432 in 2003 but bounced back in 2004 to 447. Three percent, or 13 of the U.S. companies on the list are located in Connecticut.[6]

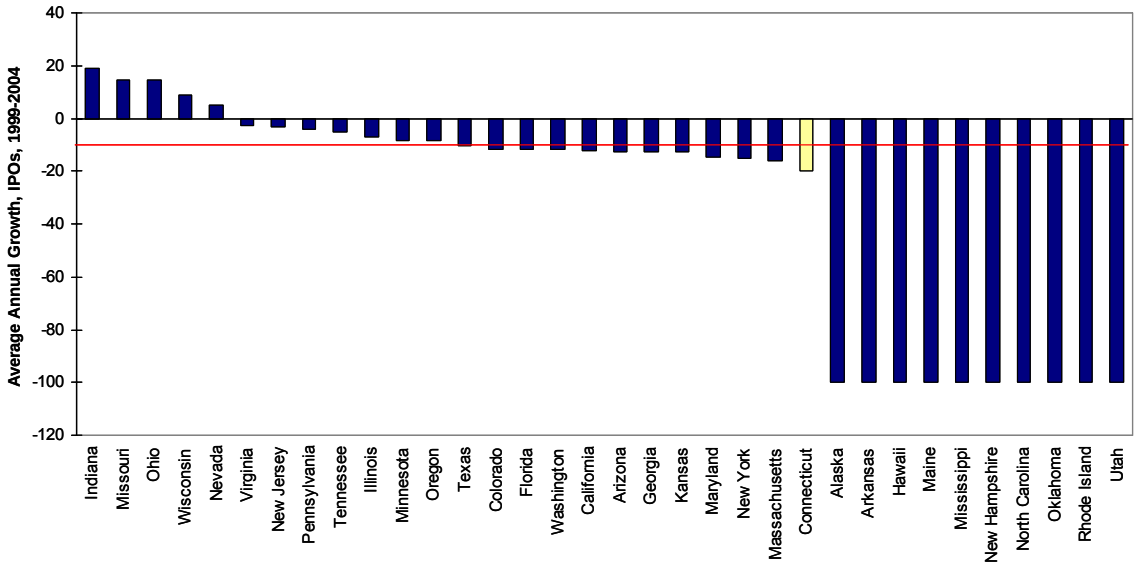
[6] Deloitte & Touche USA LLP, *Technology Fast 500*, http://www.deloitte.com/dtt/section_node/0,1042,sid%253D56072,00.html.

IPOs decreased substantially beginning in the late 1990s, but the U.S. is starting to see an increase again.



Sources: Renaissance Capital, Greenwich, CT; U.S. Small Business Administration
Note: The following states had no IPOs in 2004: AK, AR, HI, ID, ME, MS, NH, NM, NC, ND, OK, RI, SD, UT, VT, WV, WY

Connecticut's IPO growth on average has been negative, and more so than the U.S.



Source: Renaissance Capital, Greenwich, CT
Note: The following states had no IPOs in 1999 and 2004: AL, DE, ID, IA, KY, LA, MI, MT, NE, NM, ND, SC, SD, VT, WV, WY

Venture capital

Venture capital per worker

Sources: Thomson Venture Economics, U.S. Bureau of Labor Statistics

Venture capital is another element that helps entrepreneurs make the leap from prototype to production.

At $154 per worker, venture capital in Connecticut is the 6th most concentrated and above the U.S. average of $139 per worker. Massachusetts again is the clear leader, with $781 per worker.

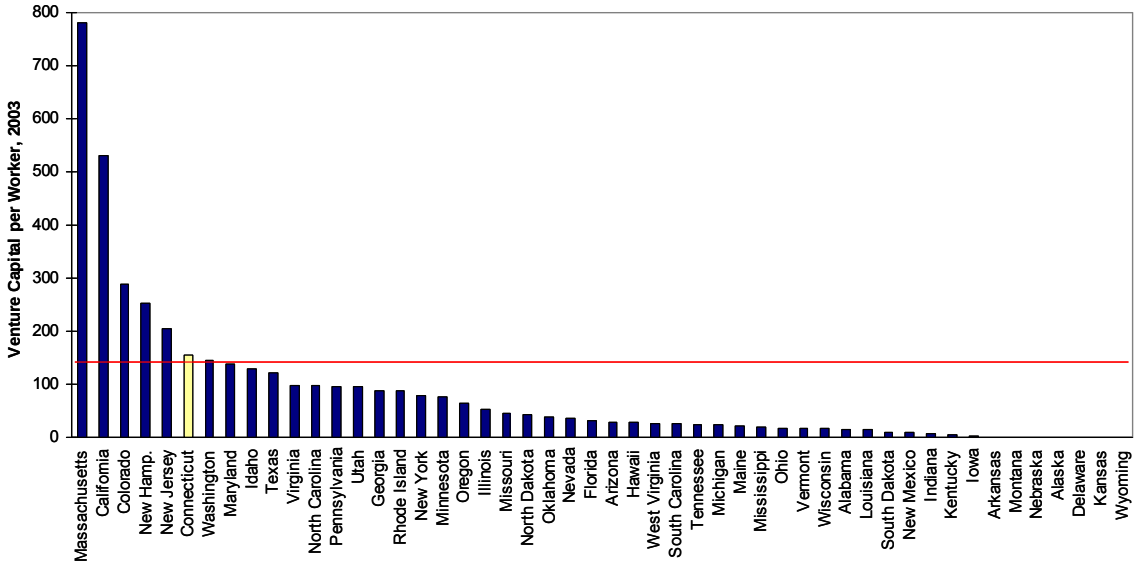
Connecticut has seen a substantial decrease in investments since 2000, similar to the national trend, but had an increase of 18 percent between 2002 and 2003. However, the state's average growth of 5.3 percent per year between 1992 and 2004 is much lower than the national average of 15.5 percent and ranks 43rd among all states.

SPOTLIGHT: Angel Investments

Approximately 48,000 ventures received angel investments in 2004, which is an increase of 24 percent from 2003. And the total amount invested in 2004 was $22.5 billion, up from $18.1 billion in 2003, and higher than the $18 billion venture capital invested in 2004. The industries that were the most popular with the approximately 225,000 angel investors in 2004 were software and health care services.[7]

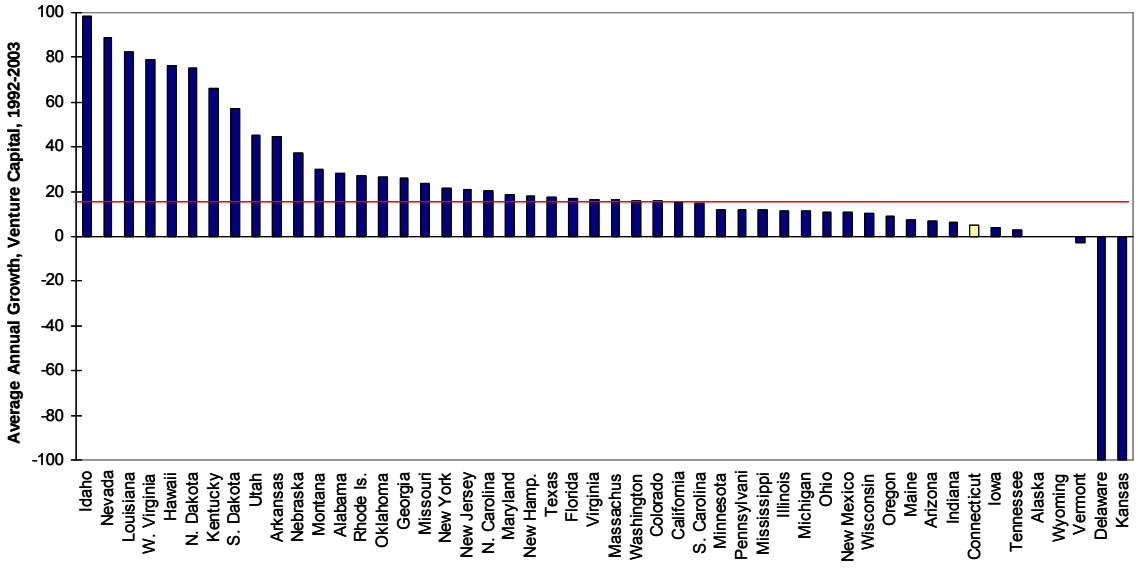
[7] Jeffrey Sohl, The Center for Venture Research, University of New Hampshire Whittemore School of Business and Economics, The Angel Investor Market in 2004: The Angel Market Sustains the Modest Recovery, http://www.unh.edu/news/docs/cvr2004.pdf.

Massachusetts and California are the leaders in venture capital investments.



Sources: *2004 National Venture Capital Association Yearbook*, Thomson Venture Economics; U.S. Bureau of Labor Statistics

Connecticut saw a substantial decrease in investments since 2000, but had an increase of 18 percent between 2002 and 2003.



Source: *2004 National Venture Capital Association Yearbook*, Thomson Venture Economics

Entrepreneurial and Business Vitality Benchmarks

Connecticut's Standing

By some indicators, Connecticut's current business climate is strong. The outlook for the future, however, is less positive, because the state's rate of growth in key areas is substantially slower than many states.

Why It's Important

A business climate that is favorable for innovation and entrepreneurial activities is important for economic growth.

The variables included in this category include:

- **Technology gazelle companies**
  Technology gazelles as a share of total gazelles filing with the Securities & Exchange Commission (SEC)
- **Gazelle companies**
  Gazelle companies (filing with the SEC) per 1 million nonfarm establishments
- **Business churn**
  Business formations and terminations as a share of total firms
- **Small business employment**
  Small business (<100 employees) share of total employment
- **Entrepreneurs (Proprietors)**
  Nonfarm proprietors per 1,000 people
- **Federal Research & Development (R&D) Intensity**
  Federal R&D expenditures as a share of gross state product (GSP)
- **Industry R&D Intensity**
  Industry R&D expenditures as a share of gross state product
- **University R&D Intensity**
  University R&D expenditures as share of gross state product
- **Patents**
  Patents awarded per 1 million people

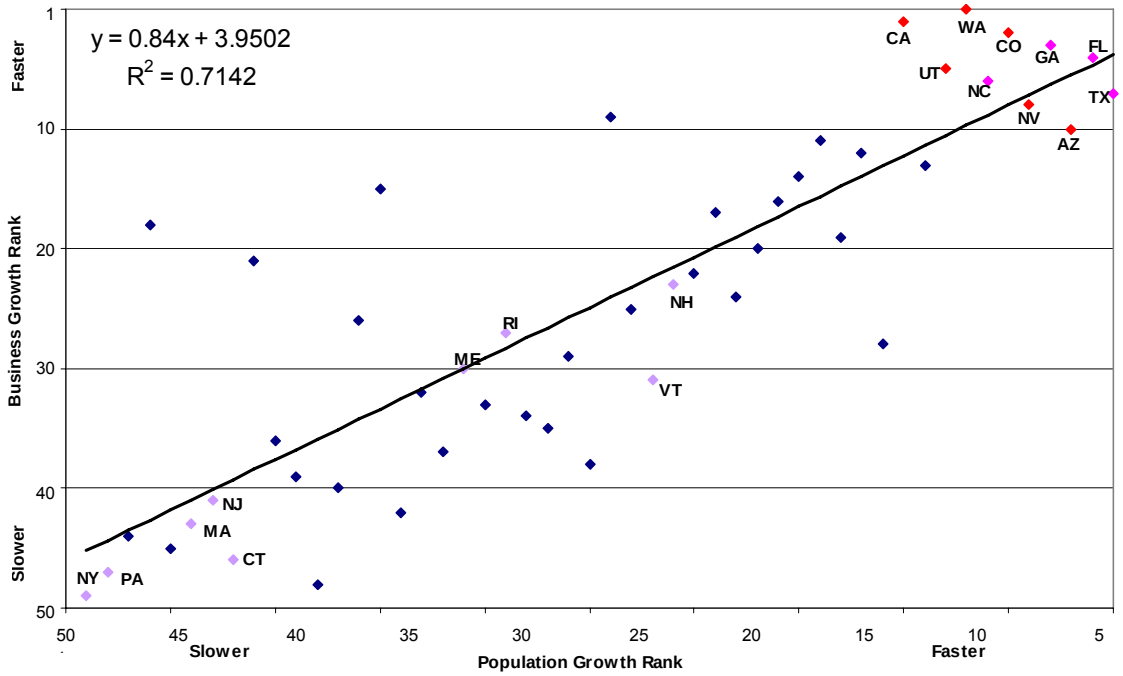
Detailed Overview

Public and private research and development (R&D) investments in basic and applied research can lead to the development of new products, processes and services, provided that the groundwork is in place to convert the research into goods for the market. New-product development opens up additional markets for consumer and business products. These new goods or processes can increase productivity levels. This reduces business costs, thereby enabling businesses to maintain or increase market share or increase workers' wages without increasing market prices. In addition, productivity growth generally increases business revenues and profit growth which, theoretically, frees up more capital for R&D investments. Growth in worker wages stimulates increased consumer demand for newer or improved products.

Improvements in technology and innovation benefit not only business but also workers and consumers in general. Business relies on a skilled and productive work force to develop and implement advances arising from innovation, while workers need sufficient wages to have a comfortable lifestyle and create demand for new and improved products. This is a symbiotic relationship in which the success of one component is necessary for the success of the other.

The chart shows the correlation between population growth and business growth between 1990 and 2000. Areas with population growth also tend to have business growth, in order to keep up with consumer demand. The states with high population and business growth are typically in the Southern and Western parts of the country, while the Northeastern states experience both slower population and business growth.

Population and Business Growth Are Highly Correlated



Sources: U.S. Census, U.S. Small Business Administration

Over the past decade, small firms have provided 60 to 80 percent of the net new jobs in the economy, and according to a U.S. Bureau of the Census working paper, almost all of these net new jobs stem from start-ups in the first two years of operation.[1]

From the first insurance company to the cotton gin to the helicopter to the atomic submarine, Connecticut's history is based on innovation, technology and new-product development. Even though legacy industries remain the bedrock of the economy, they are not necessarily the current engines of growth. Over time successful legacy industries will evolve and change to become more technologically sophisticated in their products and processes. And the newer, smaller firms in the state also are critical to the success of Connecticut's economy, for they have contributed to employment growth through the 1990s.

[1] U.S. Small Business Administration Office of Advocacy and The Ewing Marion Kauffman Foundation, *Entrepreneurship in the 21st Century: Conference Proceedings*, March 26, 2004, http://www.sba.gov/advo/stats/proceedings_a.pdf, page 7.

Small entrepreneurs lead the way in developing ideas; they are responsible for more than half of all innovations—67 percent of inventions…since World War II. [2]

In addition to the legacy industries and smaller firms, entrepreneurs contribute to the economic vibrancy of the state. Entrepreneurs are willing to take risks and invest their time and money to see that an idea or innovation becomes a market reality. They typically have the flexibility to not "do business 'the way it's always been done' but rather make changes and introduce intense levels of competition into even established industrial sectors." [3]

How does the U.S. perform relative to other countries? The Commission of the European Communities' 2004 Summary Innovation Index ranks the European Union (EU) countries, Japan and the U.S. according to their innovation performance, which is based on 20 indicators. In this index, the U.S. ranks 4th after Japan, Sweden and Finland. The report also notes that the innovation gap between the U.S. and the EU is growing, primarily because of the relative strength of the U.S. in terms of number of patents, its college-educated population, R&D expenditures, manufacturing value added, and venture capital for early-stage companies. [4]

Connecticut ranks 9th among all states in terms of its composite concentration score for this set of variables. Connecticut also ranked in the top 10 in the industry R&D (3rd), gazelles (7th) and patents (7th) metrics. The state obtains above-average rankings in terms of proprietors (14th), small-business employment (15th) and technology gazelles (19th), and an average ranking in university R&D (30th). Connecticut does not perform well in terms of federal R&D (42nd) and business churn (45th).

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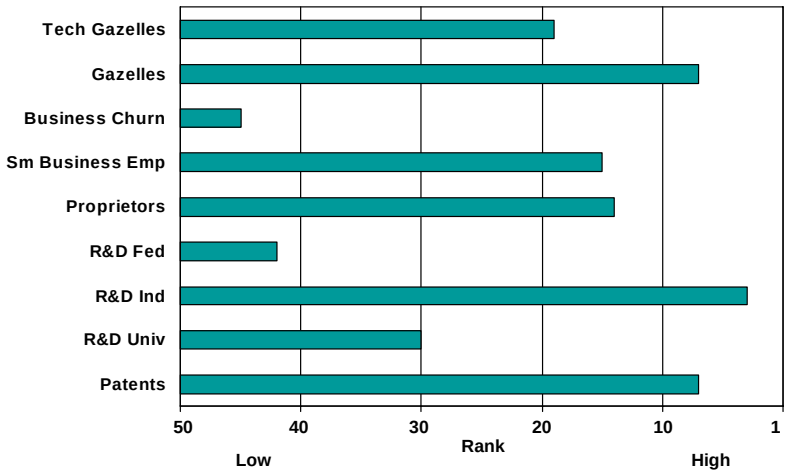
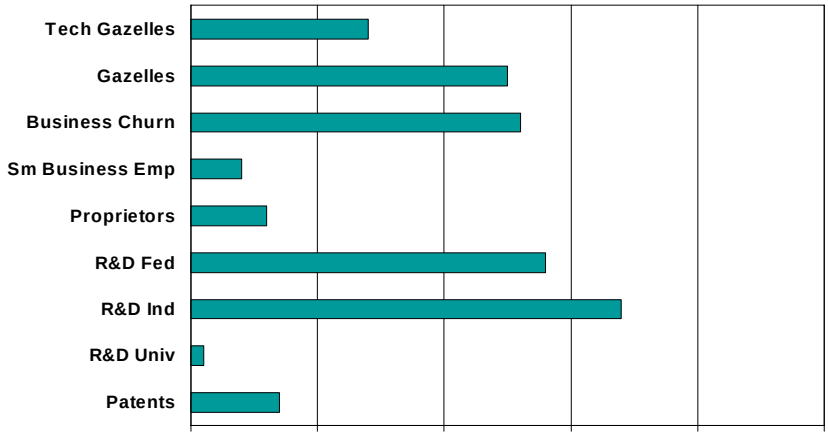
[2] National Commission on Entrepreneurship White Paper, Embracing Innovation: Entrepreneurship and American Economic Growth, http://www.publicforuminstitute.org/nde/reports/whitepap.pdf, page 3.
[3] National Commission on Entrepreneurship White Paper, Embracing Innovation: Entrepreneurship and American Economic Growth, http://www.publicforuminstitute.org/nde/reports/whitepap.pdf, page 4.
[4] Commission of the European Communities, Commission Staff Working Paper, *European Innovation Scoreboard 2004: Comparative Analysis of Innovation Performance*, November 19, 2004, http://www.insme.info/documenti/Innovation_Scoreboard_2004_EN.pdf.

Connecticut's Business Vitality Competitiveness: Concentration



On the growth dimension the state was above average on three variables: industry R&D, where Connecticut ranked 16th; federal R&D, with a rank of 22nd; and business churn, ranking 24th. The composite growth score across these measures ranked the state 42nd. Of particular concern is the university R&D category, in which Connecticut had the second slowest average annual growth rate of any state between 1993 and 2002.

Connecticut's Business Vitality Competitiveness: Growth



Technology gazelle companies

Technology (as defined in this report) gazelles as a share of total gazelles filing with Securities and Exchange Commission (SEC)[5]

Source: Standard & Poor's

The presence of a robust group of fast-growing technology businesses bodes well for a state's long-term growth prospects as innovators.

Just under half of Connecticut's 21 gazelles were technology gazelles in 2003, placing Connecticut 19th in this metric and just below the national average of 53 percent.

In 1999, 24 of Connecticut's 42 gazelles were in the technology industries, so the state's average annual growth rate was -20 percent. The national trend is also decreasing, but only by 8 percent per year.

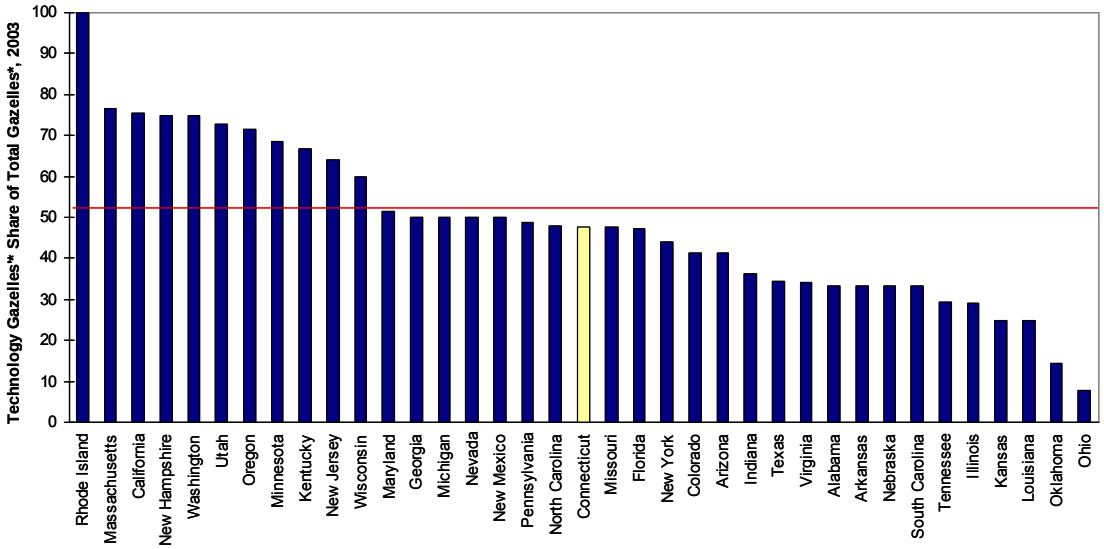
SPOTLIGHT: Technology Establishments

According to the 2002 County Business Patterns, [6] there are 9,885 Connecticut establishments in the technology industries, comprising 1.3 percent of the 738,751 U.S. technology establishments. The technology industry with the greatest number of establishments in Connecticut is North American Industry Classification System (NAICS) 5416, Management, Scientific and Technical Consulting Services, with 1,638 firms. Next is NAICS 5413, Architectural, Engineering and Related Services, with 1,394 firms, and NAICS 5415, Computer Systems Design and Related Services, with 1,365 establishments. These three industries make up 44 percent of the technology businesses in the state.

[5] Gazelles are companies (filing with the Securities & Exchange Commission) with at least $1 million in sales revenue for initial year and average annual revenue growth of 20 percent or more for four consecutive years.

[6] http://www.census.gov/epcd/cbp/view/cbpview.html

Connecticut's gazelle companies are less concentrated in the technology industries than the nation.

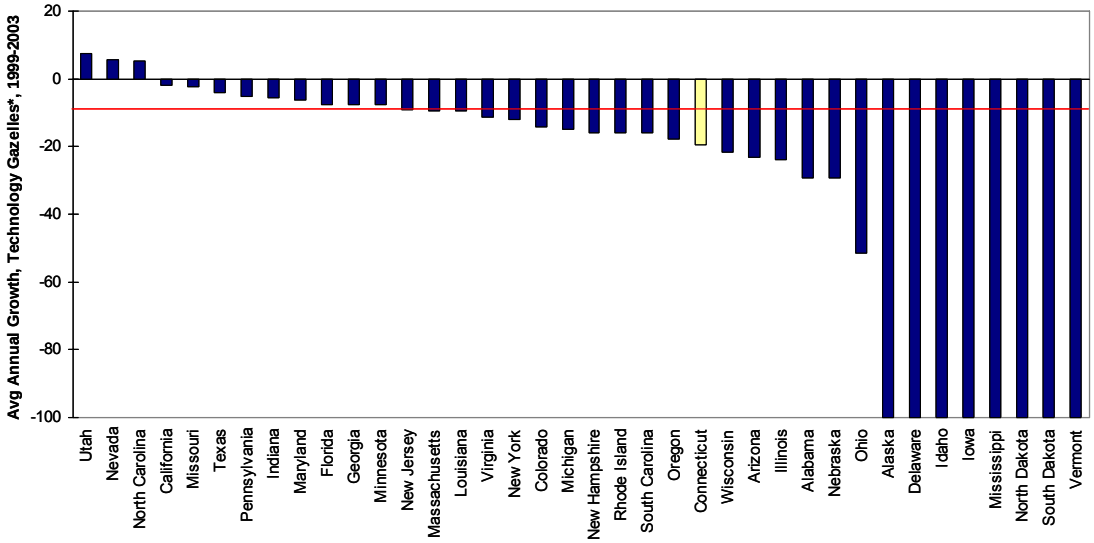


Source: Standard & Poor's

*Only includes companies that are publicly traded and file with the SEC

Note: States with no high tech gazelles in 2003: AK, DE, HI, ID, IA, ME, MS, MT, ND, SD, VT, WV, WY

Connecticut's technology gazelle companies represented a smaller percentage of the U.S. total in 2003 than in 1999.



Source: Standard & Poor's

*Only includes companies that are publicly traded and file with the SEC

Note: States with no high tech gazelles in 1999 or 2003: AR, HI, KS, KY, ME, MT, NM, OK, TN, WA, WV, WY

Gazelle companies

Gazelle companies (filing with SEC) per 1 million nonfarm establishments

Sources: Standard & Poor's, U.S. Census

A strong, fast-growing business base suggests that a state possesses the essential elements and business climate to nurture entrepreneurial companies.

Connecticut has a large concentration of gazelles. Our 21 gazelles translate to a ratio of 227 per million businesses, which is the seventh highest in the country.

Nationally there are fewer gazelles in the economy today than there were in 1999. Connecticut is no exception to the rule. With average annual growth of -16 percent, the state is slightly underperforming the nation's average of -13 percent. Only Kansas and Arkansas had more gazelles in 2003 than in 1999.

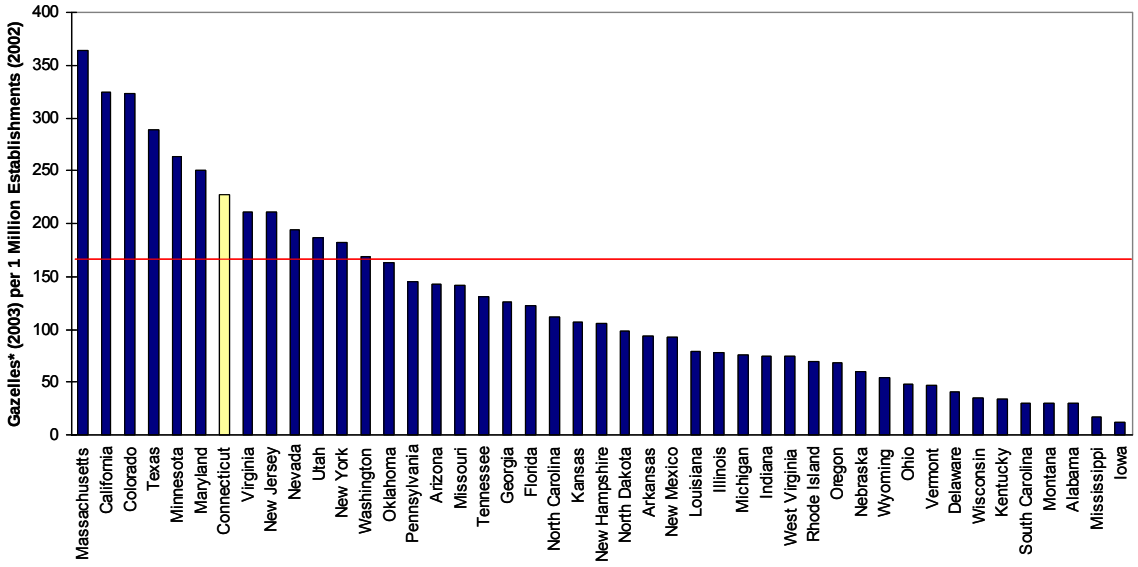
SPOTLIGHT: The Global Competitiveness Report

The *Global Competitiveness Report 2004-2005* provides results from the latest Executive Opinion Survey, which questioned more than 8,700 business executives in 104 countries about strengths and weaknesses affecting the business community. The U.S. ranked 2nd after Finland in the report's Growth Competitiveness Index—its technology strengths pulled the U.S. ranking up, while the quality of the public institutions and macroeconomic environment were seen more as disadvantages.

What are the "most problematic factors for doing business" in the U.S.? Tax regulations were seen as the worst, followed by inefficient bureaucracy, inadequately educated work force, tax rates and restrictive labor regulations. Factors that were not seen as significant include policy instability, access to financing, work ethic, crime, currency regulations, infrastructure, corruption, inflation and government instability.[7]

[7] Michael E. Porter, Klaus Schwab, Xavier Sala-i-Martin, and Augusto Lopez-Claros, World Economic Forum, *The Global Competitiveness Report 2004-2005*, pages 410-411.

As a concentration of all nonfarm companies, Connecticut has a concentration of gazelles.

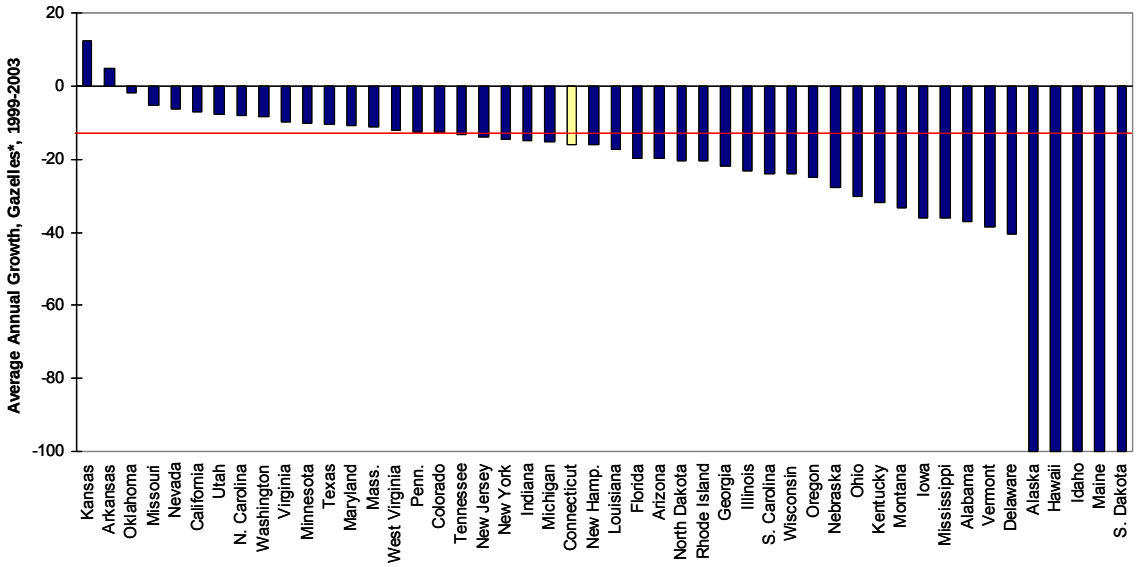


Source: Standard & Poor's

*Only includes companies that are publicly traded and file with the SEC

Note: Some states did not have gazelles in 2003: AK, HI, ID, ME, SD

Connecticut saw a decrease in the numbers of gazelle companies between 1999 and 2003.



Source: Standard & Poor's

*Only includes companies that are publicly traded and file with the SEC

Note: Two states had no gazelles in 1999 or 2003: NM and WY

Business churn

Business formations and terminations as a share of total firms

Source: U.S. Small Business Administration

Entrepreneurial regions typically have high business churn rates. This redirects resources from firms that are not thriving to companies with more potential. Innovation as a source of job growth stems from the churning of companies starting up and the closing of less competitive firms, a process Schumpeter termed "creative destruction."[8]

Connecticut's business churn rate, at about 20 percent, is low relative to the other states, with a rank of 45.

Connecticut's business churn rate has decreased through the 1990s, at an average growth rate of -0.76 percent per year. This puts the state in the middle of the pack, ranking 24th.

Business Churn: Friend or Foe?

As with the churn of jobs, there's no mistaking where the change in America's corporate pecking order is taking us—to a postindustrial economy that provides what Americans want. We may lament the tragedies of the churn's downside, but we shouldn't lose sight of its very powerful and important upside: it makes us better off. What's really going on is a healthy recycling of resources. In other words, it's conservation, not carnage.[9]

The churn creates hardships, including job losses and business failures, but it pays off handsomely with higher standards of living. For proof, Americans need only look around. The United States has endured more than two centuries of the churn. Companies and entire industries have come and gone. Millions of jobs have been created, destroyed and re-created. All the turmoil was worth it: an agrarian country transformed itself into one of the world's most advanced and prosperous nations.[10]

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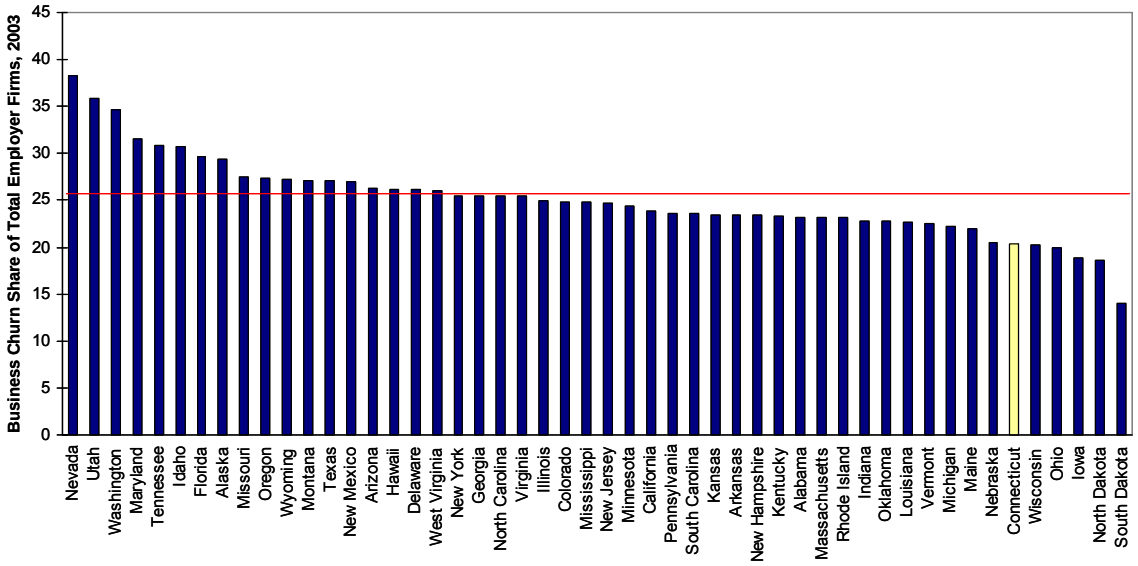
[8] U.S. Small Business Administration Office of Advocacy and The Ewing Marion Kauffman Foundation, *Entrepreneurship in the 21st Century: Conference Proceedings*, March 26, 2004, http://www.sba.gov/advo/stats/proceedings_a.pdf, page 8.

[9] Michael W. Cox, *Appreciating the Churn*, Federal Reserve Bank of Dallas, "Expand Your Insight," March 1, 1999, http://www.dallasfed.org/eyi/free/9903free.html.

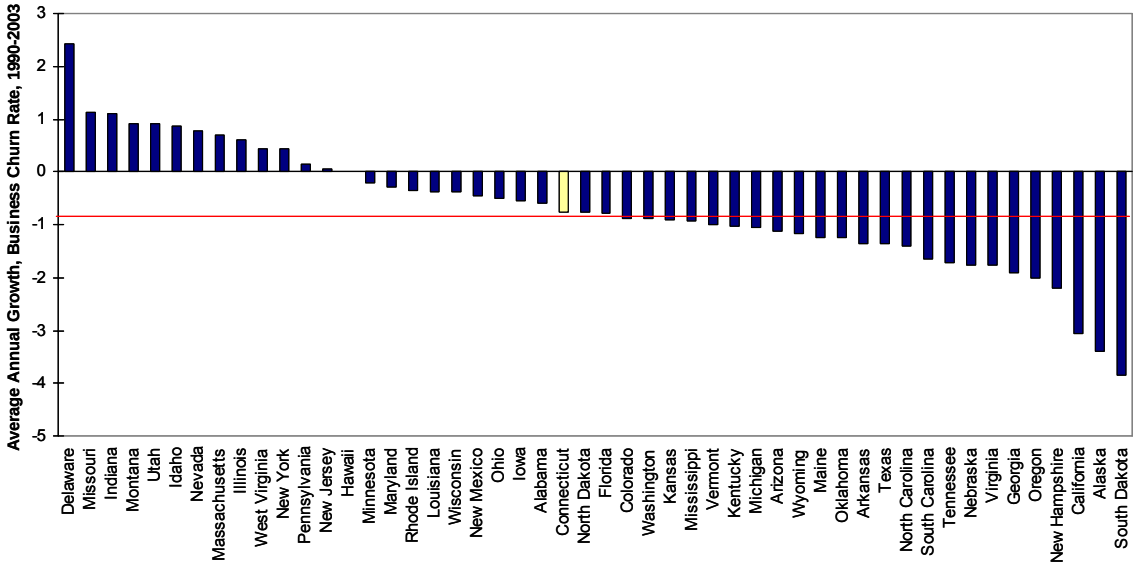
[10] Meredith M. Walker and Richard Alm, *China's Churn*, Federal Reserve Bank of Dallas, September 2000 http://www.dallasfed.org/research/pubs/churn.html.

Connecticut's business churn rate is low relative to the other states.



Source: U.S. Small Business Administration

Connecticut's business churn rate decreased through the 1990s.



Source: U.S. Small Business Administration

Small business employment

Small business (<100 employees) share of total employment

Sources: U.S. Small Business Administration, U.S. Bureau of Labor Statistics

Small business is seen as a cornerstone of the New Economy. Small, vibrant businesses, early in their life cycles, are often tomorrow's fast-growing and successful firms.

Connecticut's small businesses account for more jobs in the state (33 percent) than the national average (31 percent), and the state ranks 15th relative to the others.

However, the state's average growth in small businesses, at 0.86 percent per year, ranks 46th among the states, and is lower than the national average of 1.48 percent.

SPOTLIGHT: Small Business Trends and Issues

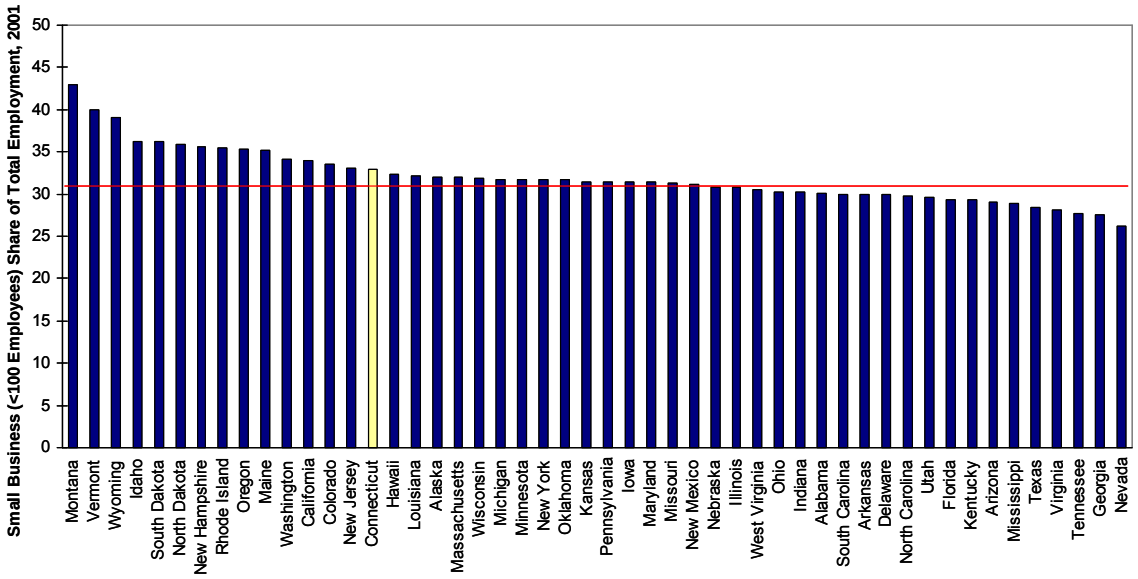
The U.S. Small Business Administration and the Ewing Marion Kauffman Foundation hosted a conference about entrepreneurship in today's economy in March 2004. Three trends for small businesses in financial markets were noted:

- Small businesses will receive loans through credit scoring, rather than building relationships with banks.
- New regulations for capital requirements will call for large banks to use a ratings-based system to assign risk, which should create lower costs and therefore increase small-business lending.
- Further consolidation in the banking industry will occur.

What are the most critical issues facing small businesses? Various costs—including health insurance, regulations, litigations and the tax burden—are too high. Global competition is also seen as an important factor facing the small-business community.[11]

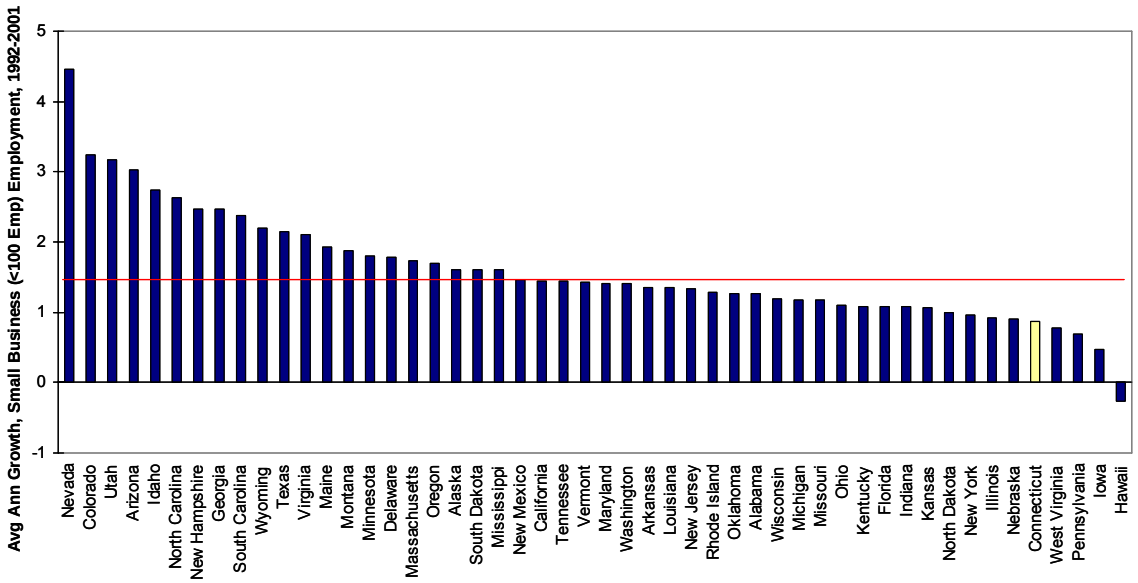
[11] U.S. Small Business Administration Office of Advocacy and The Ewing Marion Kauffman Foundation, *Entrepreneurship in the 21st Century: Conference Proceedings*, March 26, 2004, http://www.sba.gov/advo/stats/proceedings_a.pdf.

Connecticut's small businesses account for more jobs in the state than the national average.



Sources: U.S. Small Business Administration, U.S. Bureau of Labor Statistics

However, Connecticut's growth in small business employment is slower than the nation.



Source: U.S. Small Business Administration

Entrepreneurs (Proprietors)

Nonfarm proprietors per 1,000 people

Sources: U.S. Bureau of Economic Analysis, U.S. Census

Entrepreneurs are innovative and have the drive to start business ventures, which are critical components for a thriving economy.

As a share of the population, entrepreneurs are more concentrated in Connecticut than the nation as a whole. Connecticut's concentration ranks 14th among the states.

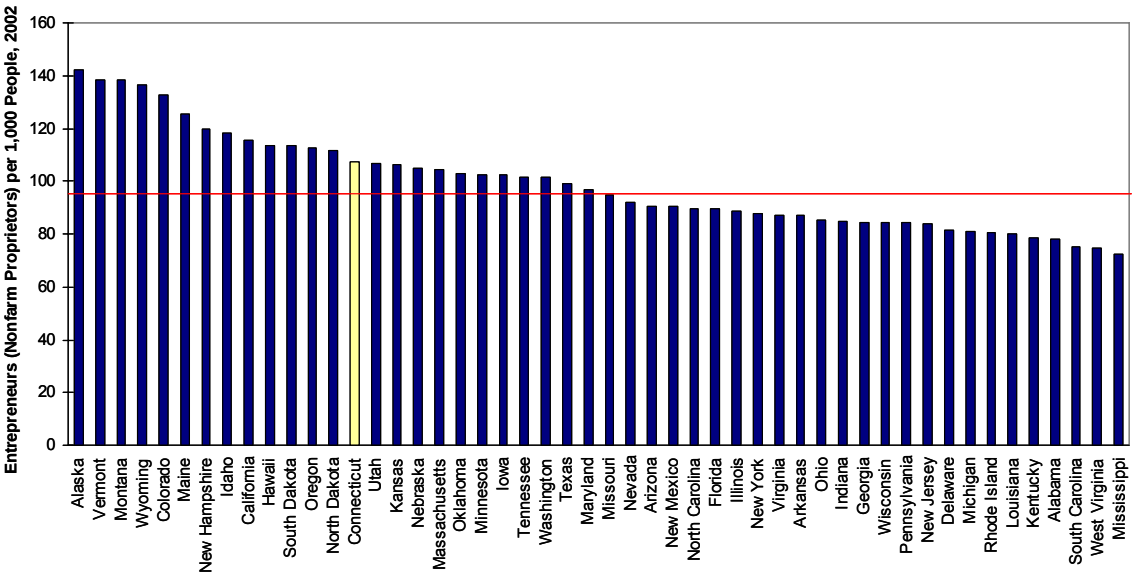
However, growth in entrepreneurs trails the nation. Connecticut's average annual growth is 2.02 percent, which is lower than the national average of 2.86 percent and the sixth slowest rate among the states.

SPOTLIGHT: Entrepreneurship in the European Union (EU)

According to serial entrepreneur Stelios Haji-Ioannou, creator of easyJet, a low-cost airline, Britain has the best environment for entrepreneurs in the EU. In France, there are serious social and legal penalties for business failures, so the residents are more risk averse. And in Greece, entrepreneurs generally provide goods and services to one major customer, the government. This is not always looked upon favorably, because if the entrepreneurs enjoy substantial profits they are at the expense of the taxpayers. Britain is tolerant of foreign entrepreneurs, as opposed to France and Germany, whose citizens prefer supporting local companies. However, even though Britain is receptive to people willing to take risks to start business ventures, the country has much to learn from the U.S., mainly because of differences in attitudes toward risk. In Britain, a business failure is never forgotten, but in "America a past business failure is almost a badge of honour."[12] In Mr. Haji-Ioannou's eyes, "if you are not failing occasionally, you are not taking enough risk and there is no reward without risk."[13]

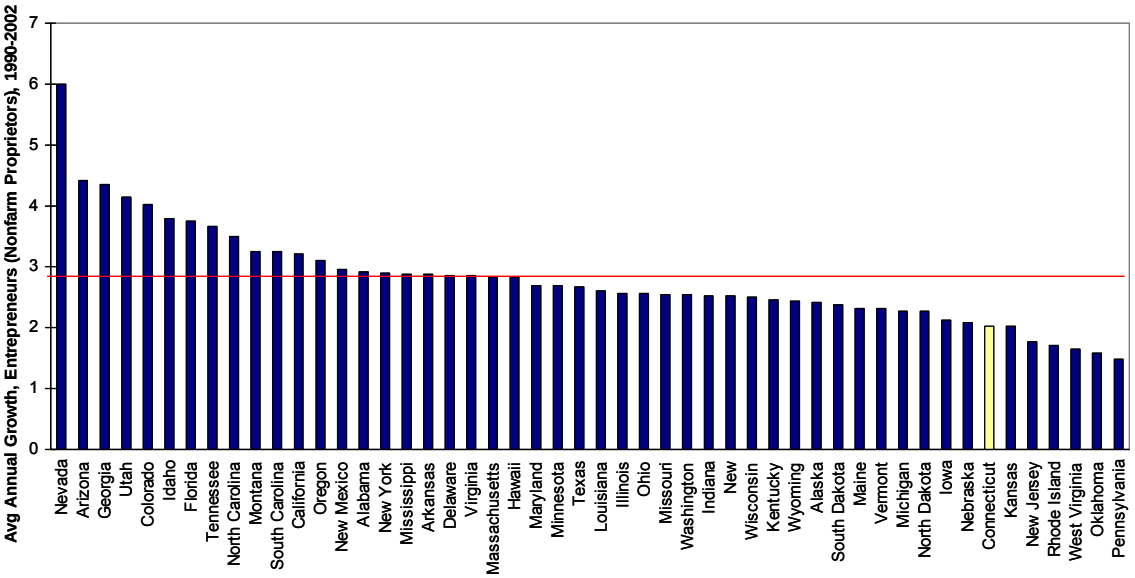
[12] Stelios Haji-Ioannou, *Risky Business*, "The Economist: The World in 2005," page 85.
[13] Ibid.

There is a larger concentration of entrepreneurs in Connecticut.



Source: U.S. Small Business Administration

However, growth in entrepreneurs trails the nation.



Source: U.S. Small Business Administration

Federal Research & Development (R&D) Intensity

Federal R&D expenditures as a share of gross state product (GSP)

Sources: National Science Foundation, U.S. Bureau of Economic Analysis

The level of R&D activity in a state reflects both the success of the state in garnering federal R&D dollars and the willingness of firms to invest in their futures.

Federal R&D expenditures in Connecticut lag behind most states and the nation. In 2002, Connecticut received $94 million of the $18.1 billion federal R&D in the U.S., which is just 0.06 percent of the state's GSP. Connecticut's ratio of federal R&D to GSP was the eighth lowest in the nation.

Although Connecticut does not capture a large portion of U.S. federal R&D, its average growth rate is about 6.6 percent per year. In 1993, Connecticut's R&D level was just under $53 million, and it dropped $17.7 million in 1995. However, in 2001 and 2002, federal R&D increased to more than $90 million each year.

SPOTLIGHT: Connecticut and Federal R&D

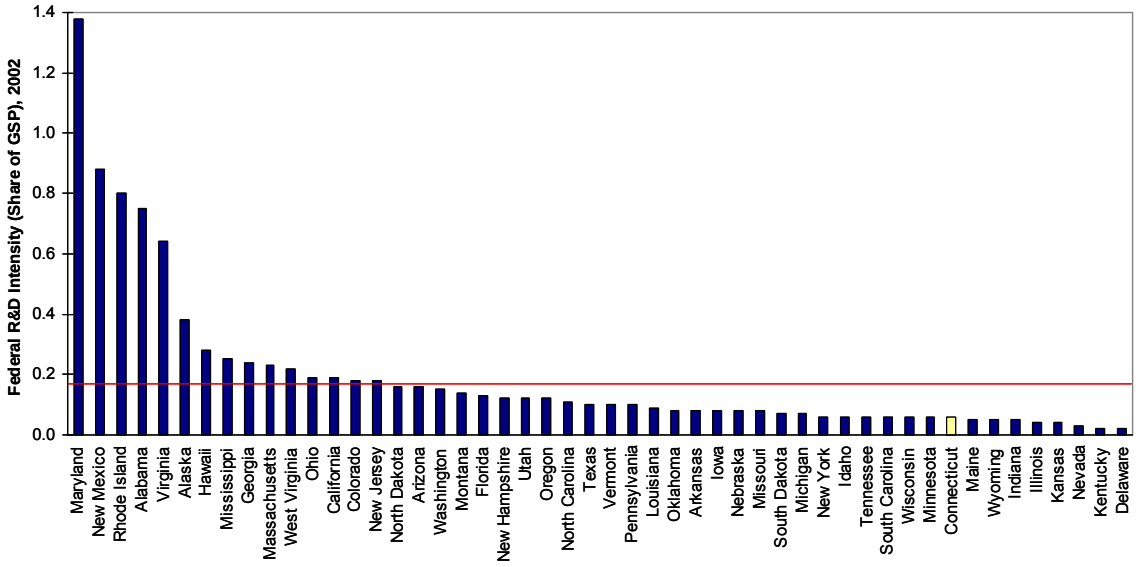
The National Science Foundation keeps track of federal obligations for R&D for each state by agency. For Connecticut in FY 2002, the overwhelming majority of federal funds, almost 70 percent, comes from the Department of Defense. Another 25 percent of the obligations originated with the Department of Health and Human Services. Less than two percent came from both the National Science Foundation and NASA. About one percent was from the Department of Energy, and the other major funding agencies (Department of Transportation, Department of Agriculture, Department of Commerce, EPA, and Department of the Interior) were sources of amounts that equaled less than one percent of the total each.[14]

Companies that consistently receive large amounts of federal R&D funds are General Electric and United Technologies. Yale University is the largest university recipient of federal R&D in the state.[15]

[14] National Science Foundation, Division of Science Resources Statistics, *Survey of Federal Funds for Research and Development, FYs 2002, 2003, and 2004*, Table C-84b, http://www.nsf.gov/statistics/nsf05307/sectc.htm#group13.

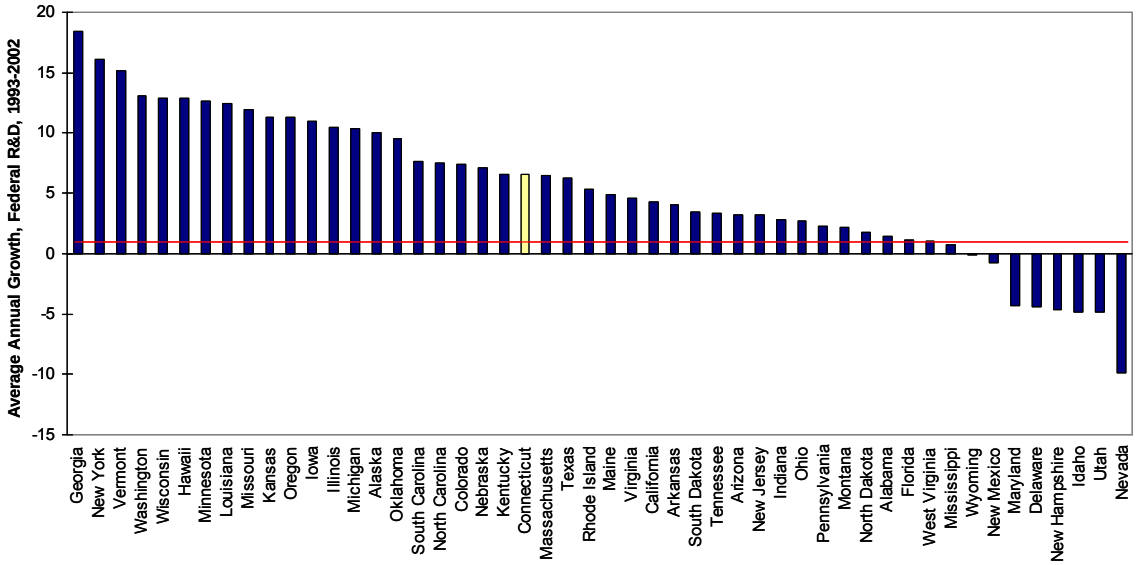
[15] American Association for the Advancement of Science, *Federal R&D to Connecticut by Agency*, http://www.aaas.org/spp/rd/ct100ch1.pdf; and Alliance for Science & Technology Research in America, *Science R&D Benefits to Connecticut!* 2002, http://photonicsclusters.com/pdf/StateRDCTfin.pdf.

Federal R&D expenditures in Connecticut lag behind most states and the nation.



Sources: National Science Foundation, U.S. Bureau of Economic Analysis

Although Connecticut does not capture a large portion of U.S. federal R&D, its growth rate has increased since the early 1990s.



Source: National Science Foundation

Industry R&D Intensity

Industry R&D expenditures as a share of gross state product

Sources: National Science Foundation, U.S. Bureau of Economic Analysis

As the source of new innovations and patents, R&D activity is a key indicator of future success.

Connecticut received more than $6 billion in industry R&D in 2002. This represented 3.7 percent of the state's GSP, which gave Connecticut a rank of third. Industry R&D expenditures in Connecticut are stronger than in all of the Northeastern states and the U.S.

And R&D keeps growing. Connecticut's average growth rate in this category was more than 11 percent per year, placing Connecticut 16th for the growth aspect of this variable.

SPOTLIGHT: Funding Basic Research

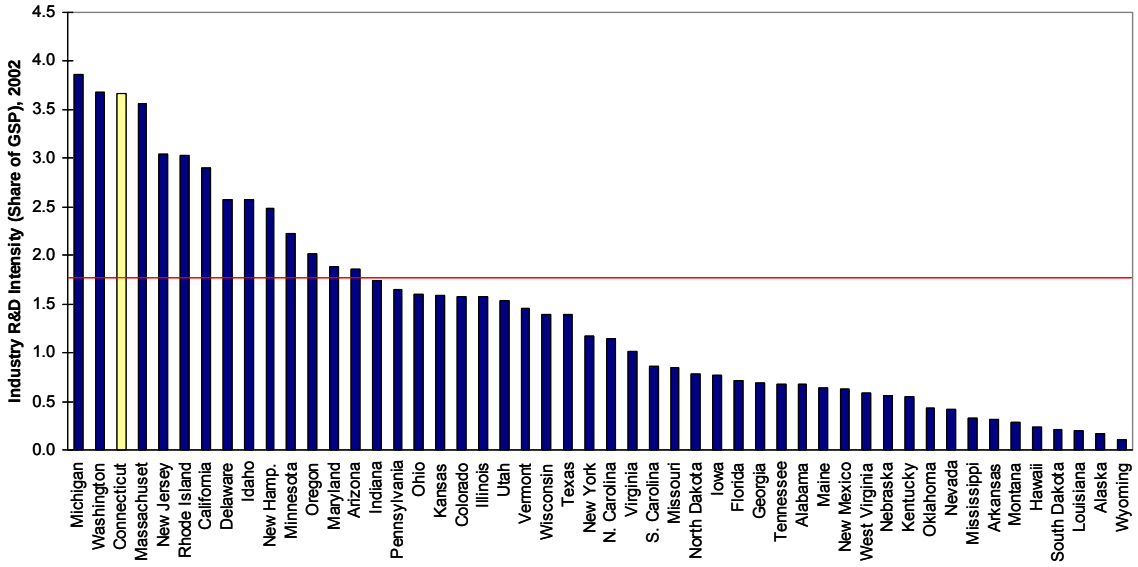
Industry allocates the majority of its R&D to product development, and only a fraction to basic research. Since much basic research is funded by federal sources, there is a concern that decreases in long-term federal research will hurt innovation in industries that rely heavily on this basic research, and hurt the Connecticut economy, which relies on these industries, including defense, aerospace and information technology.[16]

Public funding for research has kept America at the frontiers of discovery, creativity and research breakthroughs. The long time-frames, inherent risks and inability to capture returns on investment make discovery research inherently a governmental function. But publicly funded research has been steadily moving away from the frontiers of knowledge and closer to application and development. The federal research investment has grown conservative – increasingly driven by consensus, precedent and incremental approaches. At this time of global opportunity and challenge, what is needed is a return to the basics – a forward-looking vision that drives the nation's research investment across uncertain terrain toward new knowledge and breakthrough innovation.[17]

[16] Alliance for Science & Technology Research in America, *Science R&D Benefits to Connecticut!* 2002, http://photonicsclusters.com/pdf/StateRDCTfin.pdf.

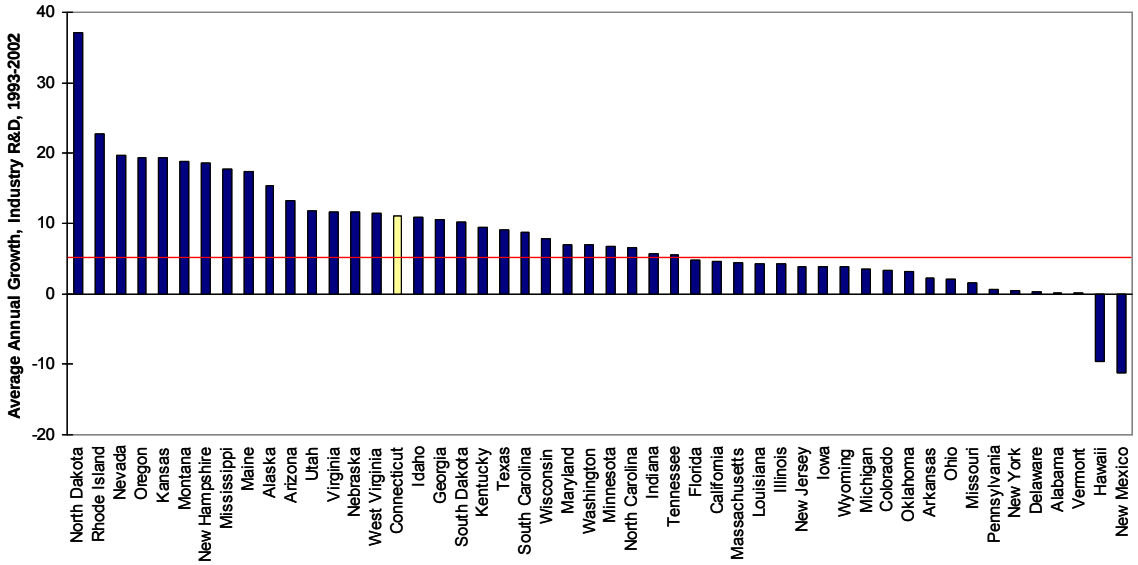
[17] Council on Competitiveness, National Innovation Initiative Report, *Innovate America*, December 2004, http://www.compete.org/pdf/NII_Final_Report.pdf, page 31.

Industry R&D expenditures in Connecticut is substantial.



Sources: National Science Foundation, U.S. Bureau of Economic Analysis

Connecticut's industry R&D expenditures have been growing for the past six years.



Sources: National Science Foundation, U.S. Bureau of Economic Analysis

University R&D Intensity

University R&D expenditures as share of gross state product

Sources: National Science Foundation, U.S. Bureau of Economic Analysis

The R&D abilities of higher education institutions generate a vibrant infrastructure that attracts and grows technology companies.

As a share of GSP, university R&D in Connecticut is 0.32 percent, which approximates the nation's ratio of 0.35 percent.

However, in terms of growth, Connecticut falls behind the pack. The state's average annual growth rate of 4.4 percent is considerably lower than the U.S. average of 6.5 percent, and the second lowest state rate in the country.

SPOTLIGHT: University Technology Transfer and Commercialization

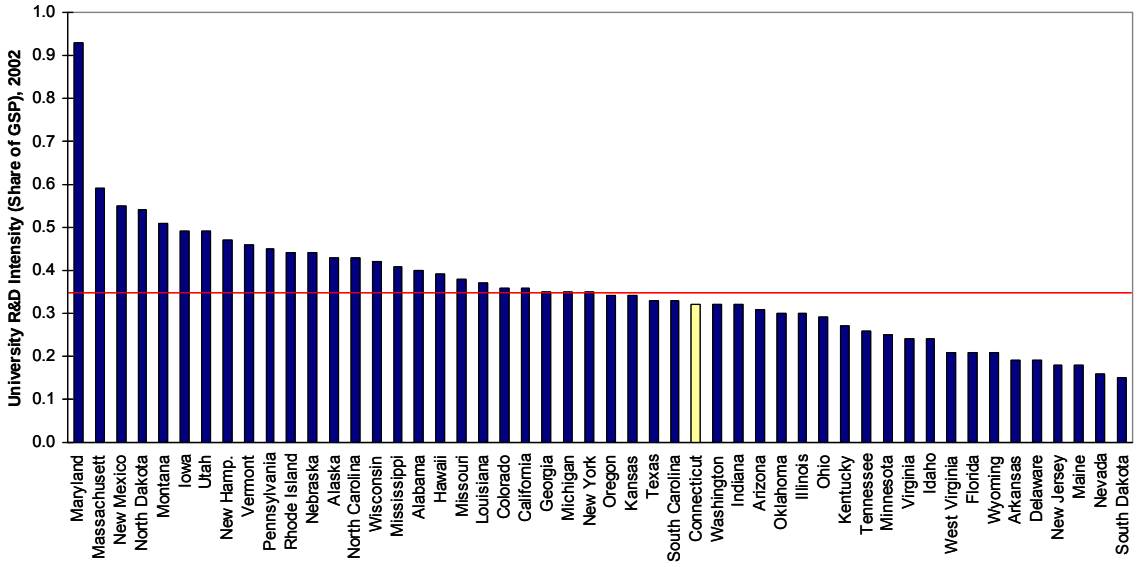
Universities are sources of innovation, especially in the areas of science and technology. In order to take advantage of Connecticut's resources, the Governor's Competitiveness Council created the Technology Transfer and Commercialization Advisory Board to oversee Connecticut's university-based economic development strategies. The Advisory Board hired Innovation Associates to identify best practices used by universities to stimulate technology transfer and commercialization and to provide recommendations to enhance activities in the state.

Activities that are consistent across the model universities for stimulating technology transfer include:

- Strong, focused university research base: Research is the base for commercialization
- Angel and early-stage capital: Access to financing is critical, along with business services such as business plan development
- Innovation centers: Centers provide focus for a host of activities
- Academic leadership and culture: The atmosphere facilitates the commercialization process
- Entrepreneurship programs: Courses and business plan competitions provide experience for science, engineering and business students
- Incubators and research parks: Create an "entrepreneurial presence"
- No quick fixes: Creating effective university-industry commercialization processes takes a number of years to achieve[18]

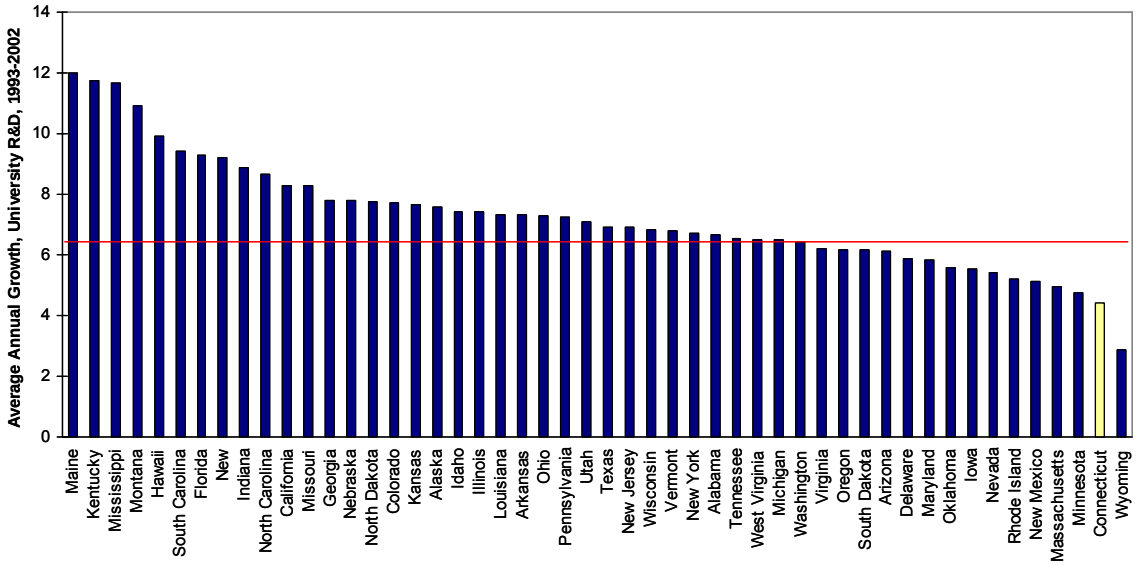
[18] Diane Palmintera, Innovation Associates, *A Report to the Connecticut Technology Transfer and Commercialization Advisory Board of the Governor's Competitiveness Council*, October 2004, http://www.youbelonginct.com/pupload/techtransreportweb.pdf.

University R&D intensity in Connecticut mirrors the nation.



Sources: National Science Foundation, U.S. Bureau of Economic Analysis

Connecticut's growth in university R&D lags the nation.



Source: National Science Foundation

Patents

Patents awarded per one million people

Sources: U.S. Patent & Trademark Office, U.S. Census

The number of new patents issued is an important indicator of the level and success of R&D activities occurring in a given state.

In 2003, 1,844 patents were awarded to individuals or organizations in Connecticut. On a per capita basis, Connecticut's patents are the 7th highest in the nation. This is an impressive ranking, except that Connecticut was either 1st or 2nd between 1992 and 1998. Since then five additional states have performed better.

The growth chart shows that Connecticut's growth in patents, 1.2 percent per year, is far below the national average of 4.8 percent, and the seventh slowest in the nation.

SPOTLIGHT: Patent Origins

Of the more than 169,000 U.S. patents awarded in 2003, almost half went to foreign inventors. The table shows the top five countries/states that were awarded U.S. utility patents. Japan is the clear leader. In terms of absolute number of patents awarded, Connecticut ranks 24th among all states and countries.[19]

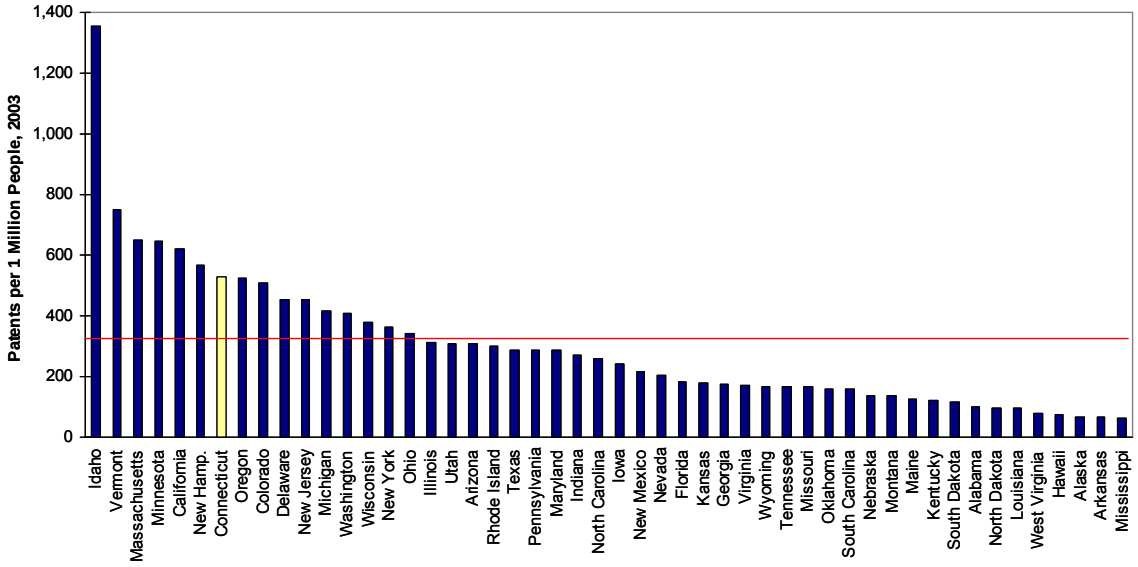
U.S. Patents Awarded	2003
Total, U.S. and Foreign Origin	169,028
-- Subtotal -- U.S.	87,901
-- Subtotal -- Foreign	81,127
Japan	35,517
California	19,692
Germany	11,444
New York	6,237
Texas	6,027

On the other hand, the European Patent Office (EPO) awarded 15,088 patents, or 25 percent of the total, to U.S. inventors in 2003. If we take into account the 10,291 patents awarded to Japanese inventors, more than 42 percent of the patents awarded by the EPO go outside the European Union.[20]

[19] U.S. Patent and Trademark Office, *Patents By Country, State, and Year - Utility Patents*, December 2003, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utl.htm.

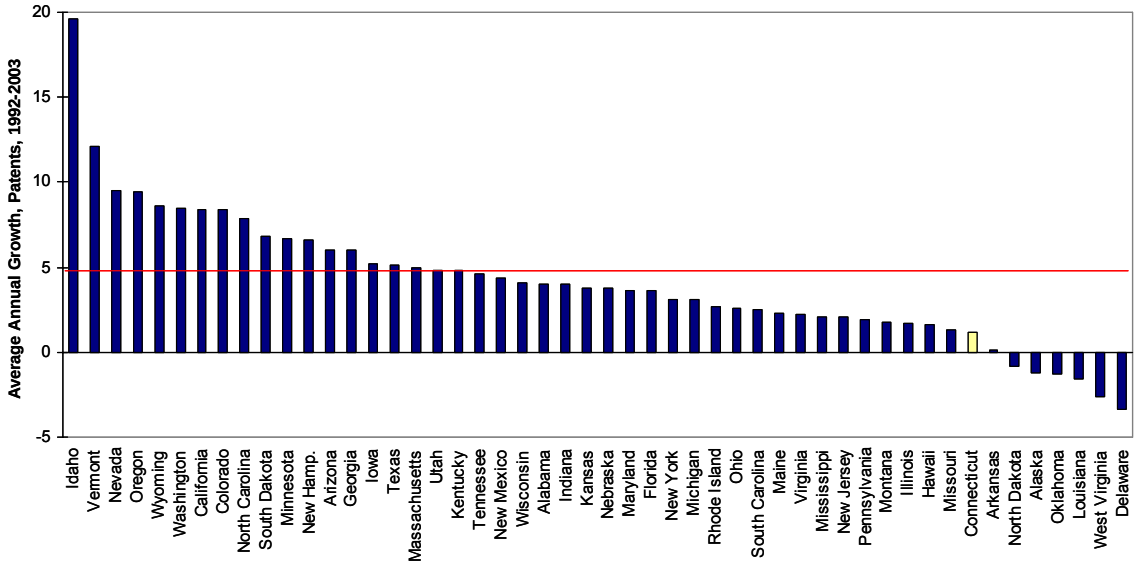
[20] European Patent Office, *European Patents Granted in 2003 (Article 97(4) EPC)*, 2003, http://annual-report.european-patent-office.org/2003/statistics/.

Connecticut's rate of new patent awards exceeds the U.S. average.



Sources: U.S. Patent and Trademark Office, U.S. Census

However, Connecticut's growth rate places it in the bottom quintile.



Source: U.S. Patent and Trademark Office

Human Capital Benchmarks

Connecticut's Standing

Connecticut's educated, skilled work force remains a powerful competitive advantage. But, as an aging state, Connecticut's growth is slow, and addressing the disadvantages confronting inner-city youth is essential.

Why It's Important

According to the widely accepted Solow model of economic growth, the performance of a state's residents is one of the most important inputs. This model states that at any time, an economy has certain amounts of capital, labor and knowledge (or effectiveness of labor), which are combined to produce output. So the economy's output changes if there is a change to the amount of capital, labor or knowledge. Over time, especially in a mature economy like Connecticut's, increasing capital and labor have less of an effect on the output of the economy. However, growth in the effectiveness of the labor can lead to sustainable output growth. [1] So knowledge and human capital are critical to every region, but especially important in a state with a demographic profile like Connecticut's. The variables in this category include:

- **National Assessment of Educational Progress (NAEP) math and reading exam performance**
  Percent of public eighth-grade students who achieved at or above basic level
- **Education affordability**
  Average annual cost of public, in-state, degree-granting, four-year higher education institutions as a share of median family income
- **College attainment**
  Percent of population over 25 years of age with at least a bachelor's degree
- **Science and engineering graduate students**
  Science and engineering graduate students per 1 million people
- **Science and engineering degrees**
  Science and engineering share of higher education degrees
- **Doctoral scientists and engineers in the work force**
  Doctoral scientists and engineers per 1,000 workers

[1] David Romer, *Advanced Macroeconomics*, The McGraw-Hill Companies, 1996.

Detailed Overview

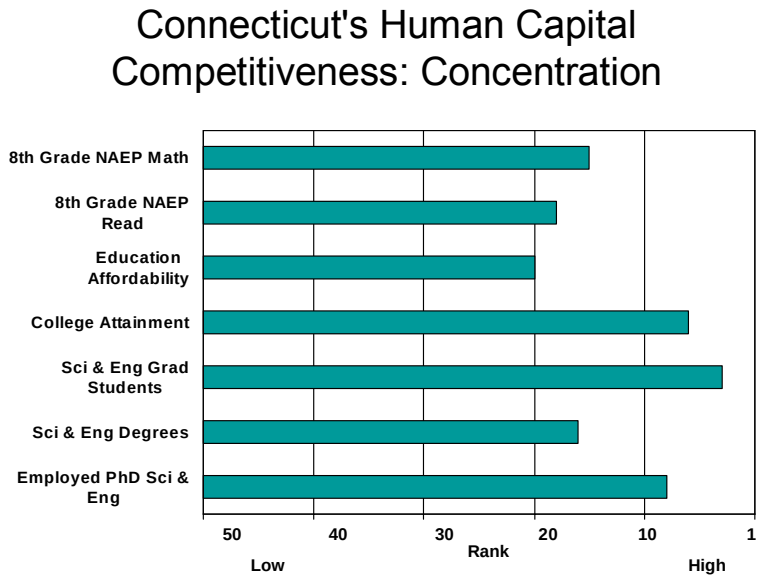
As mentioned in the introduction, Connecticut is a slow-growing state in a slow-growing region of the country. The state ranked 47th in relative population growth between 1990 and 2000. During the same period, Connecticut had the greatest relative loss in the 18-to-34-year age cohorts among the 50 states. The state had roughly 200,000 fewer people, almost 23 percent, in this age bracket in 2000 compared to 1990.

And the trends may continue. A variety of private and public population projections show Connecticut with flat or slightly negative growth during the next 10 to 20 years. The most optimistic forecast, from the U.S. Census, shows Connecticut with an average annual growth rate of about 0.5 percent per year for the next 20 years. The same forecast also shows a decrease in the number of 18-to-24-year-olds in the state.

But there is good news, too. Connecticut has seen some reversal of a trend in the out-migration of college freshmen. In 1992, more Connecticut high school graduates attended out-of-state colleges and universities than in-state. That trend continued through the 1990s until 2000, when almost 52 percent of Connecticut high school graduates enrolled in in-state colleges and universities. That figure climbed to 54.4 percent in 2002. [2]

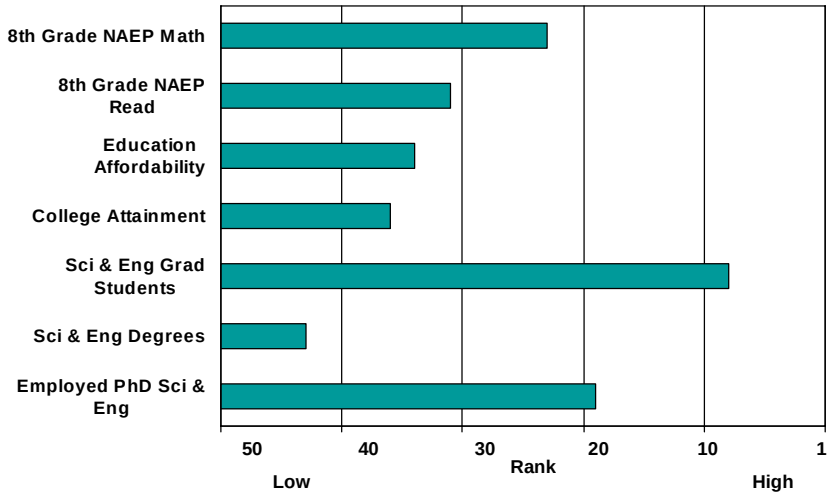
[2] www.postsecondary.org/pr/pr_02CT.asp and www.ctdhe.org/info/oldreports/rptExportStudents.htm

This category focuses on the academic success of our students and residents, relative to the other states. As a whole, Connecticut appears to have an edge in terms of concentration. In the case of concentration (below), Connecticut makes a generally strong showing in all categories, with the exception of education affordability, where the state performs in the middle among the states. Connecticut's composite score on the eight variables that make up this category place it 5th in the nation, which is compelling evidence of the state's strengths in this area.



Connecticut's performance on the growth dimension has not been as strong. One variable, science and engineering graduate students, saw a very strong positive change. However, most of the variables post mediocre or sluggish growth, placing Connecticut 35th for overall growth in this category. Of particular concern is the fact that other states are outpacing us in terms of college completion rates. The state also has weak growth in its number of science and engineering degrees. We are also beginning to lose ground in math and reading NAEP scores relative to other states.

Connecticut's Human Capital Competitiveness: Growth



There is a discrepancy between how Connecticut performs as a whole and what is happening within the cities. By 2020, it is estimated that 40 percent of new workers in Connecticut will come from its urban centers[3] such as Bridgeport, Hartford, New Haven, New London and Waterbury. This should be a concern to policy-makers because students in Connecticut's poorest school districts (Hartford, New London, Waterbury) as compared to Connecticut's wealthiest (Darien, Westport, Avon) are: [4]

- 1.7 times less likely to attend preschool (57 percent vs. 90 percent)
- Almost five times less likely to pass Mastery Tests at grades 4, 6 and 8 (13-15 percent vs. 60 percent)
- 10 times less likely to pass the CAPT at grade 10 (6 percent vs. 60 percent)
- 11 times more likely to drop out of high school (24.5 percent vs. 2.2 percent)

Even though much of this category focuses on college and graduate students, the development of human capital begins with interventions at the pre-kindergarten level. There is growing evidence that investments in early childhood development programs, especially for at-risk children, offer large public returns. [5]

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[3] Valerie Lewis, Commissioner, Connecticut Department of Higher Education, Presentation to Hartford Area Business Economists, November 18, 2003.
[4] Janice M. Gruendel, Ph.D., *Connecticut's Progress, Challenges and Innovation in Early Childhood Investment: A Brief Prepared for the National Governors Association*, February 2005.
[5] Rob Grunewald and Art Rolnick, *A Proposal for Achieving High Returns on Early Childhood Development*, Federal Reserve Bank of Minneapolis, December, 2004.

National Assessment of Educational Progress (NAEP) math exam performance

Percent of public eighth-grade students who achieved at or above basic level

Source: National Center for Education Statistics

The NAEP exam is one indicator of whether today's students, who will become tomorrow's work force, are mastering the basics in math.

In 2003, 73 percent of Connecticut's 8th-graders achieved at or above the "basic" level, as defined by the National Center for Education Statistics. This percentage was the 15th highest in the country, and six percentage points above the national average of 67.

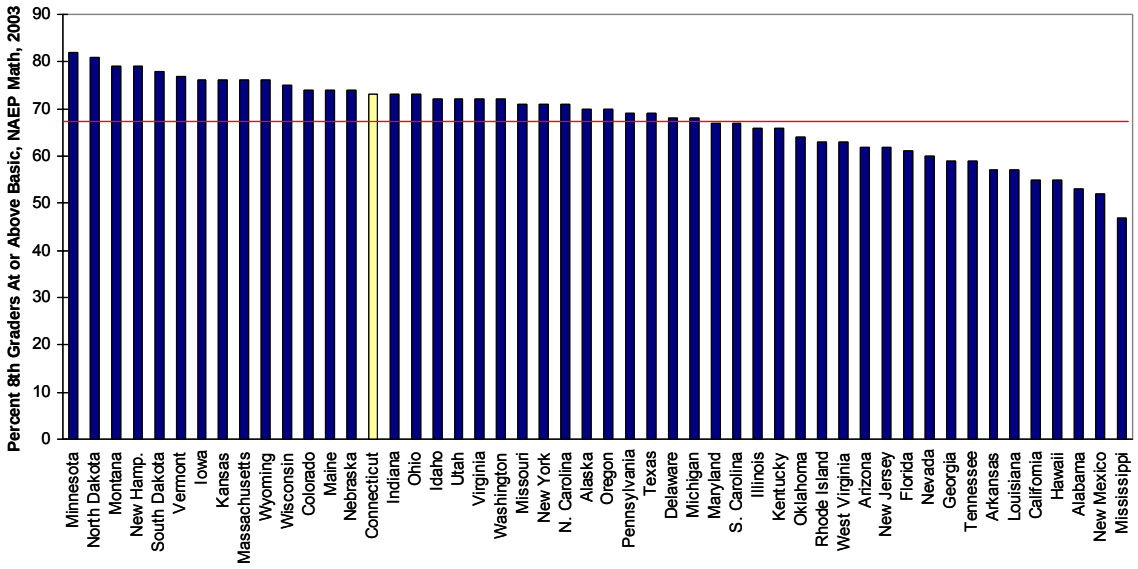
Connecticut has improved its percentage of students at the basic level, at an annual average rate of 1.2 percent, between 1992 and 2003. This growth score is below the national average and the scores of a number of other states, which means that other states are catching up to Connecticut.

SPOTLIGHT: Organisation for Economic Cooperation and Development (OECD) Comparisons

Every three years, OECD releases results from its Programme for International Student Assessment (PISA), which compares the relative academic successes of 15-year-olds from a number of industrialized countries. Compared with the mean scores for the 40 countries that participated, the United States ranked 28th in math, 18th in reading, 22nd in science, and 29th in problem-solving. If these trends continue, the U.S. may lose its place at the forefront of innovation, since other countries are increasing their capacities and aptitudes. [6]

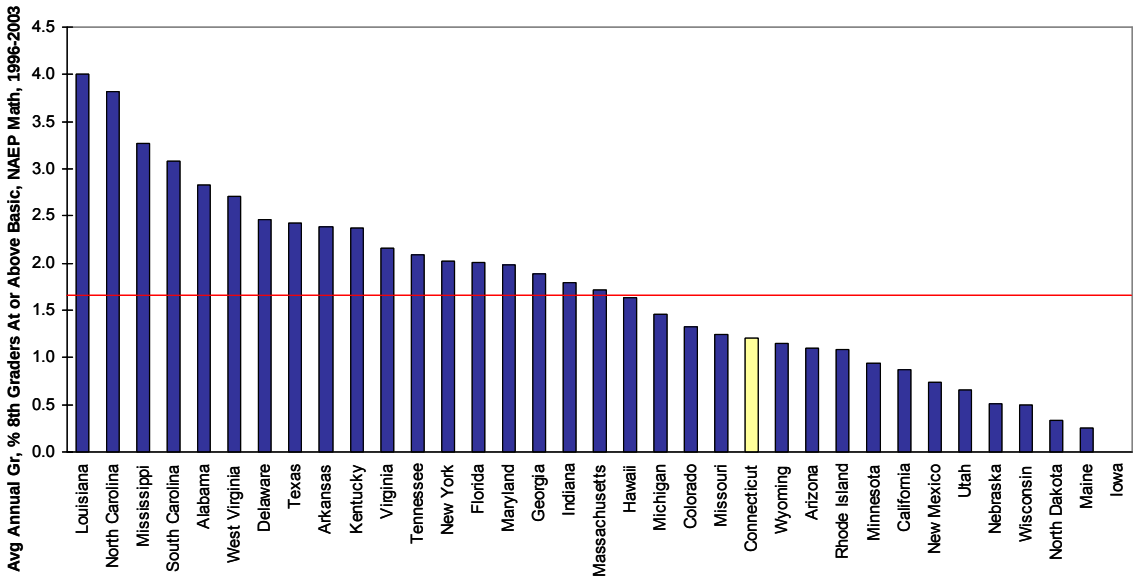
[6] OECD, Programme for International Student Assessment, *First Results from PISA 2003*, http://www.pisa.oecd.org/pages/0,2987,en_32252351_32235731_1_1_1_1_1,00.html

Connecticut's eighth-graders score better than the national average in math.



Source: National Center for Education Statistics

The growth in Connecticut's NAEP math score has been slower than the nation.



Source: National Center for Education Statistics

*Some states did not report 1996 test scores; therefore they are not included in this chart.

National Assessment of Educational Progress (NAEP) reading exam performance

Percent of public eighth-grade students who achieved at or above basic level

Source: National Center for Education Statistics

This indicator also examines whether today's students, who will become tomorrow's work force, have mastered basic reading skills.

In 2003, 77 percent of Connecticut's eighth-graders achieved at or above the "basic" level, as defined by the National Center for Education Statistics. This percentage was the 18th highest in the country, and three percentage points above the national average of 74.

Between 1998 and 2002, however, Connecticut's share of eighth-graders with the "basic" set of skills decreased, from 82 percent to 76 percent. In 2003, the state's share improved to 77 percent, but has not yet regained its 1998 level.

SPOTLIGHT: Connecticut Mastery Tests (CMT)

CMT Math, Grade 8, 2003

District Name	% Goal
Westport	91.8
Easton	90.0
Madison	88.1
Wilton	87.0
Avon	86.9
State	**56.3**
New London	22.6
Bridgeport	19.8
Bloomfield	19.6
New Haven	19.2
Waterbury	17.5

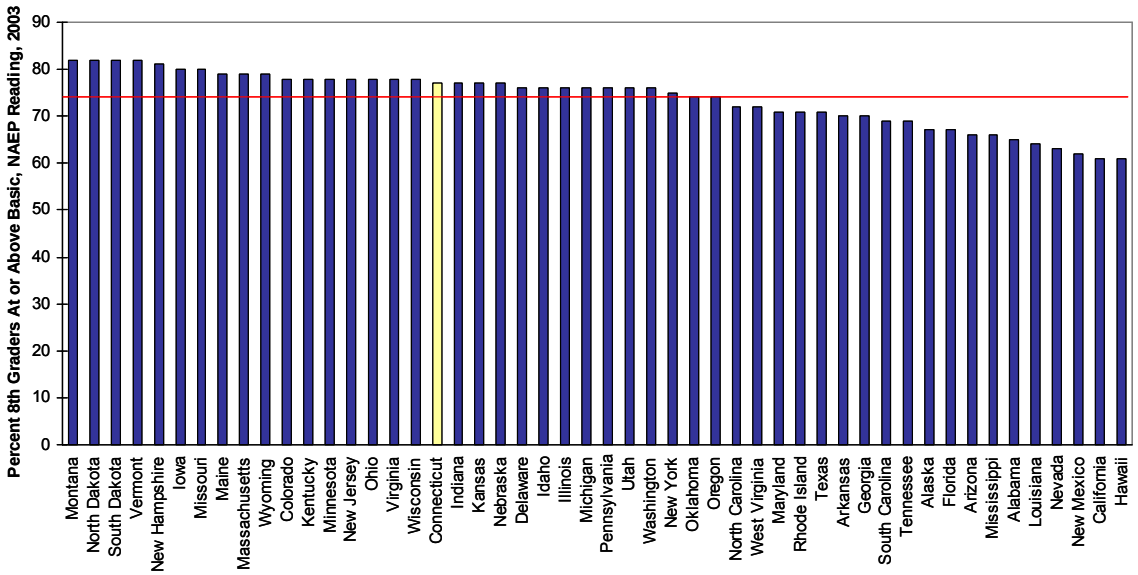
CMT Reading, Grade 8, 2003

District Name	% Goal
Westport	93.1
Suffield	92.6
Avon	92.4
Easton	92.4
Sherman	91.8
State	**66.7**
Windham	37.1
Hartford	34.8
Bridgeport	33.3
New London	31.4
New Haven	31.1

CMTs are administered every year to students in grades 4, 6 and 8 to gauge performance in math, reading and writing. The table to the left shows the school districts at the top and bottom of the range in terms of the percentage of students who achieved the goal in math, or level 4. The districts at the bottom of the pack are the urban areas. The right-hand table shows the school districts at the top and bottom of the range in terms of achieving the goal in reading. Again, the districts at the bottom of the pack are the urban areas. [7]

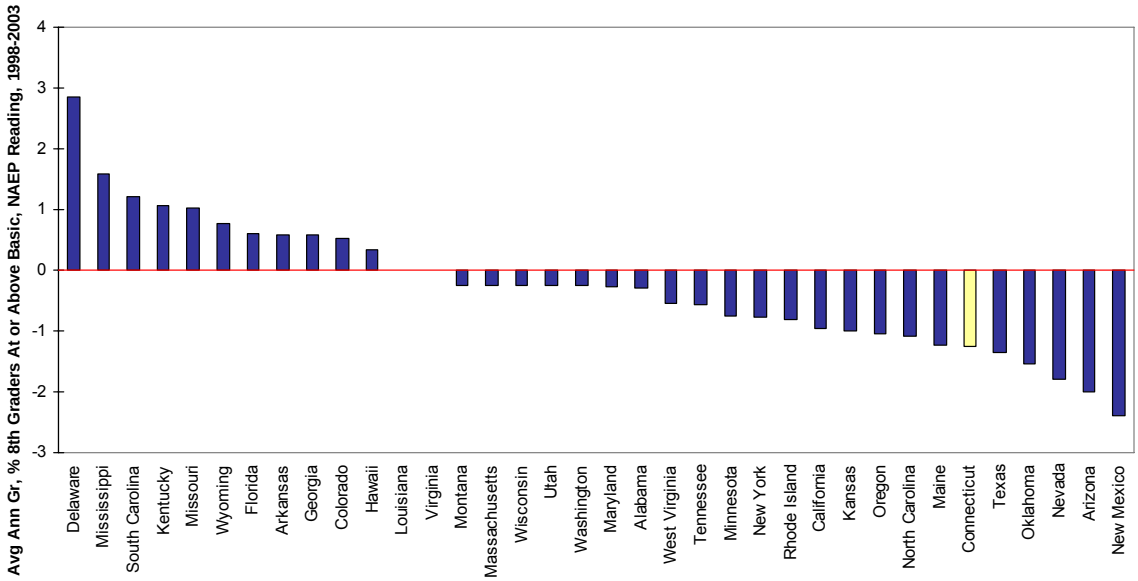
[7] http://www.cmtreports.com/iReport/index.html

Connecticut's eighth-graders score better than the national average in reading.



Source: National Center for Education Statistics

Connecticut's eighth-graders in 2003 were not performing as well in the 1998 level.



Source: National Center for Education Statistics

*Some states did not report 1998 test scores; therefore they are not included in this chart.

Education affordability

Average annual cost of public, in-state, degree-granting, four-year higher education institutions as a share of median family income

Sources: National Center for Education Statistics, U.S. Census

The availability of quality, affordable public education is a key competitive strength, and it is critical that students have access to higher education resources.

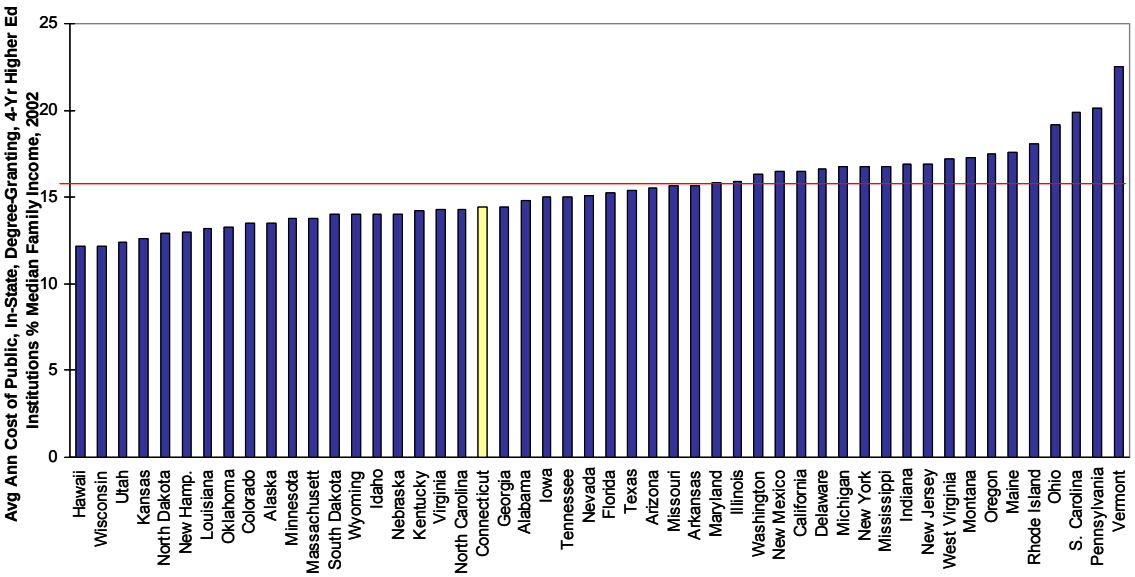
As a share of median family income, Connecticut's average public higher education cost in 2002 was lower than the national average and ranks 20th among all states.

However, costs are on the rise. Between 1991 and 2002, the annual cost of a public four-year higher education more than doubled in Connecticut from $5,976 to $11,805. Median family income, in contrast, has grown from $54,500 to $81,900, a 50 percent increase. The annual average growth rate of 6.4 percent is higher than 33 states, the nation and the average annual rate of inflation.

The State Science & Technology Institute also compiled data to compare the states in terms of college affordability between 1994 and 2004. Affordability is defined as the share of income needed to pay for college expenses minus financial aid. For two-year institutions in the state, costs have increased 22.2 percent to 22 percent of income. Public four-year institution costs have increased 26 percent to 20 percent of income in 2004. And for private, four-year institutions in the state, costs have increased almost 27 percent to 71 percent of income.[8]

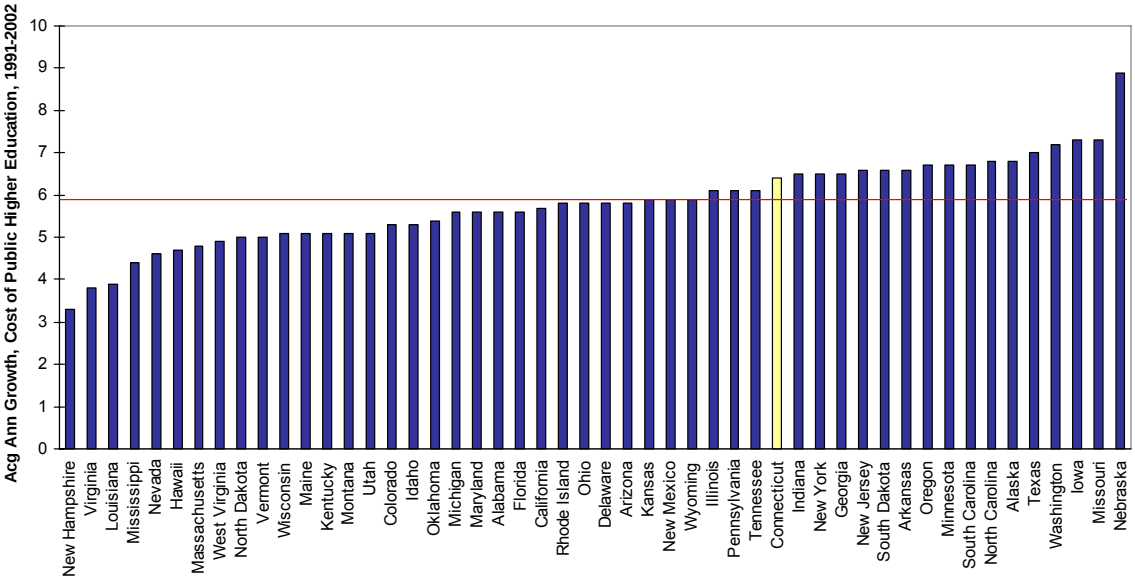
[8] State Science & Technology Institute, *State Rankings for Change in College Affordability, 1994-2004*, http://www.ssti.org/Digest/Tables/092704t.htm

Public higher education in Connecticut is relatively affordable.



Sources: National Center for Education Statistics, U.S. Census

However, higher education costs are on the rise.



Sources: National Center for Education Statistics, U.S. Census

College attainment

Percent of population over 25 years of age with at least a bachelor's degree

Source: U.S. Census

An educated work force is productive and innovative—key components for achieving economic growth.

Connecticut's college attainment rate of 34.5 percent in 2004 is the 6th highest in the nation, and almost seven percentage points higher than the national average of 27.7 percent.

Historically, Connecticut has had a highly educated population. Across the nation and state, the proportion of the adult population with a bachelor's degree increased steadily through the 1990s. In 1990, Connecticut was tied with Massachusetts for the highest college attainment. Since then, states have caught up to and surpassed Connecticut, which ranked 6th in 2004.

SPOTLIGHT: Public High School Graduation Rates

High school graduation rates have been receiving increasing attention from educational policy-makers since January 2002 when the No Child Left Behind (NCLB) Act became federal law. This law requires that high schools be held accountable for their graduation rates, as well as for the quality of education provided.

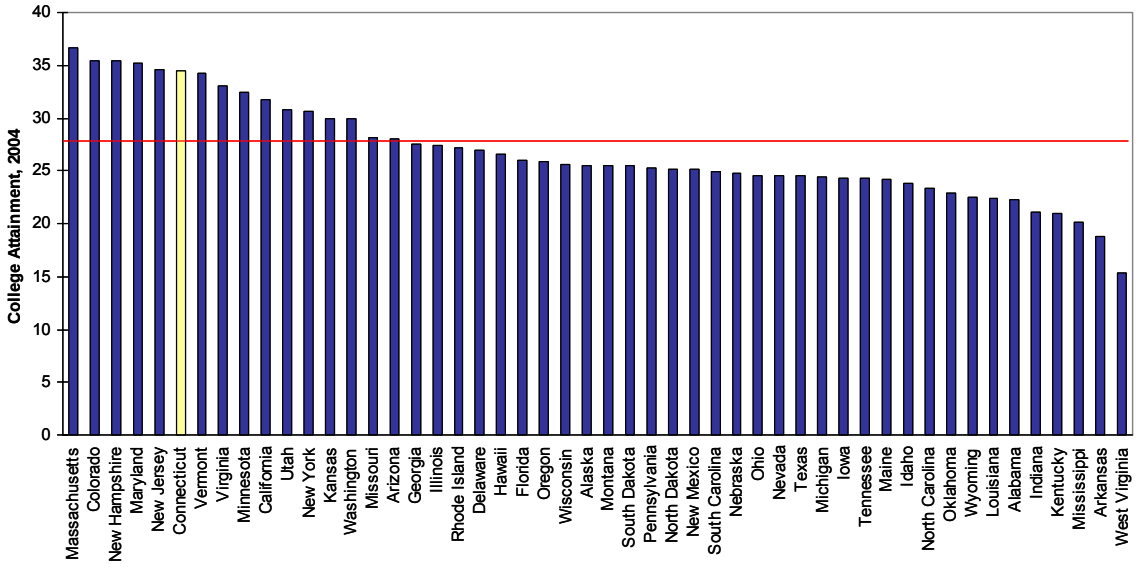
	High School Graduation Rate, 2001
West Hartford	90.2%
Stamford	82.1%
Norwalk	77.5%
State	**77.0%**
Meriden	73.5%
Danbury	72.9%
New Britain	67.2%
Bridgeport	57.3%
Waterbury	56.3%
New Haven	55.1%
Hartford	31.7%

The state's graduation rate[9] is 77 percent, which means that more than one-fifth of public high school students do not graduate. The table to the left shows the graduation rates for the 10 largest districts. Only three of these districts are above the state level. In Hartford, more than two-thirds of the students do not graduate. [10] This hurdle must be passed in order to qualify for participation in the knowledge-based economy.

[9] The graduation rates shown are based on Cumulative Promotion Indices (CPI) developed by the Urban Institute, which adhere to NCLB standards.

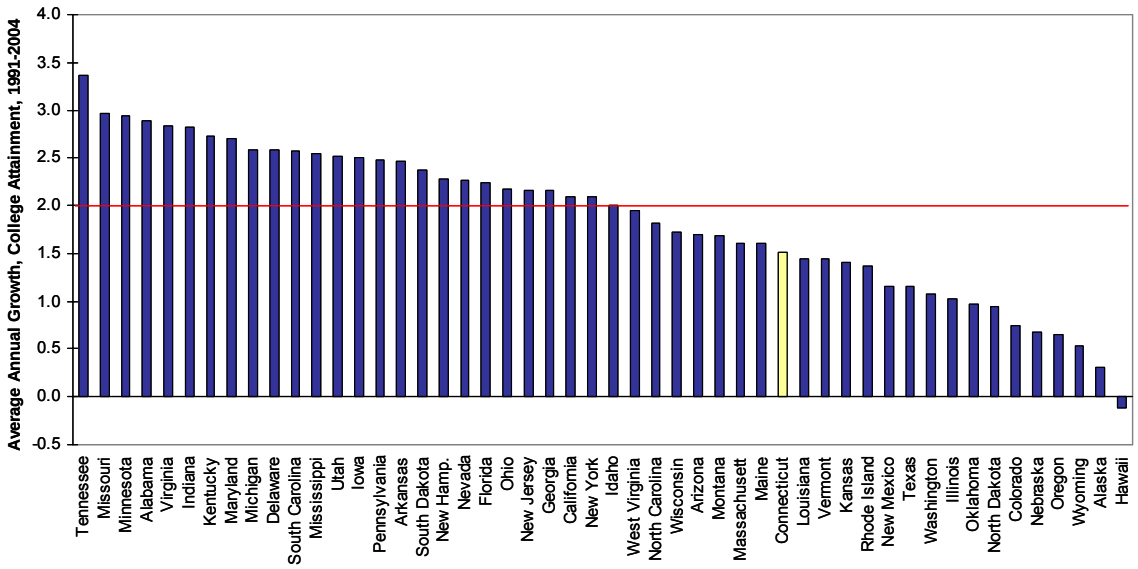
[10] Christopher B. Swanson, The Urban Institute Education Policy Center, *Who Graduates? Who Doesn't? A Statistical Portrait of Public High School Graduation, Class of 2001*, http://www.urban.org/url.cfm?ID=410934

More than one-third of Connecticut's adult population has a bachelor's degree or higher.



Source: U.S. Census

However, a number of states are catching up to Connecticut.



Source: U.S. Census

Science and engineering graduate students

Science and engineering graduate students per 1 million people

Sources: National Science Foundation, U.S. Census

The relative concentration of technically skilled people enrolled in graduate school is an indicator of the potential supply of scientists and engineers. However, given the mobility of skilled workers, it does not necessarily follow that the successful graduates will remain where they complete their education. This statistic may also be useful for determining if a state has a competitive educational system for these academic fields.

Connecticut has a higher concentration of science and engineering graduate students than most states in the U.S., ranking 3rd in 2002, but Massachusetts is the clear front-runner.

Connecticut's growth rate between 1992 and 2002 is positive and the 8th highest in the country.

OECD Countries	Tertiary Ed	Avg Yrs Schooling
United States	29.0	12.7
Norway	28.4	13.8
Netherlands	21.9	13.5
Canada	21.0	12.9
Japan	20.1	12.6
Australia	20.0	13.1
Iceland	19.9	13.4
Denmark	19.8	13.3
United Kingdom	18.6	12.7
Korea	18.5	11.7
Sweden	17.7	12.4
Spain	17.3	10.3
Switzerland	16.2	12.8
Ireland	15.9	12.7
Finland	15.6	12.4
New Zealand	14.8	10.6
Hungary	14.2	11.5
Germany	13.4	13.4
Belgium	12.8	11.2
Greece	12.7	10.5
France	12.4	10.9
Poland	12.1	11.9
Czech Republic	11.9	12.4
Luxembourg	11.6	12.9
Italy	10.4	9.4
Slovak Republic	10.4	12.5
Turkey	9.3	9.6
Portugal	7.1	8.0
Austria	7.0	11.3
Mexico	2.5	7.4

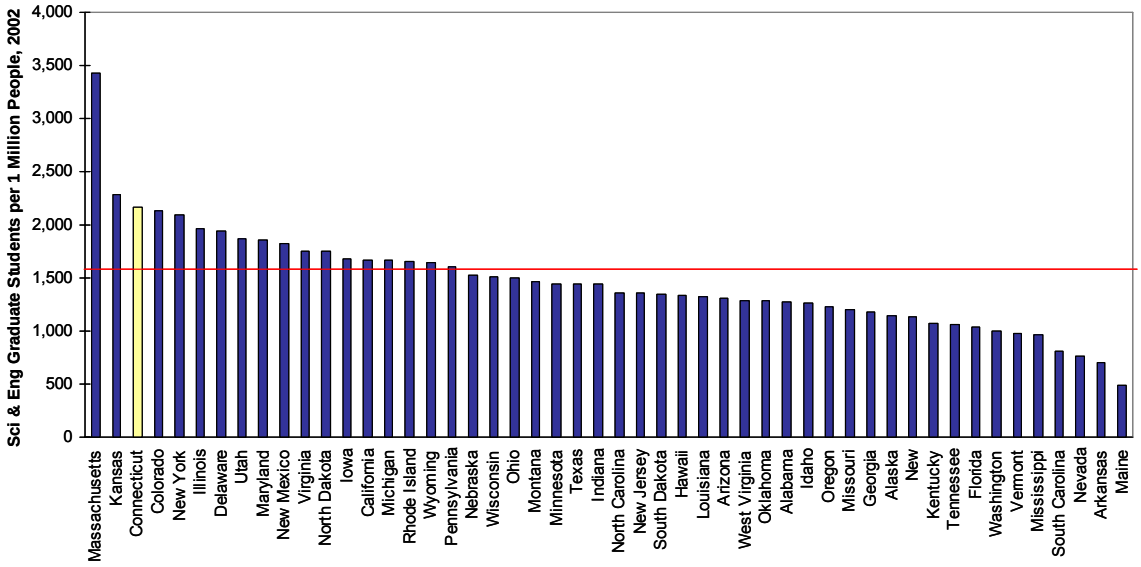
SPOTLIGHT: College Attainment by Country

The chart to the left ranks the Organisation for Economic Cooperation and Development (OECD) countries according to the percentage of 25-to-64 year-olds who have completed at least a college education ("tertiary ed" in chart) in 2002. The U.S. takes the top place, an indication of our educated population.

In terms of average years of schooling, the U.S. is tied for 10th with the United Kingdom and Ireland. [11]

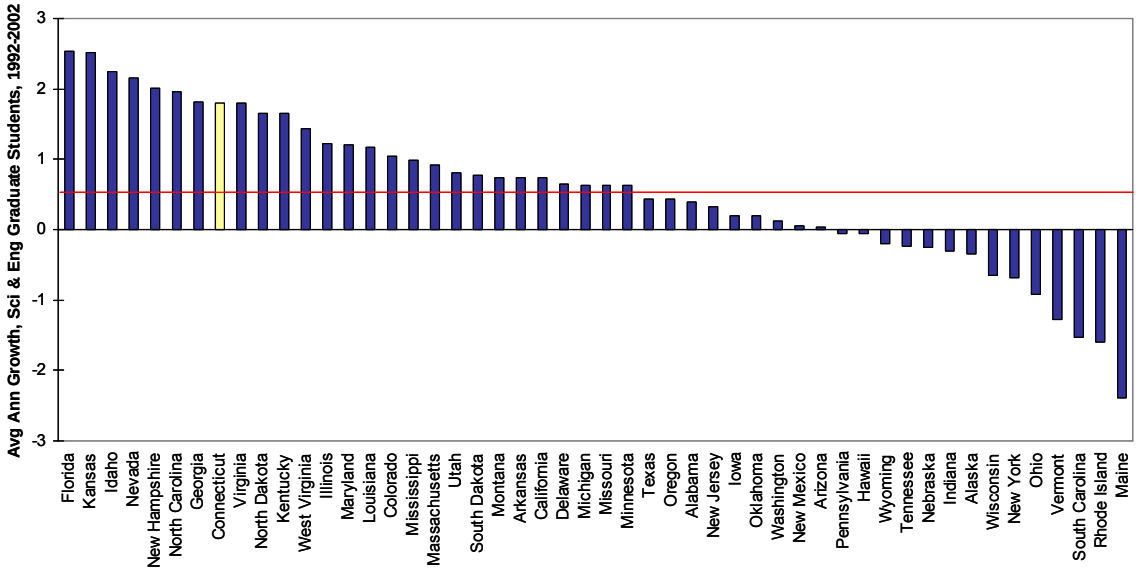
[11] OECD, *Education at a Glance 2004*, http://www.oecd.org/document/11/0,2340,en_2825_495609_33712011_1_1_1_1,00.html

Connecticut has a higher concentration of science and engineering graduate students than most states in the U.S., but Massachusetts is the clear frontrunner.



Sources: National Science Foundation; U.S. Census

Connecticut's growth rate is positive and faster than the national rate.



Source: National Science Foundation

Science and engineering (S&E) degrees

S&E share of higher education (bachelor's, master's, doctorate) degrees

Sources: National Science Foundation, National Center for Education Statistics

This metric is also an indicator of the potential availability of scientists and engineers and may also be used to determine if a state has a competitive educational system for these academic fields.

Connecticut ranked 16th for its share of higher education degrees that are in the science and engineering fields in 2000 (31.5 percent), which is above the national average of 30 percent. However, in terms of growth, Connecticut has not fared well. In 1990, the state awarded 6,419 science and engineering degrees, which increased to 7,042 in 2000. This growth rate of not even 1 percent per year during the last decade ranked Connecticut 43rd. For reference, population grew 3.5 percent in Connecticut during that time period.

SPOTLIGHT: Achievement Gaps Between Countries

A report by the United Nations Children Fund (UNICEF) in November 2002 mentioned in the Key Findings that a "child at school in Finland, Canada or Korea has a higher chance of being educated to a reasonable standard, and a lower chance of falling a long way behind the average, than a child born in Hungary, Denmark, Greece, the United States or Germany." [12]

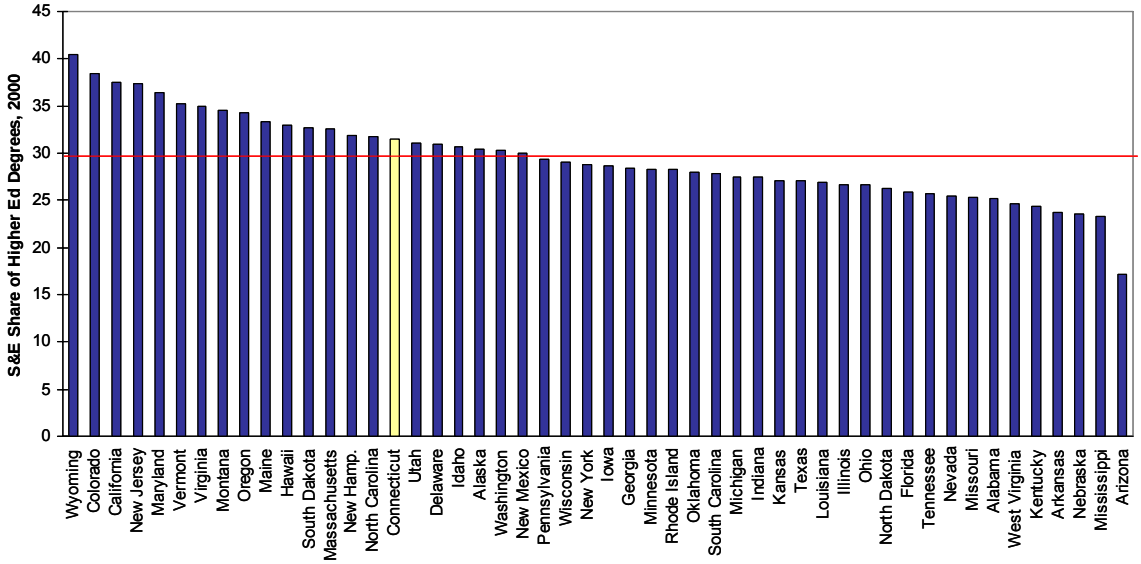
SPOTLIGHT: Welcoming International Scholars

Since fewer U.S. students pursue advanced degrees in science and engineering each year, companies and research institutions are becoming increasingly dependent on foreign nationals to supplement the work force. However, the visa quota determined by the U.S. Department of Homeland Security is too small relative to the need, and processing visas takes too much time. So many foreign workers and students are returning to their home countries or going to other welcoming host countries, such as Britain and Australia, to work and study. These international workers and students are critical for enhancing the work force and the perception of the U.S. abroad. The federal government is working to improve these issues, but it is also necessary for state and local governments to understand the importance of bringing the smartest international visitors to this country.[13]

[12] UNICEF, *A League Table of Educational Disadvantage in Rich Nations*, November 2002, http://www.unicef-icdc.org/publications/pdf/repcard4e.pdf, page 2.

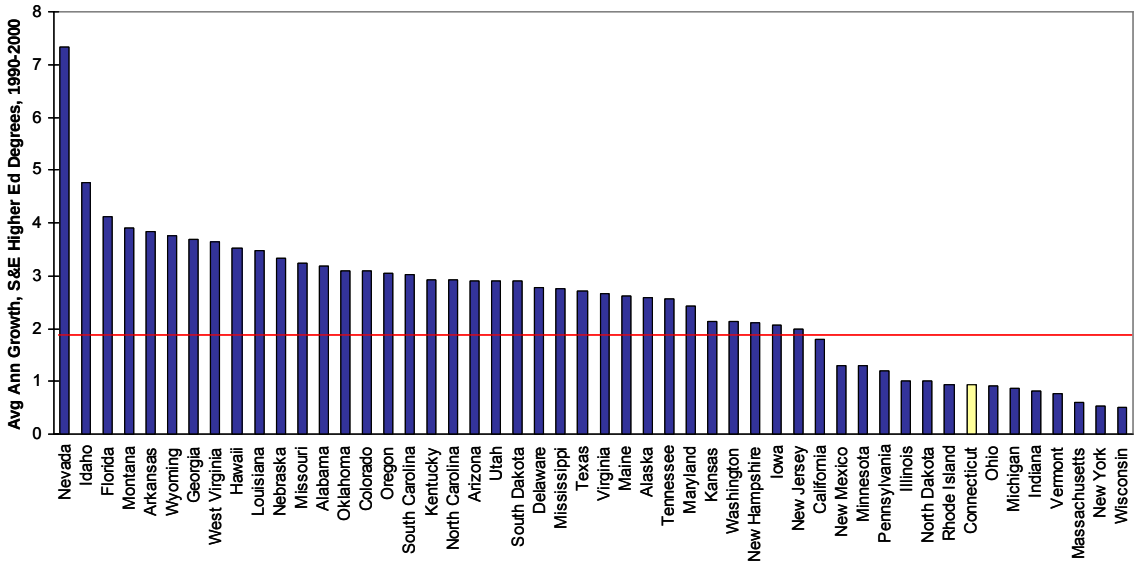
[13] Robert Gates, *Land of the Freeze*, "The Economist: The World in 2005," page 32.

More of Connecticut's graduates (bachelor's, master's, doctoral) have S&E degrees than the U.S.



Source: National Science Foundation

Connecticut's growth in the number of S&E degrees has underperformed most states and the U.S.



Source: National Science Foundation

Doctoral scientists and engineers in the work force

Doctoral scientists and engineers per 1,000 workers

Sources: National Science Foundation, U.S. Bureau of Labor Statistics

These workers are often at the forefront in developing breakthrough technologies in all areas of endeavor. States with higher concentrations presumably have advantages over those with relative shortages.

Connecticut's 5.7 doctoral scientists and engineers per 1,000 workers in 2001 was the 8th highest ratio in the country. However, the top five states (New Mexico, Maryland, North Dakota, Massachusetts and Delaware) have ratios well above 8.0.

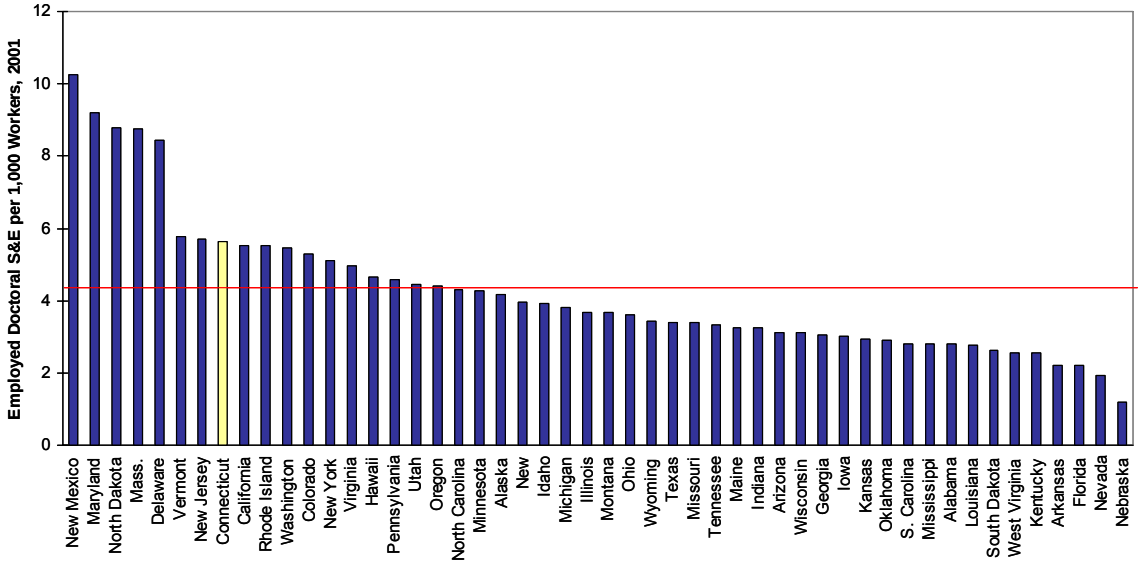
The number of doctoral scientists and engineers in the work force grew at an average rate of 3.2 percent per year between 1993 and 2001, which is greater than the national average and the 19th highest in the nation. However, North Dakota grew by almost 10 percent annually.

SPOTLIGHT: U.S. Student Performance Improvements in Math and Science

The National Center for Education Statistics released its Trends in International Mathematics and Science Study (TIMSS) of fourth- and eighth-graders. This assessment, performed every four years, found that U.S. eighth-graders improved their performances in both math and science since 1995, and the increase was better relative to the 21 other participating countries. [14]

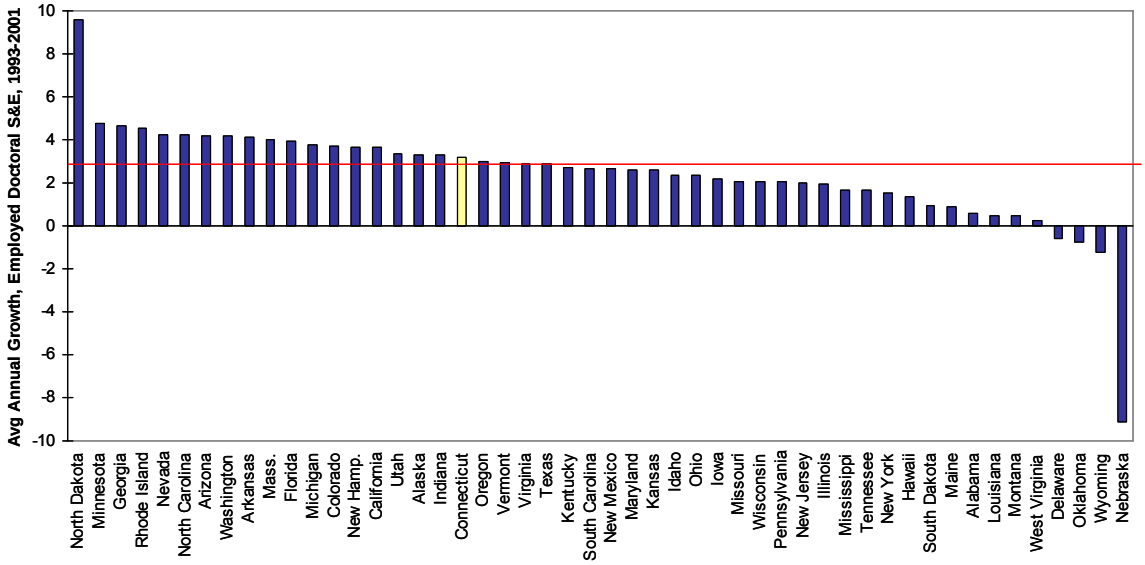
[14] NCES, *Highlights From the Trends in International Mathematics and Science Study: TIMSS 2003*, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2005005

Connecticut has a higher concentration of PhD-level scientists and engineers than the country.



Sources: National Science Foundation, U.S. Bureau of Labor Statistics

Connecticut's growth of PhD-level scientists and engineers is a bit faster than the country.



Source: National Science Foundation

Global Benchmarks

Where Connecticut Stands

By almost every measure, Connecticut today ranks as one of the most globally connected states. Its pace of growth in this area, however, lags most states.

Why It's Important

Globalization is the process of growing connectivity and integration among countries. Globalization includes more than just the trading of goods and services; it includes the sharing of ideas and cultures as well. The importance of global links and their significance in today's economy cannot be overemphasized. Many consider globalization to be an integral component of today's economy. Technological improvements, especially in telecommunications infrastructure, have opened the way for people, ideas, goods and services to move more freely among cities, regions and countries. Since the advent of the Internet, the pace of globalization has increased substantially, so that every community should ultimately consider itself part of a global economy. The variables in this category include:

- **Merchandise exports**
  Commodity exports per worker
- **Manufacturing export intensity**
  Manufacturing export sales as a share of total manufacturing shipments
- **Chemical exports**
  Chemicals' (NAICS 325) share of total exports
- **Computers & electronics exports**
  Computers and electronics' (NAICS 334) share of total exports
- **Immigrants**
  Immigrants admitted by state of intended residence per 1 million people
- **Foreign student enrollment in higher education**
  Foreign enrollees as a share of total higher education enrollees
- **Employment in foreign-owned firms**
  Foreign affiliate employment as a share of total nonfarm employment
- **Foreign capital investments**
  Capital investments of foreign affiliated firms per foreign affiliated worker

Detailed Overview

There is much debate about globalization, because the benefits and costs affect countries, industries and people differently. For developed countries with mature economies, free trade can adversely affect income distribution and reduce wages or decrease jobs for workers in the industries being traded. For developing countries that are just opening their markets to trade, the pacing and sequencing of liberalization, privatization and stabilization are essential to prevent crises. Realizing the benefits of globalization is gradual, and the benefits differ for countries in various stages of development.

Much of the debate is focused on offshoring, which refers to businesses purchasing from overseas goods or services that used to be produced within the company or purchased domestically. The U.S.-China Economic and Security Review Commission released a study in 2004 that estimates that as many as 406,000 jobs will move from the U.S. to other countries, with about one-quarter going to China in 2004. [1] Another report using the U.S. Department of Labor's Mass Layoff Survey (MLS) shows that layoffs due to relocations abroad have increased during the past five years, but represent a small share of the total workers laid off. Of the "1.5 million layoffs reported in the 2003 MLS, 13,000 (0.9 percent) were reportedly due to overseas relocation. The data also show that most of these layoffs were in the manufacturing sector." [2] However, the survey only records relatively large layoffs (50+ jobs within five weeks) from relatively large companies (50+ employees). The report notes that offshoring can create benefits "including lower prices, productivity improvements, job creation in sectors using offshored services, and overall higher growth for the U.S. economy." [3]

Since globalization is good for each nation as a whole, even though some local industries lose, policy-makers should work on strategies that minimize the pain caused and take into account the speed of social adjustment to the process of structural change. Also, policy-makers have to balance the ability to save jobs with increasing overall living

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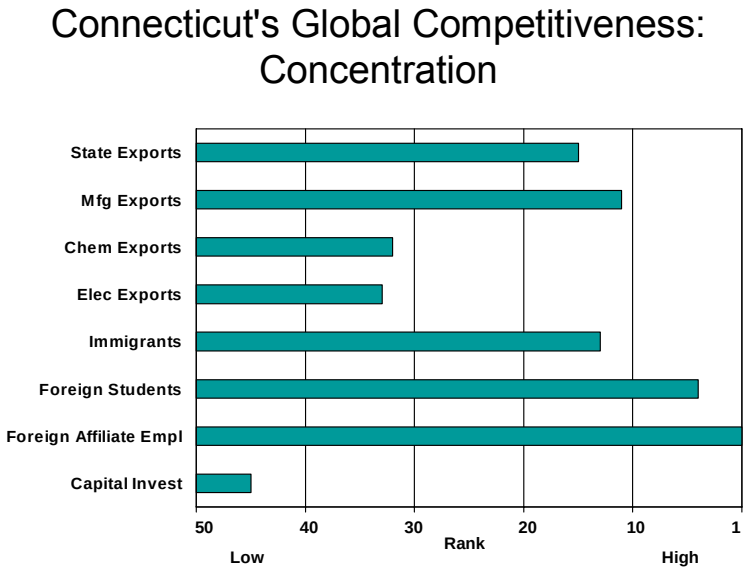
[1] The U.S.-China Economic and Security Review Commission, *The Changing Nature of Corporate Global Restructuring: The Impact of Production Shifts on Jobs in the U.S., China, and Around the Globe*, October 2004.
[2] U.S. Government Accountability Office, *International Trade: Current Government Data Provide Limited Insight into Offshoring of Services*, September 2004, page 3, http://www.gao.gov/new.items/d04932.pdf.
[3] U.S. Government Accountability Office, *International Trade: Current Government Data Provide Limited Insight into Offshoring of Services*, September 2004, page 4, http://www.gao.gov/new.items/d04932.pdf.

standards. There are so many dimensions to the issue of globalization that it is easy to see why there is so much debate on the topic. However, it is an issue worth debating, because it has the potential to harm or help many, depending on how it is handled.

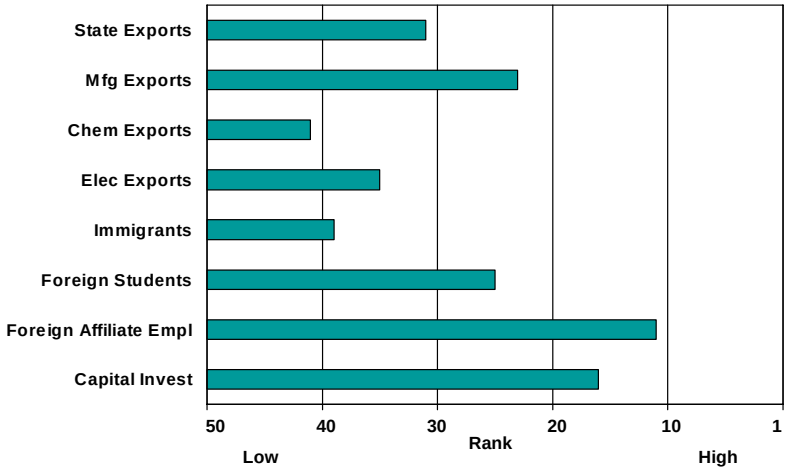
As the U.S. share of world markets declines, it is important for both public and private participants to ensure that their regions and firms are represented and competitive in emerging global markets. In addition, states and regions must constantly encourage and promote cultural diversity and international interactions.

Overall, Connecticut does very well in terms of its level or concentration of the Global Links metrics. It ranks 7th among all states in its composite concentration score. As shown in the graph below, Connecticut's performance ranges from quite strong (1st for foreign affiliate employment, 4th for foreign students) to weak (45th for foreign capital investment per foreign affiliate worker).



As with a number of the Northeastern states, Connecticut's growth indicators are less impressive than its concentration indicators. Overall, Connecticut ranked 29th among the states on its composite growth score. The state posted a strong performance in the growth of foreign affiliate employment.

Connecticut's Global Competitiveness: Growth



Merchandise exports

Commodity exports per worker

Sources: Office of Trade and Industry Information, U.S. Bureau of Labor Statistics

Exports are important for a region because they bring new money into the local economy, which further fuels the area through increases in profits, incomes and consumption levels.

Connecticut exports per worker were just under $5,000 in 2003, ranking the state 15th. However, this amount was just under the national average of $5,570. The national average was pulled up quite high because of the volume of exports in the leading states of Washington, Texas, Louisiana, Alaska and Vermont.

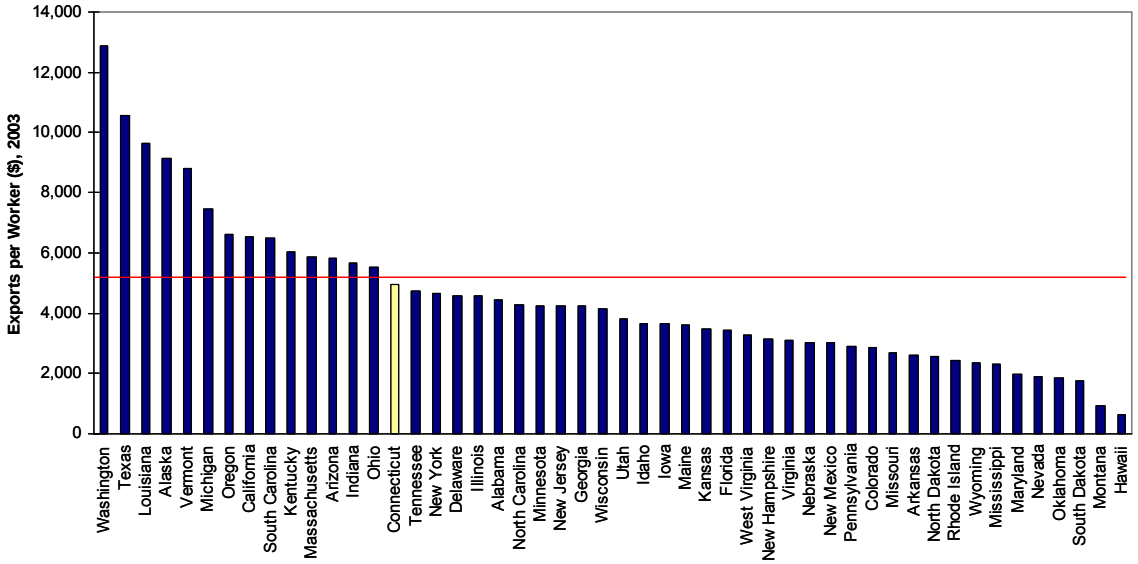
Connecticut's average annual growth of 3.3 percent per year between 1992 and 2003 is also below the national average of 4.5 percent.

SPOTLIGHT: Trade-to-GDP Ratios

A trade-to-GDP ratio is the average of exports and imports of goods and services as a share of gross domestic product (GDP), which shows how important international trade is to a country. International trade is typically more important for countries that are small in size or population and close to countries with open trade policies, rather than for larger, self-sufficient countries or those that are hindered by high transportation costs. In 2001, the Organisation for Economic Cooperation and Development (OECD) countries with the largest trade-to-GDP ratios were Ireland, Belgium-Luxembourg, Slovak Republic (2000 data), Czech Republic and Hungary, all with levels between 70 percent and 90 percent. The U.S. and Japan had the lowest ratios, both around 10 percent. [4]

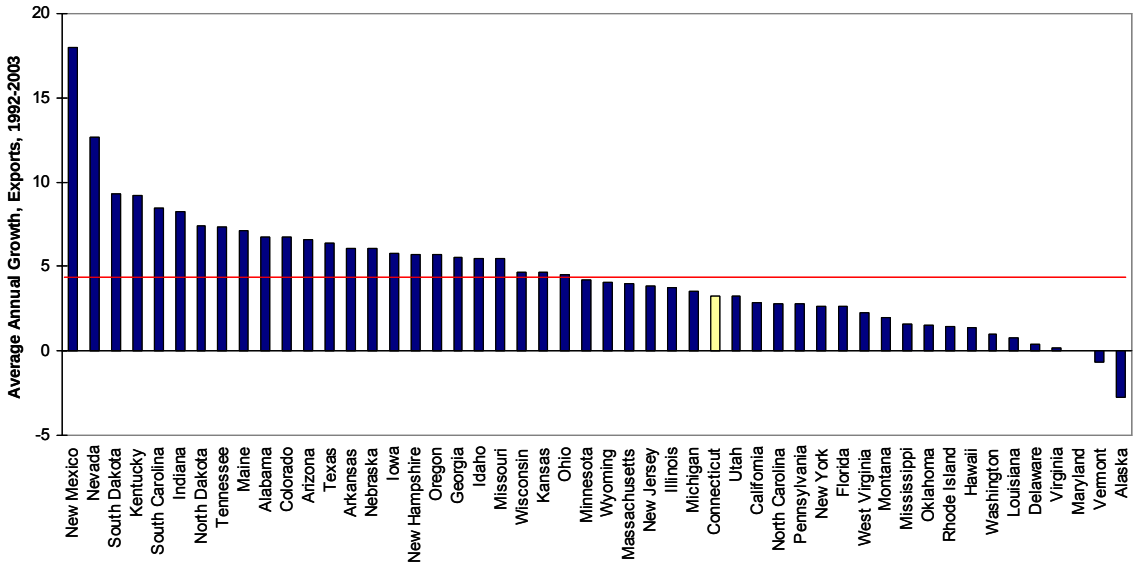
[4] Organization for Economic Cooperation and Development, *OECD Science, Technology and Industry Scoreboard, 2003 Edition*, pages 104-105.

Connecticut lags behind the U.S. in export shipments per worker.



Sources: U.S. Office of Trade and Economic Analysis, U.S. Bureau of Labor Statistics

Connecticut's average annual growth of 3.3 percent per year is below the national average.



Source: U.S. Office of Trade and Economic Analysis

Manufacturing export intensity

Manufacturing export sales as a share of total manufacturing shipments

Sources: Office of Trade and Industry Information, U.S. Census

The long-term success of the state's economic growth and prosperity, particularly its manufacturing base, depends on success in global markets. Each dollar of sales abroad has a high local impact since it gets spent locally in the form of wages, purchases from local suppliers, and state and local taxes. Exports also diffuse risk because exporting companies can gain from growing demand in other economies even if the home economy has lower demand.

Manufacturing export sales intensity in Connecticut, at 17.4 percent of the total value of shipments, is slightly greater than the U.S. average of 16.5 percent and ranks the state 11th relative to the others.

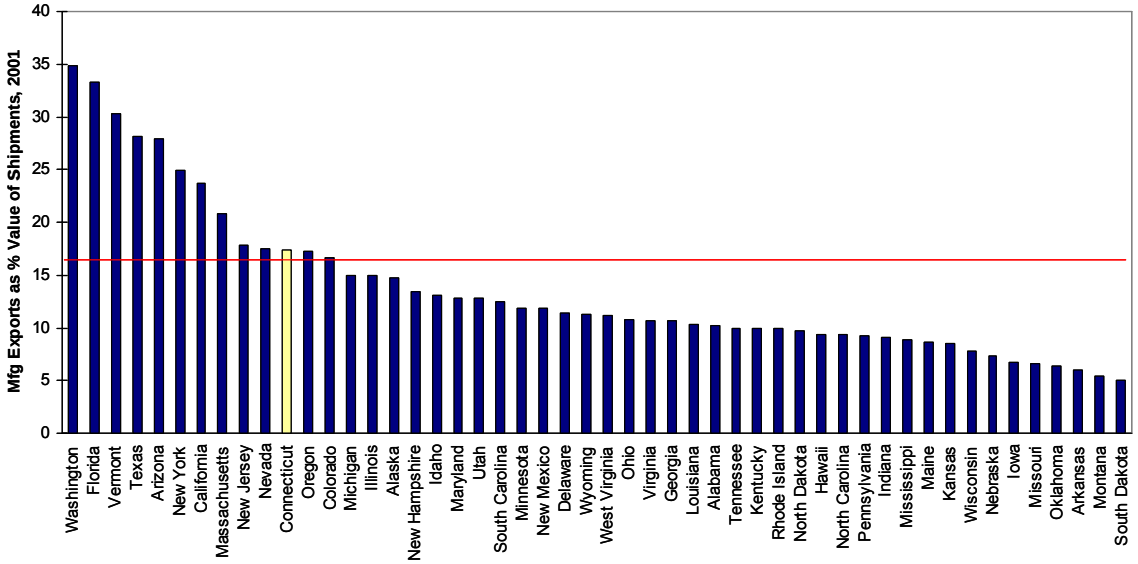
Connecticut's average annual growth in manufacturing exports (nominal terms) between 1999 and 2003 of 3.5 percent outpaces the nation's 0.7 percent. However, four states have grown at an average of more than 10 percent per year.

SPOTLIGHT: Imports Needed for Exports

As globalization encompasses more of the production process, it is possible that imports are needed to create goods and services that are eventually exported. In 1997, the import content of exports approached 45 percent in the Netherlands, while in the U.S. the share was about 12 percent. [5]

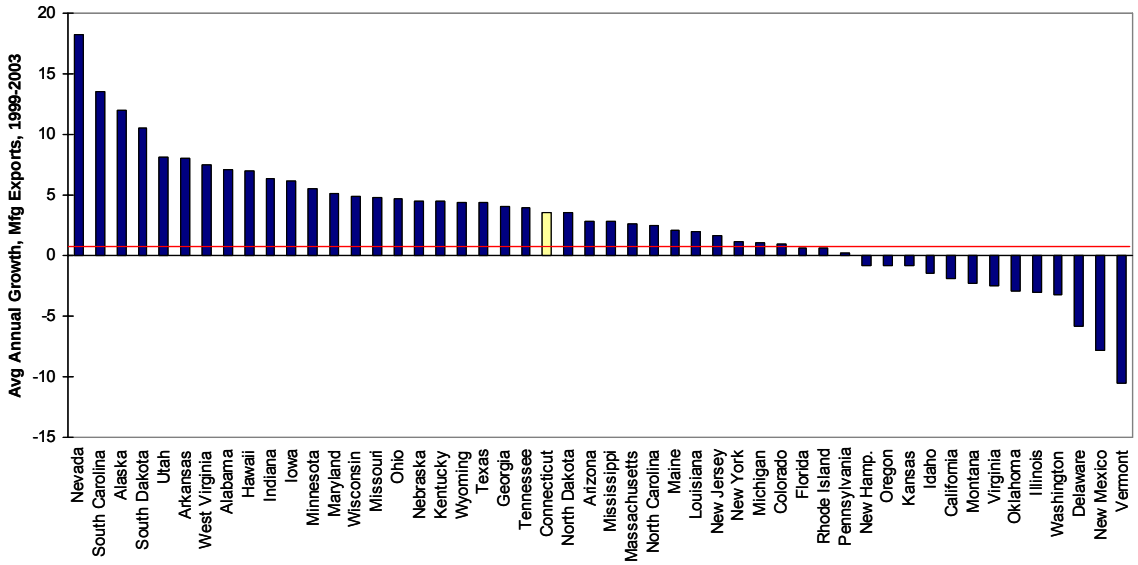
[5] Organization for Economic Cooperation and Development, *OECD Science, Technology and Industry Scoreboard, 2003 Edition*, pages 110-111.

Manufacturing export sales intensity in Connecticut is slightly greater than the U.S.



Sources: U.S. Office of Trade and Economic Analysis, Annual Survey of Manufactures

Connecticut's annual growth in manufacturing exports outpaces the nation.



Source: U.S. Office of Trade and Economic Analysis

Chemical exports

Chemicals' (NAICS 325) share of total exports

Source: WISER (www.wisertrade.com)

The chemicals industry employs more than 13,300 people in the state. [6] A major component of this industry is pharmaceutical preparation, which is also a key element of Connecticut's technology sector. Chemical exports are important to a region because they bring new money into the local economy, which typically causes a multiplier effect.

Even though the chemicals industry represents about 1 percent of the total employment in Connecticut, chemicals' share of total exports is more than 7 percent.

Exports from the chemicals industry in Connecticut grew at an average of 1.2 percent per year between 1997 and 2004, which is below the national average of 6.7 percent.

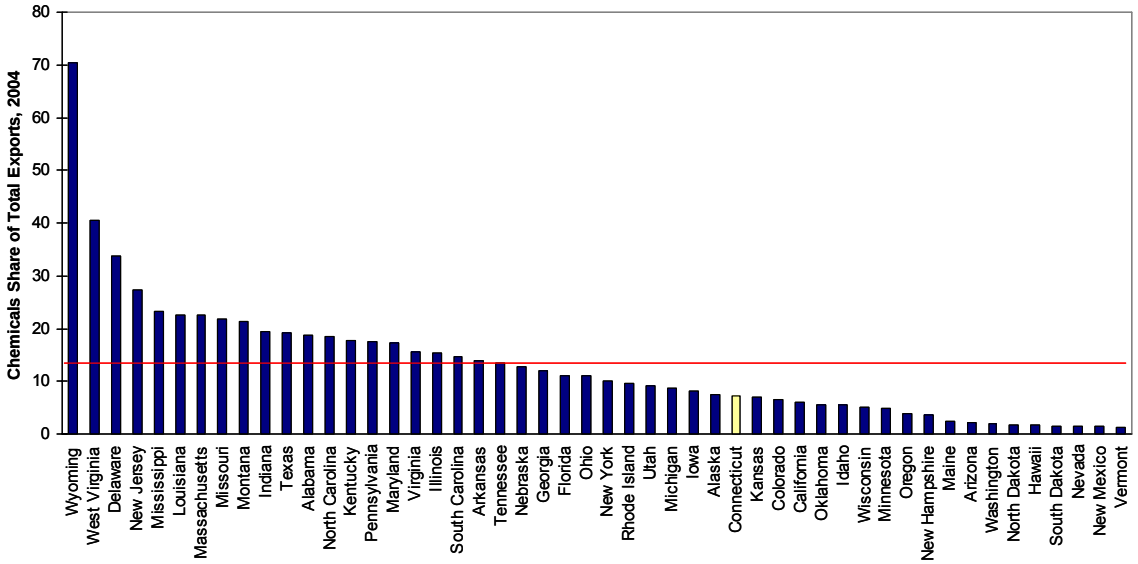
SPOTLIGHT: The Outsourcing of Innovation

There is a trend, most fully seen in the electronics sector, of U.S. companies using a new business model that utilizes global networks of partners for product design and implementation. Companies have already reduced costs by applying this model to production and back office operations, and they are now seeking to control research and development (R&D) expenses with it, as well. When this network of partners works ideally, there is a great increase in the speed and efficiency of developing new products. For example, instead of spending millions of dollars to develop a new product, such as a digital camera or cell phone, a company can choose from a range of basic designs offered by an original design manufacturer (ODM) and have a new product to market at a fraction of the time and cost. However, these new business practices may create new competitors, or profits may be marginalized if the innovation exists with the suppliers. The key to the successful implementation of these business practices, some say, is to keep some sustainable competitive advantage, either through dominating the latest technologies or the overall designs of the products or developing customer relationships. [7]

[6] U.S. Census, 2002 County Business Patterns, http://censtats.census.gov/cbpnaic/cbpnaic.shtml

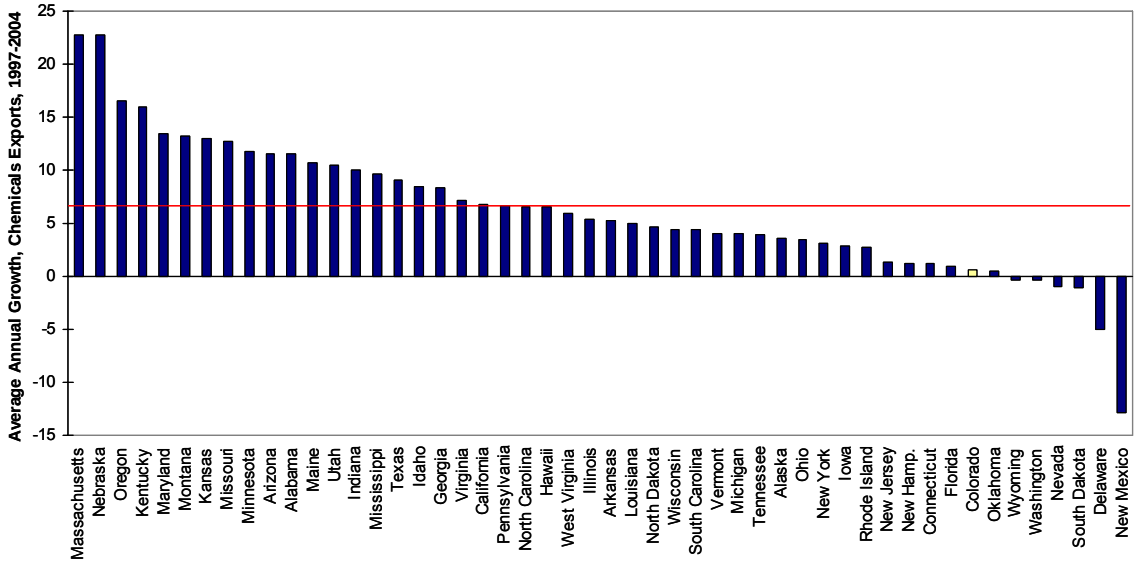
[7] Manjeet Kripalani, Andy Reinhardt, Bruce Nussbaum, and Peter Burrows, *Outsourcing Innovation*, "Business Week," March 21, 2005.

Chemicals' share of total exports is lower in Connecticut than the U.S.



Source: WISER (www.wisertrade.com)

In share of national chemical exports, Connecticut has lost ground during the past few years.



Source: WISER (www.wisertrade.com)

Computers & electronics exports

Computers and electronics' (NAICS 334) share of total exports
Source: WISER (www.wisertrade.com)

The computers and electronics industry employs almost 18,700 people in the state, [8] of which half are involved in manufacturing navigational, measuring, medical and control instruments. Like chemicals, computer and electronics exports are important to a region because they bring new money into the local economy, which typically causes a multiplier effect.

Even though the computers and electronics' share of total exports is lower in Connecticut than the U.S., it accounts for 9.4 percent of the state's total exports. This is a substantial share, considering that this industry accounts for only 1.2 percent of total employment.

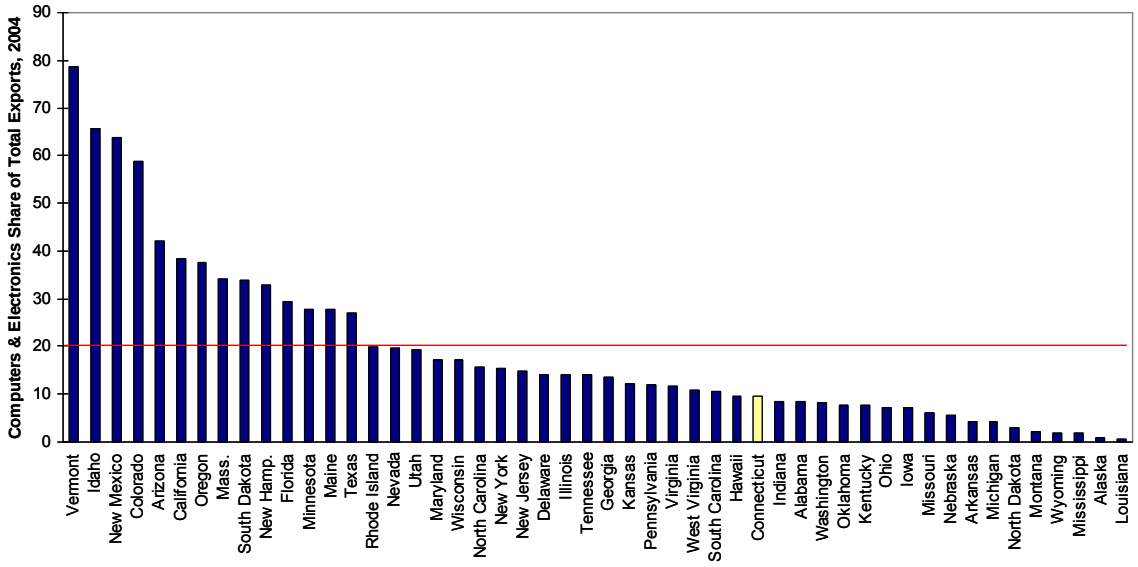
Connecticut's annual growth has averaged about -0.1 percent per year since 1997, compared to the national average of 1 percent per year.

SPOTLIGHT: International Trade Competition by Industry

During the 1990s, manufacturing industries were increasingly exposed to international trade. Based on export ratios[9] and import penetration rates, [10] the following industries in the U.S., Japan and the European Union have the highest levels of exposure to international trade competition: computers, aircraft, scientific instruments, and radio and television communication equipment. The U.S. aircraft industry has a large export orientation, as seen by its export ratio of nearly 50 percent. The U.S. computers and electrical machinery industries have both large export ratios (42 percent and 32 percent, respectively) and import penetration rates (57 percent and 40 percent) due to much outsourcing and intra-industry trade. [11]

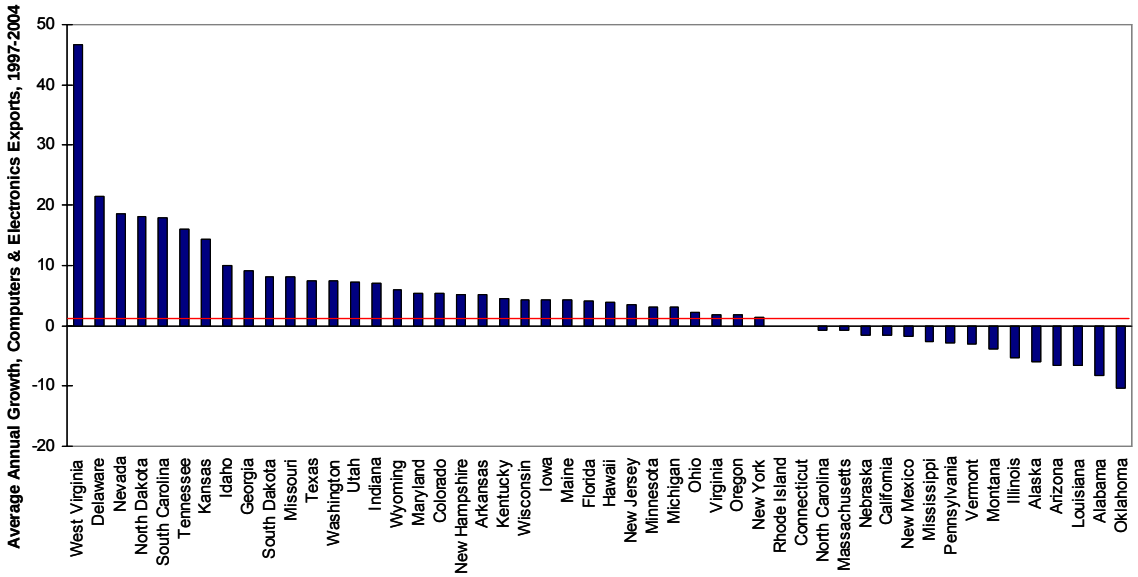
[8] U.S. Census, 2002 County Business Patterns, http://censtats.census.gov/cbpnaic/cbpnaic.shtml
[9] Export ratio = Share of industry's output that is exported
[10] Import penetration rate = Share of domestic demand for industry satisfied by imports
[11] Organization for Economic Cooperation and Development, *OECD Science, Technology and Industry Scoreboard, 2003 Edition*, pages 106-107.

Computers and electronics' share of total exports is lower in Connecticut than the U.S.



Source: WISER (www.wisertrade.com)

Connecticut has not seen growth in its computers and electronics exports.



Source: WISER (www.wisertrade.com)

Immigrants

Immigrants admitted by state of intended residence per 1 million people

Sources: Office of Immigration Statistics, U.S. Census

In regions with slower population growth, immigrants, especially skilled immigrants, can make a vital contribution to labor force growth. In addition, the presence of immigrants helps to strengthen an area's economic, cultural and social ties to other countries. Connecticut's concentration of immigrants, at almost 2,400 immigrants per 1 million people, mirrors the nation but lags behind some of its neighbors. During the 1990s, there were annual ebbs and flows in the number of immigrants to Connecticut. However, between 1992 and 2003, the number of immigrants in Connecticut declined by 2 percent on average each year. There has been a noticeable drop in immigrants during the past two years, due to federal legislation changes and perhaps because of a changed perception of the U.S. following the post-9/11 security changes.

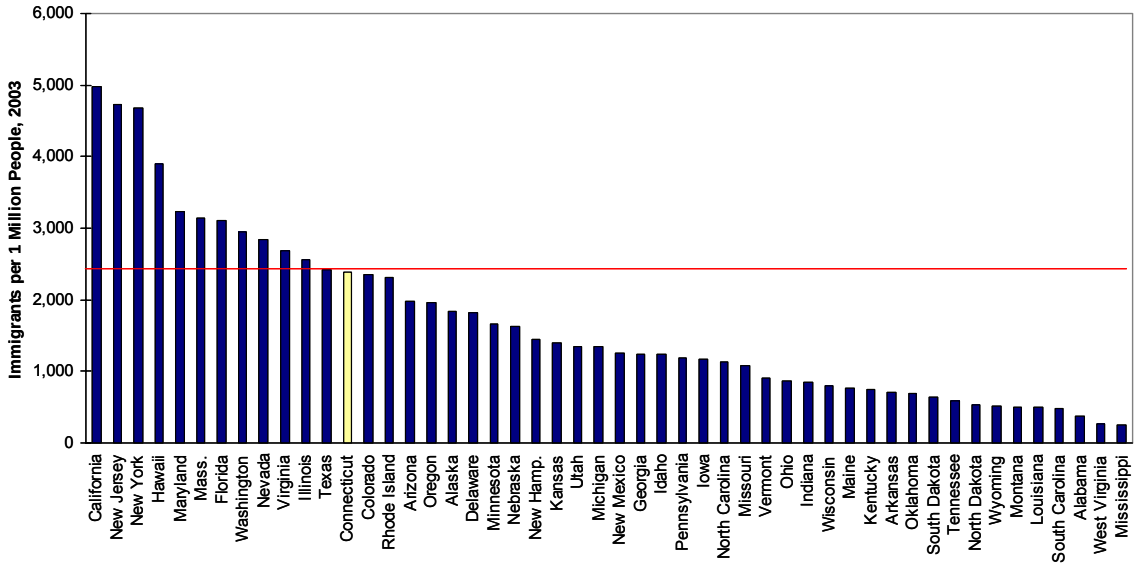
SPOTLIGHT: Immigrants—Benefits and Strains

There are more than 34 million legal and illegal immigrants living in the U.S.—the highest number ever recorded. [12] Immigrants bring benefits and challenges to an area:

- "Foreign-born households bought nearly 8% of new homes and 11% of existing homes from 1998 to 2001. Immigrants were 12% of first-time home buyers in 2001 and buy more expensive homes on average than U.S.-born first-time owners, says the Harvard University Joint Center for Housing Studies." [13]
- The children of immigrants have proven to be an important part of the future in math and science fields in the United States. Children of immigrants make up 60% of the 2004 Intel Science Talent Search, where almost three-quarters of the winners go on to obtain either doctorates or medical degrees; 65% of the 2004 U.S. Math Olympiad Top Scorers; and 46% of the 2004 U.S. Physics Team.[14]
- "Foreign-born workers make up about 11% of the U.S. population and 14% of the labor force…accounting for more than half of total workforce growth from 1996 to 2002. In the western Midwest, New England and Mid-Atlantic regions, foreign-born workers accounted for more than 90% of employment growth from 1996 to 2002." [15]
- "Critics say current, historically high levels of immigration, legal and illegal, are putting fiscal strains on state and local governments, depressing wages for low-income workers, widening the U.S. income gap and displacing Americans in the job market." [16]

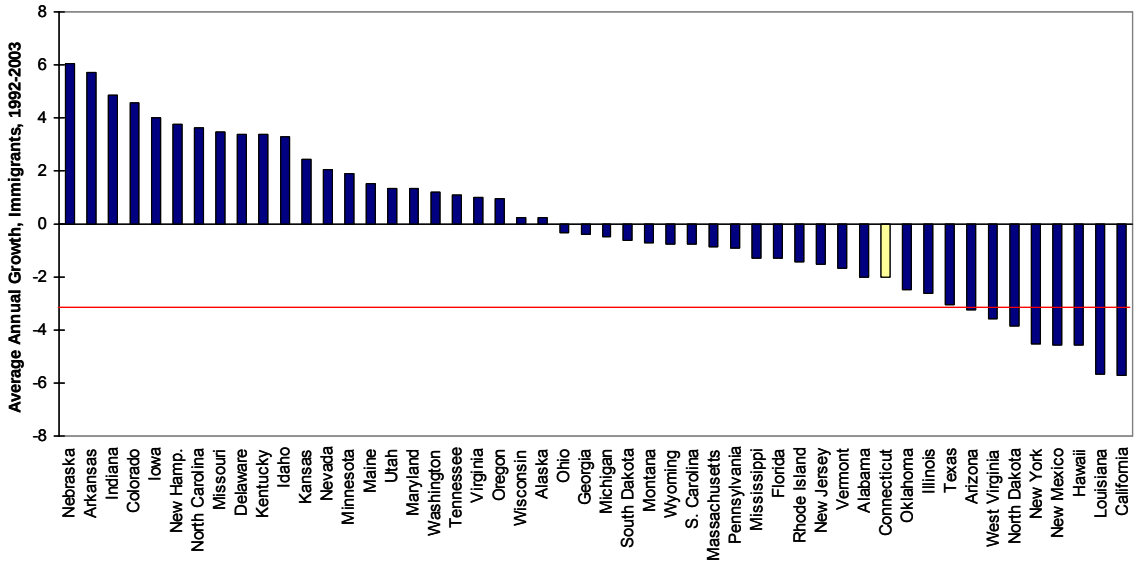
[12] Steven A. Camarota, *Economy Slowed, But Immigration Didn't: The Foreign-Born Population, 2000-2004 November 2004,* http://www.cis.org/articles/2004/back1204.html
[13] Sue Kirchhoff, *Immigrants chase American dream,* "USA TODAY," August 5, 2004, http://www.usatoday.com/money/economy/housing/2004-08-05-immigrant-housing_x.htm
[14] Stuart Anderson, *The Multiplier Effect*, "International Education," Summer 2004, http://www.nfap.net/researchactivities/studies/TheMultiplierEffectNFAP.pdf
[15] Sue Kirchhoff and Barbara Hagenbaugh, *Immigration: A fiscal boon or financial strain?* "USA TODAY," January 22, 2004, http://www.latinobeat.net/html4/013104di.htm
[16] Ibid.

Connecticut's concentration of immigrants mirrors the nation but lags behind some of its neighbors.



Sources: Immigration and Naturalization Service, U.S. Census

The number of immigrants to the U.S. dropped 28 percent between 1992 and 2003 (annual average of -2.88 percent, as seen on the chart).



Source: Immigration and Naturalization Service

Foreign student enrollment in higher education

Foreign enrollees as a share of total higher education enrollees

Sources: Institute of International Education, National Center for Education Statistics

Enrollment of foreign students increases cultural and knowledge links with other countries and regions. Additionally, it reflects awareness and favorable perceptions of a state's institutions of higher education, along with stimulating the economy through tuition and living expenditures.

Connecticut ranks 4th on the concentration side of this category, with foreign students making up almost 5 percent of total higher education enrollment. A number of the Northeastern states also perform well on this metric.

Connecticut's growth in foreign students, at an average of 2.7 percent between 1996 and 2004, is slightly below the national average. The state saw an increase of more than 1,000 foreign students between the 2002-03 and 2003-04 school years, reflecting a renewed willingness of students to study in this country.

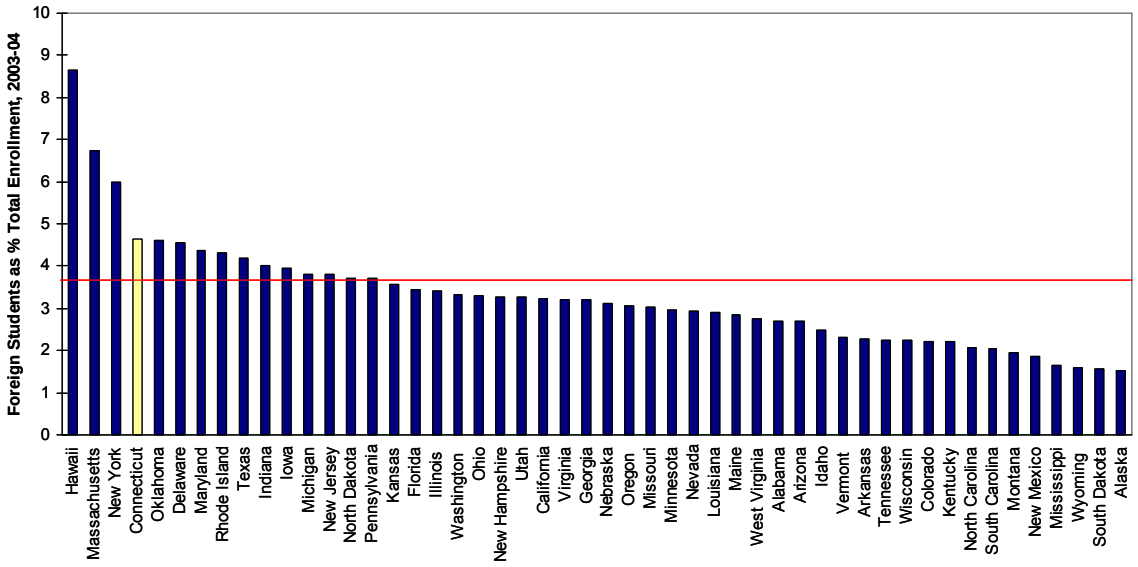
SPOTLIGHT: International Students' Contributions and U.S. Study Abroad Programs

According to the Institute of Education's Open Doors 2004 report, international students contributed almost $200 million to the Connecticut economy during the 2003-2004 school year, through $130 million in tuition and fees and $163 million in living expenses, less $94 million in funding from the U.S.[17]

The number of U.S. students studying abroad has more than doubled in the past decade, from about 70,000 in 1991-1992 to almost 175,000 in 2002-2003. Almost half of the students during the most recent year studied in the United Kingdom, Italy, Spain or France. However, the share of U.S. students studying abroad in Europe has declined, mainly because of the interest in studying in Australia. [18]

[17] Institute of International Education, *Open Doors: Report on International Education Exchange*, 2004, page 4.
[18] Ibid., page 16.

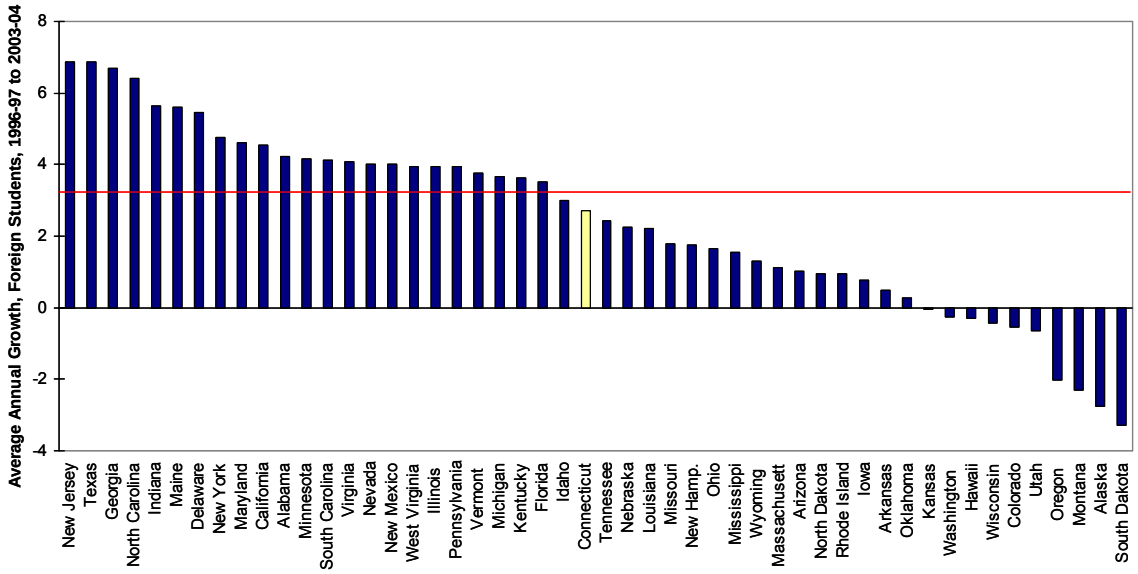
Connecticut, along with a number of Northeastern states, have high concentrations of foreign student enrollments.



Sources: Institute of International Education, National Center for Education Statistics

*Note: Total enrollment data (denominator) is from 2001.

Connecticut has positive foreign student enrollment growth, on average, but it is slower than the national rate.



Source: Institute of International Education

Employment in foreign-owned firms

Foreign affiliate employment as a share of total nonfarm employment

Sources: U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics

A state's ability to attract foreign-owned firms reflects its competitive economic climate.

At 7.2 percent of total employment, foreign affiliate employment is most concentrated in Connecticut relative to the other states. This is because Connecticut has a large concentration of foreign-owned companies. Of the 5,418 foreign affiliates in the U.S. with property, plant, equipment or employment, 725 of the companies, or 13 percent, are located in Connecticut.

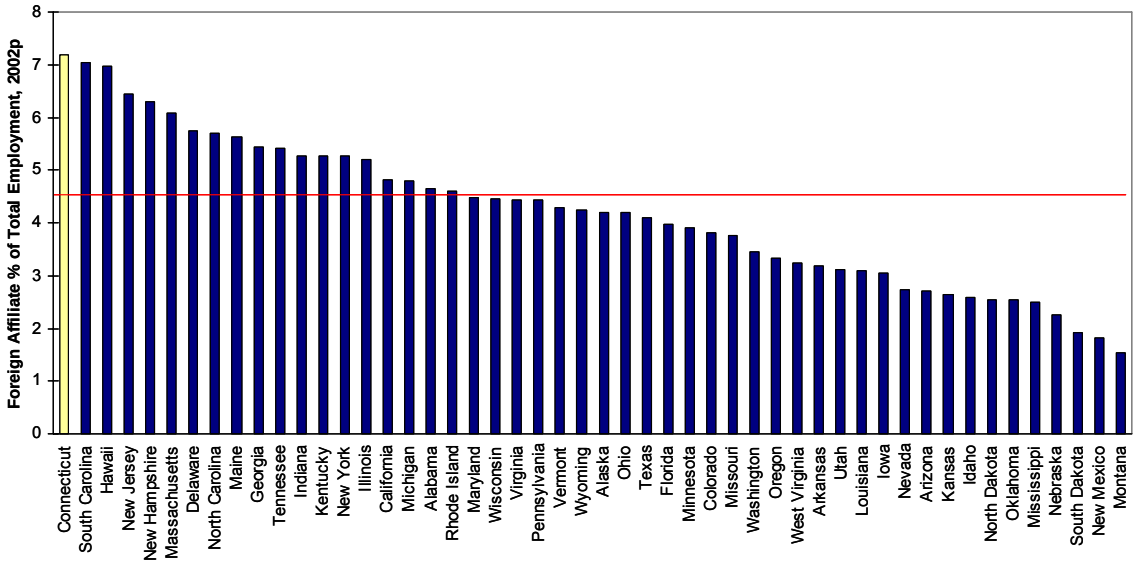
And Connecticut's foreign affiliate employment continues to increase. Foreign affiliate employment in the state has grown at an average of 3.8 percent per year, well above the national average of 2.3 percent.

SPOTLIGHT: Foreign Direct Investment (FDI)

During the 1990s, FDI was a driver in integrating global economies. The U.S. is the dominant investor abroad and host country for FDI. In 2001, outward and inward FDI were both about $140 billion. France was the second largest investor abroad in 2001, at about $90 billion, and the United Kingdom was the second largest receiver of FDI with approximately $70 billion. [19]

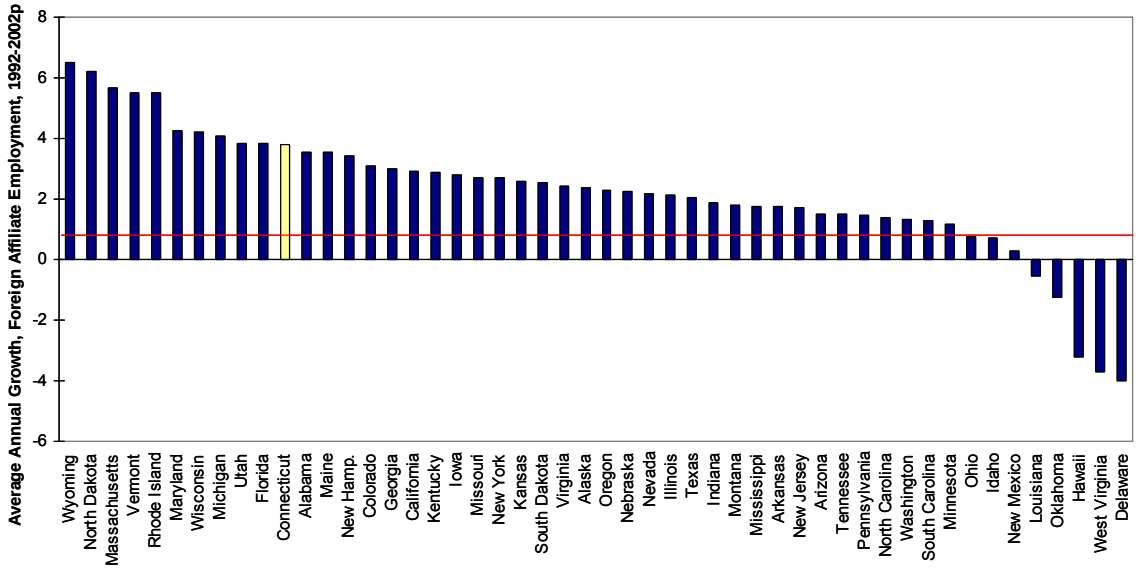
[19] Organization for Economic Cooperation and Development, *OECD Science, Technology and Industry Scoreboard, 2003 Edition*, pages 112-113.

Employment concentration in foreign-owned firms is highest in Connecticut.



Source: U.S. Bureau of Economic Analysis

Connecticut's foreign affiliate employment continues to increase.



Source: U.S. Bureau of Economic Analysis

Foreign capital investments

Capital investments in gross property, plant and equipment of foreign affiliated firms per foreign affiliated worker

Source: U.S. Bureau of Economic Analysis

A state's ability to attract foreign capital reflects its relative attractiveness and strengths in terms of work force, infrastructure, and tax and regulatory climates.

Since Connecticut has a large concentration of foreign affiliate workers, which is used as the denominator in this calculation, Connecticut ranks 45th in its 2002 concentration of this variable.

However, growth in capital investments in Connecticut grew at an average of 7.4 percent per year between 1992 and 2002, exceeding the 6 percent average for the nation. In 1992, capital investments in Connecticut were $6.7 billion, and grew to more than $13.8 billion in 2002.

SPOTLIGHT: Role of Multi-National Companies

Multi-national companies can bring a number of benefits to a host country, particularly to less developed countries. These benefits include:

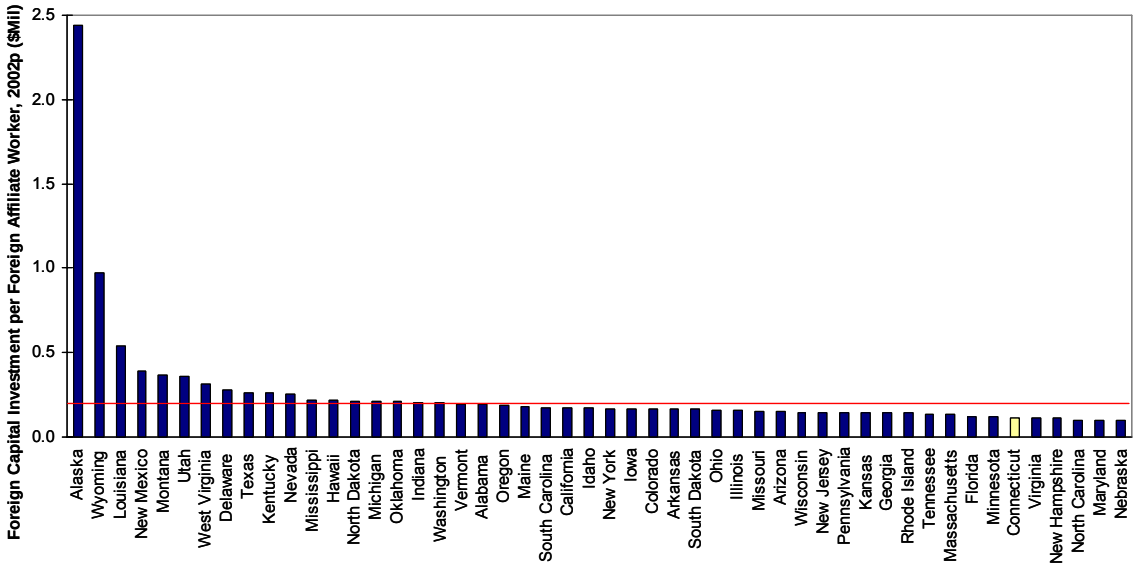
- Offering modern management techniques
- Producing knowledge spillovers in new technologies and production processes
- Creating linkages between investor and host companies

However, less-than-desirable results can also accumulate:

- Conflicting objectives between the investor trying to maximize profits and the host trying to deal with environmental, cultural and wage issues
- Investors possibly avoiding domestic taxes[20]

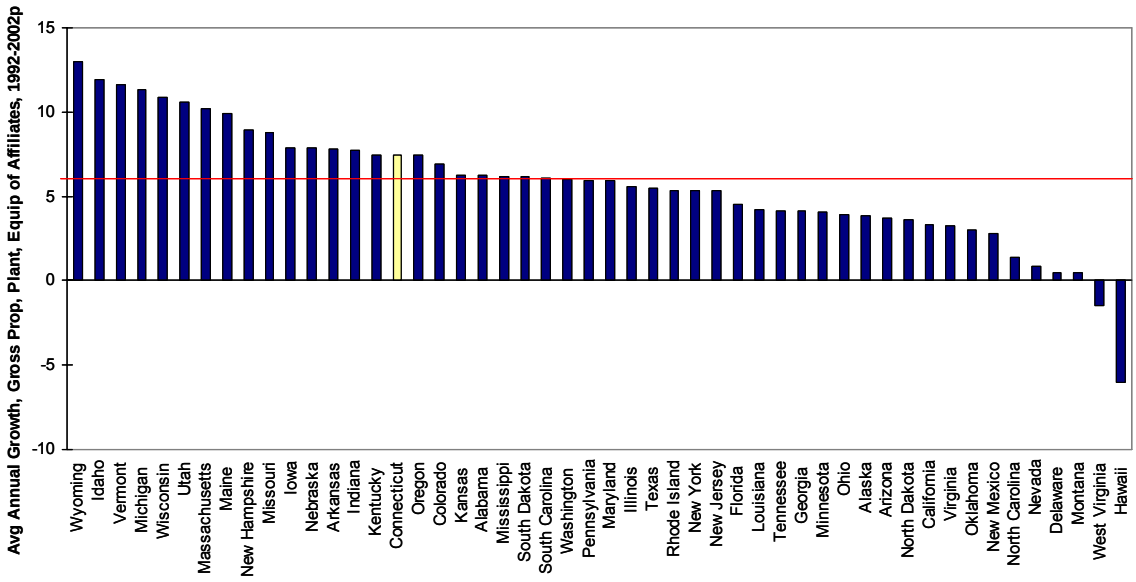
[20] http://www.tutor2u.net/economics/content/topics/development/development_policy_multinationals.htm

Foreign capital investment per foreign affiliate worker in Connecticut trails the nation.



Source: U.S. Bureau of Economic Analysis

Connecticut's foreign capital investments continue to increase.



Source: U.S. Bureau of Economic Analysis

Overall Performance

In order to determine overall concentration and growth scores for each state, the arithmetic unweighted means of the 35 variables were calculated. On the composite scores, Connecticut ranked 7th in terms of concentration and 43rd in terms of growth. All of the rankings and scores for all of the variables and states are in Appendix C.

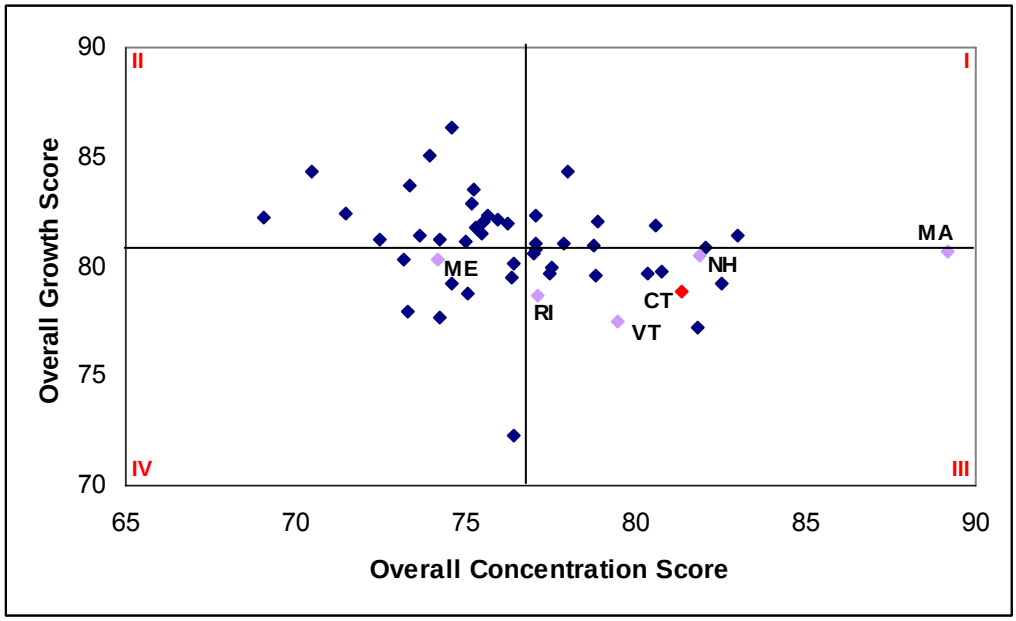
Each state is plotted on the figure below based on its composite concentration and growth scores. The U.S. averages are represented by the horizontal and vertical lines that run through the graph.

Connecticut falls into Quadrant III, which contains states with above average concentration but below average growth. In fact, every state in New England had slower than average growth. Seven of the nine Northeastern states are located in Quadrant III, which means the states have higher than average concentration but lower than average growth. The other two Northeastern states, Maine and Pennsylvania, are in Quadrant IV with other states from the Midwest and West that have low concentration and growth.

Of the nine states in Quadrant I with high composite concentration and growth, five are in the West (Arizona, Colorado, Idaho, Utah and Wyoming) and three are located in the South (Maryland, Texas and Virginia). Minnesota, in the Midwest, rounds out the list of top-performing states.

The majority of the Southern states are located in Quadrant II, with lower than average concentration but higher than average growth. The Southern states are making great strides in terms of growth.

State Distribution of Composite Scores

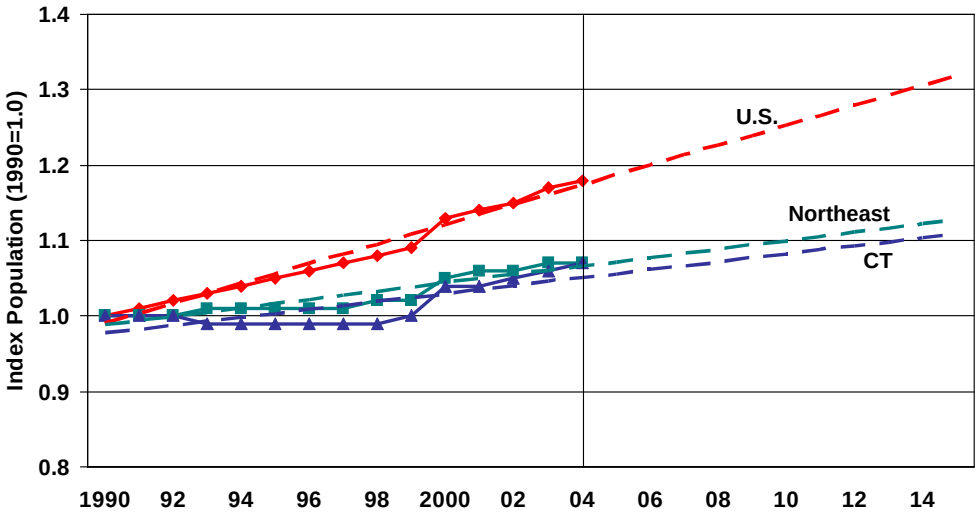


What if the Trends Continue?

If the patterns of the past few decades continue for the next 10 years, what can Connecticut expect? We explore this critical question through a simple extrapolation of historic data to see what Connecticut might look like in 2015 and beyond, assuming no significant deviation from recent trends.

As previously mentioned, Connecticut is a slow-growing state in a slow-growing region of the U.S. In and of itself, slower growth in an older, more mature economy is not necessarily bad, as long as forward momentum is maintained. Between 1990 and 2004, the populations of Connecticut and the Northeast increased 7 percent, while the nation as a whole saw a rise of 18 percent. If the regions continue this trend, Connecticut will grow approximately 4 percent over the next decade while the nation will grow about 15 percent, further eroding the state's political and national clout nationally.

What if Population Trends Continue…Looking to 2015



Source: U.S. Census; Calculations by CERC

The most recent long-term projections from the U.S. Census Bureau show Connecticut with the slowest population growth of any of the other New England states, as shown below.

Population Projections, 2000-2030

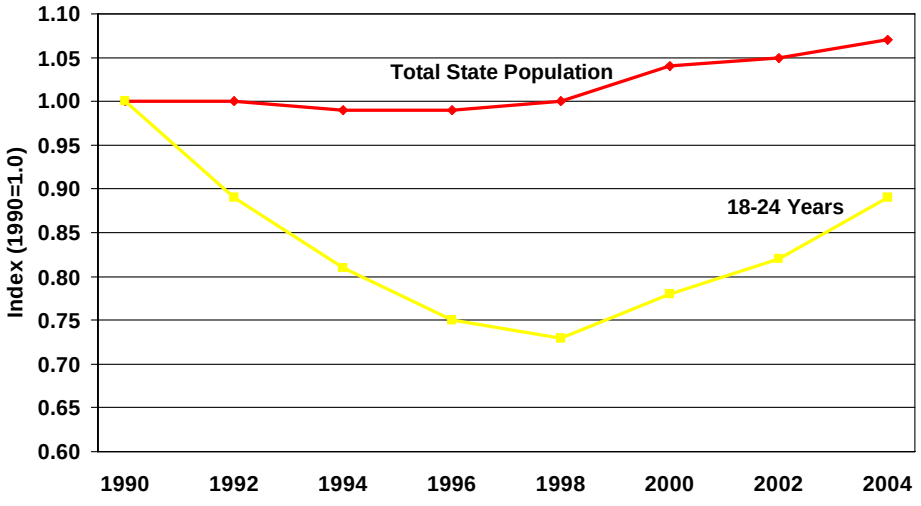
Geography	Percent change, 2000 to 2030
United States	**29.2**
New England	12.2
Maine	10.7
New Hampshire	33.2
Vermont	16.9
Massachusetts	10.4
Rhode Island	10.0
Connecticut	**8.3**

Source: U.S. Census

The U.S population is expected to increase about 2.5 times more than New England and almost four times that of Connecticut.

Even though Connecticut has lost population in the 18-24-year age group, representing college students and entry-level workers, since 1998, the recent trend is positive.

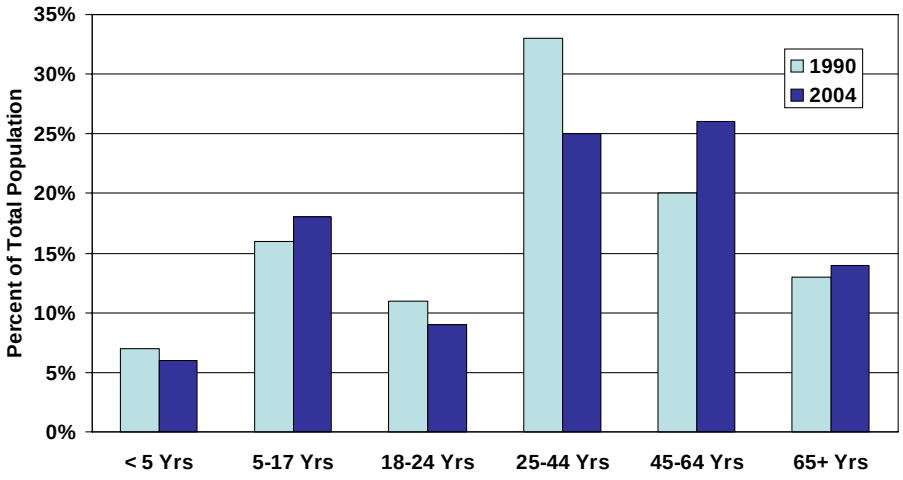
Connecticut's Population Aged 18-24 Years is Slowly Rebounding



Source: U.S. Census

And the trend can continue, because there are more 5-17-year-olds in the state today than there were in 1990. During the next few years, these young people will become college students and/or entry-level workers. However, there may be a labor shortage as the baby boomers begin to retire.

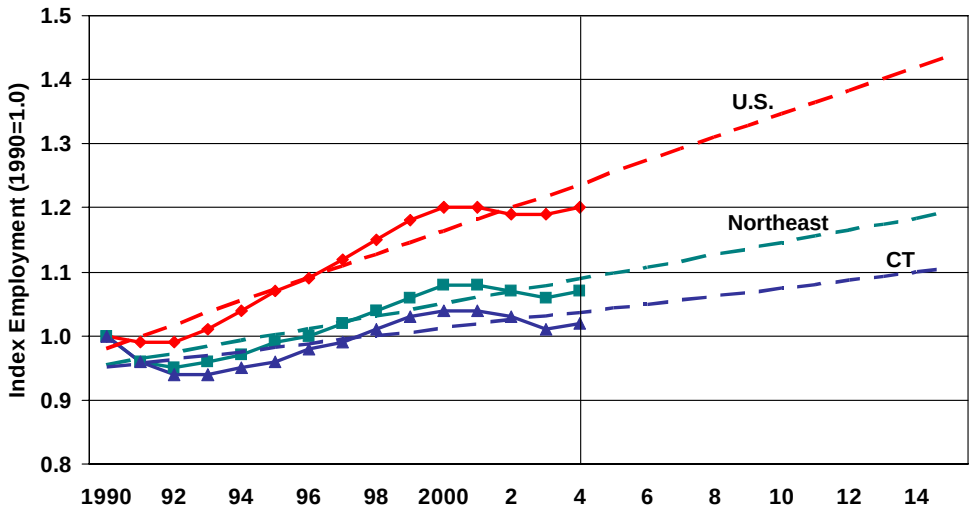
Connecticut's Population by Age Group, 1990 and 2004



Source: U.S. Census

In terms of jobs, the problem in the Northeast and Connecticut is that there has been no job growth for more than 15 years. These trends have profound implications. First, the state's prospects for economic growth could be constrained by the availability of younger workers. Second, Connecticut businesses, faced with a dwindling labor supply, may have higher wage bills as they compete for available workers.

What if Employment Trends Continue…Looking to 2015



Source: U.S. Bureau of Labor Statistics; Calculations by CERC

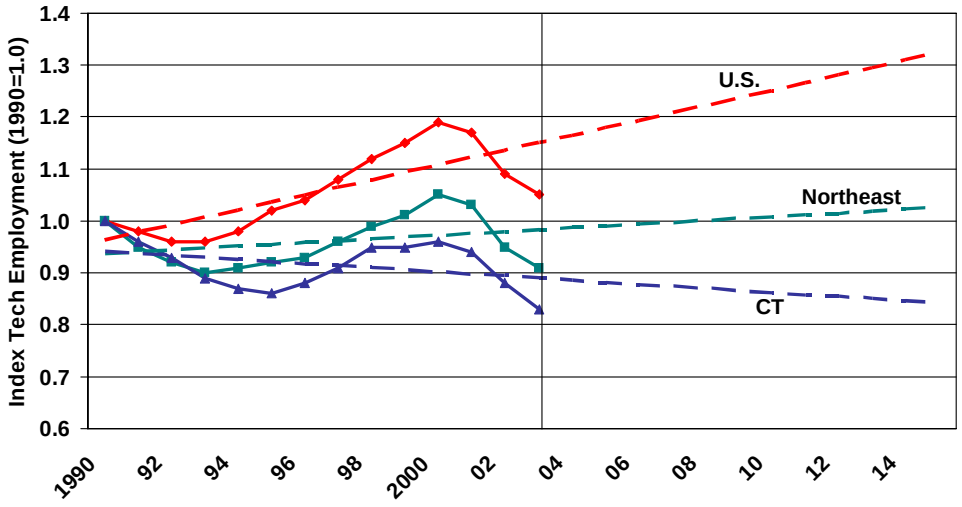
Business owners will also have to look increasingly to the inner cities for available labor. It is estimated that by 2020, 40 percent of new workers in Connecticut will come from urban centers (e.g., Hartford, New Haven, Bridgeport, Waterbury and New Britain).[1] According to the 2000 Census, more than 19 percent of children under 5 years old live in Connecticut's urban centers. However, due to a variety of challenges, children in these urban centers may not have the resources to become successful workers.

- The five-city per capita income is 57 percent of the state average.[2]
- The five-city average of students at or above the state goal for the eighth-grade mastery tests for math, reading, and writing are 68 percent, 53 percent and 46 percent less than the state averages, respectively.[3]
- The five-city average SAT test score was 17 percent below the state average.[4]

[1] Valerie Lewis, Commissioner, Connecticut Department of Higher Education, Presentation to Hartford Area Business Economists, November 18, 2003.
[2] CERC DataFinder
[3] Connecticut Department of Education, Strategic School Profiles, http://www.csde.state.ct.us/public/der/ssp/.
[4] Ibid.

And what if the overall technology employment trends continue? The following chart estimates how technology employment may continue for the next decade, given what has happened since 1990. The U.S. should post healthy growth, the Northeast is expected to remain flat, and Connecticut may continue to see decreases through 2015.

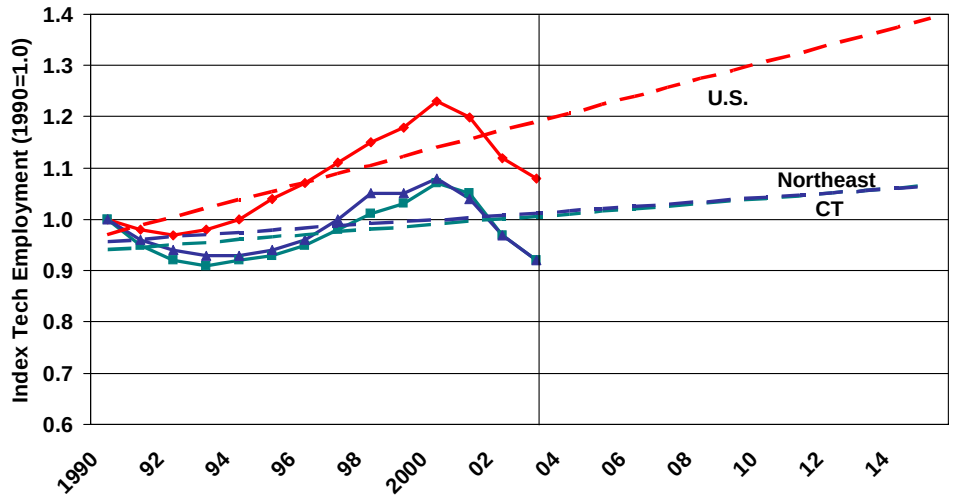
What if Technology Employment Trends Continue…Looking to 2015



Source: Economy.com; Calculations by CERC

By excluding Aerospace from the technology industries, Connecticut's prospects improve, and technology employment is expected to increase in the state by about 7 percent between 1990 and 2015.

What if Technology Employment Trends Continue (Minus Aerospace)…Looking to 2015



Source: Economy.com; Calculations by CERC

Globalization is another issue that will affect the state's economic landscape for years to come. There is much debate about globalization, because the benefits and controversies affect countries, industries and people differently. Much of the debate is focused on offshoring, which refers to businesses purchasing from overseas goods or services that used to be produced within the company or purchased domestically. It is extremely difficult to measure the level of offshoring occurring in the U.S. so it is virtually impossible to forecast the extent of this process. However, as the U.S. share of world markets declines, it is important for both public and private participants to ensure that their regions and firms are represented and competitive in emerging global markets. In addition, states and regions must constantly encourage and promote cultural diversity and international interactions.

However, it will be a challenge for our state to remain competitive if the country as a whole is losing its edge as a leader in knowledge and innovation. Compared with the mean scores of 40 countries that participated in the Organisation for Economic Cooperation and Development (OECD) Programme for International Student Assessment, the United States ranked 28th in math, 18th in reading, 22nd in science, and 29th in problem-solving.[5] The U.S. still takes the top place for the percentage of adults

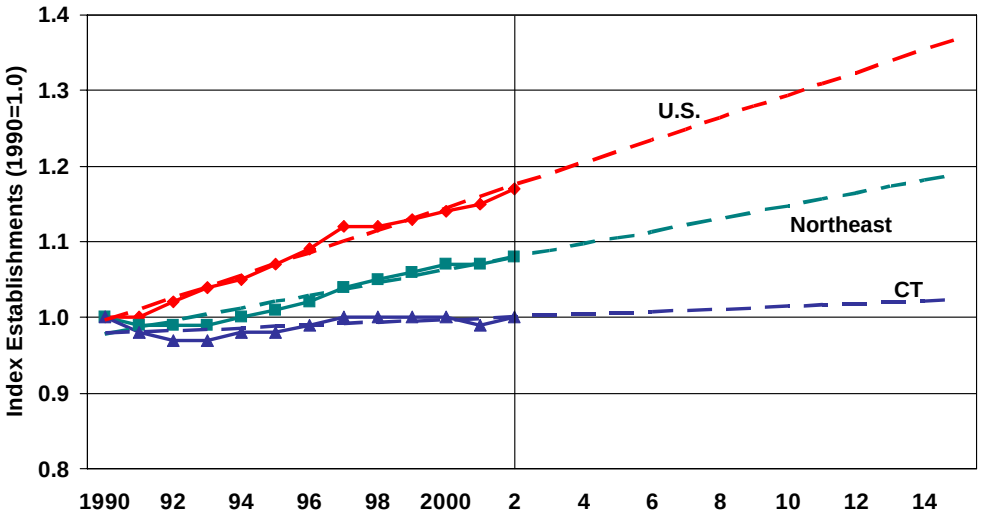
[5] OECD, Programme for International Student Assessment, *First Results from PISA 2003*, http://www.pisa.oecd.org/pages/0,2987,en_32252351_32235731_1_1_1_1_1,00.html

with a four-year college degree, but is tied for 10th in terms of average years of schooling. [6]

The fact that the U.S. is losing its prominence on global test scores is probably not an issue that this state can tackle alone. However, Connecticut is slipping from its position of most educated population in the nation. In 1990, Connecticut was tied with Massachusetts with 27.2 percent of the population with at least a bachelor's degree. In 2000, Connecticut ranked 5th in this metric. The latest year of data, 2004, shows the state ranked 6th with three states within two percentage points of our level. It is possible that, within the next 10 years, Connecticut will not be in the top 10 in this metric because other states are improving substantially and surpassing us.

Turning to total establishments, there has been no growth in Connecticut since 1990, with some growth in the Northeast and stronger growth in the nation. If left unabated, Connecticut is not expected to grow its number of establishments during the next 10 years, while the Northeast and the U.S. see stronger growth. This trend does not bode well for Connecticut's entrepreneurial culture.

What if Establishment Trends Continue…Looking to 2015



Source: U.S. Census; Calculations by CERC

[6] OECD, *Education at a Glance 2004*, http://www.oecd.org/document/11/0,2340,en_2825_495609_33712011_1_1_1_1,00.html

Policy Questions

Connecticut, despite much economic strength, is not without vulnerabilities. While the data show the state performing well today, they also reveal trends that, over time and without intervention, could undermine our prosperity and erode our ability to compete successfully in the global economy.

The policy and research questions below, although not exhaustive, are representative of the types of issues that require everyone's focus. They are designed to stimulate discussion among business and government leaders on decisions and steps Connecticut should consider ensuring continued, long-term competitiveness.

- Why is Connecticut's technology sector employment declining more quickly relative to other areas? What does that portend for the state's long-term competitiveness? Does it matter if we are losing jobs as long as output continues to rise?

- What are the roles of government, business and universities in supporting innovation? How can these institutions interact with each other to enhance this process?

- Why has there been no net job growth and no net business growth in Connecticut over the past 15 years?

- What role do business costs play in this problem? What are potential solutions? Should incentives play any role?

- How can the state's entrepreneurial climate be reactivated to reverse the state's trend of flat business growth?

- Are there reasonable steps that can be taken to stem the outflow of population, particularly among college freshmen, and young professionals and young families?

- How can Connecticut increase interest in science, math and engineering among K-12 students and increase the number of college students majoring in these fields?

- Will Connecticut have sufficient, skilled workers available to enter the work force in 2020 given that 40 percent of new entrants are projected to come from its urban areas?

- Can Connecticut realistically hope to compete for jobs and businesses when students in its two largest cities have average SAT scores 200 points lower than the lowest state?

- In light of larger structural forces re-shaping this region of the country, what state policy tools can differentiate Connecticut to help mitigate or overcome this regional disadvantage?

- Given that a number of demographic trends are not unique to Connecticut but characteristic of the Northeast, should the state collaborate with neighboring states to develop regional approaches or otherwise enhance its competitive positioning?

- What steps can be taken to enable Connecticut to maintain and further develop strong links in the global economy?

Next Steps

1. **Develop a comprehensive strategy** – Work collaboratively on a state-level economic development strategy, consistent with these new economic realties, and inclusive of regional, local and private-sector players with a stake in Connecticut's economic development future.

2. **Create regional awareness** – Build understanding throughout the Northeast regarding its declining regional competitiveness and slow growth, and establish a forum with business and government leaders to develop regional policy and program solutions.

Appendices

Appendix A: Comparison of Technology Definitions

NAICS	Industry Description	Revised CERC	(1) Tech Employers	(1) Primary Tech Generators	(1) Second Tech Generators	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2111	Oil and Gas Extraction		X										
3241	Petroleum & Coal Products Mfg	X									X	X	
3251	Basic Chemical Mfg	X	X	X							X	X	
3252	Resin, Synthetic Rubber, & Artificial Fibers & Filaments	X		X							X	X	
3253	Pesticide, Fertilizer, & Other Agricultural Chemical	X									X	X	
3254	Pharmaceutical & Medicine Mfg	X	X		X			X	X	X	X	X	X
3255	Paint, Coating, & Adhesive Mfg	X									X	X	
3256	Soap, Cleaning Compound, & Toilet Preparation Mfg	X									X	X	
3259	Other Chemical Product & Preparation Mfg	X									X	X	
3313	Alumina & Aluminum Production & Processing	X											
3324	Boiler, Tank, & Shipping Container Mfg	X											
3327	Machine Shops; Turned Product; & Screw, Nut & Bolt Mfg									X			
3329	Other Fabricated Metal Product Mfg	X									X	X	
3331	Agriculture, Construction, & Mining Machinery Mfg	X					X				X	X	
3332	Industrial Machinery Mfg	X	X			X					X	X	
3333	Commercial & Service Industry Machinery Mfg	X	X			X				X	X	X	X
3334	Ventilation, Heating, A/C, & Commercial Refrigeration Equip	X											
3336	Engine, Turbine, & Power Transmission Equip Mfg	X									X	X	
3339	Other General Purpose Machinery Mfg	X					X				X	X	
3341	Computer & Peripheral Equip Mfg	X	X	X		X	X	X	X	X	X	X	X
3342	Communications Equip Mfg	X	X	X		X		X	X	X	X	X	X
3343	Audio & Video Equip Mfg	X	X			X			X	X	X	X	
3344	Semiconductor & Other Electronic Component Mfg	X	X	X		X	X	X	X		X	X	
3345	Navigational, Measuring, Electromedical, & Control Instruments	X	X	X		X		X	X		X	X	
3346	Mfg & Reproducing Magnetic & Optical Media	X									X	X	
3353	Electrical Equip Mfg	X					X		X		X	X	
3359	Other Electrical Equip & Component Mfg	X				X			X		X	X	
3361	Motor Vehicle Mfg	X			X						X	X	
3362	Motor Vehicle Body & Trailer Mfg	X			X						X	X	
3363	Motor Vehicle Parts Mfg	X			X						X	X	
3364	Aerospace Product & Parts Mfg	X	X		X				X	X	X	X	X
3369	Other Transportation Equip Mfg	X											
3391	Medical Equip & Supplies Mfg	X					X	X	X	X	X	X	
3399	Other Miscellaneous Mfg	X											
4173	Computer & Commun Equip & Supplies Whole Distrib [CAN]								X				
4234	Prof & Commercial Equip & Supplies Merchant Wholesalers		X										
4431	Electronics and Appliance Stores								X				
5111	Newspaper, Periodical, Book, and Directory Publishers	X											
5112	Software Publishers	X	X			X	X	X	X		X	X	
5121	Motion Picture and Video Industries	X											
5122	Sound Recording Industries	X											
5141	Information Services (CBP Definition)										X	X	
5142	Data Processing Services (CBP Definition)								X		X	X	
5151	Radio and Television Broadcasting	X											
5152	Cable and Other Subscription Programming	X											
5161	Internet Publishing and Broadcasting	X	X										
5171	Wired Telecommunications Carriers	X				X		X					
5172	Wireless Telecommunications Carriers (except Satellite)	X				X		X					
5173	Telecommunications Resellers	X				X		X					
5174	Satellite Telecommunications	X				X		X					
5175	Cable and Other Program Distribution	X				X							
5179	Other Telecommunications	X	X			X		X					
5181	Internet Service Providers & Web Search Portals	X	X			X		X					
5182	Data Processing, Hosting, & Related Services	X	X			X	X	X					
5191	Other Information Services	X											
5324	Commercial & Industrial Machinery & Equip Rental & Leasing	X											
5413	Architectural, Engineering, & Related Services	X	X	X		X	X		X		X	X	
5415	Computer Systems Design & Related Services	X	X	X		X	X	X	X		X	X	
5416	Management, Scientific, & Technical Consulting Services	X	X				X		X		X	X	
5417	Scientific Research & Development Services	X	X	X		X	X	X	X		X	X	
5418	Advertising & Related Services	X											
5419	Other Professional, Scientific, & Technical Services	X						X					
5611	Office Administrative Services	X											
5612	Facilities Support Services	X											
6114	Business Schools and Computer and Management Training					X							
6117	Educational Support Services	X									X	X	
6215	Medical and Diagnostic Laboratories							X	X				
8112	Electronic and Precision Equipment Repair and Maintenance	X									X	X	

Sources of Technology Definitions:

1 Jerry Paytas, Ph.D. Interim Director, Carnegie Mellon University Center for Economic Development and Dan Berglund, President & CEO, State Science and Technology Institute, Technology Industries and Occupations for NAICS Industry Data, March 2004, http://www.ssti.org/Publications/Onlinepubs/NAICS_Tech1.pdf

2 American Electronics Association, *AeA's New NAICS-based High-Tech Definition* , 2002, http://www.aeanet.org/Publications/idmk_naics.asp

3 Cameron Macht and Scott Moore, *Today's High-Tech: How Big a Player is Minnesota?* Minnesota Department of Employment and Economic Development, June 2004, http://www.deed.state.mn.us/lmi/publications/trends/0604/hightech.htm

4 Economy.com/New England Economic Project (NEEP) High Technology Industry Definition, Fall 2004, http://www.unh.edu/news/docs/neeconoutlook_fall04.pdf

5 British Columbia Ministry of Management Services, *Business Indicators*, July 2001, http://www.bcstats.gov.bc.ca/pubs/bcbi/bcbi0107.PDF

6 Organisation for Economic Cooperation and Development (OECD), *OECD Science, Technology and Industry Scoreboard 2003* , Annex Table 1.1, http://www1.oecd.org/publications/e-book/92-2003-04-1-7294/

7 U.S. Department of Commerce, Technology Administration, *The Dynamics of Technology-based Economic Development: State Science & Technology Indicators (Fourth Edition)* , March 2004, http://www.technology.gov/Reports.htm

8 National Science Foundation, Division of Science Resources Statistics, *Science & Engineering Indicators - 2004* , http://www.nsf.gov/sbe/srs/seind04/start.htm

9 National Science Foundation, Division of Science Resources Statistics, *Science & Engineering Indicators - 2002* , http://www.cnc.ac.cn/gb/others/nsf/200201/home.htm

[CAN] Canadian industry only

The first step in any analysis of technology industries is to develop an operational definition so that data can be gathered and analyzed. There is no standard or official definition of technology industries. The broadest definition of technology encompasses virtually every NAICS (North American Industry Classification System) code, because every industry either makes or utilizes technology to improve processes or products. The task is also complex because of the transition from SIC (Standard Industrial Classification) to NAICS codes, because earlier definitions were offered in SIC codes for which updated data cannot be collected. In order to have a useful industry definition for this report, we reviewed a variety of published lists. These provided direction for the list we ultimately created.

Some technology industry definitions include:

- Economy.com, a private economic consulting firm, created an SIC definition of Information Technology (IT) producers and users in a 1999 article[1]
- Carnegie Mellon and the State Science and Technology Institute published a report in March 2004 defining technology employers, primary technology generators and secondary technology generators using NAICS industry codes[2]
- The American Electronics Association[3] offers a list of six-digit NAICS industries that we converted in 12 four-digit NAICS industries (for comparison purposes) that focus primarily on manufacturing and information.
- The Minnesota Department of Employment and Economic Development[4] has a list of 12 four-digit NAICS industries, of which six are manufacturing, five are service industries, and one is within the information sector.
- Economy.com and the New England Economic Project[5] compiled a list of six manufacturing and 12 service industries that are classified as high technology.
- The British Columbia Ministry of Management Services[6] produced a list of 24 sic-digit NAICS industries that we rolled into 19 four-digit industries for comparison purposes. One industry, Computer and Communications Equipment and Supplies

[1] Mark Zandi, *Information Economy I*, "Regional Financial Review," September 1999.
[2] Jerry Paytas, Ph.D. and Dan Berglund, *Technology Industries and Occupations for NAICS Industry Data*, March 2004, http://www.ssti.org/Publications/Onlinepubs/NAICS_Tech1.pdf.
[3] http://www.aeanet.org/Publications/idmk_naics.asp
[4] http://www.deed.state.mn.us/lmi/publications/trends/0604/hightech.htm
[5] http://www.unh.edu/news/docs/neeconoutlook_fall04.pdf
[6] http://www.bcstats.gov.bc.ca/pubs/bcbi/bcbi0107.pdf

Wholesaler-Distributors (NAICS 4173), is only a Canadian classification and is not considered in this analysis.

- The Organization for Economic Cooperation and Development[7] (OECD) developed a list of high technology industries based on data from 12 OECD countries that corresponded with eight four-digit NAICS industries.
- The Department of Commerce[8] and the National Science Foundation[9] in its 2004 edition of *Science and Engineering Indicators* use the same definition, which is a combination of four, five and six-digit NAICS industries.

In developing a technology industry definition for this report, CERC first reviewed the list of 31 three-digit SIC codes created by the U.S. Bureau of Labor Statistics (BLS) in 1999. The BLS performed a rigorous exercise, considering industries if the "scientific and technical occupations as a share of industry employment, and research and development as a percent of sales, are at least double the averages for all industries in the Occupational Employment Statistics survey."[10] Since the analysis in this report is based on the NAICS industry structure, CERC created a SIC-NAICS bridge to bring the BLS definition into the new taxonomy. CERC then supplemented the list with the other technology definitions mentioned before to create the one used in this report, as seen in the figure below.

Technology Industry Definition for Connecticut Benchmark Report

NAICS	Industry Definition
3241	Petroleum & Coal Products Mfg
3251	Basic Chemical Mfg
3252	Resin, Synthetic Rubber, & Synthetic Fibers Mfg
3253	Pesticide, Fertilizer & Other Agricultural Chemical Mfg
3254	Pharmaceutical & Medicine Mfg
3255	Paint, Coating & Adhesive Mfg
3256	Soap, Cleaning Compound & Toilet Preparation Mfg
3259	Other Chemical Product & Preparation Mfg
3313	Alumina & Aluminum Production & Processing
3324	Boiler, Tank, & Shipping Container Mfg
3329	Other Fabricated Metal Product Mfg
3331	Agriculture, Construction & Mining Machinery Mfg

NAICS	Industry Definition
3399	Other Miscellaneous Mfg
5112	Software Publishers
5122	Sound Recording Industries
5181	Internet Service Providers & Web Search Portals
5182	Data Processing, Hosting & Related Svcs
5324	Commer & Indus Machinery & Equip Rental & Leasing
5413	Architectural, Engineering & Related Svcs
5415	Computer Systems Design & Related Svcs
5416	Management, Scientific & Technical Consulting Svcs
5417	Scientific Research & Development Svcs
5418	Advertising & Related Svcs
5419	Other Professional, Scientific & Technical Svcs

[7] http://www1.oecd.org/publications/e-book/92-2003-04-1-7294/
[8] http://www.technology.gov/reports/TechPolicy/StateIndicators/2004/Sect1_Contents_Intro.pdf
[9] http://www.nsf.gov/statistics/seind04/
[10] Daniel Hecker, *High-Technology Employment: A Broader View*, "Monthly Labor Review," U.S. Bureau of Labor Statistics, June 1999, pgs. 18-28, http://stats.bls.gov/opub/mlr/1999/06/art3full.pdf.

3332	Industrial Machinery Mfg
3333	Commercial & Service Industry Machinery Mfg
3334	Ventilation, Heating, A/C & Commer Refrig Equip Mfg
3336	Engine, Turbine & Power Transmission Equip Mfg
3339	Other General Purpose Machinery Mfg
3341	Computer & Peripheral Equip Mfg
3342	Communications Equip Mfg
3343	Audio & Video Equip Mfg
3344	Semiconductor & Other Electronic Component Mfg
3345	Navig, Measuring, Electromed & Control Instru Mfg
3346	Mfg & Reproducing Magnetic & Optical Media
3353	Electrical Equip Mfg
3359	Other Electrical Equip & Component Mfg
3361	Motor Vehicle Mfg
3362	Motor Vehicle Body & Trailer Mfg
3363	Motor Vehicle Parts Mfg
3364	Aerospace Product & Parts Mfg
3369	Other Transportation Equip Mfg
3391	Medical Equip & Supplies Mfg

5611	Office Administrative Svcs
5612	Facilities Support Svcs
6117	Educational Support Svcs
5111	Newspaper, Periodical, Book & Directory Publishers
5121	Motion Picture & Video Industries
5151	Radio & Television Broadcasting
5152	Cable & Other Subscription Programming
5161	Internet Publishing & Broadcasting
5171	Wired Telecommunications Carriers
5172	Wireless Telecommunications Carriers (exc Satellite)
5173	Telecommunications Resellers
5174	Satellite Telecommunications
5175	Cable & Other Program Distribution
5179	Other Telecommunications
5181	Internet Service Providers & Web Search Portals
5182	Data Processing, Hosting & Related Svcs
5191	Other Information Svcs
8112	Electronic & Precision Equip Repair & Maintenance

These 61 four-digit NAICS industries comprise the technology definition used throughout this report. There are limitations, since it does not take into account technology occupations and there is overlap with traditional industries, but it appears to be a reasonable definition in the absence of any officially-sanctioned criteria.

Appendix B: Shift-Share of States' Technology Industries

State	Tech Emp (1000s)		National	Industry	Competitive	Rank
	1990	2003	Growth	Mix	Share	Share
U.S.-Tech	14,006.4	14,722.6				
Northeast	**3,171.2**	**2,877.5**	**598.30**	**-436.15**	**-455.90**	
Connecticut	273.3	227.6	51.55	-37.58	-59.66	45
Maine	38.6	42.3	7.28	-5.30	1.73	30
Massachusetts	484.9	454.5	91.48	-66.69	-55.24	44
New Hampshire	80.4	74.0	15.16	-11.05	-10.48	37
New Jersey	545.4	481.5	102.90	-75.01	-91.84	47
New York	1,036.6	906.5	195.58	-142.57	-183.13	50
Pennsylvania	610.8	604.5	115.23	-84.00	-37.50	42
Rhode Island	68.7	52.8	12.95	-9.44	-19.39	40
Vermont	32.7	33.9	6.16	-4.49	-0.39	32
South	**3,905.1**	**4,649.5**	**736.76**	**-537.09**	**544.69**	
Alabama	175.2	191.2	33.06	-24.10	7.00	21
Arkansas	99.2	107.1	18.72	-13.65	2.79	29
Delaware	51.6	42.9	9.73	-7.09	-11.28	38
Florida	508.9	635.8	96.01	-69.99	100.91	3
Georgia	290.3	410.8	54.77	-39.93	105.60	2
Kentucky	161.1	190.6	30.39	-22.16	21.23	12
Louisiana	134.7	145.6	25.42	-18.53	3.97	26
Maryland	258.5	293.9	48.77	-35.55	22.15	10
Mississippi	84.0	82.4	15.84	-11.55	-5.83	35
North Carolina	331.1	394.6	62.48	-45.54	46.52	6
Oklahoma	124.9	136.1	23.56	-17.18	4.82	24
South Carolina	153.3	174.9	28.92	-21.08	13.78	15
Tennessee	272.1	295.4	51.34	-37.42	9.35	19
Texas	866.5	1,038.9	163.49	-119.18	128.02	1
Virginia	340.0	456.4	64.15	-46.77	99.03	4
West Virginia	53.6	53.0	10.12	-7.37	-3.38	34
Midwest	**3,775.3**	**3,724.8**	**712.26**	**-519.23**	**-243.45**	
Illinois	727.8	689.7	137.31	-100.10	-75.32	46
Indiana	384.6	388.6	72.55	-52.89	-15.59	39
Iowa	145.5	144.2	27.45	-20.01	-8.70	36
Kansas	157.8	179.1	29.77	-21.70	13.21	16
Michigan	665.3	671.3	125.51	-91.50	-28.01	41
Minnesota	265.5	295.4	50.09	-36.51	16.39	14
Missouri	305.1	281.8	57.56	-41.96	-38.87	43
Nebraska	75.0	81.7	14.15	-10.32	2.87	28
North Dakota	16.9	24.7	3.19	-2.32	6.98	22
Ohio	722.0	640.5	136.21	-99.30	-118.38	49
South Dakota	24.3	30.1	4.58	-3.34	4.56	25
Wisconsin	285.6	297.6	53.89	-39.28	-2.58	33
West	**3,085.0**	**3,384.4**	**582.03**	**-424.29**	**141.71**	
Alaska	12.3	18.4	2.32	-1.69	5.46	23
Arizona	185.8	238.2	35.06	-25.55	42.87	7
California	1,956.1	1,954.6	369.05	-269.03	-101.53	48
Colorado	212.2	279.7	40.04	-29.19	56.61	5
Hawaii	26.7	29.1	5.03	-3.67	1.04	31
Idaho	39.8	58.6	7.51	-5.48	16.78	13
Montana	16.2	24.8	3.06	-2.23	7.79	20
Nevada	43.8	67.6	8.27	-6.03	21.52	11
New Mexico	61.6	74.9	11.62	-8.47	10.16	18
Oregon	123.9	162.8	23.37	-17.04	32.55	9
Utah	89.6	127.4	16.90	-12.32	33.25	8
Washington	306.0	333.8	57.74	-42.09	12.13	17
Wyoming	10.9	14.5	2.06	-1.50	3.07	27

Source: Economy.com; Calculations by CERC

Appendix C: State Scores and Ranks

CONCENTRATION	Technology													
State	Tech output per worker		Tech share of GSP		Tech share of nonfarm emp		High-speed lines per 1 mill people		% household with computers		% household with Internet access		Tech Concentration Composite	
	2003		2003		2003		2003		2003		2003			
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**71.1**		**75.5**		**83.2**		**79.5**		**83.9**		**84.0**		**79.5**
Alabama	45	66.8	36	72.6	29	83.3	35	77.1	47	72.6	45	73.3	43	74.3
Alaska	35	68.6	48	66.2	45	71.1	8	88.2	2	98.0	1	100.0	17	82.0
Arizona	4	82.1	4	86.3	27	83.5	18	83.0	19	86.7	24	84.8	11	84.4
Arkansas	40	67.6	30	73.3	37	79.5	41	71.5	49	67.3	49	69.2	47	71.4
California	15	71.3	18	75.6	5	93.8	6	89.3	12	89.4	11	90.2	8	84.9
Colorado	12	71.6	9	79.2	8	92.5	21	81.6	5	94.4	3	94.3	6	85.6
Connecticut	**9**	**72.1**	**22**	**75.1**	**4**	**94.9**	**3**	**92.2**	**6**	**93.2**	**4**	**94.2**	**2**	**86.9**
Delaware	34	68.6	42	69.2	33	82.0	29	78.6	21	86.4	19	86.8	29	78.6
Florida	46	66.1	44	69.0	39	76.0	7	89.2	29	82.3	22	85.3	33	78.0
Georgia	22	70.0	25	74.3	25	83.8	14	86.1	31	81.6	29	82.8	23	79.8
Hawaii	44	66.9	49	65.7	50	65.0	50	54.8	24	85.2	26	84.5	49	70.4
Idaho	3	85.1	3	91.9	23	84.0	40	71.5	7	93.2	20	86.2	7	85.3
Illinois	29	69.2	31	73.3	15	87.6	28	79.2	33	80.9	37	79.8	31	78.3
Indiana	8	72.2	6	83.1	7	93.1	44	68.3	36	80.2	39	79.7	26	79.4
Iowa	26	69.5	20	75.4	34	81.9	38	74.3	18	87.1	18	87.1	27	79.2
Kansas	17	70.8	5	83.6	2	96.5	12	87.2	23	85.9	28	83.7	10	84.6
Kentucky	5	73.6	7	81.6	21	84.6	48	65.3	40	78.3	41	78.0	37	76.9
Louisiana	14	71.5	38	72.0	42	74.1	27	79.7	48	70.5	48	71.3	45	73.2
Maine	43	67.1	43	69.2	46	70.8	31	78.0	9	91.3	15	88.1	35	77.4
Maryland	28	69.3	23	75.0	11	89.4	15	85.0	14	89.0	12	89.6	13	82.9
Massachusetts	21	70.0	19	75.6	3	95.3	1	100.0	20	86.5	14	88.3	5	86.0
Michigan	32	68.9	8	79.5	1	100.0	23	80.7	35	80.6	35	80.8	18	81.8
Minnesota	36	68.1	34	73.1	18	85.3	19	82.8	8	91.6	7	92.6	16	82.3
Mississippi	41	67.1	41	70.2	43	73.6	46	66.6	50	65.0	50	65.0	50	67.9
Missouri	33	68.9	26	74.0	28	83.4	32	77.6	30	81.8	33	82.1	34	78.0
Montana	49	65.0	47	67.2	47	69.1	47	65.6	37	80.1	40	78.9	48	71.0
Nebraska	37	68.0	35	72.9	38	78.6	16	83.5	13	89.1	23	85.1	24	79.5
Nevada	50	64.9	50	65.0	49	67.0	10	87.9	27	82.6	25	84.7	38	75.4
New Hampshire	10	72.0	15	76.4	13	88.1	11	87.5	3	96.3	2	96.9	4	86.2
New Jersey	16	71.2	28	73.6	12	89.0	2	94.5	17	88.3	9	91.2	9	84.6
New Mexico	2	98.0	2	99.0	22	84.4	43	68.4	46	72.6	47	71.8	15	82.4
New York	11	71.8	40	71.8	20	84.9	4	91.7	34	80.8	31	82.5	22	80.6
North Carolina	18	70.7	16	76.3	32	83.2	17	83.5	41	77.7	38	79.7	30	78.5
North Dakota	39	67.9	39	71.8	41	74.7	42	69.0	28	82.5	32	82.4	41	74.7
Ohio	31	69.0	17	75.7	14	87.8	25	80.3	39	79.2	34	81.5	28	78.9
Oklahoma	42	67.1	32	73.2	36	80.8	30	78.5	43	74.7	43	76.5	40	75.1
Oregon	1	100.0	1	100.0	31	83.2	13	86.5	10	90.3	8	91.9	1	92.0
Pennsylvania	24	69.8	24	74.4	30	83.2	36	76.9	32	81.1	27	84.1	32	78.2
Rhode Island	23	69.8	27	73.8	24	83.9	5	89.6	25	83.8	21	85.5	20	81.1
South Carolina	38	68.0	29	73.3	35	81.0	34	77.2	45	74.0	46	73.1	42	74.4
South Dakota	48	65.3	45	68.8	40	75.3	49	65.0	26	83.7	30	82.7	44	73.5
Tennessee	25	69.5	21	75.4	19	85.1	26	79.9	42	76.3	42	77.1	36	77.2
Texas	6	73.2	13	77.2	17	85.8	24	80.6	38	79.5	36	80.6	25	79.5
Utah	47	65.8	33	73.1	10	89.5	37	75.1	1	100.0	5	93.7	14	82.9
Vermont	19	70.2	10	78.8	16	87.0	33	77.5	15	88.5	13	88.4	19	81.7
Virginia	27	69.3	12	77.8	6	93.6	20	82.0	11	90.0	10	91.0	12	84.0
Washington	7	72.4	11	78.7	9	92.4	9	88.1	4	96.3	6	93.4	3	86.9
West Virginia	30	69.2	37	72.2	44	72.8	39	72.4	44	74.0	44	75.5	46	72.7
Wisconsin	20	70.1	14	76.6	26	83.6	22	80.8	22	86.0	17	87.5	21	80.8
Wyoming	13	71.6	46	67.7	48	68.8	45	67.2	16	88.3	16	87.7	39	75.2

CONCENTRATION	Financial											
State	SBIR Phase I awards per worker		SBIR Phase II awards per worker		STTR awards per worker		IPOs per 10,000 firms		Venture capital per worker		Financial Concentration Composite	
	2002		2002		2002		2004		2003			
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**70.2**		**70.6**		**73.3**		**74.3**		**68.7**		**71.4**
Alabama	13	70.8	9	74.1	9	79.9	30	71.7	37	65.6	16	72.4
Alaska	50	65.0	49	65.0	46	65.0	34	65.0	47	65.0	50	65.0
Arizona	18	70.1	10	73.8	10	79.8	33	70.2	26	66.3	17	72.0
Arkansas	49	65.4	46	66.0	43	66.0	34	65.0	44	65.0	49	65.5
California	7	76.5	7	75.6	16	74.6	2	95.6	2	88.8	2	82.2
Colorado	3	80.7	2	83.7	5	84.8	18	76.9	3	78.0	4	80.8
Connecticut	**9**	**72.9**	**14**	**72.1**	**15**	**76.1**	**32**	**70.9**	**6**	**71.9**	**13**	**72.8**
Delaware	22	69.1	27	68.0	17	73.1	5	87.6	47	65.0	15	72.6
Florida	33	67.0	34	67.1	37	68.5	27	73.0	25	66.4	35	68.4
Georgia	38	66.8	37	66.8	36	68.7	22	73.7	15	69.0	33	69.0
Hawaii	14	70.4	31	67.3	13	77.1	34	65.0	27	66.2	32	69.2
Idaho	31	67.5	21	69.4	46	65.0	34	65.0	9	70.8	41	67.5
Illinois	39	66.7	45	66.2	24	71.6	13	81.2	20	67.4	23	70.6
Indiana	43	66.3	41	66.5	41	66.1	7	83.2	41	65.4	29	69.5
Iowa	35	66.8	36	66.8	35	68.9	25	73.3	43	65.1	36	68.2
Kansas	44	66.0	32	67.2	44	65.8	24	73.4	47	65.0	43	67.5
Kentucky	48	65.4	42	66.4	34	68.9	29	72.0	42	65.2	40	67.6
Louisiana	47	65.5	47	65.9	46	65.0	31	71.0	38	65.6	46	66.6
Maine	24	68.7	39	66.6	40	66.8	34	65.0	32	66.0	45	66.6
Maryland	2	81.3	4	80.5	8	80.6	23	73.5	8	71.1	5	77.4
Massachusetts	1	100.0	1	100.0	1	100.0	4	91.0	1	100.0	1	98.2
Michigan	26	68.3	30	67.5	25	71.6	26	73.1	31	66.1	31	69.3
Minnesota	27	68.3	19	70.9	38	67.8	9	82.1	18	68.4	21	71.5
Mississippi	46	65.7	38	66.6	45	65.7	34	65.0	33	65.8	48	65.8
Missouri	45	66.0	44	66.3	26	71.5	15	78.0	21	67.0	26	69.8
Montana	5	78.8	12	72.3	14	76.5	10	81.8	45	65.0	8	74.9
Nebraska	42	66.3	48	65.8	46	65.0	17	77.5	46	65.0	38	67.9
Nevada	32	67.1	22	69.0	39	67.1	1	100.0	24	66.6	10	74.0
New Hampshire	6	78.1	3	82.8	6	84.6	34	65.0	4	76.3	6	77.4
New Jersey	15	70.4	16	71.3	18	72.9	14	79.9	5	74.1	11	73.7
New Mexico	4	78.9	6	78.2	7	83.6	34	65.0	40	65.4	9	74.2
New York	25	68.6	23	68.9	30	70.7	11	81.7	17	68.5	18	71.7
North Carolina	34	66.9	25	68.5	11	78.9	34	65.0	12	69.3	27	69.7
North Dakota	23	69.0	43	66.3	23	71.8	34	65.0	22	67.0	39	67.8
Ohio	19	70.0	15	71.4	27	71.4	28	72.5	34	65.8	24	70.2
Oklahoma	36	66.8	40	66.6	29	70.8	34	65.0	23	66.8	44	67.2
Oregon	11	71.4	18	71.0	22	71.8	19	76.1	19	67.8	20	71.6
Pennsylvania	20	69.7	20	70.1	19	72.6	6	86.0	13	69.3	12	73.5
Rhode Island	17	70.3	17	71.1	46	65.0	34	65.0	16	68.9	37	68.1
South Carolina	40	66.5	35	66.9	31	70.5	16	77.5	29	66.1	28	69.5
South Dakota	37	66.8	26	68.3	20	72.1	34	65.0	39	65.4	42	67.5
Tennessee	41	66.4	33	67.1	21	71.9	20	75.3	30	66.1	30	69.4
Texas	30	67.5	28	68.0	32	70.2	8	82.2	10	70.5	19	71.7
Utah	10	72.2	11	72.7	28	70.8	34	65.0	14	69.2	25	70.0
Vermont	21	69.4	24	68.8	4	86.1	34	65.0	35	65.7	22	71.0
Virginia	8	75.9	5	79.4	3	88.4	3	92.3	11	69.4	3	81.1
Washington	12	71.2	8	74.4	12	78.2	12	81.6	7	71.5	7	75.4
West Virginia	29	67.8	49	65.0	42	66.0	34	65.0	28	66.2	47	66.0
Wisconsin	28	68.1	29	67.6	33	69.1	21	74.2	36	65.7	34	69.0
Wyoming	16	70.3	13	72.2	2	90.8	34	65.0	47	65.0	14	72.6

CONCENTRATION	Entrepreneurial & Business Vitality															
State	Tech share of total gazelles		Gazelles per 1 mill estabs		Business churn share of total firms		Small business share of emp		Proprietors per 1,000 people		Federal R&D share of GSP		Industry R&D share of GSP		Univ R&D share of GSP	
	2003		2003		2003		2001		2002		2002		2002		2002	
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**77.5**		**76.0**		**81.1**		**77.2**		**78.5**		**69.5**		**77.0**		**74.2**
Alabama	28	76.7	43	67.9	35	78.4	36	73.2	47	68.0	4	83.9	35	70.3	17	76.2
Alaska	38	65.0	46	65.0	8	87.3	18	77.4	1	100.0	6	74.4	49	65.6	13	77.7
Arizona	24	79.4	16	78.7	15	82.8	44	71.0	28	74.3	17	68.7	14	81.4	33	72.1
Arkansas	28	76.7	25	74.0	32	78.7	38	73.0	35	72.5	30	66.6	44	66.9	45	66.9
California	3	91.4	2	96.2	28	79.3	12	81.3	9	86.6	13	69.5	7	91.0	22	74.2
Colorado	23	79.5	3	96.1	24	80.6	13	80.2	5	95.4	14	69.2	19	78.7	21	74.3
Connecticut	**19**	**81.7**	**7**	**86.9**	**45**	**74.2**	**15**	**79.2**	**14**	**82.7**	**42**	**66.0**	**3**	**98.2**	**30**	**72.8**
Delaware	38	65.0	38	68.9	17	82.5	39	72.7	42	69.7	50	65.0	8	88.1	46	66.6
Florida	21	81.5	20	76.8	7	87.7	42	71.8	31	73.7	20	67.9	32	70.7	43	67.5
Georgia	13	82.5	19	77.1	20	81.6	49	67.9	38	71.1	9	70.7	33	70.4	23	74.0
Hawaii	38	65.0	46	65.0	16	82.7	16	77.7	10	85.8	7	71.8	46	66.2	18	75.8
Idaho	38	65.0	46	65.0	6	89.1	4	86.0	8	88.0	37	66.2	9	88.0	41	69.0
Illinois	33	75.2	28	72.5	23	80.7	32	74.6	32	73.1	46	65.6	20	78.6	35	71.5
Indiana	25	77.7	30	72.2	38	77.8	35	73.4	37	71.3	45	65.8	15	80.3	32	72.4
Iowa	38	65.0	45	66.2	48	71.9	27	75.8	21	80.1	31	66.6	31	71.2	6	80.4
Kansas	34	73.8	22	75.3	31	78.8	25	76.2	16	82.1	47	65.5	18	78.9	27	73.2
Kentucky	9	88.3	40	68.2	34	78.5	43	71.4	46	68.1	49	65.2	40	69.0	37	70.4
Louisiana	34	73.8	27	72.6	40	77.7	17	77.6	45	68.9	28	67.0	48	65.8	20	74.7
Maine	38	65.0	46	65.0	43	76.7	10	83.8	6	91.8	43	65.9	36	70.0	48	66.1
Maryland	12	83.0	6	89.1	4	90.4	28	75.8	25	77.3	1	100.0	13	81.6	1	100.0
Massachusetts	2	91.8	1	100.0	36	78.4	19	77.1	18	81.1	10	70.6	4	97.3	2	84.8
Michigan	13	82.5	29	72.3	42	76.9	21	76.7	43	69.3	35	66.3	1	100.0	24	73.9
Minnesota	8	88.9	5	90.4	27	80.1	22	76.7	20	80.2	41	66.1	11	84.8	39	69.5
Mississippi	38	65.0	44	66.6	25	80.6	45	70.8	50	65.0	8	71.0	43	67.1	16	76.7
Missouri	19	81.7	17	78.7	9	84.5	29	75.6	26	76.4	33	66.5	29	71.9	19	75.1
Montana	38	65.0	42	67.9	12	84.0	1	100.0	3	98.1	19	68.1	45	66.6	5	81.2
Nebraska	28	76.7	34	70.7	44	74.5	31	74.8	17	81.4	32	66.5	39	69.3	12	77.8
Nevada	13	82.5	10	83.7	1	100.0	50	65.0	27	74.9	48	65.5	42	67.9	49	65.2
New Hampshire	4	91.3	23	75.2	33	78.6	7	84.8	7	88.8	21	67.8	10	87.2	8	79.4
New Jersey	10	87.4	9	85.3	26	80.4	14	79.5	41	70.7	15	69.1	5	92.4	47	66.2
New Mexico	13	82.5	26	73.9	14	83.9	30	75.4	29	74.0	2	87.2	37	69.8	3	82.8
New York	22	80.4	12	82.6	19	81.6	23	76.7	33	72.8	36	66.2	25	74.9	25	73.9
North Carolina	18	81.7	21	75.7	21	81.6	40	72.5	30	73.7	24	67.4	26	74.7	14	77.3
North Dakota	38	65.0	24	74.4	49	71.7	6	85.3	13	84.8	16	68.7	30	71.3	4	82.2
Ohio	37	67.7	36	69.6	47	73.6	34	73.6	36	71.5	12	69.5	17	79.0	36	71.1
Oklahoma	36	70.0	14	80.7	39	77.8	24	76.7	19	80.5	29	66.7	41	68.1	34	71.5
Oregon	7	90.0	33	71.6	10	84.2	9	84.0	12	85.2	23	67.5	12	82.8	26	73.3
Pennsylvania	17	82.1	15	78.9	29	78.9	26	75.9	40	71.0	27	67.2	16	79.4	10	78.2
Rhode Island	1	100.0	32	71.7	37	78.4	8	84.4	44	69.2	3	85.1	6	92.3	11	78.0
South Carolina	28	76.7	41	67.9	30	78.9	37	73.0	48	66.6	39	66.1	28	72.1	29	72.9
South Dakota	38	65.0	46	65.0	50	65.0	5	86.0	11	85.7	34	66.4	47	66.0	50	65.0
Tennessee	32	75.3	18	77.5	5	89.3	48	68.1	22	79.7	38	66.1	34	70.3	38	69.8
Texas	26	77.1	4	92.7	13	84.0	46	69.7	24	78.4	25	67.3	24	77.0	28	72.9
Utah	6	90.5	11	83.0	2	96.7	41	72.2	15	82.4	22	67.7	21	78.3	7	80.3
Vermont	38	65.0	37	69.5	41	77.3	2	93.7	2	98.2	26	67.2	22	77.6	9	78.8
Virginia	27	77.0	8	85.3	22	81.6	47	69.3	34	72.5	5	81.1	27	73.5	40	69.0
Washington	4	91.3	13	81.2	3	94.8	11	81.8	23	79.6	18	68.3	2	98.3	31	72.6
West Virginia	38	65.0	31	72.1	18	82.4	33	74.2	49	66.2	11	70.3	38	69.4	42	67.7
Wisconsin	11	86.0	39	68.4	46	74.0	20	77.0	39	71.1	40	66.1	23	77.0	15	77.2
Wyoming	38	65.0	35	70.1	11	84.1	3	91.8	4	97.1	44	65.8	50	65.0	44	67.5

CONCENTRATION				
State	Patents per 1 mill people		Vitality Concentration Composite	
	2003			
	Rank	*Score*	*Rank*	*Score*
50-State Avg		**71.4**		**75.8**
Alabama	43	66.0	36	73.4
Alaska	48	65.1	23	75.3
Arizona	19	71.6	21	75.5
Arkansas	49	65.0	47	71.2
California	5	80.1	3	83.3
Colorado	9	77.0	6	81.2
Connecticut	**7**	**77.6**	**9**	**79.9**
Delaware	10	75.6	40	72.7
Florida	29	68.2	31	74.0
Georgia	31	68.1	34	73.7
Hawaii	47	65.3	39	72.8
Idaho	1	100.0	11	79.6
Illinois	17	71.8	33	73.7
Indiana	24	70.6	35	73.5
Iowa	26	69.8	43	71.9
Kansas	30	68.2	28	74.6
Kentucky	41	66.5	44	71.7
Louisiana	45	65.9	45	71.5
Maine	40	66.7	41	72.3
Maryland	23	71.0	1	85.4
Massachusetts	3	80.9	2	84.7
Michigan	12	74.6	17	76.9
Minnesota	4	80.8	10	79.7
Mississippi	50	65.0	50	69.7
Missouri	35	67.8	22	75.4
Montana	39	67.0	16	77.6
Nebraska	38	67.0	38	73.2
Nevada	28	68.8	27	74.8
New Hampshire	6	78.7	5	81.3
New Jersey	11	75.6	14	78.5
New Mexico	27	69.1	15	77.6
New York	15	73.1	20	75.8
North Carolina	25	70.3	25	75.0
North Dakota	44	65.9	30	74.4
Ohio	16	72.5	42	72.0
Oklahoma	36	67.6	37	73.3
Oregon	8	77.5	12	79.6
Pennsylvania	22	71.1	19	75.9
Rhode Island	20	71.5	7	81.2
South Carolina	37	67.5	46	71.3
South Dakota	42	66.4	49	70.1
Tennessee	34	67.8	32	73.8
Texas	21	71.1	18	76.7
Utah	18	71.6	8	80.3
Vermont	2	83.6	13	79.0
Virginia	32	67.9	24	75.2
Washington	13	74.4	4	82.5
West Virginia	46	65.4	48	70.3
Wisconsin	14	73.6	29	74.5
Wyoming	33	67.8	26	74.9

CONCENTRATION	Human Capital															
State	NAEP math exam performance		NAEP reading exam performance		Higher ed cost share of med fam inc		College complete for pop 25+ yrs		S&E grad students per 1 mill people		S&E share of higher ed degrees		Doctoral S&E per 1,000 workers		Human Capital Concentration Composite	
	2003		2003		2002		2004		2002		2000		2001			
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**86.1**		**86.4**		**88.9**		**83.8**		**76.6**		**83.5**		**76.9**		**83.2**
Alabama	48	71.0	45	71.7	22	91.3	45	76.4	34	74.3	44	77.0	42	71.2	47	76.1
Alaska	25	88.0	41	75.0	10	95.5	25	81.7	39	72.8	20	84.9	21	76.5	29	82.0
Arizona	38	80.0	43	73.3	28	88.9	16	85.8	31	74.8	50	65.0	34	72.5	44	77.2
Arkansas	44	75.0	37	80.0	30	88.0	49	70.7	49	67.5	47	74.8	47	69.0	49	75.0
California	46	73.0	49	65.0	35	85.4	10	91.8	14	79.0	3	95.5	9	81.8	30	81.7
Colorado	12	92.0	11	93.3	9	95.6	2	98.0	4	84.6	2	97.0	12	80.9	2	91.6
Connecticut	**15**	**91.0**	**18**	**91.7**	**20**	**92.5**	**6**	**96.4**	**3**	**85.0**	**16**	**86.5**	**8**	**82.3**	**5**	**89.3**
Delaware	29	86.0	22	90.0	36	85.1	20	84.0	7	82.2	18	85.7	5	93.1	13	86.6
Florida	40	79.0	41	75.0	26	89.6	22	82.5	43	71.5	40	78.1	48	68.9	42	77.8
Georgia	42	77.0	37	80.0	21	92.4	17	85.1	38	73.2	27	81.9	36	72.2	40	80.3
Hawaii	46	73.0	49	65.0	1	100.0	21	83.5	29	75.0	11	88.7	15	78.4	38	80.5
Idaho	18	90.0	22	90.0	15	94.0	40	78.9	35	74.2	19	85.3	23	75.6	21	84.0
Illinois	33	84.0	22	90.0	32	87.3	18	84.8	6	82.6	37	79.3	25	74.7	24	83.2
Indiana	15	91.0	18	91.7	40	84.0	46	74.5	25	76.2	33	80.4	33	73.1	33	81.5
Iowa	7	94.0	6	96.7	23	90.5	37	79.7	13	79.1	26	82.2	37	72.0	19	84.9
Kansas	7	94.0	18	91.7	4	98.7	13	89.0	2	86.4	34	79.9	38	71.8	11	87.4
Kentucky	33	84.0	11	93.3	17	93.1	47	74.3	41	71.9	46	75.9	46	70.3	39	80.4
Louisiana	44	75.0	46	70.0	7	96.5	44	76.6	30	74.9	36	79.6	43	71.1	43	77.7
Maine	12	92.0	8	95.0	45	81.7	39	79.6	50	65.0	10	89.2	32	73.1	26	82.2
Maryland	31	85.0	34	81.7	31	87.7	4	97.5	9	81.3	5	93.8	2	96.0	6	89.0
Massachusetts	7	94.0	8	95.0	12	94.5	1	100.0	1	100.0	13	88.2	4	94.2	1	95.1
Michigan	29	86.0	22	90.0	37	84.4	36	79.9	15	79.0	32	80.5	24	75.2	28	82.1
Minnesota	1	100.0	11	93.3	11	94.6	9	93.1	23	76.4	28	81.7	20	76.9	8	88.0
Mississippi	50	65.0	43	73.3	39	84.3	48	72.9	46	70.7	49	74.2	41	71.3	50	73.1
Missouri	22	89.0	6	96.7	29	88.0	15	85.9	37	73.5	43	77.2	30	73.6	22	83.4
Montana	3	97.0	1	100.0	43	82.6	25	81.7	22	76.5	8	91.1	26	74.6	15	86.2
Nebraska	12	92.0	18	91.7	16	93.9	32	80.5	19	77.3	48	74.6	50	65.0	27	82.2
Nevada	41	78.0	47	68.3	25	90.1	34	80.0	48	68.2	42	77.6	49	67.9	48	75.7
New Hampshire	3	97.0	5	98.3	6	97.2	3	97.9	40	72.6	14	87.1	22	75.7	4	89.4
New Jersey	38	80.0	11	93.3	41	84.0	5	96.6	27	75.3	4	95.4	7	82.4	12	86.7
New Mexico	49	70.0	48	66.7	34	85.4	30	81.0	10	80.8	22	84.2	1	100.0	36	81.2
New York	22	89.0	29	88.3	38	84.4	12	90.0	5	84.2	25	82.4	13	80.2	18	85.5
North Carolina	22	89.0	32	83.3	19	92.7	41	78.2	26	75.3	15	87.0	19	77.1	23	83.2
North Dakota	2	99.0	1	100.0	5	97.5	29	81.2	12	80.0	39	78.6	3	94.3	3	90.1
Ohio	15	91.0	11	93.3	47	76.3	33	80.2	21	77.1	38	79.1	27	74.4	31	81.6
Oklahoma	35	82.0	30	86.7	8	96.3	42	77.4	33	74.4	30	81.3	39	71.6	34	81.4
Oregon	25	88.0	30	86.7	44	82.0	23	82.3	36	73.7	9	90.7	18	77.5	25	83.0
Pennsylvania	27	87.0	22	90.0	49	73.0	28	81.4	18	78.3	23	83.3	16	78.2	32	81.6
Rhode Island	36	81.0	34	81.7	46	79.8	19	84.5	16	78.8	29	81.5	10	81.8	35	81.3
South Carolina	31	85.0	39	78.3	48	74.0	31	80.7	47	68.7	31	81.1	40	71.3	45	77.0
South Dakota	5	96.0	1	100.0	13	94.0	25	81.7	28	75.2	12	88.3	44	70.6	14	86.6
Tennessee	42	77.0	39	78.3	24	90.4	37	79.7	42	71.7	41	77.8	31	73.3	41	78.3
Texas	27	87.0	34	81.7	27	89.1	34	80.0	24	76.3	35	79.9	29	73.6	37	81.1
Utah	18	90.0	22	90.0	3	99.4	11	90.4	8	81.4	17	85.9	17	77.7	9	87.8
Vermont	6	95.0	1	100.0	50	65.0	7	95.9	45	70.7	6	92.1	6	82.8	16	85.9
Virginia	18	90.0	11	93.3	18	93.0	8	94.1	11	80.1	7	91.7	14	79.6	7	88.8
Washington	18	90.0	22	90.0	33	86.2	14	88.9	44	71.1	21	84.8	11	81.6	20	84.6
West Virginia	36	81.0	32	83.3	42	83.0	50	65.0	32	74.5	45	76.3	45	70.4	46	76.2
Wisconsin	11	93.0	11	93.3	2	99.8	24	81.8	20	77.2	24	82.9	35	72.4	17	85.8
Wyoming	7	94.0	8	95.0	14	94.0	43	76.8	17	78.7	1	100.0	28	73.7	10	87.5

CONCENTRATION	Global															
State	Commodity exports per worker		Mfg exports share of mfg shipments		Chemicals share of total exports		Computers & elec share of total exports		Immigrants admitted per 1 mill people		Foreign % of higher ed enrollees		Foreign affiliate % of nonfarm emp		Capital invest per foreign affil worker	
	2003		2001		2004		2004		2003		2003		2002p		2002p	
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**75.9**		**75.2**		**71.0**		**73.4**		**75.6**		**73.7**		**81.5**		**67.3**
Alabama	20	75.9	31	71.1	12	73.8	35	68.7	48	65.9	33	70.0	18	84.2	20	66.4
Alaska	4	89.4	16	76.4	31	68.2	49	65.1	18	76.8	47	65.9	26	81.5	1	100.0
Arizona	12	79.8	5	91.9	43	65.5	5	83.6	16	77.7	30	71.5	41	72.2	34	65.8
Arkansas	40	70.6	48	66.2	20	71.4	43	66.8	39	68.3	40	68.5	36	75.2	29	66.0
California	8	81.8	7	87.0	35	67.4	6	82.0	1	100.0	24	73.7	16	85.4	24	66.1
Colorado	38	71.3	13	78.6	34	67.6	4	91.2	14	80.6	35	69.7	31	79.1	28	66.0
Connecticut	**15**	**77.3**	**11**	**79.6**	**32**	**68.0**	**33**	**69.0**	**13**	**80.8**	**4**	**81.4**	**1**	**100.0**	**45**	**65.3**
Delaware	18	76.2	24	72.5	3	81.4	23	71.2	19	76.6	8	78.1	7	91.1	8	67.6
Florida	31	73.0	2	98.3	24	70.0	11	77.9	7	86.2	16	75.9	29	80.1	43	65.3
Georgia	24	75.2	29	71.6	23	70.4	26	70.9	27	72.4	27	73.1	10	89.2	39	65.6
Hawaii	50	65.0	36	70.2	46	65.2	32	69.1	4	92.1	1	99.4	3	98.7	13	66.7
Idaho	27	73.7	18	74.4	37	67.2	2	94.2	28	72.3	39	68.6	43	71.5	25	66.1
Illinois	19	76.2	15	76.7	18	72.1	24	71.1	11	82.2	20	74.2	15	87.6	32	65.9
Indiana	13	79.4	39	69.8	10	74.1	34	68.7	35	69.4	15	76.1	12	88.2	17	66.6
Iowa	28	73.6	45	67.0	30	68.5	40	68.0	30	71.8	10	77.4	39	74.3	27	66.0
Kansas	30	73.1	42	69.2	33	67.9	27	70.3	23	73.5	12	76.7	42	71.8	38	65.7
Kentucky	10	80.4	33	70.9	14	73.4	38	68.3	38	68.6	41	68.4	13	88.2	10	67.5
Louisiana	3	90.8	30	71.3	6	75.7	50	65.0	46	66.8	32	71.0	38	74.7	3	71.6
Maine	29	73.5	41	69.2	42	65.6	13	77.3	37	68.8	42	68.4	9	90.3	22	66.3
Maryland	45	68.8	19	74.2	16	73.1	18	72.6	5	87.1	5	81.2	20	83.3	49	65.0
Massachusetts	11	79.9	8	83.6	7	75.7	8	80.2	6	86.4	2	92.1	6	93.2	42	65.5
Michigan	6	84.6	14	76.8	29	68.7	44	66.7	25	73.1	11	76.8	17	85.2	15	66.6
Minnesota	22	75.3	22	73.0	39	66.8	12	77.3	20	75.5	31	71.2	30	79.7	44	65.3
Mississippi	44	69.7	40	69.6	5	76.1	48	65.6	50	65.0	46	65.9	46	70.8	12	66.8
Missouri	39	70.9	46	67.0	8	75.3	41	67.6	32	71.2	29	72.7	32	78.8	33	65.8
Montana	49	65.7	49	65.5	9	75.2	46	65.8	45	66.8	43	67.8	50	65.0	5	69.1
Nebraska	35	71.8	44	67.7	22	70.8	42	67.4	21	75.2	22	74.2	47	69.4	50	65.0
Nevada	46	68.5	10	79.7	48	65.1	16	73.6	9	84.2	28	72.9	40	72.4	11	67.3
New Hampshire	33	72.1	17	74.9	41	66.1	10	79.6	22	73.9	17	75.9	5	94.6	47	65.2
New Jersey	23	75.3	9	80.2	4	78.1	22	71.5	2	98.2	13	76.6	4	95.4	36	65.7
New Mexico	36	71.7	23	73.0	49	65.1	3	93.4	26	72.4	49	65.7	49	66.8	4	69.4
New York	17	76.5	6	88.3	26	69.4	21	71.8	3	97.8	3	86.3	14	88.1	26	66.1
North Carolina	21	75.4	37	70.2	13	73.7	20	71.8	31	71.5	44	67.7	8	90.9	48	65.0
North Dakota	41	70.5	35	70.5	45	65.3	45	66.1	43	67.0	26	73.2	44	71.2	14	66.7
Ohio	14	79.0	27	71.9	25	69.9	39	68.0	34	69.5	21	74.2	27	81.4	31	65.9
Oklahoma	47	68.4	47	66.6	36	67.2	37	68.3	40	68.2	6	80.3	45	71.2	16	66.6
Oregon	7	82.2	12	79.5	40	66.3	7	81.7	17	77.6	19	74.3	34	76.2	21	66.3
Pennsylvania	37	71.5	38	70.0	15	73.2	28	70.2	29	71.9	14	76.2	23	82.9	37	65.7
Rhode Island	42	70.1	34	70.9	27	69.2	15	73.7	15	80.3	7	78.9	19	83.9	40	65.6
South Carolina	9	81.8	21	73.7	19	71.8	31	69.6	47	66.6	45	67.0	2	99.2	23	66.1
South Dakota	48	68.2	50	65.0	47	65.2	9	80.1	41	67.9	48	65.8	48	67.3	30	66.0
Tennessee	16	76.7	32	70.9	21	71.1	25	71.1	42	67.4	38	68.6	11	89.0	41	65.6
Texas	2	93.4	4	92.3	11	74.1	14	76.9	12	81.1	9	77.6	28	80.9	9	67.5
Utah	26	74.1	20	74.1	28	69.0	17	73.5	24	73.1	23	74.0	37	74.7	6	68.9
Vermont	5	88.4	3	94.7	50	65.0	1	100.0	33	69.8	34	69.7	24	82.0	19	66.5
Virginia	34	72.0	28	71.6	17	72.2	29	70.1	10	83.0	25	73.3	22	83.0	46	65.3
Washington	1	100.0	1	100.0	44	65.3	36	68.5	8	84.9	18	75.0	33	76.8	18	66.5
West Virginia	32	72.5	26	72.2	2	84.8	30	69.7	49	65.1	37	68.8	35	75.5	7	68.3
Wisconsin	25	75.0	43	68.3	38	66.9	19	72.5	36	69.1	36	69.4	21	83.1	35	65.7
Wyoming	43	69.8	25	72.4	1	100.0	47	65.7	44	67.0	50	64.5	25	81.7	2	78.1

CONCENTRATION		
State	Global Concentration Composite	
	Rank	*Score*
50-State Avg		**74.2**
Alabama	39	72.0
Alaska	10	77.9
Arizona	13	76.0
Arkansas	46	69.1
California	4	80.4
Colorado	17	75.5
Connecticut	**7**	**79.5**
Delaware	12	76.8
Florida	8	78.3
Georgia	25	73.6
Hawaii	9	78.3
Idaho	26	73.5
Illinois	14	75.7
Indiana	23	74.0
Iowa	43	70.8
Kansas	42	71.0
Kentucky	29	73.2
Louisiana	27	73.4
Maine	36	72.4
Maryland	15	75.7
Massachusetts	1	82.1
Michigan	20	74.8
Minnesota	30	73.0
Mississippi	48	68.7
Missouri	41	71.2
Montana	50	67.6
Nebraska	44	70.2
Nevada	31	73.0
New Hampshire	18	75.3
New Jersey	5	80.1
New Mexico	37	72.2
New York	2	80.5
North Carolina	28	73.3
North Dakota	47	68.8
Ohio	35	72.5
Oklahoma	45	69.6
Oregon	16	75.5
Pennsylvania	33	72.7
Rhode Island	22	74.1
South Carolina	21	74.5
South Dakota	49	68.2
Tennessee	34	72.5
Texas	3	80.5
Utah	32	72.7
Vermont	11	77.7
Virginia	24	73.8
Washington	6	79.6
West Virginia	38	72.1
Wisconsin	40	71.2
Wyoming	19	74.9

GROWTH	Technology													
State	Tech output per worker		Tech share of GSP		Tech share of nonfarm emp		High-speed lines per 1 mill people		% households with computers		% households with Internet access		Tech Growth Composite	
	1990-2003		1990-2003		1990-2003		1999-2003		1997-2003		1998-2003			
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**76.0**		**75.7**		**83.4**		**80.3**		**80.6**		**82.8**		**79.8**
Alabama	39	72.6	36	72.2	24	82.4	9	84.2	16	84.9	26	82.3	22	79.8
Alaska	48	67.0	37	72.1	3	98.4	NA	NA	50	65.0	50	65.0	50	73.5
Arizona	4	90.8	4	92.1	12	90.5	34	77.7	35	77.1	42	75.9	8	84.0
Arkansas	10	77.9	19	76.9	31	81.8	6	85.2	3	93.9	1	100.0	4	85.9
California	22	75.6	30	73.5	36	78.0	37	76.1	41	74.1	38	77.5	44	75.8
Colorado	15	77.0	6	79.5	10	91.9	26	79.8	49	66.2	45	74.2	33	78.1
Connecticut	**16**	**76.7**	**38**	**71.5**	**48**	**68.9**	**23**	**80.5**	**8**	**86.9**	**35**	**78.5**	**36**	**77.2**
Delaware	42	71.5	48	66.7	49	68.9	2	95.3	26	80.8	15	86.0	31	78.2
Florida	43	70.8	34	72.7	13	89.2	30	79.0	11	85.5	34	79.2	26	79.4
Georgia	20	75.8	5	79.5	7	95.6	22	80.5	25	80.9	17	85.4	11	83.0
Hawaii	50	65.0	50	65.0	26	82.3	NA	NA	17	84.5	36	78.3	46	75.0
Idaho	3	92.6	3	96.4	4	97.6	33	78.2	39	74.9	32	80.7	2	86.7
Illinois	26	75.3	35	72.4	41	75.3	15	81.6	28	79.7	40	77.2	39	76.9
Indiana	6	79.6	13	77.4	34	78.5	10	82.1	22	82.1	37	77.9	24	79.6
Iowa	23	75.6	31	73.4	37	77.6	31	78.7	7	87.1	4	94.3	15	81.1
Kansas	8	78.4	8	78.2	21	84.4	25	79.9	42	73.8	28	82.1	25	79.5
Kentucky	14	77.3	9	77.9	18	86.5	40	74.3	6	87.5	11	88.1	12	81.9
Louisiana	49	66.7	49	66.5	30	81.9	14	81.6	4	92.4	8	91.2	20	80.1
Maine	25	75.4	23	74.9	23	82.6	43	72.8	13	85.3	19	85.2	28	79.4
Maryland	33	73.9	26	74.1	20	84.4	29	79.3	44	73.0	41	76.6	40	76.9
Massachusetts	29	74.5	39	71.4	42	74.8	36	77.2	33	77.9	30	81.0	43	76.1
Michigan	40	72.1	41	70.4	35	78.5	27	79.4	27	80.3	33	80.4	41	76.9
Minnesota	31	74.3	25	74.1	22	83.4	20	80.9	23	81.2	25	82.5	27	79.4
Mississippi	19	76.3	27	73.9	40	77.1	8	84.5	1	100.0	2	99.5	6	85.2
Missouri	37	73.1	42	69.8	43	74.1	7	85.2	38	76.3	21	83.9	37	77.1
Montana	46	69.0	24	74.3	2	99.7	NA	NA	31	78.3	12	88.0	13	81.8
Nebraska	30	74.4	28	73.9	28	82.3	44	71.9	20	83.5	9	89.8	29	79.3
Nevada	47	67.6	33	73.2	1	100.0	28	79.3	19	83.7	29	81.3	16	80.8
New Hampshire	5	81.6	10	77.7	44	73.9	39	74.4	45	69.7	46	72.1	48	74.9
New Jersey	36	73.1	45	69.2	46	71.8	24	79.9	29	78.8	39	77.3	47	75.0
New Mexico	1	100.0	2	99.9	15	87.8	4	90.5	46	69.2	48	71.2	3	86.4
New York	38	73.0	46	68.9	47	71.3	18	81.1	14	85.3	16	85.6	35	77.5
North Carolina	17	76.5	15	77.3	17	86.8	11	82.1	5	87.9	6	93.1	9	84.0
North Dakota	32	74.1	7	78.5	5	97.4	35	77.4	12	85.4	5	93.6	7	84.4
Ohio	34	73.4	44	69.5	45	72.1	42	74.2	36	77.1	23	82.7	49	74.8
Oklahoma	45	70.0	43	69.7	27	82.3	46	65.0	9	86.0	10	88.6	38	77.0
Oregon	2	98.6	1	100.0	11	91.8	12	82.1	32	77.9	43	75.4	1	87.6
Pennsylvania	24	75.6	32	73.3	38	77.5	17	81.1	10	85.9	20	84.3	23	79.6
Rhode Island	13	77.4	40	70.8	50	65.0	41	74.2	18	83.7	31	80.7	45	75.3
South Carolina	21	75.7	22	75.8	19	84.6	21	80.8	21	82.7	24	82.7	18	80.4
South Dakota	41	72.0	29	73.7	14	88.8	45	69.4	15	85.2	18	85.4	30	79.1
Tennessee	12	77.4	20	76.6	29	82.1	38	76.0	24	81.0	13	86.8	21	80.0
Texas	18	76.5	14	77.4	16	87.1	19	81.0	34	77.3	27	82.2	19	80.2
Utah	35	73.3	16	77.2	6	95.8	13	81.9	47	69.1	47	71.8	32	78.2
Vermont	9	77.9	21	76.4	33	79.9	3	91.0	48	68.4	44	74.3	34	78.0
Virginia	28	74.6	11	77.5	8	92.9	16	81.4	43	73.4	22	83.4	17	80.5
Washington	11	77.8	17	77.0	25	82.4	32	78.3	40	74.2	49	70.4	42	76.7
West Virginia	44	70.6	47	68.7	39	77.4	1	100.0	2	98.8	3	96.2	5	85.3
Wisconsin	7	78.6	18	77.0	32	80.1	5	88.9	37	76.5	14	86.6	14	81.3
Wyoming	27	74.6	12	77.4	9	92.5	NA	NA	30	78.4	7	92.6	10	83.1

GROWTH	Financial											
State	SBIR Phase I awards per worker		SBIR Phase II awards per worker		STTR awards per worker		IPOs per 10,000 firms		Venture capital per worker		Financial Growth Composite	
	1997-2002		1997-2002		1994-2002		1999-2004		1990-2003			
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**70.0**		**73.1**		**79.9**		**87.7**		**86.4**		**79.4**
Alabama	40	67.9	39	71.7	18	73.5	6	94.4	13	87.6	21	79.0
Alaska	50	65.0	42	71.7	44	71.2	41	65.0	46	82.6	50	71.1
Arizona	45	67.4	16	72.5	20	73.4	34	90.7	41	83.9	40	77.6
Arkansas	11	70.3	2	93.8	15	91.2	41	65.0	10	90.5	12	82.2
California	25	68.5	36	71.8	35	72.2	33	90.9	29	85.3	38	77.8
Colorado	26	68.5	17	72.4	26	73.0	30	91.0	28	85.4	32	78.1
Connecticut	**44**	**67.5**	**48**	**71.1**	**41**	**71.8**	**40**	**88.5**	**43**	**83.6**	**45**	**76.5**
Delaware	48	66.7	49	70.5	11	95.0	6	94.4	49	65.0	27	78.3
Florida	33	68.3	43	71.7	30	72.7	30	91.0	24	85.6	36	77.9
Georgia	23	68.7	34	71.8	24	73.1	34	90.7	16	87.2	28	78.3
Hawaii	15	69.3	33	71.8	6	97.7	41	65.0	5	96.1	17	80.0
Idaho	6	73.0	6	74.1	48	65.0	6	94.4	1	100.0	13	81.3
Illinois	32	68.3	37	71.8	31	72.7	26	92.4	34	84.7	34	78.0
Indiana	12	70.1	45	71.6	42	71.7	1	100.0	42	83.7	18	79.4
Iowa	4	75.5	8	73.5	9	97.0	6	94.4	44	83.4	6	84.8
Kansas	16	69.3	11	72.9	43	71.2	34	90.7	49	65.0	46	73.8
Kentucky	38	68.0	38	71.7	5	97.9	6	94.4	7	94.3	3	85.3
Louisiana	13	69.8	5	74.1	48	65.0	6	94.4	3	97.2	15	80.1
Maine	5	74.9	44	71.6	16	91.2	41	65.0	40	83.9	43	77.3
Maryland	34	68.2	20	72.3	32	72.5	37	90.2	21	85.9	37	77.8
Massachusetts	35	68.2	28	72.0	34	72.4	39	89.7	26	85.6	41	77.6
Michigan	31	68.4	47	71.4	22	73.2	6	94.4	35	84.6	25	78.4
Minnesota	43	67.6	18	72.4	4	98.1	27	92.0	31	84.8	10	83.0
Mississippi	7	72.0	9	73.2	17	90.0	41	65.0	33	84.7	44	77.0
Missouri	22	68.8	12	72.7	27	73.0	2	98.8	17	86.8	16	80.0
Montana	3	76.1	1	100.0	10	96.2	6	94.4	12	87.9	1	90.9
Nebraska	19	69.0	35	71.8	48	65.0	6	94.4	11	89.2	35	77.9
Nevada	14	69.6	7	73.6	14	93.5	5	96.0	2	98.3	2	86.2
New Hampshire	36	68.1	41	71.7	39	72.1	41	65.0	22	85.8	49	72.5
New Jersey	27	68.5	24	72.1	33	72.5	23	93.5	19	86.4	23	78.6
New Mexico	42	67.9	40	71.7	37	72.2	6	94.4	37	84.5	29	78.1
New York	20	69.0	31	71.9	28	73.0	38	90.0	18	86.4	33	78.1
North Carolina	30	68.4	22	72.2	19	73.5	41	65.0	20	86.2	48	73.1
North Dakota	18	69.1	10	73.2	13	93.5	6	94.4	6	95.9	4	85.2
Ohio	29	68.4	15	72.6	40	72.1	2	98.8	36	84.6	19	79.3
Oklahoma	10	70.8	19	72.4	3	98.8	41	65.0	15	87.4	22	78.9
Oregon	28	68.5	46	71.6	38	72.2	27	92.0	39	84.2	39	77.7
Pennsylvania	24	68.7	30	71.9	25	73.0	24	93.2	32	84.8	26	78.3
Rhode Island	1	100.0	32	71.9	44	71.2	41	65.0	14	87.4	20	79.1
South Carolina	9	71.3	3	74.7	2	99.3	6	94.4	30	85.3	5	85.0
South Dakota	47	67.0	4	74.5	12	94.2	6	94.4	8	92.7	8	84.6
Tennessee	46	67.3	27	72.0	36	72.2	25	93.0	45	83.2	42	77.5
Texas	37	68.0	21	72.2	23	73.1	29	91.4	23	85.7	30	78.1
Utah	21	68.9	23	72.1	46	70.8	41	65.0	9	90.6	47	73.5
Vermont	49	65.8	13	72.7	8	97.5	6	94.4	48	82.1	11	82.5
Virginia	41	67.9	25	72.1	29	73.0	22	93.6	25	85.6	24	78.4
Washington	39	68.0	14	72.7	21	73.3	30	91.0	27	85.5	31	78.1
West Virginia	2	79.7	50	65.0	47	70.5	6	94.4	4	96.6	14	81.3
Wisconsin	17	69.3	26	72.0	1	100.0	4	97.1	38	84.4	7	84.6
Wyoming	8	72.0	29	72.0	7	97.5	6	94.4	46	82.6	9	83.7

GROWTH	Entrepreneurial & Business Vitality															
State	Tech share of total gazelles		Gazelles per 1 mill estabs		Business churn share of total firms		Small business share of emp		Proprietors per 1,000 people		Federal R&D share of GSP		Industry R&D share of GSP		Univ R&D share of GSP	
	1999-2003		1999-2003		1990-2003		1992-2001		1990-2002		1993-2002		1993-2002		1993-2002	
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**89.9**		**88.4**		**82.6**		**78.8**		**75.3**		**83.9**		**79.1**		**81.8**
Alabama	40	88.0	43	84.6	23	83.1	33	76.3	15	76.2	39	78.9	47	73.2	31	79.6
Alaska	43	65.0	46	65.0	49	67.5	19	78.9	36	72.3	15	89.6	10	84.3	18	83.1
Arizona	38	90.1	29	90.0	34	80.2	4	89.4	2	87.7	32	81.1	11	82.7	39	77.5
Arkansas	4	97.6	2	97.6	38	78.9	28	77.0	18	75.8	29	82.1	41	74.7	22	82.1
California	16	97.0	8	93.9	48	69.3	23	77.7	12	78.5	28	82.5	31	76.4	11	85.8
Colorado	30	93.0	19	92.2	27	81.6	2	91.0	5	84.8	19	86.4	39	75.5	16	83.5
Connecticut	**36**	**91.2**	**25**	**91.2**	**24**	**82.2**	**46**	**73.3**	**44**	**69.3**	**22**	**85.3**	**16**	**81.1**	**49**	**70.9**
Delaware	43	65.0	45	83.5	1	100.0	16	80.2	19	75.8	46	71.7	46	73.4	40	76.5
Florida	22	95.0	28	90.0	26	82.0	39	75.0	7	82.6	40	78.5	30	76.6	7	89.6
Georgia	22	95.0	32	89.3	45	75.8	8	85.2	3	87.4	1	100.0	18	80.7	13	83.9
Hawaii	4	97.6	46	65.0	14	86.5	50	65.0	22	75.5	6	93.1	49	66.1	5	92.0
Idaho	43	65.0	46	65.0	6	91.3	5	87.2	6	82.9	48	71.2	17	81.0	19	82.5
Illinois	39	89.7	33	88.9	9	89.9	44	73.8	27	73.5	13	90.1	34	76.2	20	82.4
Indiana	20	95.8	23	91.5	3	92.6	40	75.0	31	73.2	34	80.6	28	77.2	9	88.0
Iowa	43	65.0	41	84.9	22	83.4	49	70.4	42	70.1	12	90.8	36	76.0	43	75.3
Kansas	4	97.6	1	100.0	29	81.4	41	74.8	45	69.3	10	91.2	5	87.1	17	83.4
Kentucky	4	97.6	39	86.2	32	80.7	38	75.0	34	72.6	21	85.4	20	80.0	2	99.1
Louisiana	27	94.4	27	90.8	18	84.4	29	76.9	26	73.8	8	92.5	33	76.2	21	82.2
Maine	4	97.6	46	65.0	36	79.6	13	81.2	38	71.6	26	83.2	9	85.7	1	100.0
Maryland	21	95.5	15	92.8	16	84.9	26	77.4	23	74.4	45	71.9	24	78.2	41	76.4
Massachusetts	26	94.5	16	92.6	8	90.4	17	79.8	21	75.6	23	85.2	32	76.3	47	72.9
Michigan	31	92.8	24	91.4	33	80.6	35	75.6	40	71.3	14	90.0	38	75.7	34	78.9
Minnesota	22	95.0	13	93.0	15	85.2	15	80.4	24	74.3	7	92.8	26	78.1	48	72.2
Mississippi	43	65.0	41	84.9	30	81.2	21	78.8	17	75.9	42	78.1	8	85.9	3	98.6
Missouri	17	96.8	6	94.5	2	92.8	36	75.6	29	73.4	9	91.9	43	74.3	12	85.8
Montana	4	97.6	40	85.8	4	91.6	14	80.8	10	78.8	37	79.9	6	86.8	4	95.8
Nebraska	40	88.0	37	87.5	43	76.7	45	73.6	43	69.7	20	86.0	14	81.5	14	83.9
Nevada	2	99.4	7	94.1	7	90.8	1	100.0	1	100.0	50	65.0	3	87.4	44	74.7
New Hampshire	32	92.4	25	91.2	47	74.2	7	85.3	32	73.1	47	71.4	7	86.6	8	89.3
New Jersey	25	94.6	21	91.8	13	86.7	30	76.8	46	67.4	33	81.1	35	76.0	27	80.5
New Mexico	4	97.6	3	96.1	20	84.0	22	77.8	14	76.5	44	76.2	50	65.0	46	73.7
New York	29	93.7	22	91.5	11	88.9	43	74.0	16	76.0	2	97.1	45	73.5	30	79.8
North Carolina	3	99.2	10	93.7	40	78.6	6	86.3	9	80.7	18	86.5	27	77.9	10	87.2
North Dakota	43	65.0	30	89.7	25	82.2	42	74.3	41	71.2	38	79.4	1	100.0	15	83.7
Ohio	42	80.8	38	86.8	21	83.7	37	75.2	28	73.5	35	80.5	42	74.7	23	81.9
Oklahoma	4	97.6	5	95.6	37	79.5	32	76.4	49	66.0	16	89.0	40	75.4	42	75.4
Oregon	35	91.7	36	88.4	46	75.3	18	79.5	13	77.7	11	91.1	4	87.2	37	77.7
Pennsylvania	19	95.9	18	92.3	12	87.4	48	72.1	50	65.0	36	80.0	44	73.5	24	81.8
Rhode Island	32	92.4	30	89.7	17	84.5	31	76.5	47	66.8	25	83.8	2	89.7	45	74.0
South Carolina	32	92.4	34	88.6	41	77.3	9	84.5	11	78.7	17	86.6	22	79.5	6	90.0
South Dakota	43	65.0	46	65.0	50	65.0	20	78.9	37	71.9	30	81.5	19	80.5	38	77.6
Tennessee	4	97.6	20	92.0	42	76.8	24	77.6	8	82.0	31	81.3	29	77.1	32	79.1
Texas	18	96.2	14	92.9	39	78.8	11	82.8	25	74.2	24	84.9	21	79.8	26	80.6
Utah	1	100.0	9	93.8	5	91.6	3	90.4	4	85.6	49	71.2	12	81.6	25	81.1
Vermont	43	65.0	44	84.1	31	80.9	25	77.5	39	71.5	3	96.0	48	73.2	29	80.0
Virginia	28	93.9	12	93.1	44	76.6	12	82.5	20	75.7	27	82.9	13	81.5	36	77.8
Washington	4	97.6	11	93.5	28	81.5	27	77.3	30	73.3	4	93.3	25	78.1	35	78.6
West Virginia	4	97.6	17	92.4	10	88.9	47	72.6	48	66.4	41	78.4	15	81.4	33	78.9
Wisconsin	37	90.5	34	88.6	19	84.3	34	75.8	33	73.1	5	93.2	23	78.8	28	80.2
Wyoming	4	97.6	3	96.1	35	79.9	10	83.1	35	72.5	43	77.1	37	75.9	50	65.0

GROWTH				
State	Patents per 1 mill people 1992-2003		Vitality Growth Composite	
	Rank	*Score*	*Rank*	*Score*
50-State Avg		**76.4**		**81.8**
Alabama	23	76.2	43	79.6
Alaska	46	68.3	49	74.9
Arizona	13	79.3	8	84.2
Arkansas	44	70.2	28	81.8
California	7	82.9	20	82.7
Colorado	8	82.9	5	85.6
Connecticut	**43**	**71.9**	**42**	**79.6**
Delaware	50	65.0	48	76.8
Florida	28	75.6	19	82.8
Georgia	14	79.2	2	86.3
Hawaii	41	72.5	45	79.3
Idaho	1	100.0	34	80.7
Illinois	40	72.8	27	81.9
Indiana	24	76.2	15	83.3
Iowa	15	78.1	47	77.1
Kansas	25	76.0	7	84.5
Kentucky	19	77.4	11	83.8
Louisiana	48	67.6	24	82.1
Maine	34	73.6	26	81.9
Maryland	27	75.7	33	80.8
Massachusetts	17	77.8	18	82.8
Michigan	30	74.8	30	81.2
Minnesota	11	80.4	14	83.5
Mississippi	36	73.4	39	80.2
Missouri	42	72.1	9	84.1
Montana	39	72.8	6	85.6
Nebraska	26	76.0	37	80.3
Nevada	3	84.7	1	88.5
New Hampshire	12	80.2	21	82.6
New Jersey	37	73.3	32	80.9
New Mexico	21	76.9	35	80.4
New York	29	74.8	16	83.2
North Carolina	9	82.2	4	85.8
North Dakota	45	68.9	44	79.4
Ohio	32	74.0	46	79.0
Oklahoma	47	68.1	36	80.3
Oregon	4	84.5	12	83.7
Pennsylvania	38	73.0	40	80.1
Rhode Island	31	74.3	29	81.3
South Carolina	33	73.9	13	83.5
South Dakota	10	80.6	50	74.0
Tennessee	20	77.2	23	82.3
Texas	16	78.0	17	83.1
Utah	18	77.4	3	85.9
Vermont	2	88.5	41	79.6
Virginia	35	73.5	25	82.0
Washington	6	83.1	10	84.0
West Virginia	49	66.2	38	80.3
Wisconsin	22	76.4	22	82.3
Wyoming	5	83.2	31	81.2

GROWTH	Human Capital															
State	NAEP math exam performance		NAEP reading exam performance		Higher ed cost share of med fam inc		College complete for pop 25+ yrs		S&E grad students per 1 mill people		S&E share of higher ed degrees		Doctoral S&E per 1,000 workers		Human Capital Growth Composite	
	1992-2003		1998-2003		1991-2002		1991-2004		1992-2002		1990-2000		1993-2001			
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**70.0**		**79.1**		**84.3**		**85.0**		**86.0**		**75.2**		**86.5**		**81.3**
Alabama	5	89.7	20	78.9	21	85.6	4	95.2	30	84.8	13	78.8	43	83.1	14	85.2
Alaska	36	0.0	NA	NA	45	77.8	49	69.3	43	79.5	28	75.6	17	88.2	50	65.1
Arizona	25	74.6	35	67.7	27	84.3	30	83.2	36	82.3	20	77.3	7	89.9	36	79.9
Arkansas	9	85.8	8	84.8	40	79.1	16	90.9	22	87.2	5	82.0	9	89.8	11	85.7
California	28	72.6	26	74.6	23	84.9	24	87.2	23	87.2	36	71.6	15	88.9	30	81.0
Colorado	21	76.6	10	84.4	16	87.6	45	73.7	16	89.4	15	78.2	13	89.0	23	82.7
Connecticut	**23**	**75.5**	**31**	**72.6**	**34**	**80.6**	**34**	**81.3**	**8**	**94.7**	**43**	**67.2**	**19**	**87.9**	**35**	**80.0**
Delaware	7	86.6	1	100.0	26	84.4	10	92.2	24	86.6	23	76.6	47	81.0	9	86.8
Florida	14	82.6	7	85.0	22	85.5	20	88.6	1	100.0	3	83.4	11	89.4	5	87.8
Georgia	16	81.5	8	84.8	37	79.9	23	87.9	7	94.9	7	81.3	3	90.7	10	85.9
Hawaii	19	79.3	11	83.2	6	91.2	50	65.0	38	81.6	9	80.4	40	84.6	31	80.7
Idaho	NA	NA	NA	NA	17	87.3	26	86.3	3	98.0	2	86.8	29	86.4	3	89.0
Illinois	NA	NA	NA	NA	31	82.7	42	76.5	13	90.7	40	67.6	36	85.6	32	80.6
Indiana	17	80.7	NA	NA	35	79.9	6	94.5	42	79.8	46	66.6	18	88.2	28	81.6
Iowa	35	65.0	NA	NA	48	75.1	14	91.4	32	83.4	34	73.0	31	86.1	39	79.0
Kansas	NA	NA	27	74.3	28	83.9	37	80.4	2	99.9	31	73.4	28	86.8	21	83.1
Kentucky	10	85.7	4	88.0	13	88.9	7	93.6	11	93.7	18	77.4	24	87.1	6	87.8
Louisiana	1	100.0	12	81.0	3	96.6	35	80.6	15	90.2	10	80.2	44	82.9	8	87.4
Maine	34	67.2	30	72.8	12	89.0	33	82.2	50	65.0	27	75.7	42	83.7	44	76.5
Maryland	15	82.3	19	79.1	20	85.7	8	93.3	14	90.6	30	74.8	27	86.9	15	84.7
Massachusetts	18	80.0	15	79.3	7	90.7	32	82.4	18	88.5	48	65.5	10	89.5	25	82.3
Michigan	20	77.7	NA	NA	19	85.8	9	92.2	25	86.4	45	66.9	12	89.0	22	83.0
Minnesota	27	73.2	23	76.0	42	78.5	3	95.7	27	86.4	38	69.0	2	90.9	29	81.4
Mississippi	3	93.5	2	91.5	4	93.1	12	91.7	17	89.0	24	76.5	37	85.1	4	88.6
Missouri	22	75.8	5	87.8	49	75.1	2	96.0	26	86.4	12	79.0	32	85.9	17	83.7
Montana	36	0.0	14	79.3	14	88.6	31	83.2	21	87.3	4	82.4	45	82.9	46	72.0
Nebraska	31	69.4	NA	NA	50	65.0	46	73.0	41	80.2	11	79.5	50	65.0	45	72.0
Nevada	NA	NA	34	69.0	5	91.7	19	89.0	4	97.3	1	100.0	5	90.0	2	89.5
New Hampshire	NA	NA	NA	NA	1	100.0	18	89.1	5	96.4	33	73.2	14	88.9	1	89.5
New Jersey	NA	NA	NA	NA	38	79.5	22	87.9	31	84.3	35	72.6	35	85.7	26	82.0
New Mexico	29	71.4	36	65.0	29	83.8	39	77.8	35	82.4	37	69.0	26	86.9	43	76.6
New York	13	82.6	24	75.8	36	79.9	25	87.1	45	77.2	49	65.1	39	84.9	40	78.9
North Carolina	2	98.4	29	73.8	44	78.3	28	84.5	6	95.8	19	77.3	6	89.9	12	85.4
North Dakota	33	68.0	NA	NA	9	89.6	44	75.7	10	93.8	41	67.6	1	100.0	24	82.4
Ohio	NA	NA	NA	NA	25	84.6	21	88.0	46	75.5	44	67.1	29	86.4	33	80.3
Oklahoma	NA	NA	33	70.7	18	86.8	43	75.9	33	83.3	14	78.2	48	80.6	38	79.3
Oregon	36	0.0	28	74.0	41	78.9	47	72.7	29	85.1	16	78.0	20	87.7	48	68.0
Pennsylvania	NA	NA	NA	NA	32	82.7	15	91.1	37	81.6	39	68.6	34	85.9	27	82.0
Rhode Island	26	74.4	25	75.5	24	84.6	38	79.9	49	70.7	42	67.2	4	90.5	42	77.5
South Carolina	4	91.9	3	89.0	43	78.4	11	92.0	48	71.2	17	77.8	25	87.0	16	83.9
South Dakota	NA	NA	NA	NA	39	79.3	17	90.0	20	87.5	22	77.2	41	83.8	18	83.6
Tennessee	12	83.2	22	77.2	33	82.5	1	100.0	40	80.3	29	75.5	38	85.1	19	83.4
Texas	8	86.2	32	72.0	46	76.9	40	77.8	28	85.1	25	76.3	23	87.4	34	80.2
Utah	30	70.7	17	79.2	15	88.4	13	91.4	19	87.7	21	77.3	16	88.3	20	83.3
Vermont	36	0.0	NA	NA	10	89.1	36	80.6	47	73.0	47	66.3	21	87.5	49	66.1
Virginia	11	83.8	12	81.0	2	96.6	5	94.7	9	94.7	26	76.1	22	87.5	7	87.8
Washington	36	0.0	17	79.2	47	75.8	41	77.0	34	82.8	32	73.3	8	89.8	47	68.3
West Virginia	6	88.6	21	77.3	8	89.9	27	85.8	12	92.2	8	81.0	46	82.5	13	85.3
Wisconsin	32	69.4	16	79.3	11	89.0	29	83.5	44	77.4	50	65.0	33	85.9	41	78.5
Wyoming	24	75.1	6	86.1	30	83.4	48	71.5	39	80.6	6	81.6	49	79.8	37	79.7

GROWTH	Global															
State	Commodity exports per worker		Mfg exports share of mfg shipments		Chemicals share of total exports		Computers & elec share of total exports		Immigrants admitted per 1 mill people		Foreign % of higher ed enrollees		Foreign affiliate % of nonfarm emp		Capital invest per foreign affil worker	
	1992-2003		1999-2003		1997-2004		1997-2004		1992-2003		1996-2003		1992-2002p		1992-2002p	
	Rank	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*	*Rank*	*Score*
50-State Avg		**77.3**		**81.2**		**83.8**		**74.2**		**82.0**		**84.7**		**85.8**		**86.7**
Alabama	10	81.1	8	86.5	11	89.0	49	66.4	38	76.1	11	90.9	12	90.2	20	87.5
Alaska	50	65.0	3	92.3	34	81.2	46	67.8	23	82.7	49	66.9	25	86.3	38	83.2
Arizona	12	80.8	25	81.2	10	89.0	47	67.4	43	72.4	35	79.9	36	83.4	39	82.9
Arkansas	14	80.0	6	87.5	26	82.8	20	74.5	2	98.9	39	78.1	34	84.2	13	90.4
California	33	74.5	42	75.6	20	84.3	39	70.4	50	65.0	10	92.0	17	88.1	41	82.2
Colorado	11	81.0	34	79.0	43	78.3	18	74.7	4	95.6	45	74.5	15	88.6	18	88.8
Connecticut	**31**	**75.2**	**23**	**82.0**	**41**	**78.8**	**35**	**71.4**	**39**	**76.1**	**25**	**85.7**	**11**	**91.0**	**16**	**89.8**
Delaware	46	70.3	48	70.6	49	72.8	2	84.7	9	92.0	7	95.2	50	65.0	47	77.0
Florida	37	74.1	35	78.6	42	78.7	25	74.0	34	78.1	23	88.4	10	91.2	32	84.4
Georgia	19	79.0	21	82.8	18	85.8	9	77.0	25	80.9	3	99.4	16	88.4	35	83.7
Hawaii	43	71.9	9	86.3	23	84.1	26	73.8	48	68.4	43	75.3	48	67.6	50	65.0
Idaho	20	79.0	41	76.0	17	86.0	8	77.5	11	91.8	24	86.6	44	80.7	2	98.0
Illinois	29	76.0	46	74.1	25	83.0	45	68.1	41	74.2	18	89.9	29	85.4	27	86.4
Indiana	6	83.6	10	85.5	14	87.5	15	75.8	3	96.5	5	95.7	31	84.6	14	90.4
Iowa	16	79.5	11	85.3	37	80.4	23	74.1	5	93.9	38	79.0	19	87.7	11	90.6
Kansas	23	77.5	40	76.8	7	90.5	7	80.2	12	89.2	41	76.2	22	87.0	19	87.6
Kentucky	4	85.2	18	83.2	4	93.3	21	74.2	10	92.0	22	88.8	18	87.9	15	89.8
Louisiana	45	70.9	30	80.1	27	82.6	48	67.4	49	65.1	28	84.0	46	76.6	33	83.9
Maine	9	81.7	29	80.4	12	88.2	24	74.0	15	86.5	6	95.6	13	90.1	8	94.3
Maryland	48	69.7	13	84.1	5	90.9	17	74.8	17	85.9	9	92.2	6	92.5	26	87.1
Massachusetts	27	76.4	27	81.0	1	100.0	37	71.0	31	79.4	34	80.2	3	97.2	7	94.9
Michigan	30	75.6	33	79.1	32	81.6	29	73.3	26	80.6	21	89.0	8	92.0	4	97.0
Minnesota	25	76.8	12	84.5	9	89.3	28	73.3	14	87.7	12	90.6	42	82.2	36	83.5
Mississippi	40	72.3	26	81.2	15	87.2	41	69.7	33	78.2	32	81.6	33	84.3	21	87.5
Missouri	21	78.9	15	83.6	8	90.2	11	76.4	8	92.3	29	82.5	20	87.4	10	92.3
Montana	39	73.0	43	75.0	6	90.7	44	69.1	28	79.9	48	68.4	32	84.4	48	76.9
Nebraska	15	79.9	17	83.3	2	100.0	38	70.5	1	100.0	27	84.0	27	85.9	12	90.6
Nevada	2	91.1	1	100.0	47	76.6	3	82.8	13	88.1	15	90.2	28	85.5	46	77.7
New Hampshire	17	79.3	38	76.8	40	78.8	19	74.6	6	93.1	30	82.4	14	89.7	9	92.5
New Jersey	28	76.1	31	79.8	39	78.9	27	73.5	36	77.5	1	100.0	35	84.1	31	85.9
New Mexico	1	100.0	49	68.3	50	65.0	40	70.3	47	68.5	16	90.2	45	79.3	44	81.2
New York	36	74.1	32	79.2	36	80.7	33	72.2	46	68.5	8	92.7	21	87.4	30	86.0
North Carolina	34	74.4	28	80.9	22	84.2	36	71.0	7	92.7	4	98.4	39	82.9	45	78.6
North Dakota	7	82.2	24	82.0	28	82.2	4	82.5	45	70.4	36	79.6	2	99.1	40	82.7
Ohio	24	77.2	16	83.5	35	81.0	30	72.7	24	80.9	31	82.0	43	80.9	37	83.3
Oklahoma	41	72.2	45	74.2	44	78.2	50	65.0	40	74.7	40	77.2	47	74.2	43	81.6
Oregon	18	79.2	39	76.8	3	93.9	32	72.4	21	84.8	47	69.4	26	86.0	17	89.7
Pennsylvania	35	74.3	37	78.0	21	84.2	42	69.6	32	79.2	19	89.9	38	83.2	25	87.1
Rhode Island	42	72.1	36	78.5	38	80.4	34	71.4	35	77.8	37	79.5	5	96.6	29	86.0
South Carolina	5	84.0	2	94.3	30	81.9	5	82.4	30	79.7	13	90.5	41	82.7	23	87.2
South Dakota	3	85.4	4	90.7	48	76.5	10	76.4	27	80.2	50	65.0	23	86.8	22	87.5
Tennessee	8	82.0	22	82.6	33	81.5	6	81.3	19	85.2	26	84.7	37	83.3	34	83.8
Texas	13	80.5	20	83.1	16	86.5	12	76.0	42	72.8	2	100.0	30	85.2	28	86.2
Utah	32	75.1	5	87.7	13	88.0	14	75.9	16	86.0	46	74.1	9	91.2	6	95.6
Vermont	49	68.6	50	65.0	31	81.7	43	69.5	37	77.0	20	89.4	4	96.7	3	97.5
Virginia	47	69.9	44	74.7	19	84.7	31	72.5	20	85.0	14	90.4	24	86.4	42	82.0
Washington	44	71.3	47	73.9	46	77.3	13	76.0	18	85.5	42	75.4	40	82.7	24	87.2
West Virginia	38	73.5	7	86.9	24	83.6	1	100.0	44	71.4	17	89.9	49	66.0	49	73.3
Wisconsin	22	77.6	14	83.7	29	82.0	22	74.1	22	82.7	44	74.8	7	92.4	5	96.2
Wyoming	26	76.5	19	83.1	45	77.4	16	75.0	29	79.8	33	80.8	1	100.0	1	100.0

GROWTH		
State	Global Growth Composite	
	Rank	*Score*
50-State Avg		**82.0**
Alabama	19	83.5
Alaska	45	78.2
Arizona	41	79.6
Arkansas	11	84.6
California	42	79.0
Colorado	26	82.6
Connecticut	**29**	**81.2**
Delaware	44	78.4
Florida	31	80.9
Georgia	10	84.6
Hawaii	50	74.1
Idaho	12	84.5
Illinois	40	79.6
Indiana	1	87.5
Iowa	15	83.8
Kansas	21	83.1
Kentucky	2	86.8
Louisiana	48	76.3
Maine	5	86.4
Maryland	9	84.6
Massachusetts	8	85.0
Michigan	17	83.5
Minnesota	18	83.5
Mississippi	37	80.3
Missouri	6	85.4
Montana	47	77.2
Nebraska	3	86.8
Nevada	4	86.5
New Hampshire	20	83.4
New Jersey	27	82.0
New Mexico	46	77.8
New York	39	80.1
North Carolina	24	82.9
North Dakota	25	82.6
Ohio	38	80.2
Oklahoma	49	74.7
Oregon	28	81.5
Pennsylvania	33	80.7
Rhode Island	36	80.3
South Carolina	7	85.4
South Dakota	30	81.1
Tennessee	22	83.1
Texas	16	83.8
Utah	13	84.2
Vermont	34	80.7
Virginia	32	80.7
Washington	43	78.7
West Virginia	35	80.6
Wisconsin	23	82.9
Wyoming	14	84.1

State	OVERALL Concentration Composite		OVERALL Growth Composite	
	Rank	*Score*	*Rank*	*Score*
50-State Avg		**76.8**		**80.9**
Alabama	43	73.7	20	81.4
Alaska	24	76.4	50	72.5
Arizona	20	77.0	25	81.1
Arkansas	49	70.4	4	84.0
California	3	82.5	42	79.3
Colorado	2	83.0	19	81.4
Connecticut	**7**	**81.3**	**43**	**78.9**
Delaware	18	77.5	38	79.7
Florida	32	75.3	17	81.8
Georgia	33	75.3	6	83.6
Hawaii	40	74.2	47	77.8
Idaho	15	78.0	3	84.4
Illinois	26	76.3	40	79.4
Indiana	29	75.6	10	82.3
Iowa	36	75.0	23	81.2
Kansas	22	77.0	28	80.8
Kentucky	42	74.0	2	85.1
Louisiana	47	72.5	22	81.2
Maine	41	74.2	33	80.3
Maryland	4	82.1	27	81.0
Massachusetts	1	89.2	29	80.8
Michigan	23	77.0	31	80.6
Minnesota	12	78.9	13	82.1
Mississippi	50	69.0	11	82.3
Missouri	30	75.5	14	82.1
Montana	31	75.5	18	81.5
Nebraska	37	74.6	41	79.3
Nevada	38	74.6	1	86.3
New Hampshire	5	81.9	30	80.6
New Jersey	8	80.7	37	79.7
New Mexico	17	77.5	35	79.9
New York	13	78.8	39	79.6
North Carolina	28	76.0	12	82.2
North Dakota	34	75.2	7	82.8
Ohio	35	75.0	44	78.7
Oklahoma	45	73.3	46	78.0
Oregon	10	80.3	36	79.7
Pennsylvania	25	76.4	34	80.1
Rhode Island	19	77.1	45	78.7
South Carolina	44	73.3	5	83.6
South Dakota	46	73.2	32	80.5
Tennessee	39	74.2	21	81.3
Texas	16	77.9	24	81.1
Utah	14	78.7	26	81.0
Vermont	11	79.4	48	77.4
Virginia	9	80.6	16	81.9
Washington	6	81.8	49	77.2
West Virginia	48	71.5	8	82.5
Wisconsin	27	76.2	15	81.9
Wyoming	21	77.0	9	82.4

Appendix D: Data Scoring Method

Overview

Two principles guided this analysis. The first was to select only those indicators that reflect the technology and innovation economy, leaving more traditional indicators for those groups already reporting them. The second was to work with a limited number of indicators—be selective rather than inclusive—to respect the time of the audience.

Data Organization

In defining the data categories, the goal was to combine variables into logical groupings that focused on one aspect reflective of the innovation economy. Five categories were identified that provided the best framework for measuring key attributes among states:

- Technology (six indicators)
- Financing (five indicators)
- Entrepreneurial and Business Vitality (nine indicators)
- Human Capital (seven indicators)
- Global Links (eight indicators)

Scoring Method

Altogether there are 35 indicators grouped into the five categories. For each indicator, two separate scores are calculated: one highlights each state's average annual growth, while the other focuses on the current level or capacity. For example, in the case of technology employment, the concentration of technology employment for each state (level or concentration) was assessed, and the average annual growth rate of the state's technology employment between two points in time is calculated. Thus, in total there are 70 scores for each state, reflecting 35 measures of a state's level or concentration and 35 measures of growth.

For each variable, states are assigned a score for growth and a score for concentration. The state with the highest value receives 100 while the lowest is assigned a 65. Scores are then assigned to the remaining states based on the actual distribution of the data for that particular variable. For instance, if all the values for a particular indicator are on the high side, then the majority of scores will be higher. The scores essentially transform the disparate data values and indices into a standardized structure that supports calculations and comparisons across states and variables.

Each state is scored on 35 growth indicators and 35 level or concentration indicators. Within categories, each state is assigned a growth score and a concentration score, which are the unweighted means of the variable scores. The growth and concentration scores are not combined because it would only serve to mask the two dimensions of each category.

Appendix E: Data Sources

Technology Strengths

Worker productivity in high technology industries
Technology output per worker
Source: Economy.com, February 2005 data request.

Output (value added) from high-technology industries
Technology share of gross state product
Source: Economy.com, February 2005 data request.

Employment in high-technology industries
Technology share of total nonfarm employment
Source: Economy.com, February 2005 data request.

High-speed lines
High-speed lines (ADSL, wireline, fiber, satellite, fixed wireless) per one million people
Sources: Federal Communications Commission, Common Carrier Bureau, Industry Analysis Division, *Trends in Telephone Service*, May 2004, August 2001 and December 2000, http://www.fcc.gov/ccb/stats; U.S. Census, http://www.census.gov/popest/states/ (Accessed 2/1/05).

Computers in households
Percent of households with computers
Sources: National Telecommunications and Information Administration (NTIA), *A Nation Online: Entering the Broadband Age*," Sep 2004, and *A Nation Online: How Americans Are Expanding Their Use of the Internet*, Feb 2002, http://www.ntia.doc.gov/reports/anol/index.html (Accessed 1/5/05).

Internet access in households
Percent of households with Internet access
Sources: National Telecommunications and Information Administration (NTIA), *A Nation Online: Entering the Broadband Age*," Sep 2004, and *A Nation Online: How Americans Are Expanding Their Use of the Internet*, Feb 2002, http://www.ntia.doc.gov/reports/anol/index.html (Accessed 1/5/05).

Financing

Small Business Innovation Research (SBIR) Phase I awards
SBIR Phase I awards per worker
Sources: U.S. Small Business Administration, Office of Technology, *SBIR Program Annual Reports*, FY 1992-1998, and http://www.sba.gov/SBIR/indexsbir-sttr.html#sbirstats (for data after 1997); U.S. Bureau of Labor Statistics, http://www.bls.gov/sae/home.htm (Accessed 2/1/05).

Small Business Innovation Research (SBIR) Phase II awards
SBIR Phase II awards per worker
Sources: U.S. Small Business Administration, Office of Technology, *SBIR Program Annual Reports*, FY 1992-1998, and http://www.sba.gov/SBIR/indexsbir-sttr.html#sbirstats (for data after 1997); U.S. Bureau of Labor Statistics, http://www.bls.gov/sae/home.htm (Accessed 2/1/05).

Small Business Technology Transfer Program (STTR) awards
STTR awards per worker

Sources: U.S. Small Business Administration, Office of Technology, http://www.sba.gov/SBIR/indexsbir-sttr.html#sttrstats (Accessed 1/24/05); U.S. Bureau of Labor Statistics, http://www.bls.gov/sae/home.htm (Accessed 2/1/05).

Initial public offerings (IPOs)
IPOs per 10,000 employer firms
Sources: Renaissance Capital, Greenwich, CT, www.IPOhome.com (Accessed 2/4/05); U.S. Small Business Administration, *Small Business Economic Indicators*, http://www.sba.gov/advo/research/sbei.html (Accessed 1/26/05).

Venture capital
Venture capital per worker
Sources: Thomson Venture Economics, *National Venture Capital Association Yearbook* , http://www.ventureeconomics.com/vec/publications.html; U.S. Bureau of Labor Statistics, http://www.bls.gov/sae/home.htm (Accessed 2/1/05).

Entrepreneurial & Business Vitality

Technology gazelle companies
Technology (as defined in this report) gazelles as a share of total gazelles filing with Securities and Exchange Commission (SEC)
Source: Standard & Poor's, March 2005 custom project request.

Gazelle companies
Gazelle companies (filing with SEC) per 1 million nonfarm establishments
Sources: Standard & Poor's, March 2005 custom project request; U.S. Census, County Business Patterns, http://www.census.gov/epcd/cbp/view/cbpview.html (Accessed 1/17/05).

Business churn
Business formations and terminations as a share of total firms
Source: U.S. Small Business Administration, *Small Business Economic Indicators*, http://www.sba.gov/advo/research/sbei.html (Accessed 1/26/05).

Small business employment
Small business (<100 employees) share of total employment
Sources: U.S. Small Business Administration, *Small Business Economic Indicators*, http://www.sba.gov/advo/research/sbei.html (Accessed 1/26/05); U.S. Bureau of Labor Statistics, http://www.bls.gov/sae/home.htm (Accessed 2/1/05).

Entrepreneurs (Proprietors)
Nonfarm proprietors per 1,000 people
Sources: U.S. Bureau of Economic Analysis, *Regional Economic Accounts*, http://www.bea.doc.gov/bea/regional/data.htm (Accessed 1/17/05); U.S. Census, http://www.census.gov/popest/states/ (Accessed 2/1/05).

Federal Research & Development (R&D) Intensity
Federal R&D expenditures as a share of gross state product (GSP)
Sources: National Science Foundation, U.S. National Patterns of R&D Resources, http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf03313 (Accessed 2/1/05); U.S. Bureau of Economic Analysis, *Regional Economic Accounts*, http://www.bea.doc.gov/bea/regional/data.htm (Accessed 1/17/05).

Industry R&D Intensity
Industry R&D expenditures as a share of gross state product

Sources: National Science Foundation, U.S. National Patterns of R&D Resources, http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf03313 (Accessed 2/1/05); U.S. Bureau of Economic Analysis, *Regional Economic Accounts*, http://www.bea.doc.gov/bea/regional/data.htm (Accessed 1/17/05).

University R&D Intensity
University R&D expenditures as share of gross state product
Sources: National Science Foundation, U.S. National Patterns of R&D Resources, http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf03313 (Accessed 2/1/05); U.S. Bureau of Economic Analysis, *Regional Economic Accounts*, http://www.bea.doc.gov/bea/regional/data.htm (Accessed 1/17/05).

Patents
Patents awarded per one million people
Sources: U.S. Patent and Trademark Office, *Patent Counts by Country/State and Year, All Patents, All Types Report*, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/reports.htm#PSR (Accessed 1/12/05); U.S. Census, http://www.census.gov/popest/states/ (Accessed 2/1/05).

Human Capital

National Assessment of Educational Progress (NAEP) math exam performance
Percent of public eighth-grade students who achieved at or above basic level
Source: National Center for Education Statistics, *The Nation's Report Card*, http://nces.ed.gov/nationsreportcard/sitemap.asp (Accessed 11/4/04).

National Assessment of Educational Progress (NAEP) reading exam performance
Percent of public eighth-grade students who achieved at or above basic level
Source: National Center for Education Statistics, *The Nation's Report Card*, http://nces.ed.gov/nationsreportcard/sitemap.asp (Accessed 11/4/04).

Education affordability
Average annual cost of public in-state higher education as a share of median family income
Sources: National Center for Education Statistics, *Digest of Education Statistics*, http://www.nces.ed.gov/programs/digest/ (Accessed 11/4/04); U.S. Census, *Income*, http://www.census.gov/hhes/www/income/income.html (Accessed 9/20/04).

College attainment
Percent of population over 25 years of age with at least a bachelor's degree
Source: U.S. Census, *Educational Attainment*, http://www.census.gov/population/www/socdemo/educ-attn.html (Accessed 3/28/05).

Science and engineering graduate students
Science and engineering graduate students per one million people
Sources: National Science Foundation, *Graduate Students and Postdoctorates in Science and Engineering*, http://www.nsf.gov/statistics/nsf05310/htmstart.htm (Accessed 5/31/05); U.S. Census, http://www.census.gov/popest/states/ (Accessed 2/1/05).

Science and engineering degrees
Science and engineering share of higher education (bachelor's, master's, doctorate) degrees
Source: National Science Foundation, *Science and Engineering Indicators*, http://www.nsf.gov/sbe/srs/seind04/start.htm (Accessed 1/31/05); National Center for Education Statistics, *Digest of Education Statistics*, http://www.nces.ed.gov/programs/digest/ (Accessed 11/4/04).

Doctoral scientists and engineers in the work force

Doctoral scientists and engineers per one thousand workers
Sources: National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States*, http://www.nsf.gov/sbe/srs/nsf03310/sect3.htm (Accessed 1/31/05); U.S. Bureau of Labor Statistics, http://www.bls.gov/sae/home.htm (Accessed 2/1/05).

Global Links

Merchandise exports
Commodity exports per worker
Sources: Office of Trade and Industry Information, *TradeStats*, http://ese.export.gov/SCRIPTS/hsrun.exe/Distributed/ITA2003_STATES/MapXtreme.htx;start=HS_WORLDnewMap (Accessed 9/21/04); U.S. Bureau of Labor Statistics, http://www.bls.gov/sae/home.htm (Accessed 2/1/05).

Manufacturing export intensity
Manufacturing export sales as a share of total manufacturing shipments
Sources: Office of Trade and Industry Information, *TradeStats*, http://ese.export.gov/SCRIPTS/hsrun.exe/Distributed/ITA2003_STATES/MapXtreme.htx;start=HS_WORLDnewMap (Accessed 9/21/04); U.S. Census, Annual Survey of Manufactures, http://www.census.gov/mcd/asm-as3.html (Accessed 3/3/04).

Chemical exports
Chemicals' (NAICS 325) share of total exports
Source: WISER, www.wisertrade.com, February 2005 data request.

Computers & electronics exports
Computers and electronics' (NAICS 334) share of total exports
Source: WISER, www.wisertrade.com, February 2005 data request.

Immigrant growth
Immigrants admitted by state of intended residence per one million people
Sources: Office of Immigration Statistics, Yearbook of Immigration Statistics, www.bcis.gov/graphics/shared/aboutus/statistics/ybpage.htm (Accessed 9/20/04); U.S. Census, http://www.census.gov/popest/states/ (Accessed 2/1/05).

Foreign student enrollment in higher education
Foreign enrollees as a share of total higher education enrollees
Sources: Institute of International Education, *Open Doors Report on International Educational Exchange*; National Center for Education Statistics, *Digest of Education Statistics*, http://www.nces.ed.gov/programs/digest/ (Accessed 11/4/04).

Employment in foreign-owned firms
Foreign affiliate employment as a share of total nonfarm employment
Sources: U.S. Bureau of Economic Analysis, *Foreign Direct Investment in the U.S.*, http://www.bea.gov/bea/di/di1fdiop.htm (Accessed 9/27/04); U.S. Bureau of Labor Statistics, http://www.bls.gov/sae/home.htm (Accessed 2/1/05).

Foreign capital investments
Capital investments in gross property, plant and equipment of foreign affiliated firms per foreign affiliated worker
Source: U.S. Bureau of Economic Analysis, *Foreign Direct Investment in the U.S.*, http://www.bea.gov/bea/di/di1fdiop.htm (Accessed 9/27/04).

Appendix F: Relevant Studies

These reports inspired the creation of the *Connecticut Benchmarks Report* because of the issues addressed, the thoughtful analysis and the geographies and variables compared.

Atkinson, Robert D., Progressive Policy Institute, *The 2002 State New Economy Index*, http://www.neweconomyindex.org/states/index.html.

Corporation for Enterprise Development, *2004 Development Report Card for the States*, http://drc.cfed.org/.

Innovation Philadelphia, *Greater Philadelphia Road Map 2003*, http://www.ipphila.com/index.cfm/fuseaction/document.detail/documentID/34/.

Joint Venture: Silicon Valley Network, Inc., *The 2005 Silicon Valley Index*, http://www.jointventure.org/publications/index/indexofsiliconvalley.html.

Kansas Technology Enterprise Corporation, *The Kansas Innovation Index 1999*.

Maine Development Foundation, *Measures of Growth 2004: Performance Measures and Benchmarks to Achieve a Vibrant and Sustainable Economy for Maine*, http://www.mdf.org/megc/measures/megc2004.pdf.

Maryland Technology Development Corporation, 2003 Maryland Innovation Index, http://www.marylandtedco.org/resources/publication_pdfs/CompleteText2.pdf.

Massachusetts Technology Collaborative, *2004 Index of the Massachusetts Innovation Economy*, http://www.masstech.org/institute/the_index/index_11_23_04final.pdf.

Organisation for Economic Co-operation and Development, *Information Technology Outlook 2004*, http://www.oecd.org/document/57/0,2340,en_2649_34223_33950905_1_1_1_1,00.html.

Organisation for Economic Cooperation and Development (OECD), *OECD Science, Technology and Industry Scoreboard 2003*, http://www1.oecd.org/publications/e-book/92-2003-04-1-7294/.

Schwab, Klaus, Porter, Michael E., Sachs, Jeffrey D., Warner, Andrew M., Levinson, Macha, *The Global Competitiveness Report 2004-2005*, World Economic Forum, http://www.weforum.org/site/homepublic.nsf/Content/Global+Competitiveness+Programme%5CGlobal+Competitiveness+Report.

U.S. Department of Commerce, Technology Administration, *The Dynamics of Technology-based Economic Development: State Science & Technology Indicators (Fourth Edition)*, March 2004, http://www.technology.gov/Reports.htm.

Washington Technology Center, *Index of Innovation and Technology for Washington State 2005*, http://www.watechcenter.org/downloads/index2005_final.pdf.