

APPENDIX B-7: INNOVATION

Leading States

When it comes to innovation, many of the states profiled as leaders in previous sections come up again: California, Texas, North Carolina, and Virginia, to name a few. These states have high percentages of patents per capita and have made funding research and development a legislative priority. Some examples of states' accomplishments in this area are highlighted here.

California

California remains one of the leading states when it comes to science and innovation. The state is famous for developing high-technology products, and further innovation is encouraged in the universities. Currently, The University of California leads the world in high-speed computer technology and is poised to debut the next generation of supercomputers.¹ In addition to university developments in computer technology, The California Institute for Telecommunications and Information Technology lists the state as having 20% of all technology jobs in the country. Moreover, the Institute also claims that Californians are responsible for 25% of the nation's patents.²

National studies that rank the states for their progress in innovation and technology have been extremely complimentary toward California. In particular, California leads its region in patents, which are crucial to determining a new competitive advantage in specific markets.

In addition to funding from the private sector, funding from the state is also especially important. In late 2006 Governor Schwarzenegger infused state funds with his pro-environment and alternative fuel public policies to the tune of a \$95 million dollar commitment.³ Sectors that benefited from the governor's disbursement included cleantech, nanotech and biotech industries

Florida

Florida is home to nearly 21,000 Science & Engineering PhDs and employs almost 305,000 science, technology, and high-tech professionals.

The National Institute of Health and National Science Foundation funding in Florida is rising faster than the national average, and so are the R&D expenditures of the state's academic institutions.

Florida also has one of the nation's highest numbers of patents granted. Many of the entrepreneurs who own them rely on the state's numerous tech transfer offices, incubators and technology & research parks to take their inventions to market.

¹ "Schwarzenegger Proposes \$95 Million For Tech Initiative". 5 Jan. 2007. HBCWire.
<http://www.hpcwire.com/hpc/1181200.html>

² HPCWire..

³ HBC Wire.

Florida became the first state to establish intellectual property law as a legal specialty, making it one of the 22 board-certification areas available in the state. Currently, over 550 legal firms in Florida practice Intellectual Property Law.

Georgia

Georgia's record for innovation is slightly above average. The 2007 State New Economy Index ranks Georgia 18th overall for new business.⁴ Particular strengths in this realm are building on existing businesses (13th in Job Churning and 6th in Fastest Growing Firms).⁵

Georgia's success is also noted by its high rank in foreign affairs (16th in both Export Focus of Manufacturing and Services and Foreign Direct Investment).⁶

On the opposite end of international business, Georgia has proven itself as one of the most open states to foreign firms creating business in-state.

Georgia is extremely strong when it comes to business incubation (overall rank of 8th according to the SCR).⁷ The state is ranked 10th in venture capital investment dollars per worker, 3rd in percentage of labor force that is represented by unions, and 1st in minimum wage. The State New Economic Index (SNEI) ranks Georgia 12th in Entrepreneurial Activity and 17th in Economic Dynamism.⁸

Infrastructure as an element of innovation needs some improvement in the state of Georgia. Overall, Georgia is ranked 35th in terms of infrastructure by the SCR.⁹ Factors of this overall ranking are air passengers per capita (5th), and high speed lines per 1,000 citizens (16th).

Maryland

By some standards, Maryland is among the strongest states when it comes to innovation. However, the state has some room for improvement. In SNEI ranking, Maryland received an overall ranking of 3rd.¹⁰ This was due in part to the incredibly competent workforce. The state has a very strong workforce in terms of higher degrees and technical skill.

Maryland scores highly in the field of technology as well. The high ranking in Knowledge Jobs undoubtedly contributes to this. Other factors are Online Population (10th), number

⁴ Atkinson, Robert D. and Correa, Daniel K. The 2007 State New Economy Index. Ewing Marion Kauffman Foundation Kansas, 2007. http://www.kauffman.org/pdf/2007_State_Index.pdf. 13.

⁵ Atkinson, 14.

⁶ Atkinson, 14.

⁷ Beacon, 29.

⁸ Atkinson, 15.

⁹ Beacon, 29.

¹⁰ Atkinson, Robert D. and Correa, Daniel K. The 2007 State New Economy Index. Ewing Marion Kauffman Foundation Kansas, 2007. http://www.kauffman.org/pdf/2007_State_Index.pdf. 13.

of Internet Domain Names (14th), E-Government (22nd), Broadband Telecommunications (9th), High-Tech Jobs (5th) and Scientists and Engineers (1st).

Another general category demonstrating Maryland's capacity for innovation is aptly named Innovation Capacity. This category factors the ranks of High-Tech Jobs, Scientists and Engineers, Patents (11th), Industry Investment in R&D (9th) and Venture Capital (6th).¹¹

Maryland's one area of weakness with regard to innovation is Globalization (30th overall). The SCR scored Maryland only one point above average in the category of Business Incubation. The factors of this category are Venture Capital Investment Dollars per Worker (5th), Employer Firm Births per 100,000 Inhabitants (11th), IPO per 1,000 companies, in dollars (18th), Percent of Labor Force that is represented by Unions (33rd) and Minimum Wage (34th).¹²

Massachusetts

In 2006, another major economic stimulus package was enacted which authorized approximately \$152 million in new funding for economic stimulus-related programs. The package authorized the creation of many new research centers and grant programs, and recapitalized several programs originally funded under 2003 legislation.¹³ The 2006 legislation also authorized \$35 million for a nanotechnology and biotechnology manufacturing center at the University of Massachusetts Lowell; \$10 million to develop a Massachusetts Life Sciences Center; and \$10 million to develop a bio-processing facility at the University of Massachusetts Dartmouth. The legislation also created additional tax credits and exemptions to encourage the growth of manufacturing facilities and for environmental cleanup and the manufacture of medical devices. It further authorized the establishment of tax-exempt special development districts in municipalities.

New Jersey

In general, business leaders in New Jersey perceive current policies to spur innovation as too narrow and restricted to only one sector of business.

Because innovation is key to the state's economic growth, the state allocated \$60 million to 92 technology and biotechnology companies in 2007 through the State of New Jersey's innovative and enhanced Technology Business Tax Certificate Transfer Program.

New York

New York State has become a world class technology center that fosters innovative ideas and pioneers programs focused on bringing the most advanced cutting edge technological products to market. As a commitment to broadening its status as a leader in the high technology and biotechnology industries, New York has invested more than

¹¹ Beacon, 39.

¹² Beacon, 39.

¹³ "Acts of 2006: Chapter 123

<http://www.masseconomy.org/documents/Chapter123oftheActsof2006.pdf>

\$1 billion in the state's technology business sector, world-class research laboratories, and academic centers over the past seven years.

In addition, New York has ranked second nationally in the number of new businesses incorporated since 1993, and holds between approximately 10% of new businesses in the US.¹⁴

As far as University-based research and development goes, New York State is ranked 2nd in total university research and development expenditures (\$2.76 billion). For entrepreneurial activity supported by technology and business incubators, New York is ranked 5th nationally with the most fastest-growing new entrepreneurial businesses.

North Carolina

North Carolina's performance in innovation positioned it above the majority of the states with continuous improvement over the five years with the NC Chamber Index. The state's rank of 14th (three stars) compares favorably to Georgia at 22nd and Florida at 27th (two stars each) and South Carolina at 39th and Virginia at 46th (one star each).¹⁵

North Carolina has been ranking in the middle of the states in Patents per Worker and Patents per R&D dollar.

The Technology in Schools index improved from a rank of 43rd in 2002 to 35th in the most recent year.¹⁶

Pennsylvania

Pennsylvania's competitive performance in broadband connections ranks it slightly above the majority of states with a stronger growth rate than the U.S. average according to the PA Chamber Foundation.¹⁷ At the same time, its peers rank significantly higher and several states that currently rank lower are experiencing twice the growth rate of Pennsylvania.

Rhode Island

Rhode Island's most positive scores by far can be found in the categories measuring technology and innovation. In this particular category Beacon Hill ranked Rhode Island 8th in technology and innovation.¹⁸ A large part of Rhode Island's positive technology rating is due to state funding of research and development (R&D) by state universities.

Although these numbers are impressive nationally, the results are less impressive when comparing the state to others in its geographical region. Rhode Island's success has been eclipsed by every state within the Northeast with the exception of Maine.

¹⁴ Entrepreneur Magazine. <http://www.entrepreneur.com/>

¹⁵ North Carolina.

¹⁶ North Carolina.

¹⁷ The Pennsylvania Chamber of Business and Industry.

¹⁸ Tureck, 58.

Tennessee

Following a unified effort among the state's leaders to bring the Spallation Neutron Source (SNS) to Oak Ridge, Tennessee now claims one of the world's leading venues for particle research and nanotechnology development as one of its emerging research centers. For the first time, the American Electronics Association listed Tennessee among the nation's top 10 exporters of technology in the association's 2006 Cyberstates Report.

Additionally, in 2006, the University of Tennessee system saw a record \$308 million in research funding (an 8% increase) and Vanderbilt University saw its research funding grow to an all time high of \$444 million (up 15%).

Texas

Data from the U.S. Patent & Trademark Office indicates that Texas residents were issued 5,660 patents and Texas residents filed 12,951 patent applications in FY2005.¹⁹ This ranked the state second in the nation in both categories behind California. In 2004, Texas was ranked third in the nation for academic R&D expenditures by state by the National Science Foundation, with approximately \$2.8 billion spent.²⁰

The state also has dedicated dollars to innovation via the Texas Emerging Technology Fund, a \$200 million fund that is used for research and development activities in emerging technology industries. Eligible industries are those that will lead to immediate or long-term creation of high-quality new jobs in Texas, and/or could lead to medical or scientific breakthroughs.

Utah

Utah also has received high marks in the fields of technology and innovation. In particular respect towards patents, which are crucial to determining a new competitive advantage in specific markets, the New Economy Index ranked Utah 2nd in the country for patents per 1000 inhabitants.

In 2006, the state instituted its USTAR program to allocate funding- to date, nearly \$20 million- in start-up costs to new businesses. In addition, USTAR has also used its funds to recruit professors from other major universities and has placed them at Utah and Utah State Universities to continue their research and also instruct the next generation of scientists and inventors.

Virginia

The American Electronics Association, the nation's largest trade association representing all segments of the high-tech industry, has ranked Virginia as the national leader for its concentration of high-tech workers according to their recent report,

¹⁹ U.S. Patent and Trademark Office. <http://www.uspto.gov/>

²⁰ National Science Foundation. <http://www.nsf.gov/>

“Cyberstates 2007: A Complete State-by-State Overview of the High-Technology Industry.”²¹

Virginia also ranks 3rd as a recipient of federal R&D funds.

Washington

Washington is home to two industries competitive on a national and international basis - Aerospace and Software. Both of these industries are dependent on research and technology innovation. Within these industries, Boeing and Microsoft are clearly dominant market leaders. Within the electronics and telecommunications industries, subsidiaries of large corporations such as Hewlett Packard, Sharp and AT&T Wireless are based in Washington and provide strength in certain market segments. In energy and bioscience there are pockets of strength. In addition, in each industry there are smaller, rapidly growing innovative companies supported by the same workforce.

Challenged States

As with other portions of this report, some states appear in both the leaders and laggards categories. In Georgia, for example despite the state’s global approach to business, Georgia’s innovation is somewhat inhibited by below-average technology, despite above average numbers of scientists and engineers (19th), high-tech businesses (14th)²², its #1 ranking in broadband telecommunications and 13th ranking in digital economy²³, so the negative figures of technology in the state are again not representative of all aspects of Georgia’s technology. Areas in which Georgia ranked poorly were inventor patents (44th), online population (37th) and industry investment in R&D (35th).²⁴

Some other states’ challenges when it comes to innovation are outlined below.

Michigan

Even with the state’s challenges in other areas, Michigan’s performance in innovation positioned it above the majority of the states with continuous improvement. Michigan has been ranked 12th overall in patents per capita.²⁵ However, according to the Michigan Department of Labor and Economic Growth’s report, the state is only slightly ahead of the national average.²⁶ Furthermore, Michigan’s growth has stagnated slightly

²¹ “Virginia Now Has the Highest Concentration of Technology Workers” AEA Association . 2007. http://www.aeanet.org/publications/idjj_cyberstates2007_overview.asp

²² Beacon, 29.

²³ Atkinson, 15.

²⁴ Atkinson, 15.

²⁵ Tureck, David; Sirin, Cagdas; Solyemez, Arif Orcun. State Competitiveness Report 2006. Boston: Beacon Hill Institute for Public Policy Research at Suffolk University, 2006. 41. <http://www.beaconhill.org/Compete06/06StateCompeteFinal.pdf>

²⁶ Reffit, Mark.; Sorenson, Carol. “Innovation Indicators: A Report To The Council For Labor And Economic Growth.” Michigan Department of Labor and Economic Growth: Bureau of Labor Market Information and Strategic Initiatives. August, 2007. 3.

in patent production and its current rank is down from 11th place in 2000. Michigan's patent ranking loses more of its luster when following the growth trends in the 21st Century when compared to the US rate of growth during the same period. From the years of 2000-2006, the national growth in patents was nearly six times that of the state of Michigan.

Massachusetts

The Massachusetts Technology Collaborative's (MTC) Innovation Economy Index²⁷ says flattening federal assistance for research and development, combined with the venture capital industry veering away from risky start-ups, has reduced cash flow into the state's economy, stunting innovation.²⁸ Despite the numerous highly ranked universities in the state, "there are concerns around sub-par job growth, low rates of commercialization and high-tech startups and housing costs contributing to the exodus of some of our younger workers," said Patrick Larkin, director of the John Adams Innovation Institute, MTC's economic development arm, and an author of the index. When compared to leading technology states, Massachusetts growth in innovation sectors of the state's economy is significantly slower.

North Carolina

The state's performance in Infrastructure and Connectivity slipped below the majority of the states in recent years, earning a rank of 39th and three stars in the Chamber Index. That trailed states in the region such as Florida at 2nd with five stars, Virginia at 3rd with five stars, Georgia at 9th with four stars, and South Carolina at 31st with three stars. States that lead in some areas often need improvement in other areas of their innovation programs, as North Carolina demonstrates.

West Virginia

The state struggles in this aspect as well. Technology is barely trickling into the state in any form. Patents are low (ranked 46th), and the state's struggle with improving the quality of education does not give much hope for improvement. When it comes to other aspects of the high-tech economy, West Virginia remains very weak. It is ranked 44th in number of IT professionals, 47th in online population, 48th in e-government, and last in broadband telecommunications, according to the 2007 State New Economy Index.

Wisconsin

The state is ranked poorly in a number of innovation indicators, according to the State New Economy Index. While it ranks near average (28th) for IT jobs, the state is underperforming in Job Churning (47th), broadband telecommunications (38th), number

http://www.milmi.org/admin/uploadedPublications/1296_Innovation_Indicator_Report_2007.pdf
²⁷ Flynn, Patricia M. PHD. "Federal Academic and Health Research and Development Expenditures" 10 Years of the Index of the Massachusetts Innovative. Massachusetts Technology Collaborative.2006. <http://web3.streamhoster.com/mtc/index2006.pdf>

²⁸ Flynn, 48.

of patents (35th) and economic dynamism (36th).²⁹ A similar rating of innovation capacity to High-Tech Jobs is the sub-category counting scientists and engineers as percent of the workforce.³⁰ Wisconsin earned a ranking of 33rd here as well. However, due to the size of the agricultural sector in the state, this ranking does not necessarily indicate that Wisconsin has very few scientists and engineers.

²⁹ Atkinson, Robert D. and Correa, Daniel K. The 2007 State New Economy Index. Ewing Marion Kauffman Foundation Kansas, 2007. http://www.kauffman.org/pdf/2007_State_Index.pdf. 14.

³⁰ Atkinson, 47.