PURSUING INNOVATION

Benchmarking Milwaukee's transition to a knowledge-based economy

Metro Milwaukee Innovation Index 2010

Public Policy Forum
moving the region forward

ABOUT THE PUBLIC POLICY FORUM

Milwaukee-based Public Policy Forum – which was established in 1913 as a local government watchdog – is a nonpartisan, nonprofit organization dedicated to enhancing the effectiveness of government and the development of southeastern Wisconsin through objective research of regional public policy issues.

PREFACE AND ACKNOWLEDGMENTS

This report was undertaken to provide citizens, business leaders and policymakers in the Milwaukee region with information that will allow them to gauge the region's success and progress in pursuing innovation as a key component of economic growth. We hope that policymakers and community leaders will use the report's findings to inform discussions during upcoming policy debates, budget deliberations, and civic gatherings regarding economic development programs and strategies in our region.

Report authors would like to thank the Forum's Economic Development Committee, consisting of 18 Public Policy Forum members and Trustees, for originating the idea of an Innovation Index and providing guidance during the research process. In addition, we would like to thank David Linz, Southeast Regional Director, Wisconsin Entrepreneurs' Network and Ryan Horton for their assistance.

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Laura Million, Researcher

Anneliese Dickman, Research Director
Rob Henken, President

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Innovation is a cornerstone in the foundation for the region's future.

~Milwaukee 7
March 2006[1]

Introduction

While the Milwaukee region's economic base is rooted in its manufacturing history, many believe that the region's future prosperity will be tied to its ability to successfully transition its economy into one that is based on knowledge and innovation.

Indeed, fostering innovation has become the call to action for business and political leaders alike. On its web site, the Milwaukee 7 economic development group touts the region's success in helping businesses "transform technological innovations into marketable products" and describes its vision for a region that is "globally competitive in an innovation economy."[2] Meanwhile, in his recent state of the state address, Governor Jim Doyle asserted that Wisconsin is "spurring research and development through new incentives" and "giving investors new tools to create start-ups." On the federal level as well, the Obama administration has outlined "A Strategy for American Innovation"[3] calling for increased federal investment in research, education and other initiatives commonly seen as the building blocks of innovation.

With this growing emphasis on innovation as a critical component of regional, state and national economic development strategies, it is pertinent to ask where our region stands in this regard. Several local efforts have been launched to promote "next generation" manufacturing, increase university research and development, and grow the region's knowledge workforce. As these efforts pick up steam, it is important to assess whether they are succeeding and how our region compares to others.

The Public Policy Forum's Innovation Index is designed to do just that. In our premier report, we gather baseline regional data on measures that have been closely linked to the 21st century economy: idea development and commercialization; entrepreneurship; and the availability of knowledge and skilled workers. We utilize that data not only to assess whether our region is making progress, but also to evaluate how we measure up to other similar-sized metropolitan regions, including some that have been widely recognized for their innovation prowess. We plan to update this analysis at regular intervals in order to continue to measure our progress and benchmark our success against other regions.

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[1] Milwaukee 7, *Milwaukee Regional Economic Development: Securing Our Region's Future* accessed 7/10/09 http://www.mmac.org/ImageLibrary/User/cdavis/PDF/Investors_Piece_020106.pdf.
[2] Milwaukee 7, *Strategic Framework* http://www.choosemilwaukee.com/upload/documents/m7-take-away-copy.pdf accessed 7/10/09.
[3] National Economic Council, Office of Science and Technology Policy, *A Strategy for American Innovation: Driving Toward Sustainable Growth and Quality Jobs*, September 2009 accessed at http://www.whitehouse.gov/assets/documents/SEPT_20__Innovation_Whitepaper_FINAL.pdf.

Defining Innovation

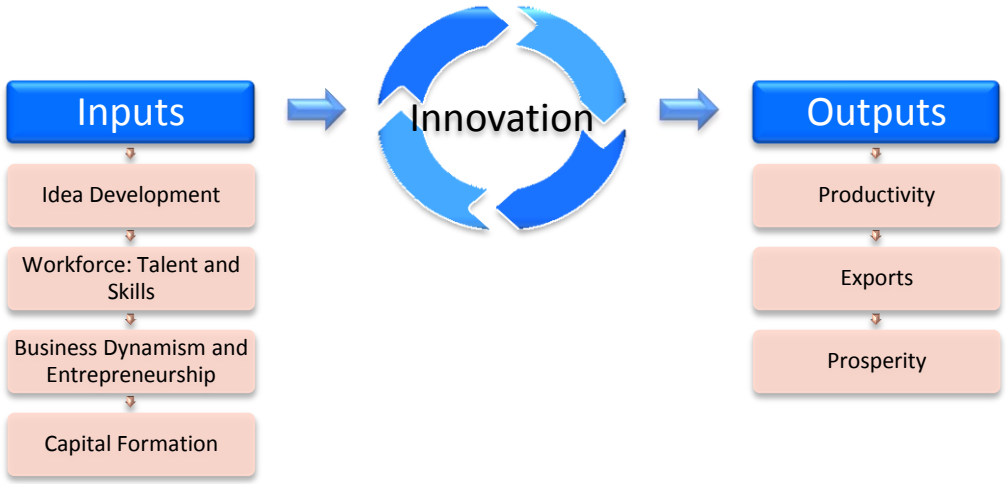
In economic development circles, innovation is frequently cited as the means to gaining competitive advantage and helping grow the economy. According to the Council on Competitiveness, "real growth depends on innovation—creating new markets and new value."[4] At a business level a simplified definition might be "doing things better, faster, cheaper, and greener."[5] Or, as management consultant Peter Drucker puts it, "Innovation is the specific instrument of entrepreneurship. The act that endows resources with a new capacity to create wealth." Innovation takes many different forms. New ideas may result in drastically new or differentiated products. New or existing technologies can be applied to improve manufacturing methods or improve supply chain management. Whether incremental or novel, innovative activities can reduce costs, increase productivity and/or improve efficiency with the goal of increasing firm profitability.[6]

But how does one recognize and measure innovation and the shift to the knowledge economy in the Milwaukee region? In short, it is complicated. Much of the current economic data is geared to an industrial model and only is available for larger geographic areas. To complicate matters, the process of innovation is continuous and often conducted by private businesses, making it difficult to systematically capture and track the transfer of new ideas and their application to the marketplace.

Despite these limitations, public data are available on specific inputs and outputs that are commonly associated with innovation (Diagram 1). Together, this information helps provide a baseline picture for the Milwaukee region's move to the knowledge-based economy.

[4] Council on Competitiveness, *Competitiveness Index: Where America* Stands, 2007, http://www.compete.org/images/uploads/File/PDF%20Files/Competitiveness_Index_Where_America_Stands_March_2007.pdf.
[5] Erik R. Pages and Graham S. Toft, "Benchmarking Innovation," *The Economic Development Journal*. Vol. 8, No. 1, Winter 2009.
[6] Center for Regional Development, Purdue University and et al, *Crossing the Next Regional Frontier: Information and Analytics Linking Regional Competitiveness to Investments in a Knowledge-based Economy,"* October 2009, p. 74, accessed at http://www.eda.gov/PDF/Crossing_Regional_Frontier%20Report_Oct%202009.pdf.

Diagram 1



The critical inputs identified – which include the sufficiency of research and development (R&D) funding, qualifications of the regional workforce, the strength of the region's culture of entrepreneurship, and the availability of venture capital – contribute to the innovation process and help develop promising ideas into viable businesses, products or services. In addition, recognizing that ideas alone will not move the region further along the knowledge economy continuum nor make our region more competitive, it is necessary to look at the impacts innovation activities may have on the wider economy. This report does so by collecting data on outputs that reflect productivity, exports and regional prosperity.

Methodology

The selected indicators portray the innovation footprint in the Southeast Wisconsin region. The indicators gauge both resource inputs and outputs each of which is tied to creative process improvements and product and business development. This report defines the ~~"r~~egion" as the Milwaukee Metropolitan Statistical Area, which includes Milwaukee, Ozaukee, Washington, and Waukesha Counties. Indicators are utilized to measure the region's progress on the following input areas:

- *Idea Development* – Targeted regional investment can help spur the creation of new ideas and processes that can be further developed and transferred to the marketplace. Specifically, investment in idea development is measured by how much is being spent and by the sources of research and development support (federal or nonfederal) at area universities.

  While university R&D plays an important role in basic research, more immediate results are often seen through industrial research and investment, which allows viable ideas to more quickly be transferred to market or be implemented by companies to maintain or grow their market share. Analyzing regional businesses' R&D investment

provides a more complete picture of idea development in the region than looking at university R&D alone. For this indicator, patent filings serve as a proxy of firm investment in R&D.

- *Regional Talent and Skills*—Knowledge workers are often the source and implementers of new ideas. Consequently, a skilled workforce is integral to spurring an innovation environment where companies can to compete globally. Indicators utilized to assess regional talent and skills include concentrations of area scientists and engineers, knowledge workers and middle skill workers. Another indicator utilized for this measurement is the number of highly educated foreign-born workers in the region.

- *Business Dynamism and Entrepreneurship*—Implementing innovative ideas requires taking calculated risks in developing and launching new products and business ideas. Start-up and young firms provide a conduit for taking such risks. To gauge the Milwaukee region's entrepreneurial climate, the index measures the number of area small businesses and their associated job growth. In addition, it assesses *business dynamism*, which is measured by the entry (openings) and exit (closings) of firms.

- *Capital Formation*—Capital is essential for business growth, and attracting capital is necessary to start new businesses and bring new products and ideas to market. A set of capital formation indicators measures area businesses who have been awarded Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards through the federal government and small business loan activity in the region.

To provide a more complete picture of the regional economy, the Innovation Index includes the following output measures.

- *Productivity gains,* as measured by GDP per worker, show changes in the region's overall economic health.
- *Global Exports* measure the value of products from the Milwaukee region being sold outside the U.S.
- *Prosperity* captures changes in the economic well-being of the region's residents through changes in employment and area personal income and median household income.

The outputs, while not exclusively linked to innovation-specific inputs, measure improvements in economic health, which often result from innovation.

To supplement the trend data and provide context for the Milwaukee region's performance, the Index uses two sets of benchmark regions (leader and peer regions) (Table 1). The three leader regions are Austin, which is considered a current leader; and Kansas City and

Portland, OR, which are considered emerging leaders.[7] These regions are widely known for their high tech industries, and they were chosen for comparison to provide a better understanding of elements existing in regional economies that already have made a successful shift to the knowledge economy. Three Midwestern regional peers (Cincinnati, Indianapolis, and Minneapolis) provide a more localized perspective from which to compare the Milwaukee region's standing.[8] While any number of comparison regions could have been selected, the goal was to choose a mix of regions and set a bar toward which the Milwaukee region could strive to improve its performance.

Data for the analysis comes from several sources including:

- The National Science Foundation
- The Harvard Cluster Mapping Project
- U.S. Census and the American Community Survey
- Occupational Employment Survey, Bureau of Labor Statistics
- National Establishment Time Series available from the Edward Lowe Foundation
- Statistics of U.S. Businesses, U.S. Census Bureau
- Small Business Administration's Tech-Net
- Bureau of Economic Analysis
- U.S. Department of Commerce International Trade Association
- National Center for Education Statistics' Integrated Postsecondary Education Data System

It should be noted that much of the data reviewed pre-date the current economic downturn. This is an appropriate time, however, to take a baseline measurement. Despite the changes that have occurred recently in the regional economy, the identified trends should be informative for policymakers and business leaders as they make decisions on how best to deploy regional economic development resources to foster innovation and grow a knowledge-based economy.

[7] Mayer, Heike, Brookings Metropolitan Program. "Bootstrapping High-Tech: Evidence from Three Emerging High Technology Metropolitan Areas." June 2009, http://www.brookings.edu/~/media/Files/rc/reports/2009/06_metro_hightech_mayer/06_metro_hightech_mayer.pdf.

[8] The Midwestern peers were chosen based on a combination of factors including size, location and having a combined higher ranking on both the *New Economy Index* (http://www.neweconomyindex.org/metro/rankings.html) and *Economic Strength* (http://www.policom.com/metrorank.htm).

Regions Spurring Innovation

Austin, Texas: With just over 1.6 million people, Austin is often recognized for its diverse cultural scene, ability to attract knowledge workers, and dynamic high-tech business community. The region continues to invest in idea development through research and development at the University of Texas, Austin and area companies, resulting in 27.9 patents per 10,000 workers being approved in 2007 (Harvard Institute on Strategy and Competitiveness, 2009). Successful idea development – coupled with the ability of entrepreneurs to attract seed funding and venture capital – help make Austin a regional leader in fostering innovation.

Kansas City, Kansas-Missouri: The business and economic development communities in the Kansas City region have taken a proactive approach to building the community's innovation-linked assets. Starting in 1998, the region began focusing on ways to organize and support the region's many life sciences firms and formed the Kansas City Area Life Science Institute (KCALSI, www.kclifesciences.org). Regional R&D has been spurred not by a strong R&D university, but by clusters of firms in pharmaceutical contract research and animal health and nutrition companies (Mayer, June 2009). A dynamic business environment linked to frequent mergers and acquisitions of area companies laid the groundwork for an active regional entrepreneurial climate, which is recognized as a key component in spurring innovation.

Portland, Oregon: Like Kansas City, idea development is not centered on a strong research and development university. Instead, innovation is spurred by the region's 5,600 high tech firms (Mayer, June, 2009). Growth of the so called Silicon Forest has been linked to substantial investment by local industry in research and development and educational programming for its workforce. Retooling within local industry during the 1980s spurred increased spin-off business development, fueling a more entrepreneurial culture in the region.

Table 1: Benchmark MSAs at a Glance

MSA Name	Major Municipality	Population 2008	Counties in MSA	Colleges and Universities	Universities Reporting R&D Expenditures	State Capital
Milwaukee-Waukesha-West Allis, WI	Milwaukee	1,549,308	4	16	4	No
Leader Regions						
Austin-Round Rock, TX	Austin	1,652,602	5	6	2	Yes
Kansas City, MO-KS	Kansas City	2,002,047	15	20	2	No
Portland-Vancouver-Beaverton, OR-WA	Portland	2,207,462	7	19	6	No
Peer Regions						
Cincinnati-Middletown, OH	Cincinnati	2,155,137	15	10	3	No
Indianapolis-Carmel, IN	Indianapolis	1,715,459	10	9	1	Yes
Minneapolis-St. Paul-Bloomington, MN-WI	Minneapolis	3,229,878	13	32	3	Yes

Sources: U.S. Census Bureau, National Science Foundation, Integrated Postsecondary Education Data System, Public Policy Forum

Indicator Set #1 – Idea Development

The *Idea Development* indicators capture regional investment in encouraging idea and process discoveries that can be further developed and transferred to the marketplace. Viable new ideas, whether for products, processes, or services, provide opportunities for fueling the creation of new businesses and enable existing firms to maintain and grow their businesses and potentially enter new markets. The *Idea Development* indicators track regional investment in new ideas by measuring university R&D expenditures and regional patent activity (which is a means of approximating business R&D activity).

A. University Research and Development

Regional Trend: 

Comparison to Benchmarks: Average

University prominence in R&D has long been recognized as helping to catalyze regional economic growth. Investment in university R&D for science and engineering is trending upward nationally and in the Milwaukee region. Total R&D expenditures at Marquette, UW-Milwaukee, Milwaukee School of Engineering (MSOE), and the Medical College of Wisconsin equaled $211.7 million in 2007, more than double the amount spent in 2000 (Table 2). While each of these universities contributed to the region's gain in R&D spending, it should be noted that a substantial portion (75%) of the region's R&D spending in 2007 emanated from the Medical College, followed by UW-Milwaukee (19%), Marquette (4%) and MSOE (2%).

Quick View

Regional Trend shows the direction of the data trend for the Milwaukee region.

Comparison to Benchmarks rates our region's performance as it compares to the 6 benchmark regions.

Favorable = top 2 positions
Average = the middle of the comparison regions
Unfavorable = bottom 2 positions

Table 2: Total University R&D Expenditures by MSA ($1,000s)

MSA	2000	2004	2007	Total R&D Rank	Avg. Annual Growth	Annual Growth Rank
Milwaukee	$100,264	$180,301	$211,678	5	13.9%	3
Leader Regions						
Austin	$277,318	$353,016	$454,655	2	8.0%	4
Kansas City*	$20,324	$33,066	$28,137	6	4.8%	6
Portland, OR	$150,041	$278,830	$317,403	4	14.0%	2
Peer Regions**						
Cincinnati	$182,695	$292,579	$401,165	3	15.0%	1
Minneapolis***	$414,615	$531,164	$629,173	1	6.5%	5
U.S. Total	$30,084,148	$43,257,731	$49,430,767		8.0%	

* University of Kansas, located in Lawrenceville, Kansas, is in close proximity to Kansas City, but falls outside the MSA definition and was not included in this data analysis.

** Data for the Indianapolis MSA was insufficient to measure for university R&D spending. While Indiana University-Purdue University (IUPUI) conducts R&D activities in the MSA, official numbers are attributed to the separate entities that make up the partnering institutions (Indiana University located in Bloomington, IN and Purdue University based in West Lafayette, IN).

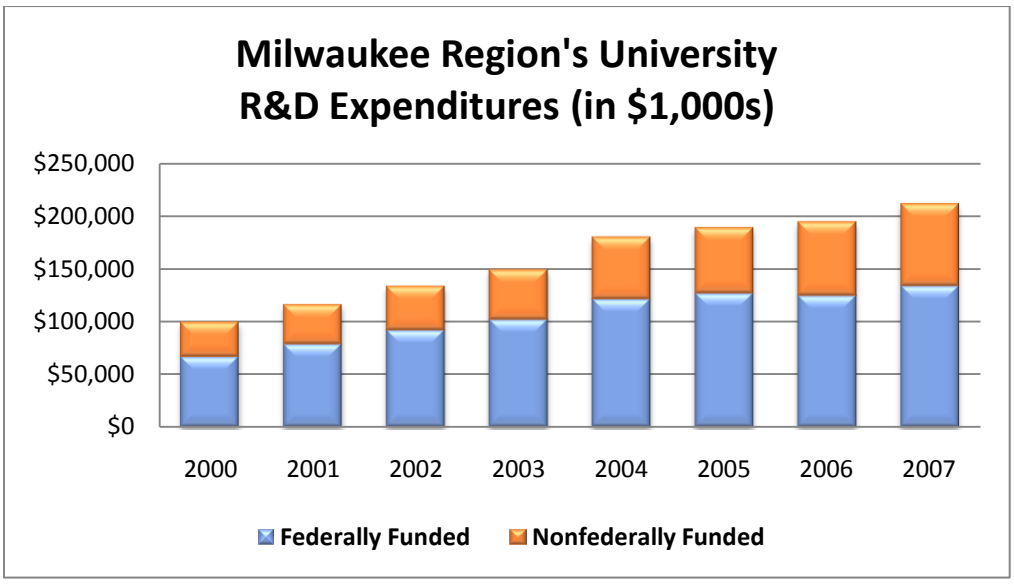
*** The Minneapolis MSA total R&D funding is skewed by the reporting of University of Minnesota R&D expenditures for all campuses.

Source: National Science Foundation

R&D funding for science and engineering at universities can be divided into federal and nonfederal sources. Federal funds are the primary source of university R&D activities nationally and in Milwaukee (Chart 1).[9] Federal funding in the Milwaukee region almost doubled between 2000 and 2007, accounting for 63% of total R&D expenditures in 2007. Nonfederal sources, which include university endowments, outside grants, and industrial funding, are an increasingly important element of university R&D support, accounting for 38% of total university R&D expenditures nationally. Nonfederal funding support for R&D in the Milwaukee region increased from just over $33 million in 2000 to over $78 million in 2007, making up 37% of area universities' spending on R&D.

[9] The availability of R&D funds from the Federal government has slowed, increasing by just 2.3% in FY 2008 (Rhonda Britt, National Science Foundation, *Federal Government is the Largest Source of University R&D funding in S&E; Share Drops in FY 2008*, September 2009, accessed at http://www.nsf.gov/statistics/infbrief/nsf09318/)

Chart 1



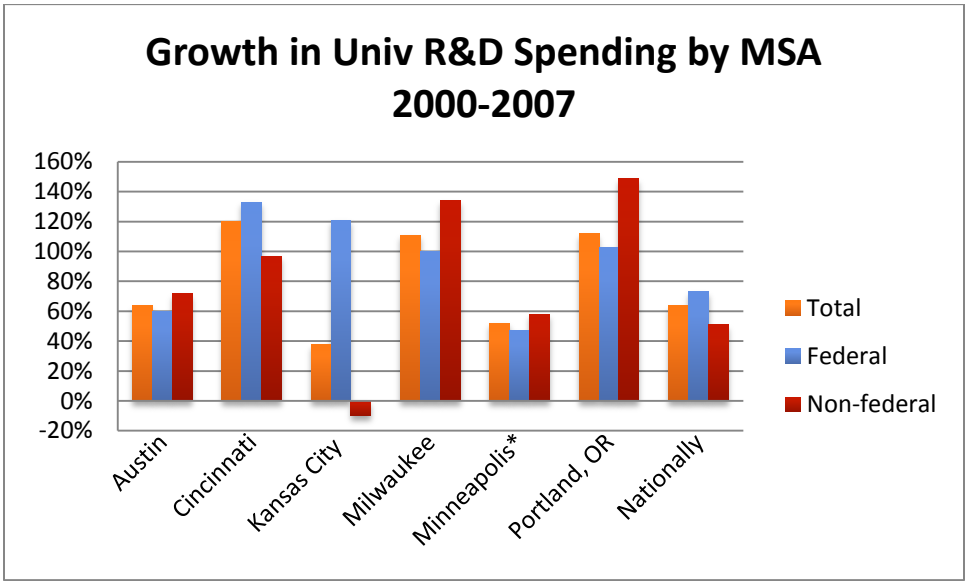
Source: National Science Foundation, Division of Science Resources Statistics. 2008. *Academic Research and Development Expenditures: Fiscal Year 2007*. Detailed Statistical Tables NSF 09-303.

Despite growth in R&D expenditures, the Milwaukee region lags behind most of the benchmark MSAs (Metropolitan Statistical Areas), falling well behind Minneapolis, Austin, Cincinnati, and Portland, OR in total R&D dollars spent (Table 2). Only Kansas City, which lacks a major university within its MSA boundaries, ranks lower than Milwaukee.[10]

While Milwaukee ranks low in total R&D funding, regional *growth* in university R&D compares favorably with other MSAs (Chart 2). Between 2000 and 2007, Milwaukee experienced a 111% increase in total R&D expenditures, behind only Cincinnati (120% increase) and on par with Portland, OR (112% increase). Adjusted for inflation, the Milwaukee region still experienced a significant 75% increase in total university spending on R&D between 2000 and 2007.

[10] University of Kansas, which is located in Lawrenceville, Kansas, is in close proximity to Kansas City, but falls outside the MSA definition. Data for the Indianapolis MSA was insufficient to measure for University R&D spending. While Indiana University-Purdue University (IUPUI) conducts R&D activities in the MSA, official numbers are attributed to the separate entities that make up the partnering institutions (Indiana University located in Bloomington, IN and Purdue University based in West Lafayette) making it difficult to track and compare actual R&D investment in the Indianapolis MSA.

Chart 2



Source: National Science Foundation.

B. Industry Patents

Regional Trend: ⇩
Comparison to Benchmarks: Unfavorable

Area companies are an important source of new ideas. To be successful, local businesses must continuously invest in internal research and development, make adjustments to their products, seek process improvements, and interact with their customers. Many valuable innovations are discovered and applied by area companies, forming the basis of how business is done. While much of this innovation is hard to capture statistically, patent activity provides one window to corporate R&D activity in the region.[11]

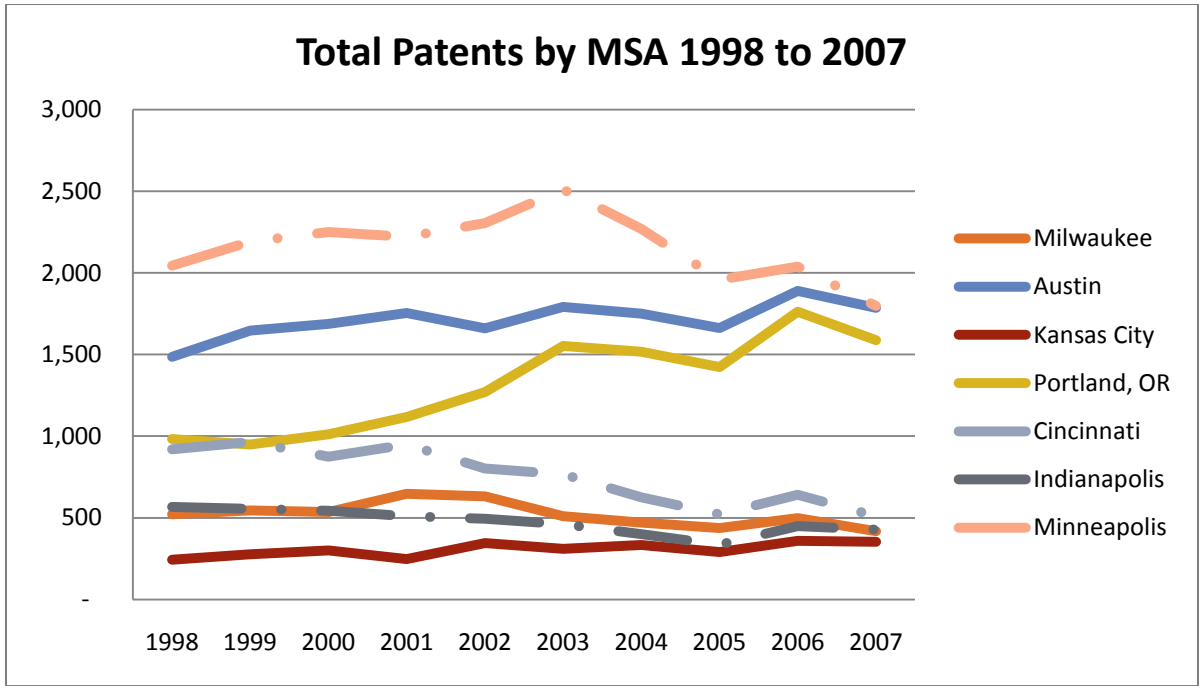
Chart 3 shows patent[12] activity among the benchmark MSAs. Those MSAs form two distinct groups—one with large numbers of patents (Austin, Minneapolis, and Portland) and the other with considerably fewer patents (Cincinnati, Indianapolis, Milwaukee, and Kansas City). Higher rates of patent activity indicate more idea generation and greater investments to protect intellectual property.

[11] Patent data is one of the few data sources that reflects industry R&D activity and that is available at the local level. While this data provides insight into local industry innovation, it should be noted that it has some limitations. Patent totals are simply totals and do not differentiate based on quality of the ideas or assess commercial potential. Some literature also suggests that patents may impede innovation rather than promote innovation when used by large firms to protect market share.

[12] Patent activity measures the number of utility patents which includes invention of —new and useful process, machine, manufacture, or composition of matter, or a new and useful improvement thereof." http://www.uspto.gov/web/offices/ac/ido/oeip/taf/patdesc.htm

As noted, the Milwaukee region falls into the group with fewer patents. Patent activity in the region remains relatively flat across the 10-year period, placing Milwaukee at the bottom of its Midwestern peers with 417 patents awarded in 2007.

Chart 3



Source: Harvard Institute for Strategy and Competiveness, Cluster Mapping Project, http://data.isc.hbs.edu/isc/.

A look at patents per employee further highlights the Milwaukee region's relatively low ranking in this area. Patents per employee between 1998 and 2007 declined not only in the Milwaukee region, but in several other MSAs (Table 3). [13] This may be attributable – at least in part – to the acknowledged backlog in patent approvals by the U.S. Patent Office.[14] However, the relatively flat and falling regional activity also could be indicative of a less creative environment that produces fewer patentable discoveries. It also may be possible that local companies and inventors are choosing to apply their inventions without seeking patent approval.[15] If the latter is true, then it may be beneficial to gather information on our region's innovative business activity capacity through non-traditional measurement methods.

[13] A more fine-grained analysis of patent activity by McKinsey & Company places Milwaukee in the category of "silent lakes" for patent activity. These cities are marked by "slow-growing innovation ecosystems backed by a narrow range of very large established companies that operate in a handful of sectors." Andonian, Adre, Christoph Loos and Luis Pires, "Building an innovation nation" What Matters, McKinsey & Company, March 4, 2009. http://wahtmatters.mckinseydigital.com/innovation/building-an-innovation-nation.

[14] Schmid, John. "No Quick End to Backlog in Sight," *Milwaukee Journal Sentinel*, 10/24/2009, http://www.jsonline.com/watchdog/watchdogreports/65911387.html.

[15] Regional variation in patent activity may also be influenced by size of businesses and industry mix.

Table 3: Patents Per 10,000 Employees

	1998	2002	2007	2007 Rank
Milwaukee	6.79	8.32	5.26	6
Leader Regions				
Austin	30.98	30.25	27.92	1
Kansas City	2.90	3.88	3.84	7
Portland, OR	11.74	15.04	17.00	2
Peer Regions				
Cincinnati	10.25	8.74	5.50	4
Indianapolis	7.75	6.47	5.41	5
Minneapolis	13.28	14.49	10.61	3

Source: Harvard Institute for Strategy and Competiveness, Cluster Mapping Project, Http://data.isc.hbs.edu/isc

Indicator Set # 2 – Regional Talent and Skills

> *A technologically sophisticated and globally competitive economy demands increasingly higher level skills from all workers, and requires that workers continuously upgrade skills.*
>
> ~ Council on Competitiveness
> *Competitiveness Index: Where America Stands,* 2007

Talent and Skills are the currency of the knowledge economy. An area's workforce develops the ideas that create new businesses and that enable established businesses to gain and maintain a competitive advantage. A region's collective skills base also influences company location and relocation decisions.[16] Clearly, the development and maintenance of a skilled and educated workforce is critical to the Milwaukee region's ability to achieve a competitive regional economy.

Quality of primary and secondary education, the availability of continuing education and training, and the availability of in-demand trained and skilled workers all contribute to the health of a region's human capital assets. To gauge where the Milwaukee region stands on this important asset, the *Regional Talent and Skills* indicators examine educational attainment and occupational skill levels by measuring the concentration of scientists and engineers, knowledge workers, and skilled and technical workers in the region. Another indicator also assesses the Milwaukee region's ability to attract college-educated immigrants, a demographic often associated with innovative businesses.[17]

A. Educational Attainment

Regional Trend: ⇧
Comparison to Benchmarks: Unfavorable

In the knowledge economy, higher levels of education are prized, signaling a workforce with the skills and abilities to perform and support innovative product and task development; process implementation; and sale of products and services in the global marketplace. This indicator analyzes the Milwaukee region's educational attainment rates—the percentage of adults 25 years or older living within the MSA with various levels of education including high school diploma, some college, two-year college degree (associate's degree), four-year college degree (bachelor's degree), and graduate or professional degree.

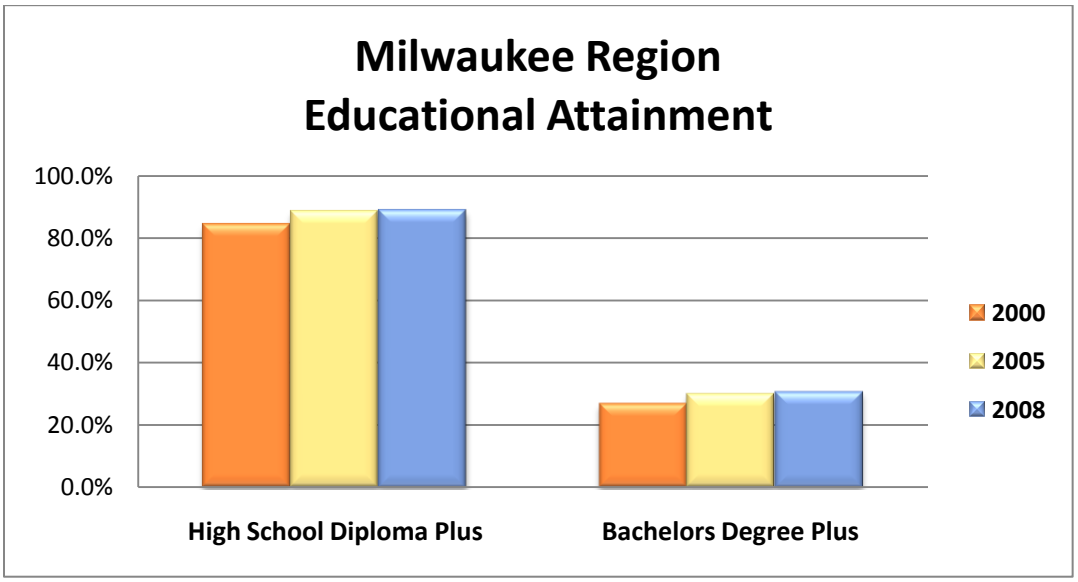
[16] *Existing workforce skills* top Site Selection Magazine's list of top 10 factors considered by real estate executives when making location decisions, November 2009, http://www.siteselection.com/portal/index.shtml.
[17] Herman, Richard T. and Robert L. Smith, Immigrant, Inc. 2009.

Table 4: Milwaukee Region Level of Educational Attainment			
	2000	2005	2008
High School Diploma	29.1%	29.9%	28.3%
Some College	21.6%	21.2%	22.4%
Associates Degree	6.8%	7.3%	7.2%
Bachelors Degree	18.3%	20.4%	20.4%
Graduate/Professional Degree	8.7%	9.7%	10.5%
High School Plus	84.5%	88.6%	88.9%

Source: U.S. Census Bureau, 2000 Census and American Community Survey 2005 and 2008

Educational attainment in the Milwaukee region is improving. Between 2000 and 2008, the percent of our region's population with at least a high school diploma grew from 84.5% to 88.9% (Table 4). Much of the increase was fueled by an increase in the number of residents with a bachelors degree or higher (Chart 4).

Chart 4



Source: U.S. Census Bureau, 2000 Census and American Community Survey 2005 and 2008

While the Milwaukee region exceeds the national rates of population with a bachelors degree or higher (Table 5), our region falls behind comparable innovation leader regions and two of three Midwestern peers (Indianapolis and Minneapolis). This indicates that despite improvements, there is a need to further improve the region's educational attainment levels.

Table 5: 2008 Levels of Educational Attainment

	High School Plus	High School Plus Rank	Associate (2-yr degree)	2-Yr Degree Rank	Bachelors Degree Plus	Bachelors Plus Rank	Bachelors Degree	Grad or Prof Degree
Milwaukee	88.9%	4	7.2%	5	30.9%	6	20.4%	10.5%
Leader Regions								
Austin	86.5%	7	6.8%	7	38.2%	1	24.5%	13.7%
Kansas City	90.1%	2	7.3%	4	31.9%	4	20.5%	11.4%
Portland	90.0%	3	8.2%	2	33.3%	3	21.5%	11.7%
Peer Regions								
Cincinnati	87.4%	6	7.8%	3	28.1%	7	17.7%	10.4%
Indianapolis	88.7%	5	7.1%	6	31.7%	5	21.0%	10.7%
Minneapolis	92.7%	1	9.0%	1	37.6%	2	25.4%	12.1%
U.S.	85.0%		7.5%		27.7%		17.5%	10.2%

Source: U.S. Census Bureau, American Community Survey 2008.

While much of the emphasis of the knowledge economy is on highly educated workers, workers with a range of educational abilities and skill levels also are required. ~~"~~Middle skill" jobs, for example, are occupations that require at least a high school diploma, but less than a four-year college degree. Middle skill jobs such as registered nurses, health technicians, and many production workers require specialized training, certificates, or two-year college degrees.

Attainment of a two-year degree can be used as a proxy of the availability of skilled workers for middle skill jobs. The percentage of the Milwaukee region's workforce with an associate degree is increasing. However, the region falls behind the national attainment rate of 7.5%, as well as several of the leader regions and its Midwestern peers.

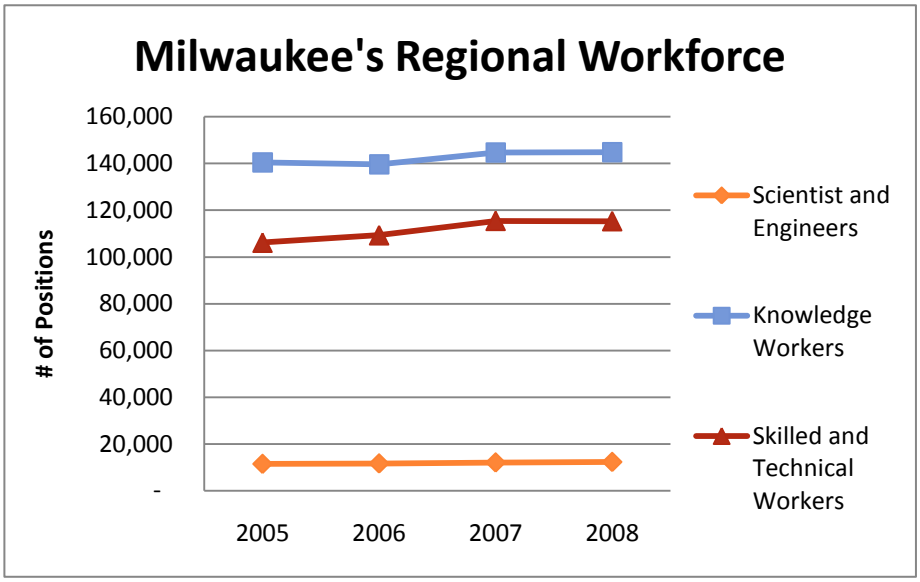
B. Scientists and Engineers

Regional Trend: 

Comparison to Benchmarks: Average

Scientists and Engineers (S&Es) make up a small percentage of the U.S. workforce (1.5 %). Their role in discovery of new products and processes, however, makes them a much-coveted demographic in the innovation economy.

Chart 5



Source: Bureau of Labor Statistics, Occupational Employment Statistics Survey, 2005-2008.

The Milwaukee region's S&E population mirrors that of the U.S. workforce, making up 1.5% of regional occupations in 2008 (Table 6). The number of S&E jobs in the region has grown, increasing 7.3% between 2005 and 2008. However, the rate of increase is slower than the rate of growth nationally (8.8%). S&E positions in the region are flat as a percentage of total occupations and on a per capita basis during the period (Chart 5).

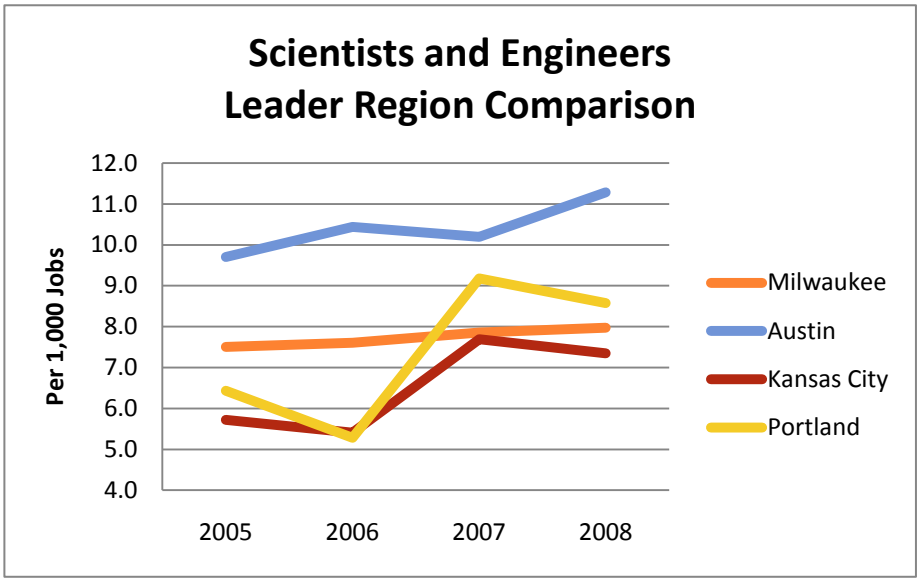
Table 6: Scientist and Engineers by MSA, 2008

	S&E Employment	S&E % of Total Occupations	S&E Jobs per 1,000 People	Per Capita Rank
Milwaukee	12,350	1.5%	8.0	4
Leader Regions				
Austin	18,650	2.4%	11.3	1
Kansas City	14,710	1.4%	7.3	5
Portland	18,940	1.8%	8.6	3
Peer Regions				
Cincinnati	13,400	1.3%	6.2	6
Indianapolis	8,430	0.9%	4.9	7
Minneapolis	28,340	1.6%	8.8	2
National	2,026,030	1.5%	6.7	

Source: Bureau of Labor Statistics, Occupational Employment Statistics Survey, 2008 and Public Policy Forum.

Milwaukee is in the middle of the pack when compared to innovation leader economies (Chart 6) and peer regions in both percentage of total jobs that are S&E and per capita S&E jobs. Milwaukee has more S&E positions per capita than Kansas City, Cincinnati, and Indianapolis, but lags Portland and Austin. As expected, Austin leads all the benchmark regions with the most S&E positions per capita, growing by 31.2 percent between 2005 and 2008.

Chart 6



Source: Bureau of Labor Statistics, Occupational Employment Statistics Survey, 2005-2008. [18]

C. Knowledge Workers

Regional Trend: ⟺
Comparison to Benchmarks: Average

Knowledge workers, a broadly defined category of occupations which includes scientists and engineers (see Appendix A), are the source of many of the ideas upon which the innovation economy is built.

Milwaukee's knowledge workforce of almost 145,000 is modest in size among the comparison regions (Table 7). With just over 17% of all occupations in knowledge jobs, Milwaukee lags the 18.7 percent of knowledge jobs available across the nation and behind all comparison regions except Indianapolis. The Milwaukee region's knowledge workforce experienced a limited increase (3.2%) between 2005 and 2008, again falling below the 8.2% growth of knowledge jobs nationally. On a per capita basis, Milwaukee fares more favorably with 93.5 knowledge jobs per 1,000 people in comparison to 83.2 jobs per 1,000 nationally, and falls in the middle of comparable MSAs.

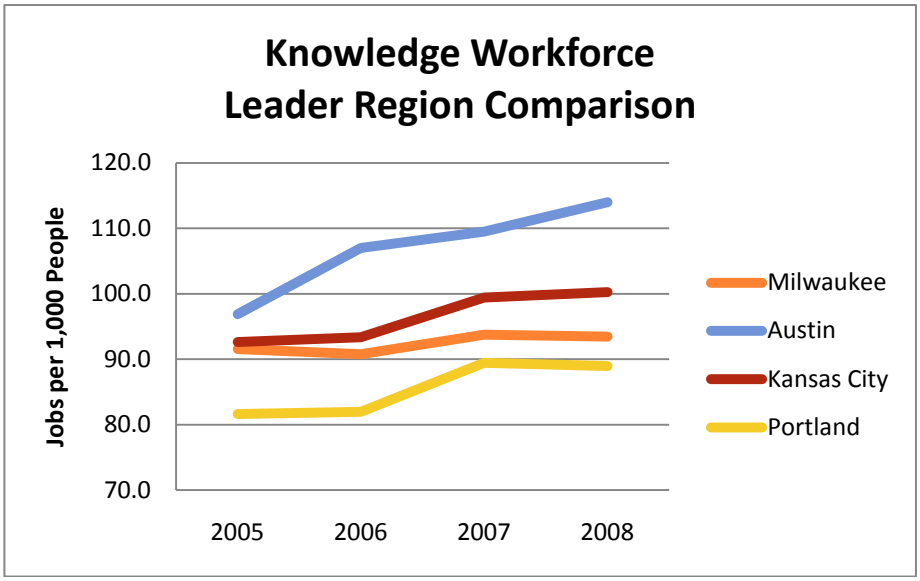
[18] The Occupational Employment Statistics use panel data to reflect gradual changes in staffing patterns. However, changes in occupational categories can result in significant shifts in employment totals. The analysis period was chosen to minimize affects of such changes. Despite this effort spikes are seen in the data for some MSAs. In chart 6, there is a sudden spike in Portland's S&E employment in 2007, which results when the occupational category of computer hardware engineers is added for the MSA. A similar spike is not seen for the other MSAs because the category was already in place for the 2005 and 2006 data sets.

Table 7: Knowledge Workers by MSA, 2008				
	Total Employment	% of Total Occupations	Knowledge Jobs per 1,000 People	Per Capita Rank
Milwaukee	144,810	17.1%	93.5	4
Leader Regions				
Austin	188,430	24.3%	114.0	2
Kansas City	200,710	19.8%	100.3	3
Portland	196,360	18.8%	89.0	6
Peer Regions				
Cincinnati	182,530	17.7%	84.7	7
Indianapolis	154,310	17.1%	90.0	5
Minneapolis	395,640	22.2%	122.5	1
National	25,296,130	18.7%	83.2	

Source: Bureau of Labor Statistics, Occupational Employment Statistics Survey, 2008 and Public Policy Forum.

Benchmarked solely with recognized leader regions, Milwaukee compares favorably with Portland, but behind Austin and Kansas City in knowledge jobs per 1,000 people (Chart 7).

Chart 7



D. Skilled and Technical Workers

Trend: ⇧
Comparison to Benchmarks: Favorable

Between 2006 and 2016, an estimated 46% of job openings in Wisconsin are expected to be in middle-skill jobs that require some training, but less than a four-year college degree.[19] As seen in Table 8, one of our region's strengths lies in its skilled workforce. Skilled and technical occupations (see Appendix A for definition), also known as middle-skilled jobs, make up 13.6 percent of all jobs in the Milwaukee region. While the region's skilled jobs as a percentage of all occupations is comparable to other MSAs, Milwaukee's skilled and technical jobs per 1,000 people at 74.4 exceeds all the comparison leader and peer regions (Chart 8). Despite the loss of manufacturing jobs, the Milwaukee region continues to see an increase in skilled jobs, growing by 8.6 % between 2005 and 2008. Only Portland experienced a larger jump at 22.2%.

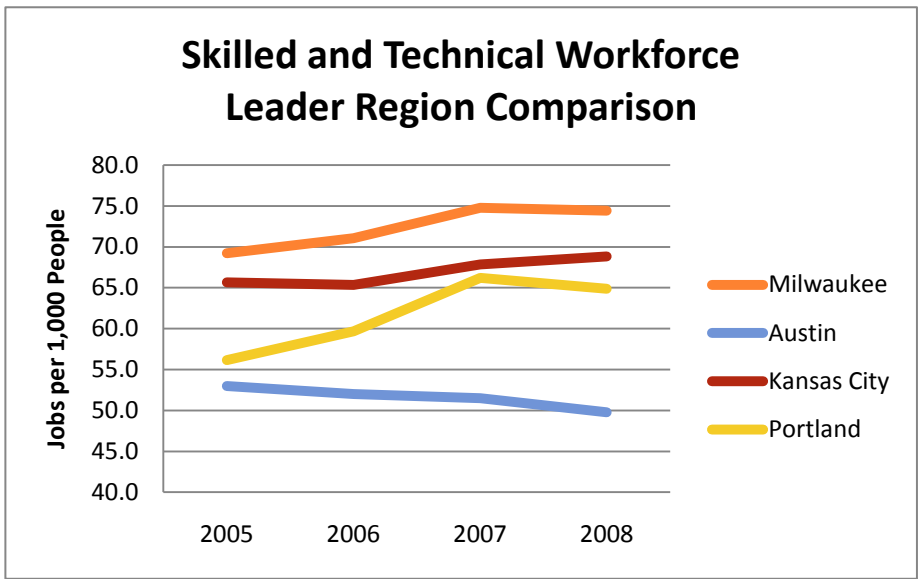
Table 8: Skilled and Technical Workers, 2008

	Total Employment	% of Total Occupations	Skilled Jobs per 1,000 People	Per Capita Rank
Milwaukee	115,300	13.6%	74.4	1
Leader Regions				
Austin	82,290	10.6%	49.8	7
Kansas City	37,800	13.6%	68.8	4
Portland	143,210	13.7%	64.9	5
Peer Regions				
Cincinnati	137,130	13.3%	63.6	6
Indianapolis	119,640	13.2%	69.7	3
Minneapolis	33,740	13.1%	72.4	2
National	18,148,800	13.4%	59.7	

Source: Bureau of Labor Statistics, Occupational Employment Statistics Survey, 2008 and Public Policy Forum.

[19] Skills to Compete Wisconsin and The Workforce Alliance, Wisconsin's Forgotten Middle-Skill Jobs: Meeting the Demands of a 21st-Century Economy, October 2009 accessed on 11/4/09 at http://www.skills2compete.org/atf/cf/%7B8E9806BF-4669-4217-AF74-26F62108EA68%7D/FORGOTTENJOBS_WI_FINAL.PDF

Chart 8



E. College Educated Foreign Born

Regional Trend: ⟺
Comparison to Benchmarks: Average

Highly educated foreign born immigrants are a key demographic associated with innovation. For example, patent activity among immigrants has been shown to be almost double that of the United States' native born population. The research notes that higher rates of patenting may be linked to the substantial number of immigrants who hold advanced degrees in science and engineering.[20] In addition, *The Kauffman Index of Entrepreneurial Activity* found that immigrants start businesses at higher rates than native born residents in the U.S.,[21] and other research has shown that immigrants often are founders of U.S.-based firms receiving venture capital.[22]

In Milwaukee, the immigrant population age 25 years old and older increased by more than 11,000 people (14.7%) between 2005 and 2008. Like many regions, much of the growth among immigrants in the Milwaukee region is comprised of less-educated foreign-born residents. Nevertheless, as seen in Table 9, the Milwaukee region continues to attract highly-educated foreign-born residents as well, though at a slower pace than less-educated immigrants.

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[20] Hunt, Jennifer and Marjolaine Gauthier-Loiselle, "How much does immigration boost innovation," 2008, http://www.iza.org/conference_files/TAM_08/hunt_j136.pdf.
[21] Fairlie, Robert, "The Kauffman Index of Entrepreneurial Activity, 1996-2008," p. 11 accessed at http://www.kauffman.org/uploadedFiles/kiea_042709.pdf
[22] Anderson, Stuart and Michaela Platzer for the National Venture Capital Association, *American Made: The Impact of Immigrant Entrepreneurs and Professionals on U.S. Competitiveness*, November 2006, http://www.nvca.org/index.php?option=com_content&view=article&id=79&Itemid=103.

Table 9 also shows that the Milwaukee region's educated immigrant population is average in size when compared to the benchmark regions, falling behind Minneapolis, Austin, and Portland (Table 9). Milwaukee also is experiencing slower *growth* of educated immigrants.

Table 9: Highly Educated Foreign Born Residents by MSA, 2008

	2008				2005-2008
	Foreign Born as % of Total Population (25 and Older)	Number of Foreign Born (25 years and older) with Bachelors or Higher	Highly Educated Foreign Born as % of Total Pop	Rank % Educated Foreign Born Pop	% Change in Highly Educated Immigrants
Milwaukee	8.5%	5,212	2.5%	4	8.5%
Leader Regions					
Austin	18.1%	54,090	5.2%	1	11.1%
Kansas City	7.4%	7,529	2.1%	5	15.6%
Portland, OR	15.1%	1,280	4.1%	2	9.9%
Peer Regions					
Cincinnati	4.2%	5,814	1.8%	7	-2.8%
Indianapolis	6.0%	2,743	2.0%	6	12.7%
Minneapolis	10.3%	2,490	3.4%	3	18.8%

Source: American Community Survey 2005 and 2008.

Indicator Set #3 – Business Dynamism and Entrepreneurship

…the return on investments in innovation capacity is greater for regions that are able to support a high level of entrepreneurship activity.[23]

Local entrepreneurs play a pivotal role in the knowledge economy. The entrepreneurial spirit is commonly housed most prominently in smaller and newer companies that strive to translate new ideas and technologies into viable products. This indicator offers a snapshot of our region's entrepreneurial environment through job growth associated with small businesses and the dynamic environment of business creation and destruction.

Business Size Defined

Micro Businesses: less than 10 employees

Small Businesses: 10-99 employees

Medium and Large Firms: more than 100 employees

Nonresident Firms: firms headquartered outside of Wisconsin

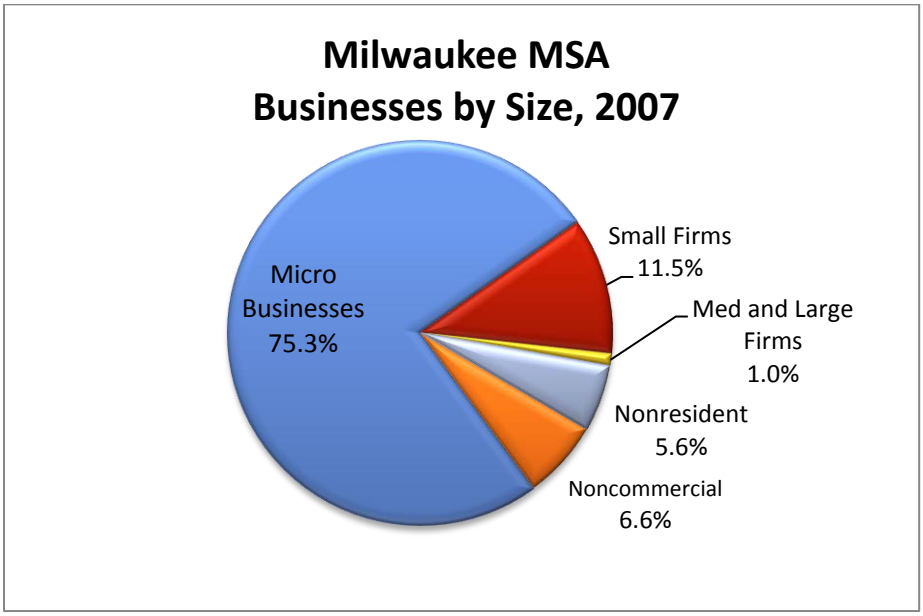
Noncommercial Businesses: nonprofits and government entities

A. Entrepreneurial Job Growth

Regional Trend: ⇧
Comparison to Benchmarks: Average

Small businesses make up an increasing number of Milwaukee-area businesses. In 2007, almost 87% of regional businesses employed fewer than 100 people (Chart 9). These same small establishments (micro plus small businesses) provided over 387,000 jobs, amounting to almost 43% of jobs in the region (Chart 10).

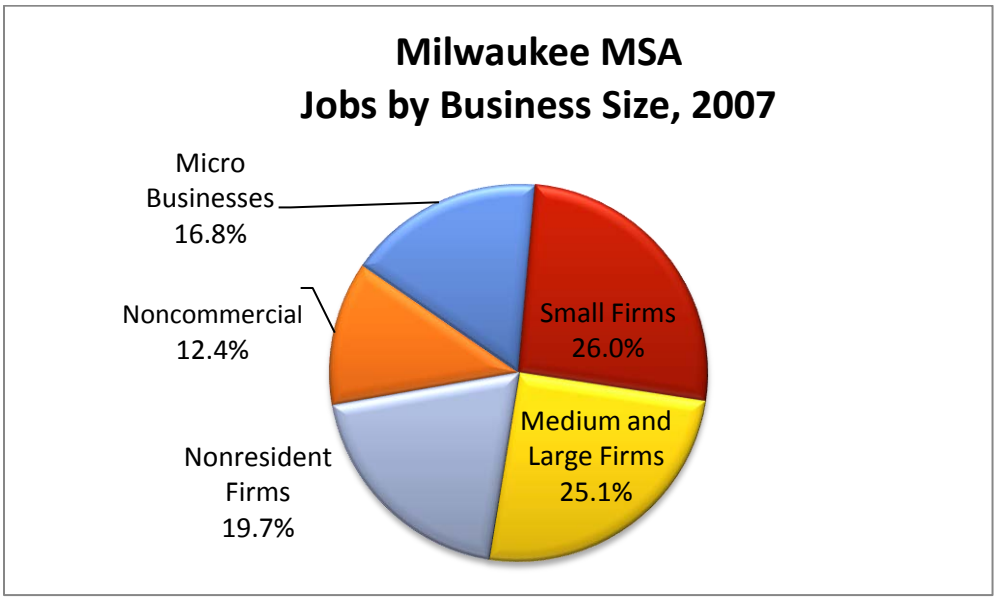
Chart 9



[23] Advanced Research Technologies, LLC, The Innovation-Entrepreneurship NEXUS: A National Assessment of Entrepreneurship and Regional Economic Growth and Development.

Source: National Establishment Time Series on Edward Lowe Foundation, www.youreconomy.org

Chart 10



Source: National Establishment Time Series on Edward Lowe Foundation, www.youreconomy.org

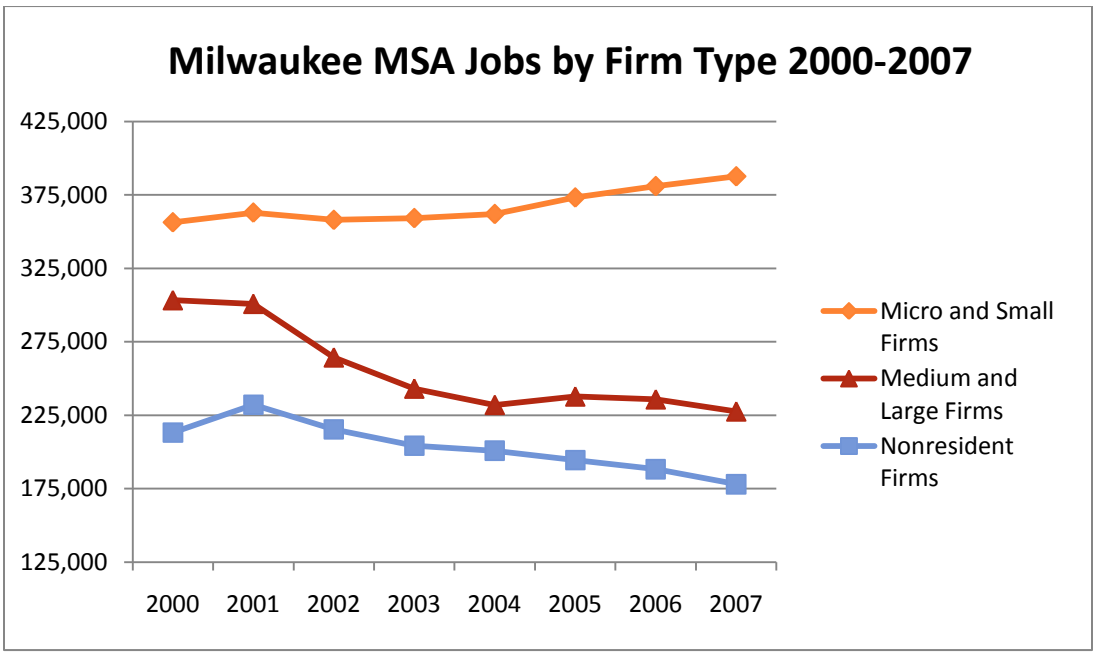
Milwaukee's jobs picture just prior to the economic downturn echoed that of many regions across the country—overall employment was shrinking, despite the rise in the aggregate number of businesses. Job losses were happening across the board, but were especially concentrated among larger companies and nonresident firms (businesses headquartered outside the region). As seen in Chart 11, many of the jobs being added were in small and entrepreneurial firms (Chart 11).

Defining Entrepreneurship

Frequently, small business owners and entrepreneurs are equated as one and the same. It should be noted, however, that not all small businesses contribute equally to economic growth. To capture this differentiation, David M. Hart in The Emergence of Entrepreneurship Policy (2003) offers a more precise definition of entrepreneurship: "the process of starting and continuing to expand new businesses." The focus is not just limited by business size, but by how the business develops as it adds employees and income.

This analysis is unable to make this distinction because of the lack of data that allows for distinction between entrepreneurial and non-entrepreneurial small businesses. Instead, we use changes in the number and employment levels of small businesses as a proxy for entrepreneurship. While not a perfect indicator, it is informative given that small start-ups typically have a high potential for growth.

Chart 11



Source: National Establishment Time Series on Edward Lowe Foundation, www.youreconomy.org

A Kauffman Foundation report notes that firms employing one to four individuals on average account for 20% of new positions added each year. [24] Micro firms in the Milwaukee area employed an average of 2.4 workers in 2007 and created over 10,000 jobs between 2006 and 2007. As Table 10 indicates, employment opportunities in the smallest businesses in the region have increased by an average of 3.3% a year since 2000. Despite this steady increase, Milwaukee lags comparison regions in the number of jobs created among the smallest firms.

[24] Kauffman Foundation. Business Dynamics Statistics Briefing: Jobs Created from Business Startups in the United States, January 2009. http://www.kauffman.org/uploadedFiles/BDS_Jobs_Created_011209b.pdf

Table 10: Micro Businesses (1-9 Employees)

	2000	2007	Avg Annual Growth Rate	2000 Jobs per 1,000 People	2007 Jobs per 1,000 People	2007 Jobs per Capita Rank
Milwaukee	120,300	152,083	3.3%	80	99	6
Leader Regions						
Austin	138,647	193,023	4.9%	111	121	2
Kansas City	172,072	208,956	2.7%	94	105	5
Portland	212,606	277,936	3.8%	110	128	1
Peer Regions						
Cincinnati	175,002	197,443	1.6%	87	92	7
Indianapolis	129,173	181,345	5.0%	85	107	4
Minneapolis	289,486	369,537	3.5%	98	116	3

Source: National Establishment Time Series on Edward Lowe Foundation, www.youreconomy.org and U.S. Census Bureau

The Milwaukee region compares more favorably on a per capita basis with regard to jobs in small firms—those with 10 to 99 employees (Table 11). These businesses, referred to as second stage firms, are said to have more stable product and business plans than early stage or micro businesses, leading to less entry and exit of businesses out of this size category.[25] The number of jobs within Milwaukee's second stage firms has remained constant since 2000. The minimal change in jobs in the Milwaukee region may reflect fewer micro firms growing into second stage firms and slower growth among existing second stage firms.

Table 11: Small Businesses (10-99 Employees)

	2000	2007	Avg Annual Growth Rate	2000 per 1,000 People	2007 per 1,000 People	2007 per Capita Rank
Milwaukee	236,042	235,573	0.0%	157	153	2
Leader Regions						
Austin	183,559	201,157	1.2%	147	126	6
Kansas City	255,162	258,322	0.2%	139	130	4
Portland	269,082	275,412	0.3%	140	127	5
Peer Regions						
Cincinnati	278,696	270,160	-0.4%	139	126	6
Indianapolis	214,527	224,795	0.6%	141	133	3
Minneapolis	498,416	503,493	0.1%	168	157	1

Source: National Establishment Time Series on Edward Lowe Foundation, www.youreconomy.org and U.S. Census. Bureau

[25] YourEconomy, http://youreconomy.org/guide/?section=Glossary#ST accessed 9/24/09.

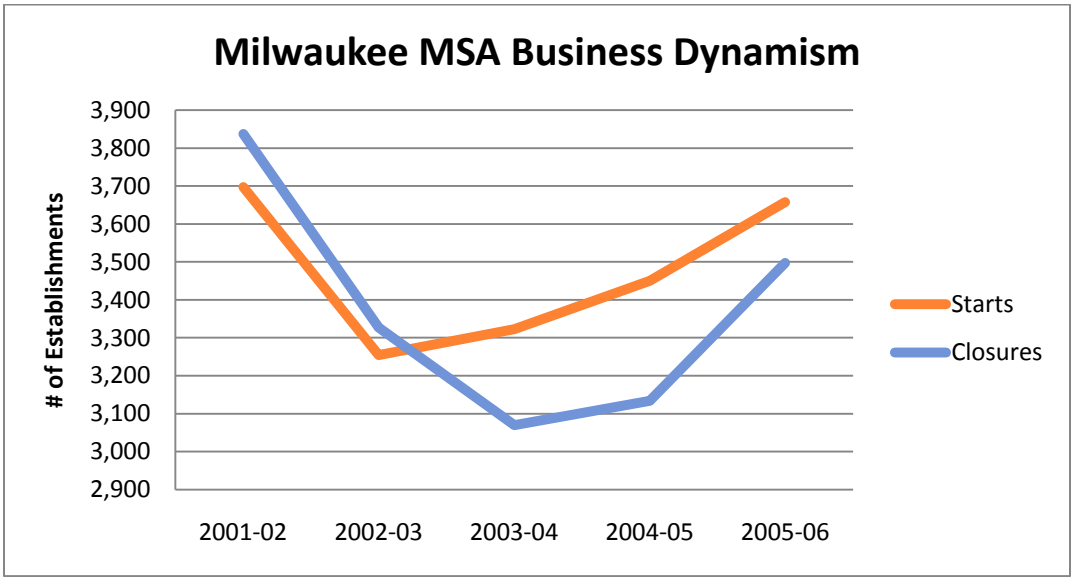
B. Business Dynamics

Regional Trend: ⇧
Comparison to Benchmarks: Unfavorable

The business world obviously is dynamic, with new companies constantly being formed while others close their doors. This churning of businesses can produce positive results when new businesses with innovative ideas take the place of less efficient and less nimble firms. In a healthy region, business starts (births) exceed business closures (deaths) and point to opportunities for economic growth.

As Chart 12 shows, the Milwaukee region recently experienced a rebound in business creation activity after a decline earlier in the decade. The same phenomenon held true for business closures, however, which declined earlier in the decade but increased significantly in the middle of the decade.

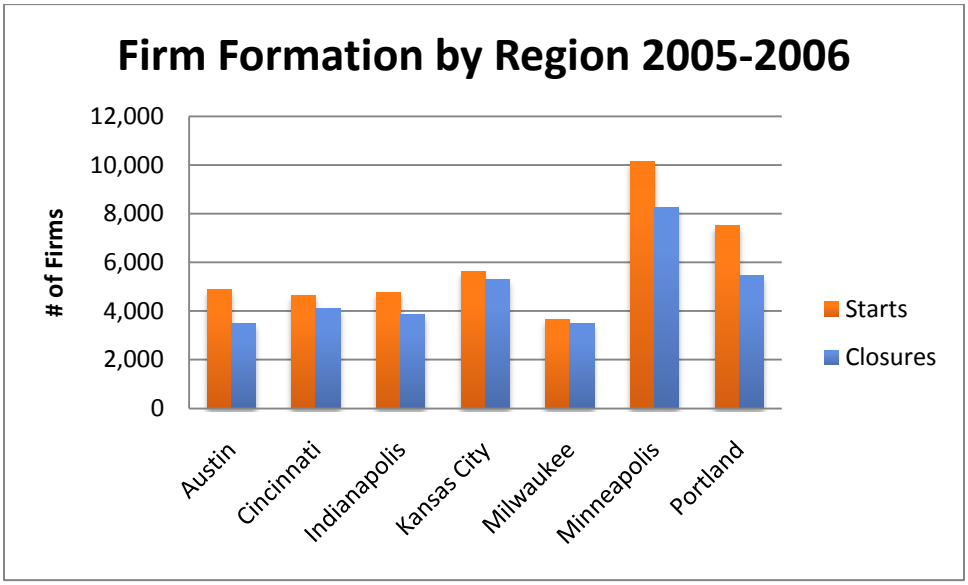
Chart 12



Source: U.S. Census Bureau, Statistics of US Businesses Employment Change Data, 2001-2002 to 2005-2006. http://www.census.gov/econ/susb/

Despite improvements in the region's business starts, there appears to be a relative risk aversion to creating new businesses in the Milwaukee region as compared to the benchmark areas. In fact, with the exception of Austin, each comparison region had more businesses created or failed than were created in the Milwaukee region between 2005 and 2006 (Chart 13).

Chart 13



Source: U.S. Census Bureau, Statistics of US Businesses Employment Change Data, 2005-2006. http://www.census.gov/econ/susb/

The more active business creation and closure activity in other regions may point to more active entrepreneurial climates than exists in the Milwaukee region. The active business dynamic in other regions is also reflected in positive business birth to death ratios that generally well exceed those that exist in Milwaukee (Table 12).

Table 12: Business Dynamics—Ratio of Business Starts to Closures

	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2005-2006 Rank
Milwaukee	0.96	0.98	1.10	1.10	1.05	7
Leader Regions						
Austin	1.11	1.18	1.26	1.26	1.41	1
Kansas City	1.05	1.12	1.13	1.13	1.06	6
Portland	1.03	1.13	1.26	1.26	1.37	2
Peer Regions						
Cincinnati	1.04	1.01	1.05	1.05	1.14	6
Indianapolis	1.09	1.13	1.05	1.05	1.24	3
Minneapolis	1.04	1.18	1.16	1.16	1.23	4
All MSAs Nationally	1.06	1.11	1.14	1.14	1.18	

Source: U.S. Census Bureau, Statistics of US Businesses Employment Change Data, 2001-2002 to 2005-2006. http://www.census.gov/econ/susb/

Indicator Set # 4 – Capital Formation

The commercializing activities of local entrepreneurs are necessary to convert a region's innovation assets into long-term economic gain. [26]

The transformation to an innovation economy requires more than developing ideas. It also necessitates translating promising ideas into practical, marketable, and saleable products and services. The catalyst for this translation is attraction of venture capital and other resources to entrepreneurial companies for technology transfer and product development. One mechanism for tracking *Capital Formation* in the Milwaukee region is to measure success in securing Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards and small business loan activity.[27]

A. SBIR and STTR Awards

Regional Trend: ⇧
Comparison to Benchmarks: Unfavorable

SBIR Award Types

Phase I awards fund exploration of the feasibility of new ideas.

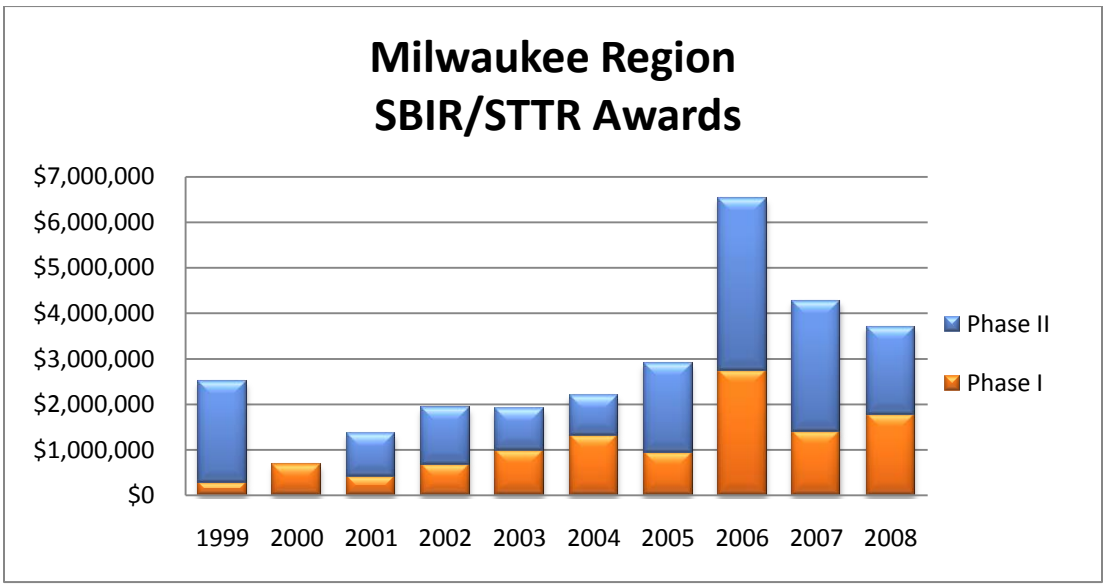
Phase II awards support further R&D and evaluation of commercialization potential. It does not support marketing of discoveries.

SBIR-STTR awards provide small businesses with a valuable resource to use in developing technologies that hold promise for transfer to market. While SBIR-STTR awards do not fund marketing activities, the programs do provide critical start-up capital that can assist businesses in proving the efficacy of new technologies and in attracting additional funding (often in the form of venture capital).

The flow of SBIR-STTR monies to Milwaukee-area companies has increased over the last 10 years, growing 48.4 % between 1999 and 2008 (Chart 14). Growth in the region's SBIR/STTR awards is fueled by Phase I awards, while the region has seen mixed success in securing Phase II awards (see accompanying box for definitions). The overall growth in SBIR/STTR funds is also reflected by the increasing *number* of awards made to regional companies (Chart 15). Companies have received awards through successful applications to various federal agencies, including the Departments of Defense, Health and Human Services and Education, and the National Science Foundation.

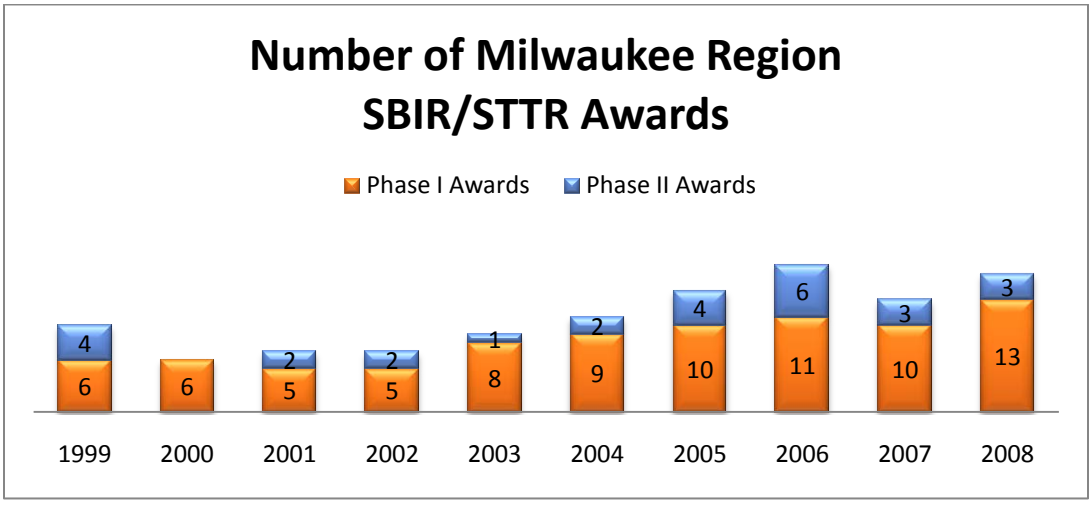
[26] Advanced Research Technologies, LLC, The Innovation-Entrepreneurship NEXUS: A National Assessment of Entrepreneurship and Regional Economic Growth and Development, p. 8.
[27] SBIR-STTR and SBA lending provide only a partial picture of capital formation in the Milwaukee region. To provide a clearer picture, additional data on angel investing and venture capital at the metropolitan level is needed, but is not currently available.

Chart 14



Source: U.S. Small Business Administration, Technology Resources Network, accessed August 27, 2009.

Chart 15



Source: U.S. Small Business Administration, Technology Resources Network, accessed August 27, 2009.

Several local companies, including Physiogenix of Milwaukee, Simulation Technology and Applied Research of Mequon, and 3-D Molecular Designs of Wauwatosa, have secured awards for different technology applications in multiple years. Physiogenix received eight different awards for six different technologies between 1999 and 2008. Simulation Technology and Applied Research received 15 different awards for 11 different technologies. These two businesses alone received 48% of the total awards made in the Milwaukee region in 2006, accounting for the large spike in total SBIR/STTR funds flowing into the region that year.

While the Milwaukee region has made progress in securing SBIR-STTR awards, it has been late to the game, bringing in fewer numbers of awards and less funding than several of the leader and peer regions (Table 10).

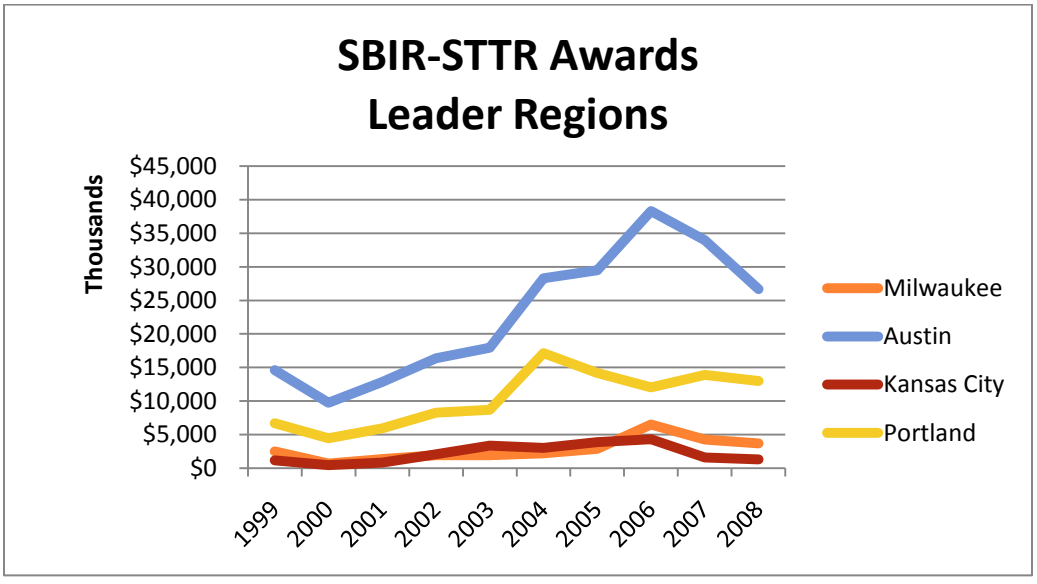
Table 10: SBIR-STTR Award Totals by Region

	1999	2003	2008	1999-2008 Avg Annual Growth	Growth Rank
Milwaukee	$2,498,201	$1,903,299	$3,708,351	4.8%	5
Leader Regions					
Austin	$14,596,517	$17,920,867	$26,666,055	8.3%	4
Kansas City	$1,154,296	$3,369,135	$1,290,451	1.2%	6
Portland	$6,689,087	$8,704,741	$12,981,042	9.4%	3
Peer Regions					
Cincinnati	$10,661,912	$12,449,999	$9,484,474	-1.1%	7
Indianapolis	$2,171,316	$5,199,846	$6,029,225	17.8%	1
Minneapolis	$14,727,962	$29,655,162	$31,531,844	11.4%	2

Source: U.S. Small Business Administration, Technology Resources Network, accessed August 27, 2009.

Chart 16 shows how the Milwaukee region fares when compared specifically to the innovation leader regions.

Chart 16



Source: U.S. Small Business Administration, Technology Resources Network, accessed August 27, 2009.

B. Small Business Lending

Regional Trend: ↓
Comparison to Benchmarks: not available[28]

Debt financing is a primary source of capital for small businesses.[29] While small businesses can obtain financing through different lenders, the U.S. Small Business Administration's 7(a) and 504 loan programs provide one way to track lending to local small businesses.

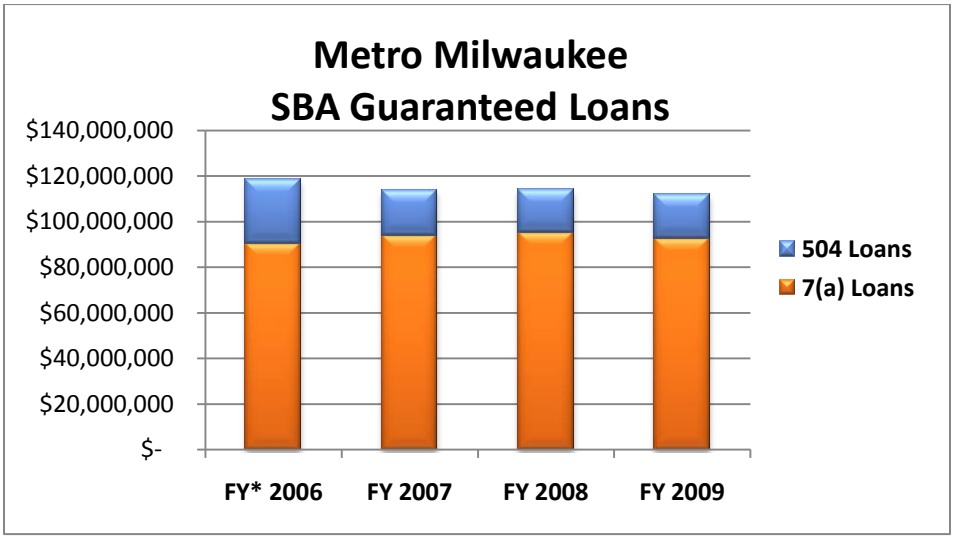
The current credit crunch has negatively affected the ability of small businesses to access financing. According to the SBA, total loan volume across the U.S. in the 7(a) and 504 programs decreased $4.5 billion between 2007 and 2008, but began to rebound in 2009.[30]

SBA Loan Programs

7(a) Loans are provided to start-up and existing small businesses by commercial financial institutions to finance general business purposes. The loans are guaranteed by the Small Business Administration (SBA).

504 Loans are long-term loans for fixed assets (such as real estate or equipment) provided to small businesses through Certified Development Companies (CDCs). The loans are guaranteed by the SBA.

Chart 17



*The Federal fiscal year extends from October 1 to September 30.
Source: U.S. Small Business Administration Wisconsin Office, December 2009.

[28] The U.S. Small Business Administration does not publish comprehensive data on small business lending activity at the metropolitan or county level.
[29] Robb, Alicia M. and David T. Robinson, The Kauffman Firm Survey, "The Capital Structure Decisions of New Firms," November 2008, accessed at http://www.kauffman.org/uploadedFiles/Capital_Structure_Decisions_New_Firms.pdf.
[30] Small Business Administration, Office of Advocacy. "Third Quarter 2009: The Economy and Small Business," Quarterly Indicators, November 9, 2009 accessed at http://www.sba.gov/advo/research/sbqel0903.pdf.

In the Milwaukee region, small businesses have seen smaller fluctuations in access to SBA guaranteed loans (Chart 17 and Table 14). In fact, 7(a) loans decreased by 2.7% between 2008 and 2009, but increased a modest 2.1% in 2009 over 2006 levels. Resources have been more constrained for small businesses looking to purchase long-term assets. Receipt of 504 loans in the Milwaukee region dropped by almost 29% between 2006 and 2007 and has remained relatively flat. Despite this drop, the Milwaukee region secures a substantial portion of SBA lending in the state of Wisconsin, with nearly 27% of 7(a) and 504 loans originating in the region in 2009.

Table 14: Milwaukee Metro Small Business Lending

	2006	2007	2008	2009
7(a) Loans	$ 90,529,292	$ 93,856,251	$ 95,043,624	$ 92,463,600
504 Loans	$ 28,129,000	$ 20,037,000	$ 18,895,000	$ 19,393,000
Total SBA Lending in Region	$ 118,658,292	$ 113,893,251	$ 113,938,624	$ 111,856,600
% of Wisconsin's SBA Lending in Milwaukee Metro	28.5%	25.9%	27.7%	26.8%

Source: U.S. Small Business Administration Wisconsin Office, December 2009.

Outputs

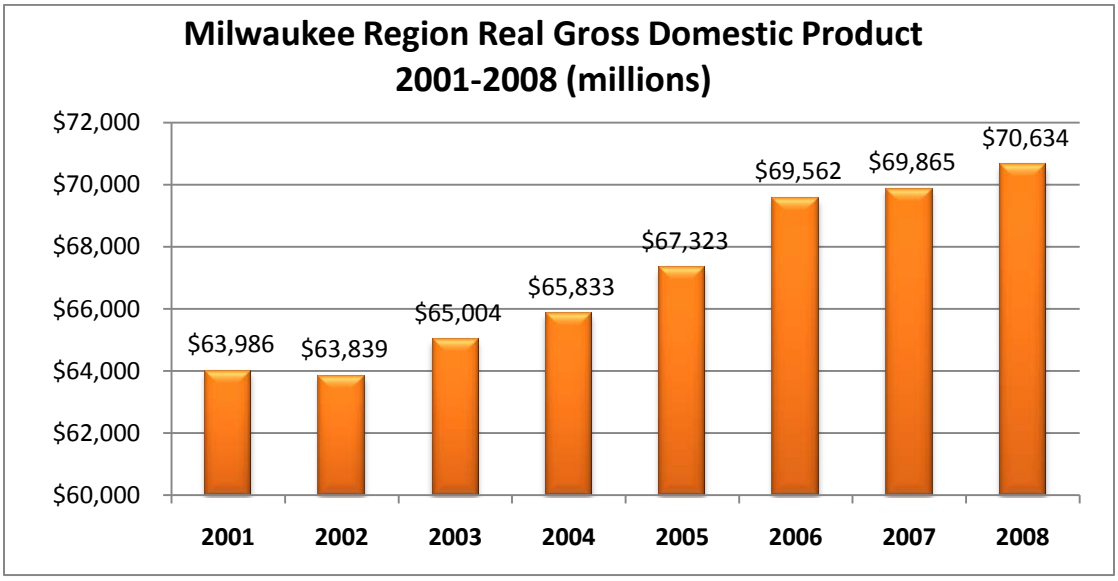
Increasing regional innovation and making the region a more competitive place to do business should improve the region's overall economic health. Consequently, any effort to determine the Milwaukee region's progress in transforming to a knowledge-based economy should consider general economic outputs as well as specific inputs linked to innovation. In this section, we measure changes in productivity, global exports, and prosperity to provide additional insights into the Milwaukee region's move to the knowledge economy and to guide current and future strategies to enhance innovation.

1. Productivity

Regional Trend: ⇧
Comparison to Benchmarks: Average

Real gross domestic product (GDP) in the region climbed by 10 percent between 2001 and 2008 (Chart 18). However, the region's average yearly growth in GDP trailed most of the leader and peer regions and was lower than the growth across all U.S. metro areas (Table 15).

Chart 18



Source: Bureau of Economic Analysis, www.bea.gov. Accessed 9/28/09.

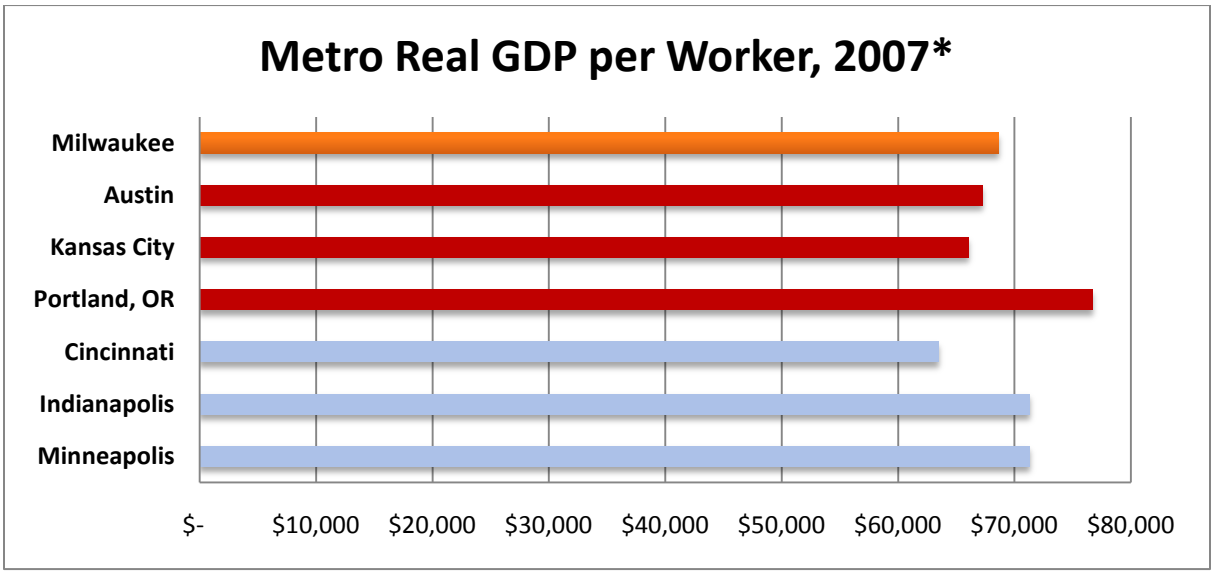
Table 15: Real Gross Domestic Product by MSA

	2001 (millions)	2008 (millions)	GDP Rank 2008	Avg Yearly Growth
Milwaukee	$ 63,986	$ 70,634	7	1.3%
Leader Regions				
Austin	$53,497	$72,415	6	4.4%
Kansas City	$76,457	$86,312	3	1.6%
Portland	$77,181	$105,540	2	4.6%
Peer Regions				
Cincinnati	$75,968	$81,831	4	1.0%
Indianapolis	$71,062	$79,684	5	1.5%
Minneapolis	$142,733	$164,067	1	1.9%
U.S. Metro Portion	$9,046,139	$10,622,056		2.2%

Source: Bureau of Economic Analysis, www.bea.gov. Accessed 9/28/09.

A closer look at regional productivity (output per worker) portrays the Milwaukee region in a more favorable light (Chart 19). Regional productivity measured $68,607 per worker and increased by an average of 1% per year since 2001. The region's productivity exceeds innovation leaders Austin and Kansas City, but trails Portland, which experienced expansive growth through 2007, as well as peer regions Indianapolis and Minneapolis (Chart 20).

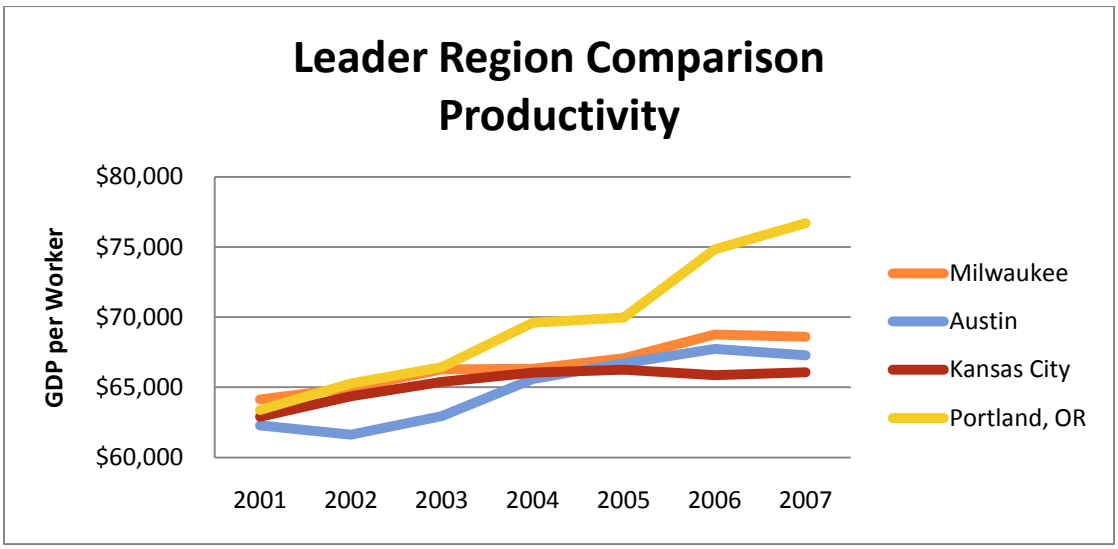
Chart 19



*2007 nonfarm employment is the most recent Local Area Income and Employment data available from the Bureau of Economic Analysis.

Source: Bureau of Economic Analysis, GDP and Local Area Income and Employment Data, www.bea.gov. Accessed 9/28/09.

Chart 20



Source: Bureau of Economic Analysis, GDP and Local Area Income and Employment Data, www.bea.gov. Accessed 9/28/09.

2. *Global Exports*

Regional Trend: 

Comparison to Benchmarks: Unfavorable

Measuring the value of the Milwaukee region's exports provides a snapshot of how well the region's businesses are fairing in the global market and the extent to which the development and sale of innovative products and services are enhancing competitiveness. As seen in Table 16, the Milwaukee region's exports totaled $7.3 billion in 2007, increasing 21% from 2005.

Table 16: Export Value by MSA

	Export Value 2005 (millions)	Export Value 2006 (millions)	Export Value 2007 (millions)	2007 Rank
Milwaukee MSA	$6,019	$6,849	$7,303	6
Leader Regions				
Austin MSA	$7,687	$8,205	$8,429	4
Kansas City MSA	$4,915	$5,682	$6,706	7
Portland MSA	$11,202	$14,581	$15,784	2
Peer Regions				
Cincinnati MSA	$11,192	$12,708	$15,359	3
Indianapolis MSA	$7,301	$7,340	$7,979	5
Minneapolis MSA	$15,938	$17,602	$21,628	1

Source: Bureau of the Census, U.S. Department of Commerce.

Despite this rate of expansion, the Milwaukee region's performance lags several of the peer and innovation leader regions, as indicated in Chart 21. And, perhaps more troubling, Milwaukee places last behind all the leader and peer regions in export value per worker (Table 17).

Chart 21

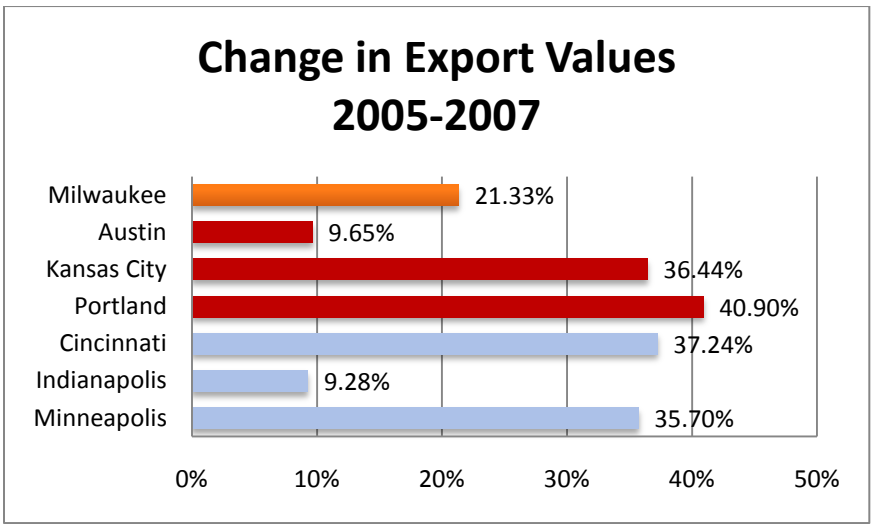


Table 17: Exports Per Private Worker

	2005	2006	2007	2007 Rank
Milwaukee MSA	$8,039	$9,025	$9,615	7
Leader Regions				
Austin MSA	$14,151	$14,364	$13,727	5
Kansas City MSA	$10,467	$11,389	$14,029	4
Portland MSA	$13,241	$16,637	$17,757	1
Peer Regions				
Cincinnati MSA	$9,434	$9,340	$10,095	6
Indianapolis MSA	$13,299	$15,035	$17,235	2
Minneapolis MSA	$12,408	$14,049	$16,869	3

Source: Bureau of the Census, U.S. Department of Commerce and Bureau of Labor Statistics, Current Employment Statistics

3. *Prosperity*

Regional Trend: ⟺
Comparison to Benchmarks: Average

Prosperity, as measured by growth in jobs and personal and median household income, is a mixed bag in the Milwaukee region. As seen in Table 18, the Milwaukee region lost more than 97,000 jobs between 2000 and 2007. Nearly 21% of those losses occurred between 2006 and 2007.

Table 18: MSA Total Employment

	2000	2007	2000-2007 % change	Rank Employment Change	2000 Jobs per 1,000 People	2007 Jobs per 1,000 People	2007 Jobs per 1,000 People Rank
Milwaukee	1,003,125	905,654	-9.7%	6	668	587	3
Leader Regions							
Austin	796,309	833,831	4.7%	1	637	524	6
Kansas City	1,264,696	1,137,875	-10.0%	7	689	574	4
Portland	1,126,805	1,122,051	-0.4%	3	584	508	7
Peer Regions							
Cincinnati	1,230,413	1,145,393	-6.9%	4	612	531	5
Indianapolis	1,028,506	1,032,220	0.4%	2	674	602	2
Minneapolis	2,217,446	2,047,920	-7.6%	5	747	640	1

Source: National Establishment Time Series on Edward Lowe Foundation, www.youreconomy.org and U.S. Census Bureau

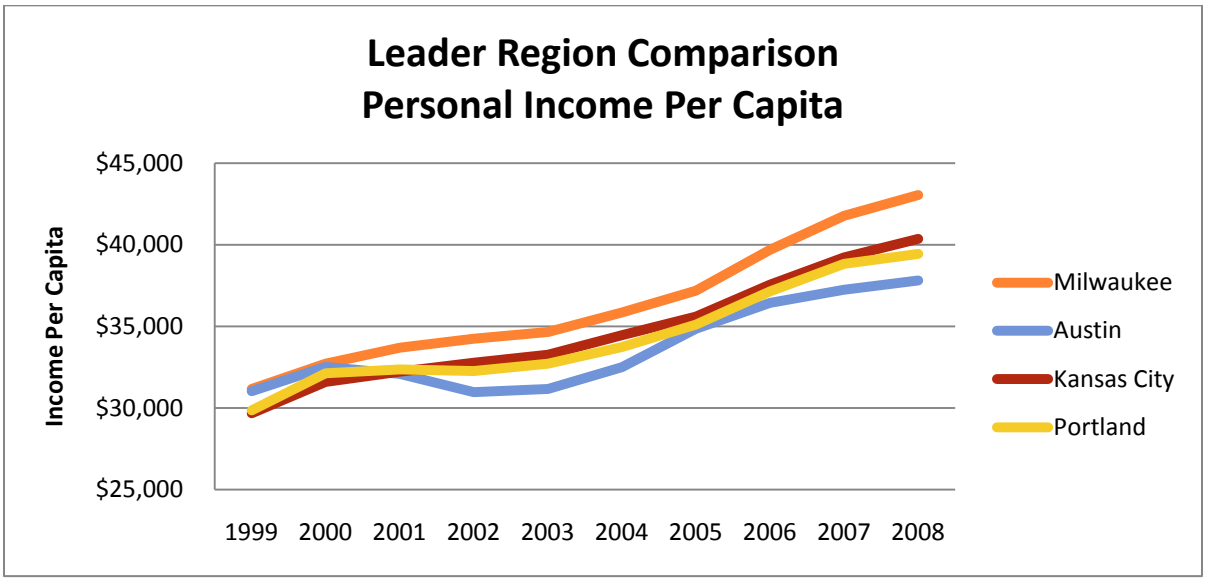
Despite the job losses, the Milwaukee region's per capita personal income levels grew in the years preceding the economic downturn, and the region's growth levels exceeded those in several of the comparison regions (Table 19 and Chart 22).

Table 19: Per Capita Personal Income

	2004	2008	Rank	% Change 2004-2008	Change Rank	Avg Annual Growth
Milwaukee	$35,863	$43,042	2	20.0%	1	4.0%
Leader Regions						
Austin	$32,509	$37,811	7	16.3%	5	3.3%
Kansas City	$34,471	$40,367	3	17.1%	2	3.4%
Portland, OR	$33,738	$39,436	4	16.9%	3	3.4%
Peer Regions						
Cincinnati	$33,933	$38,766	6	14.2%	6	2.8%
Indianapolis	$34,920	$39,318	5	12.6%	7	2.5%
Minneapolis	$41,071	$47,863	1	16.5%	4	3.3%
U.S.	$33,157	$39,582		19.4%		3.9%

Source: Regional Economic Information System, Bureau of Economic Analysis, US Department of Commerce, August 2009, http://www.bea.gov/regional/reis

Chart 22



A look at regional median household income shows a slightly different picture (Table 20). Median household income in the region increased during the first eight years of the decade and was above national levels. However, the region was well behind many of the leader and peer regions, and its average annual growth fell short of all regions except Indianapolis.

Table 20: Regional Median Household Income				
	2000	2008	Rank 2008	Avg Yearly Growth
Milwaukee	$ 45,982	$ 54,386	5	2.0%
Leader Regions				
Austin	$ 49,054	$ 59,221	2	2.3%
Kansas City	$ 45,856	$ 56,458	4	2.6%
Portland, OR	$ 47,169	$ 58,758	3	2.7%
Peer Regions				
Cincinnati	$ 44,858	$ 54,059	6	2.3%
Indianapolis	$ 46,119	$ 53,671	7	1.8%
Minneapolis	$ 54,707	$ 65,862	1	2.3%
National	$ 41,994	$ 52,029		2.7%

Source: U.S. Census Bureau and American Community Survey

The State of Our Region

> *Innovation is not the product of logical thought, although the result is tied to logical structure.*
> ~Albert Einstein

The Milwaukee region's transition to the knowledge-based economy may best be described as a work in progress. With regard to innovation inputs, many regional trends are positive, including growing university R&D spending, higher educational attainment levels, more jobs created by small firms, and more SBIR-STTR awards. Far less promising, however, are the region's negative or flat trends in patent activity, number of scientists and engineers, and knowledge workers per capital.

When compared to six leader and peer regions, the Milwaukee region's performance again is mixed. Milwaukee leads the benchmark regions in availability of skilled and technical workers (74.4 jobs per 1,000), a sometimes overlooked component of the innovation process. On four much more touted innovation indicators—expenditures on university R&D and numbers of scientists and engineers, knowledge workers, and educated immigrants, Milwaukee places in the middle among leader and peer regions. Specific areas in which the need for improvement is evident include:

- Patent activity—Milwaukee ranked 6th with 5.26 patents per 10,000 employees in 2007.
- Educational attainment—30.9% of Milwaukee residents in 2008 held a bachelors degree or higher, placing Milwaukee 6th among the benchmark regions.
- Business dynamics—In 2005-2006, fewer businesses were started in the Milwaukee region than closed in many of the comparison regions.
- Capital formation—Milwaukee captured fewer SBIR-STTR grant awards in 2008 than many of the benchmark regions.

Promoting Regional Innovation

Several regional and statewide initiatives target key assets for spurring innovation. While it is hard to gauge the contribution any one initiative has on the region's *Innovation Indicators,* initiatives such as the ones listed below are drawing attention and attracting resources for building the Milwaukee region's innovation capacity.

Idea Development

- Wisconsin Technology Council and WIN-Milwaukee
- UW-Milwaukee's Research Growth Initiative
- The Southeastern Wisconsin Energy Research Center (a collaborative venture between MSOE, Marquette University, UWM and local businesses)
- Milwaukee Institute (nonprofit supporting collaborative infrastructure to support high technology research)

Talent Development

- FUEL Milwaukee
- The WIRED Initiative and the Regional Workforce Alliance

Entrepreneurship

- BizStarts Milwaukee
- The Kohler Center for Entrepreneurship at Marquette University
- Center for Entrepreneurship at MSOE
- Bostrom Center for Business Competitiveness, Innovation and Entrepreneurship at UW-Milwaukee
- Governor's Business Plan Contest
- Wisconsin Early Stage Symposium
- Wisconsin Entrepreneurs' Network

Capital Formation

- Wisconsin Angel Network
- The Golden Angels Network
- Milwaukee Economic Development Corporation (MEDC)
- State of Wisconsin's angel investor and venture capital tax credits

Improving the Milwaukee region's performance in those areas may prove critical to its economic future and takes on more urgency given the recent economic downturn.

Local leaders have recognized the need to modernize regional economic development programs and help foster innovation.[31] Numerous efforts have materialized in recent years that are focused on improving the region's research and development capacity; building, attracting, and retaining a skilled workforce; and building and supporting entrepreneurial business formation (see side bar). This report does not assess those individual efforts. However, by tracking progress on a set of critical indicators, the innovation index is intended to provide valuable insights into the success of those efforts and potentially suggest the need for new or revised strategies.

Significant groundwork has been laid to grow our region's innovation capacity. But sustaining these efforts requires continued evaluation and assessment to ensure that our economy is moving in the right direction. Just as it takes more than an idea to move an innovation to market, active leadership will be necessary to keep the many innovation-focused efforts working together and producing results.

[31] For example, as a part of initial strategy development for the Milwaukee 7, Lane Brostrom and Louis G. Tornatzky authored —A Innovation Economy Strategy for Metro Milwaukee" in February 2006 which set out several initiatives to increase regional innovation.

Summary of Innovation Indicators in the Milwaukee Region

	Regional Trend	Comparison To Benchmarks
Idea Development		
A. University Research and Development	⇧	Average
B. Industry Patents	⇩	Unfavorable
Regional Talent and Skills		
A. Educational Attainment	⇧	Unfavorable
B. Scientists and Engineers	⇔	Average
C. Knowledge Workers	⇔	Average
D. Skilled and Technical Workers	⇧	Favorable
E. College Educated Foreign Born	⇔	Average
Business Dynamism and Entrepreneurship		
A. **Entrepreneurial Job Growth**	⇧	Average
B. Business Dynamics	⇧	Unfavorable
Capital Formation		
A. **SBIR-STTR Awards**	⇧	Unfavorable
B. Small Business Loans	⇩	n/a
Outputs		
1. Productivity	⇧	Average
2. Global Exports	⇧	Unfavorable
3. Prosperity	⇔	Average

Appendix: Definitions

Scientists and Engineers: Scientists and engineers are valued creators of ideas and sources of innovations. Estimates for this category are a subset of knowledge workers and include Occupational Employment Survey (OES) occupational categories for engineers and physical and life scientists.

Knowledge Workers: Knowledge workers are a broadly defined category which has been characterized in the literature as using information to make specialized decisions in the workplace. In this report, knowledge worker occupations are ones that require at least a 4-year college degree as defined by the Bureau of Labor Statistics *Occupational Projection and Training Data*. Knowledge worker occupations also fall into one of the following occupational categories:

- management
- business professional
- science and engineering
- health professional
- education
- law and social science related professional
- arts and culture professional occupations

Skilled and Technical Workers: While emphasis is increasingly on the acquisition of a four-year college diploma, not all work in the knowledge economy requires a bachelor degree. Middle-skill jobs are ones that require specialized training and education beyond a high school diploma, but less than a four- year college degree. Skilled and technical occupations are positions that require education or training of an Associate's degree, vocational certification, or significant on the job training. Generally, these positions support and interact with knowledge workers, but may also perform other functions to support product development and production processes. With our emphasis on innovation and innovative product development, service occupations are not included in our definition of skilled and technical workers.