NEVADA INDUSTRY AND COMPETITIVENESS ANALYSIS

PRELIMINARY ASSESSMENT & BENCHMARKING

November 14, 2011

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November 15, 2011

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These reports were developed in order to inform the creation of a State Economic Development Plan as mandated by Assembly Bill 449. The 2011 Nevada Legislature passed AB 449, eliminating the Nevada Commission on Economic Development, and creating in its place the Advisory Council on Economic Development and the Nevada Board of Economic Development which is tasked with creating the State's new Economic Development Plan.

The research was commissioned and contracted for by the Nevada Secretary of State, with funding approved the Nevada Legislature's Interim Finance Committee. It provides a situational analysis of Nevada current economic conditions and evaluates a variety of industry sectors, ultimately proposing realistic pursuits for economic growth and diversification as the state formulates its Economic Development Plan.

I look forward to continuing to work with SRI International and to seeing the work herein used to build a stronger, economically viable Nevada.

Sincerely,

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We are indebted to the offices of the Secretary of State and the Nevada Commission on Economic Development for setting up listening sessions and interim presentations with key industry and community leaders in Nevada to inform our research and analysis.

We also wish to thank the many leaders in industry, academia, and government who generously spent time with our team to discuss Nevada's economic conditions and industry opportunities. We appreciate their candor, insights, and deep commitment to economic development in Nevada.

This study was led by Ophelia Yeung and Katherine Johnston of SRI International, and received substantial research and analytical contributions from Decker Ringo, Elizabeth Tennant, Jin Noh, and John Chase.

Finally, the study benefitted tremendously from the guidance and analytical support provided by the Brookings team, led by Mark Muro and Rob Lang, and anchored by Neil Ruiz and Devashree Saha.

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INTRODUCTION

The State of Nevada stands at a critical juncture, chastened by serious economic challenges but in reach of real opportunity. The state's recent economic volatility, its causes, and its impacts have been well-documented and thoroughly discussed over recent months, as state leaders and stakeholders have begun to coalesce on the need to put the state on a sustainable growth path. The strategy and actions to achieve this new course are yet to be determined and require careful, data-informed analysis and strategy-setting. What is clear is that Nevada has considerable economic opportunities, and the assets and potential to harness them to spark an economic renewal.

SRI International has been commissioned by the Nevada Commission for Economic Development, Secretary of State, and Lieutenant Governor to work with the Brookings Institution to conduct rigorous, objective industry research/analysis and to assist in crafting a new economic growth and target industry development agenda for the State of Nevada and its major metro areas. With significant bipartisan agreement in place among state leadership about the need for economic renewal in Nevada, this study is intended to provide a comprehensive, authoritative analysis of the composition, performance, and prospects of Nevada's key and emerging industries, with a particular focus on two critical metropolitan areas: Las Vegas and Reno/Carson City. The analysis will take a data- and market research-driven approach – thereby establishing an objective basis upon which to develop widespread, shared understanding of current economic realities. This analysis, combined with collaborative input from key stakeholders in the public and private sectors, will form the basis for devising an action-oriented strategy to address the deep challenges that Nevada and its metro areas face, and will also provide a foundation of guidance for the new state-level Advisory Council, Board, and Office of Economic Development (currently being formed under the auspices of AB 449).

There have already been a number of notable, broad-based efforts at the state level to assess Nevada's ongoing challenges and to lay out new plans and priorities.[1] This study is by no means a replacement or duplication of those efforts, but rather a complementary effort that aims to support and supplement the work already done by other state stakeholders and leaders in two ways:

1. Provide an in-depth, data-driven focus on the specific economic and industry development needs and opportunities in Nevada, which will directly support this study's conclusions and strategies as well as support the plans and priorities laid out in other recent studies and efforts.

2. Focus on Nevada's two major metropolitan areas (Las Vegas and Reno/Carson City), which account for the large majority of the state's jobs and, as such, will be the key drivers of the state's growth.

[1] Notable studies/strategies that have informed this initiative include: ***Envisioning Nevada's Future: Goals & Strategies for Advancing Our Quality of Life*****,** Nevada Vision Stakeholder Group and Moody's Analytics (September 2010); ***New Nevada Taskforce Report on Initiatives*** (March 2011); ***The Silver Spark for Nevada: Sustainable Innovation Leading a Vital Economic Renaissance***, Nevada Institute for Renewable Energy Commercialization, commissioned by the Nevada Commission on Economic Development (March 2011); and ***Technology Strategy for Nevada***, Battelle Memorial Institute (December 2000).

PRELIMINARY HIGHLIGHTS AND FINDINGS

Through extensive preliminary data analysis and research (combined with a review of other major state studies), the SRI and Brookings team has identified four overarching challenges and goals for the State of Nevada and its metro areas, which will provide an important framework for the analysis conducted throughout this study. The research conducted to date has provided an up-to-date baseline of data for better understanding those goals (and the challenges they address). More importantly, this research has also provided the groundwork for identifying considerable assets and opportunities that the state can build upon to identify new pillars of growth and catalyze innovation, as well as renew and reposition its core industries. Highlights from the research are summarized below.

1. *NEVADA NEEDS TO RESTORE GROWTH AND JOBS*

- Nevada's economy has experienced an extreme boom-bust cycle over the last decade, with both upward and downward economic swings that have exceeded the national average by a factor of 1.5-2.0 or more. In the recent recession, the state has lost nearly 170,000 jobs (from 2007-2011), or about 10% of its total employment base[2] – and 99% of those job losses have been in the Reno/Carson City and Las Vegas metro areas.
- Augmented by the real estate bust, the recent recession and accompanying job losses have manifested themselves in statewide unemployment rates (12.1% in May 2011) that are currently about 40% higher than the national average (8.7%). Poor job prospects have slowed labor force growth in the Reno and Las Vegas regions, and, even more troubling, both metros areas have experienced a population out-migration in recent years (reversing the previous trend of population in-migration).
- Following the recent period of extreme economic volatility and recession, Nevada must restore growth and jobs in a strategic and future-oriented way, especially in order to maintain and improve quality of life for the state's citizens. Given that Nevada's two major metro areas account for around 94% of the state's jobs, pursuing appropriate targets of opportunity in Las Vegas and Reno/Carson City will make great strides towards catalyzing a new growth trajectory for the entire state.

[2] By contrast, total job loss in the United States during the recession (2007-2011) has represented only 3.5% of total employment.

2. *NEVADA NEEDS TO DIVERSIFY ITS ECONOMY*

- Nevada's economy is much more oriented toward service-sector industries than the national average. In particular, consumption-oriented industries (*construction/real estate*, *tourism/gaming*, and *retail trade*) have traditionally been the core drivers of growth in Nevada's economy, and they currently account for about 47% of all jobs in the state (as compared to only 31% of all jobs nationally). Only 19% of jobs in the State of Nevada are in knowledge- & technology-based industries (as compared to 24% of all jobs nationally).
- While traditional strengths in *construction/real estate*, *tourism/gaming*, and *retail* have served the state well in periods of economic expansion, they have also made the state more susceptible to extreme volatility and recession. Nevada's three consumption-based industries accounted for half of the state's employment growth during the period of economic expansion (2001-2007), but accounted for 83% of the state's job losses during the recent recession (2007-2011).
- In looking to the future, Nevada needs to support development of a more diversified economy, in order to spur long-term growth and provide a cushion against future economic cycles.

3. *NEVADA NEEDS TO INNOVATE IN BOTH EMERGING AND TRADITIONAL INDUSTRIES*

- Nevada's reliance on its core consumption-based industries has meant that its innovation-intensive industries have not always received adequate attention and support, as borne out by the state's relatively weak position in a number of innovation activities. Nevada significantly lags the national average for every indicator of innovation and R&D used in this study. The innovation activities that are taking place in the state are heavily concentrated in the Reno metro area.
- Nevada does have some solid, emerging foundations of innovation activities to build upon for future growth, and many of these strengths are grounded in the state's traditional natural resource-based industries and assets. In particular:
    - The Reno metro area has especially strong research resources and capacity in geosciences and environmental sciences. The University of Nevada, Reno (UNR) has an above average (and growing) availability of lab space to support research in physical sciences-related fields, and also produces an above-average number of doctoral degrees in geosciences. The Reno region also has above average rates of university R&D spending and scientific publishing activity (as compared to national per capita averages).
    - In general, the Las Vegas metro area lags in innovation activities, but the region does have some bright spots, including strong research competencies in environmental sciences, geosciences, and water. The University of Nevada, Las Vegas (UNLV) is one of the state's

leading producers of scientific publications, with significant concentrations of publications in water resources, geology, and environmental sciences/ecology. UNLV and the Nevada Cancer Institute have strong laboratory space dedicated to biological and biomedical sciences research; UNLV also has a significant level of engineering-related lab space.

- Technology commercialization - turning innovative ideas into marketable products and services that create companies and jobs – is an essential aspect of supporting innovation-based growth. Nevada's performance on commercialization activities is mixed:
  - Compared to institutions in peer metro areas, the University of Nevada, Reno (UNR) is relatively strong in technology commercialization activities, with high levels of invention disclosures and patents, as well as strong licensing revenues. UNR could be more effective with transferring inventions into the commercial space, though. The university executed licenses on only two inventions in 2009, and it has not reported the formation of any startup companies since 2004.
  - The University of Nevada, Las Vegas (UNLV) is very weak on technology commercialization and lags institutions in all of its peer metro areas. Stepping up efforts to improve the level of R&D funding, technology commercialization, and collaboration with industry players at UNLV would help turn the university's pockets of research strengths into tangible activities that would support regional economic growth.
- Compared to peer metro areas, the level of higher education attainment is average in Reno and below average in Las Vegas; however, the share of the population with a post-secondary degree has been growing in both regions. Nevada will need to continue to increase the skill level of its workforce to become competitive in today and tomorrow's increasingly knowledge-based economy.
- Nevada's level of investment in higher education is relatively low compared to other states of a similar size, and it is the only state of over 2 million people that is not home to a top-tier Carnegie-ranked research university.
- Going forward, stepping up policies and programs that strengthen Nevada's innovation ecosystem not only can catalyze new emerging industries, but may also spark renewal and reinvention of established industries.

4. *NEVADA HAS AN OPPORTUNITY TO BUILD NEW PILLARS OF ECONOMIC GROWTH*

- Nevada's economy is already starting to recover from the recent downturn, and future growth projections for the state are solid (and well above national averages). However, the extremely high growth figures achieved in the last decade are no longer viable, and the state's traditional industries can no longer serve reliably as the primary drivers of job growth and expansion.
- While Nevada's economy continues to be dominated by consumption-oriented sectors, job gains in the coming years are likely to come from a broad cross-section of industries. A number of innovation-intensive industries have shown the highest resilience and positive growth in Nevada during the recent period of economic recession, including: *Energy & Environment*, *IT Services*, *Financial Services*, and *Medicine & Life Sciences*.
- The State of Nevada and its metro areas need to think strategically about how to build off of traditional economic strengths and pivot toward new high-potential drivers of growth. This can be accomplished by: 1) renewing and repositioning traditional/core industries by looking for "innovation space" that can catalyze strategic growth opportunities; and 2) cultivating emerging knowledge- and innovation-based industries that will diversify and strengthen the state's economy.
- A number of factors are critical in identifying future high-potential industry development opportunities in Nevada – these include industry growth trends, critical mass (employment concentration), job quality, and industry "exportability" (i.e., being able to sell products/services in markets beyond the local region). Based on these factors:
  - Reno/Carson City shows strengths in *Financial* and *Business Services*, *IT services*, *Energy & Environment*, and *Medicine & Life Sciences*. More "traditional" industries also offer strong potential for growth, including *Transportation & Logistics*, *Advanced Manufacturing*, and *Materials/Mining*.
  - Industry strengths in the Las Vegas metro area include: *IT Services*, *Aerospace & Defense*, *Medicine & Life Sciences*, and *Financial* and *Business Services*. *Energy & Environment* and *Transportation & Logistics* have also demonstrated strong potential in the region.
  - Across Nevada, the state's "core" industries of *Tourism & Gaming* and *Construction & Real Estate* will continue to serve as important employers and drivers in the state economy, and these traditional industries can also provide strategic opportunities for new growth and job creation over the near- and long-term.

ABOUT THIS EXECUTIVE SUMMARY REPORT

This executive summary report, *Nevada Industry and Competitiveness Analysis – Preliminary Findings Executive Summary*, presents a summary of the SRI and Brookings research team's initial data analysis and findings for several key components of this study:

Analysis Included in this Report

- **Industry Cluster Analysis:** Comprehensive data analysis was conducted for twenty-five industry clusters (as well as their comprising sub-clusters) that comprise the economy of the State of Nevada, as well as the Reno/Carson City and Las Vegas metro areas. The analysis utilized an Economic Modeling Specialists Inc. (EMSI) dataset that provides NAICS-based industry employment for the time period 2001-2016, and it provides a detailed picture of the state's and metro areas' historical and projected economic and industry growth trends.[3]
- **Innovation Analysis:** Innovation is the development of new ideas, products, and processes that create value for customers or citizens. Supporting innovation and promoting the development and commercialization of new knowledge requires significant support from public and private research institutions, as well as a robust entrepreneurial environment. The innovation analysis examined two categories of innovation indicators – innovation inputs and innovation outputs.
- **Benchmarking Analysis:** To illuminate competitive strengths and weaknesses in the Reno and Las Vegas metropolitan areas, a benchmarking analysis was conducted to compare the two cities with a set of "peer" benchmark metropolitan areas. "Peer" cities were selected for their similarities in size, growth rates, industrial composition, and unique industry activity. The benchmark analysis covered four foundational areas of regional competitiveness: Human Investment, Innovation Resources, Globalization & Vitality, and Infrastructure.

This report is an early-stage presentation of initial findings gleaned only from the desk research portion of the study. The next phase is to gather extensive stakeholder inputs and insights during a series of focus groups to be held with industry members and state leaders in the Las Vegas, Reno, and Carson City metro areas. These sessions will guide the next stage of research, eventually building toward the recommendation of strategic target industries for the Las Vegas and Reno/Carson City metro areas, and initiatives and action steps to strengthen and develop those industries.

[3] The EMSI dataset used for this analysis aggregates data from multiple federal/state government datasets, and it includes labor categories that are not typically included in standard government data (e.g., self-employed/sole proprietors, commission-based workers, military/armed forces, state/local government workers, agricultural workers, etc). Therefore, the state and regional employment figures shown in this report may be higher than the figures shown in other publicly-available datasets.

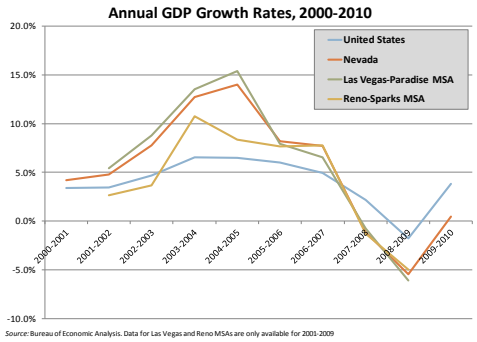
STATE-LEVEL ECONOMIC CONTEXT FOR THIS STUDY

There is already a fairly broad consensus among state leaders about the long-term issues and challenges currently facing the State of Nevada and its economy. These issues have been well-discussed in a number of recent state-level reports, and they are not new information for most state stakeholders. The purpose of this section is to synthesize and document a number of critical economic realities in the State of Nevada. The broader economic issues outlined here will set the context for and shape the recommendations made in this study, which particularly focuses on the state's major metro areas of Las Vegas and Reno/Carson City.

Based on an assessment of recent economic and industry data, as well as a review of the analysis and conclusions drawn in other recent state studies, the SRI and Brookings team have identified four major challenges currently facing the State of Nevada:

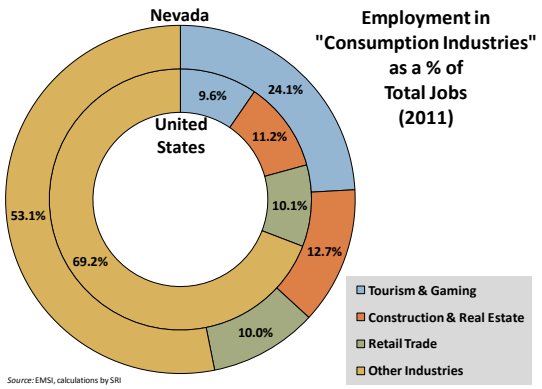
NEVADA'S ECONOMY IS EXTREMELY VOLATILE. THE STATE HAS RECENTLY EXPERIENCED A MASSIVE ECONOMIC SLOWDOWN AND HAS FARED SIGNIFICANTLY WORSE THAN THE NATIONAL AVERAGE FOR JOB LOSSES, UNEMPLOYMENT, AND REAL ESTATE STRUGGLES.

Nevada's economy has experienced an extreme boom-bust cycle over the last decade. From 2001-2007, the state's economic growth rate (as measured by year-on-year GDP growth) ranged from 5% to 14%, ranking it among the top ten fastest-growing states in the nation each year. Once hit by the recession in 2007, however, Nevada's economy plummeted precipitously, ranking it among the bottom three states in the nation for economic growth over the last few years. In both boom and bust cycles, Nevada's growth rates have typically exceeded the national average by a factor of 1.5-2.0 or more.



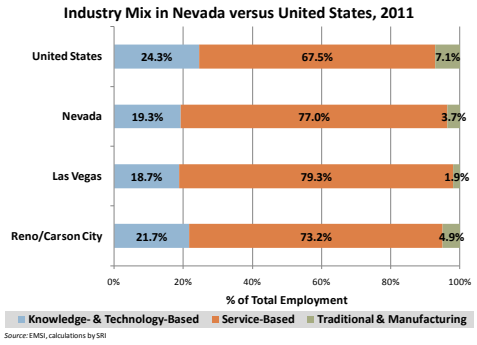
NEVADA'S LACK OF ECONOMIC DIVERSITY AND DEPENDENCE ON CONSUMPTION BASED INDUSTRIES HAS CONTRIBUTED TO ITS ECONOMIC VOLATILITY.

Nevada's economy is heavily dominated by consumption-oriented industries, which are heavily influenced by consumer spending patterns and disposable income. *Construction/Real Estate*, *Tourism/Gaming*, and *Retail Trade* currently account for about 47% of all jobs in the state. These industries accounted for half of the state's employment growth during the economic expansion (2001-2007), but accounted for 83% of the state's job losses during the recession (2007-2011).



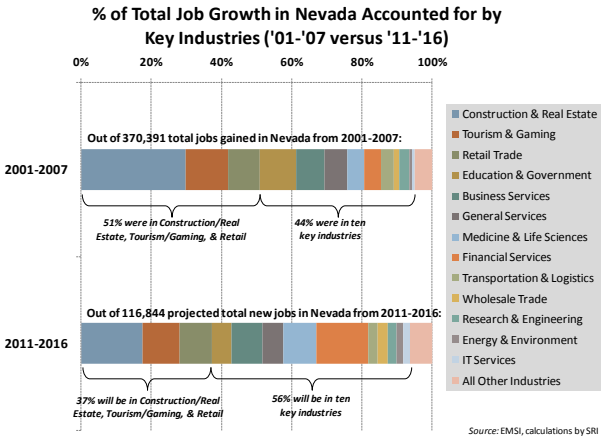
NEVADA'S RELIANCE ON ITS CORE CONSUMPTION BASED INDUSTRIES HAS MEANT THAT CRITICAL KNOWLEDGE AND TECHNOLOGY BASED SECTORS HAVE NOT ALWAYS RECEIVED THE SUPPORT AND ATTENTION THAT THEY NEED TO FLOURISH.

Nevada lags the national average on every indicator of innovation and R&D activity included in this study. Nevada's lagging innovation activity is likely intertwined with the nature of its dominant industries, which do not typically attain competitive advantage through R&D investments. About 19% of jobs in the State of Nevada are in *knowledge- & technology-based industries* (as compared to 24% nationwide). The state's economy continues to be heavily weighted toward employment in the lower-skill *service-based* sectors, even in spite of the recent massive job losses. There are, however, some strengths to build upon – including strong R&D activity in fields related to environmental sciences and geosciences, as well as potential innovative strengths in core industries such as gaming and mining.



NEVADA'S ECONOMY WILL RECOVER AND GROW IN THE COMING YEARS, BUT THE STATE'S TRADITIONAL CORE INDUSTRIES NEED TO BE COMPLEMENTED BY NEWLY EMERGING INDUSTRIES TO DRIVE FUTURE GROWTH.

Future projections for Nevada's economy are solid. Employment growth is expected to resume this year (at a projected annual rate of 1.55% from 2011-2016), and these growth projections exceed the national average (1.24% annually over the same timeframe). However, Nevada's future growth is not likely to look like it did during the previous period of expansion. From 2001-2007, the state's dominant consumption-oriented industries accounted for *over 50% of all job growth*; during the coming five years, Nevada is projected to add nearly 117,000 jobs, but the consumption-oriented industries will account for *only 37% of that growth*. Future job growth will likely be driven by a wide cross-section of industries – notably, industries such as *Financial Services*, *Medicine & Life Sciences*, *Business Services*. As state leaders think about building a more robust economy for the future, they can look to these and other industries as potential future engines for growth and innovation and as new pillars for economic development.



STATE OF NEVADA – *PRELIMINARY DATA ANALYSIS*

INDUSTRY CLUSTER ANALYSIS: STATE OF NEVADA

The State of Nevada has experienced a dramatic boom-and-bust cycle in employment over the past decade and presently employs over 1.4 million workers (94% of which are within the metropolitan areas of Las Vegas and Reno/Carson City). Industry cluster characteristics and growth trajectories are illustrated by the bubble chart on the following page, and key findings are highlighted below:

INDUSTRY MIX: Nevada's economy is heavily weighted toward service sectors. *Service-based industries* comprise 77% of all employment in the State of Nevada, compared to 68% in the United States. K*nowledge- & technology-based industries* (19% of jobs in Nevada, versus 24% of jobs in the U.S.) have displayed the least volatility over the past decade and have the strongest future growth projections. *Traditional & manufacturing industries* represent only 4% of jobs in Nevada.

LEADING EMPLOYERS: *Tourism & Gaming* is by far the largest industry; with 351,808 jobs, this cluster alone accounts for 24% of total employment in the state. *Tourism & Gaming* is followed in size by *Construction & Real Estate*, *Education & Government, Retail Trade,* and *Business Services* (which together account for 66% of statewide employment).

EMPLOYMENT CONCENTRATION: *Tourism & Gaming* and *Aerospace & Defense* stand out as being twice as concentrated in the State of Nevada as in the United States overall. *Construction & Real Estate*, *Financial Services*, *Transportation & Logistics Services*, *Materials & Chemicals*, and *Business Services* also have employment concentrations in Nevada that are higher than the national average.

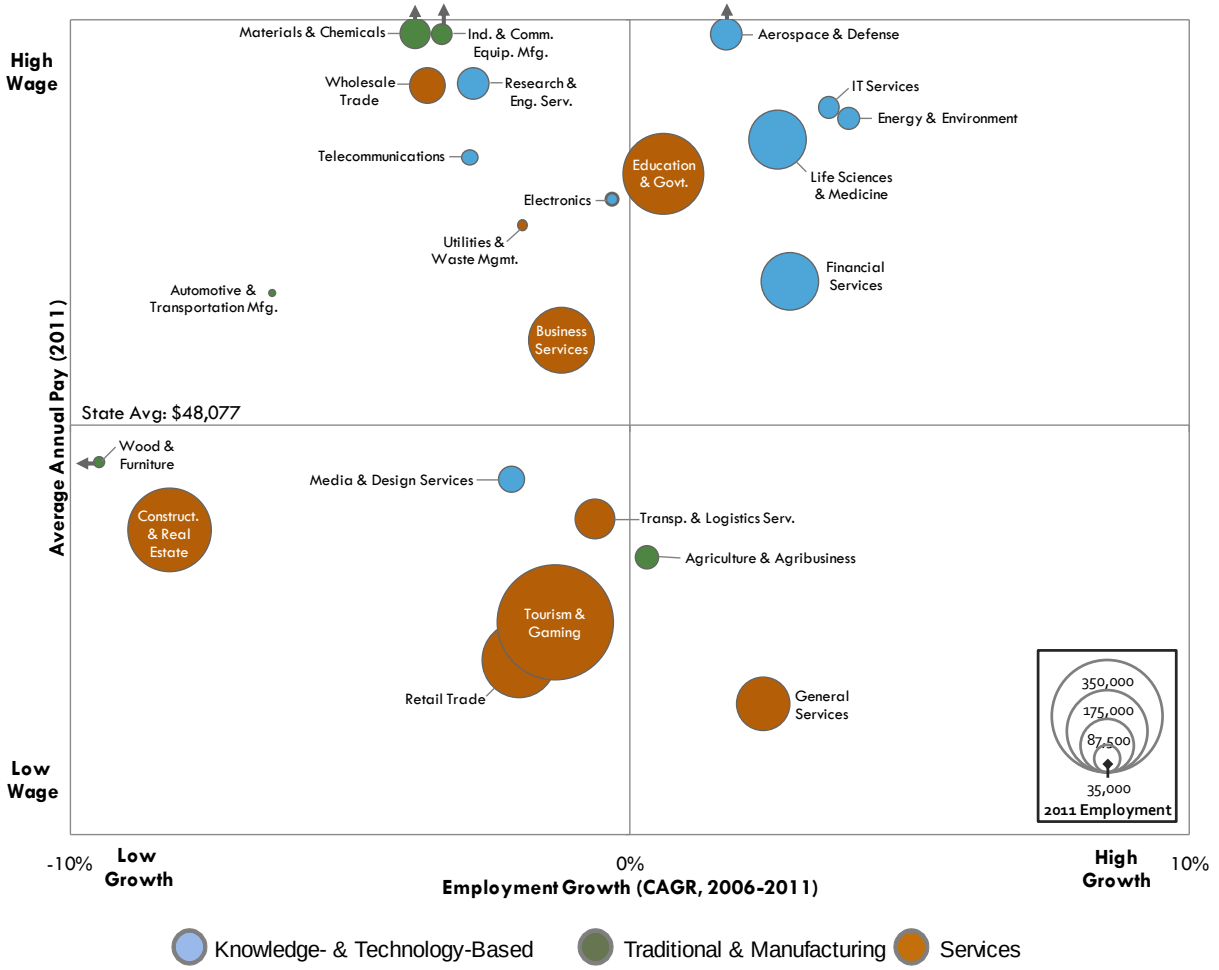
EMPLOYMENT GROWTH RATES: Only nine of the twenty-five industry clusters in Nevada have experienced positive employment growth rates over the past five years. The industry clusters with the highest growth rates during this (2006-2011) period were *Energy & Environment*, *IT Services*, *Financial Services*, and *Medicine & Life Sciences* – all innovation-intensive industries.

Nevada Industry Supersectors in Q2 2011

Industry Segment	2011 Total Employment*	Average Annual % Employment Growth (2006 2011) Nevada	(2006 2011) U.S.	*Predicted* (2011 2016) Nevada	*Predicted* (2011 2016) U.S.	2011 *National* Location Quotient	2010 # of Establishments	2011 Average Annual Pay
Knowledge- & Technology-Based	281,641	1.59%	1.41%	2.57%	1.88%	0.795	18,931	$64,394
Service-Based	1,123,358	-2.36%	-0.58%	1.29%	1.22%	1.141	51,749	$43,066
Traditional & Manuf.	53,750	-3.75%	-2.97%	1.65%	-0.92%	0.520	2,158	$67,216
Total Economy	**1,459,214**	**-1.72%**	**-0.28%**	**1.55%**	**1.24%**	**NA**	**73,080**	**$48,077**

** Figures do not include industries or NAICS codes with <10 employees, so actual employment is slightly higher than the figures shown.*
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

Overview of Nevada Industry Clusters, Q2 2011



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the employment size for that cluster in Q2 2011.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
- The horizontal axis represents employment growth expressed as a compound annual growth rate (CAGR) from 2006 to 2011. Industry clusters falling to the right of the midpoint have a positive employment growth rate, and industry clusters falling to the left of the midpoint have a negative employment growth rate.
- The vertical axis represents average annual pay in Q2 2011. Industries falling above the midpoint have an average annual pay that is greater than the overall average for Nevada ($48,077), and those falling below the midpoint have average annual pay levels falling below the state average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth (e.g., *Construction & Real Estate*, *Retail Trade*).

INNOVATION ANALYSIS: STATE OF NEVADA

The State of Nevada lags the rest of the United States in most measures of innovation inputs and outputs, but shows some bright spots in fields such as environmental sciences and geology. Key innovation indicators are summarized below:

- Overall, Nevada produces a relatively low number of doctorate degrees, but it has a high concentration of psychology and geoscience doctorates.
- There is low overall availability of research facilities in the state, but higher than average availability of facilities to support research in *Physical Sciences – atmospheric, earth, and geological sciences, meteorology and oceanography* and *Physical Sciences – astronomy, astrophysics, chemistry, and physics*. Lab space has been growing rapidly in the state.
- Total per capita federal R&D spending in Nevada is less than one-third of the national average, but Nevada receives higher than average R&D spending from the Department of Energy and the Environmental Protection Agency. Nevada's universities are heavily reliant on the federal government for their R&D funding – the federal government supports 68% of all academic R&D in Nevada, versus 59% nationally.
- Nevada receives relatively few National Science Foundation (NSF) awards, but receives a higher than average number of geosciences and polar research NSF awards. Scientific publications in Nevada reflect this trend, with a high location quotient in fields such as *Environmental Sciences Ecology*, *Geology*, *Meteorology Atmospheric Sciences*, and *Water Resources*.
- Nevada rates well below average for venture capital investments, receiving only 0.2% of all U.S. venture capital investments from 2005-2010.

State of Nevada Innovation Analysis Summary

	Nevada		United States	
Innovation Inputs	***Indicator Value***	***Per Capita***	***Indicator Value***	***Per Capita***
Earned Doctorates (2006-2009)	660	2.52 / 10,000 people	192,072	6.35 / 10,000 people
S&E Research Space (2009)	1,115,245 ft^2	0.42 ft^2	213,787,532 ft^2	0.70 ft^2
Federal R&D Funding ($000s) (2007)	$298,924	$114.92	$111,428,438	$369.91
University R&D Spending ($000s) (2009)	$182,016	$67.80	$54,935,457	$179.08
NSF Awards (2006-2010)	245	0.93 / 10,000 people	60,628	2.00 / 10,000 people
SBIR/STTR Awards (2006-2010)	61	0.23 / 10,000 people	25,570	0.84 / 10,000 people
Venture Capital Investment ($000s) (annual avg., 2005-2010)	$38,832	$0.014	$25,083,946	$0.082
Innovation Outputs	***Indicator Value***	***Per Capita***	***Indicator Value***	***Per Capita***
Scientific Publications (2009-2010)	2,259	9.39 / 10,000 people	566,468	18.41 / 10,000 people
Patents (2006-2010)	2,006	7.62 / 10,000 people	437,025	14.38 / 10,000 people

RENO METRO AREA – *PRELIMINARY DATA ANALYSIS*

INDUSTRY CLUSTER ANALYSIS: RENO/CARSON CITY METRO AREA

Current employment in Reno/Carson city is 332,029 workers, down significantly from 376,442 workers in 2007 – illustrating the exaggerated boom-and-bust cycle in employment over the past decade in Reno/Carson City (as compared to national averages). Industry cluster characteristics and growth trajectories are illustrated by the bubble chart on the following page, and key findings are highlighted below:

INDUSTRY MIX: The Reno/Carson City economy is largely dominated by *service-based industries*, with over 73% of jobs in those sectors. Roughly 22% of jobs in Reno/Carson City are in *knowledge- & technology-based industries* and only 5% of jobs are in *traditional & manufacturing industries*.

LEADING EMPLOYERS: *Tourism & Gaming* and *Education & Government* are the largest employer clusters, followed by *Construction & Real Estate, Retail Trade,* and *Business Services*. These five clusters account for over 200,000 jobs, or 60% of total employment in the region.

EMPLOYMENT CONCENTRATION: Eight of the region's clusters have concentration ratios that are above the national average: *Tourism & Gaming*; *Industrial & Commercial Equipment Manufacturing*; *Transportation & Logistics Services*; *Electronics*; *Financial Services*; *Construction & Real Estate*; *Aerospace & Defense*; and *Business Services*.

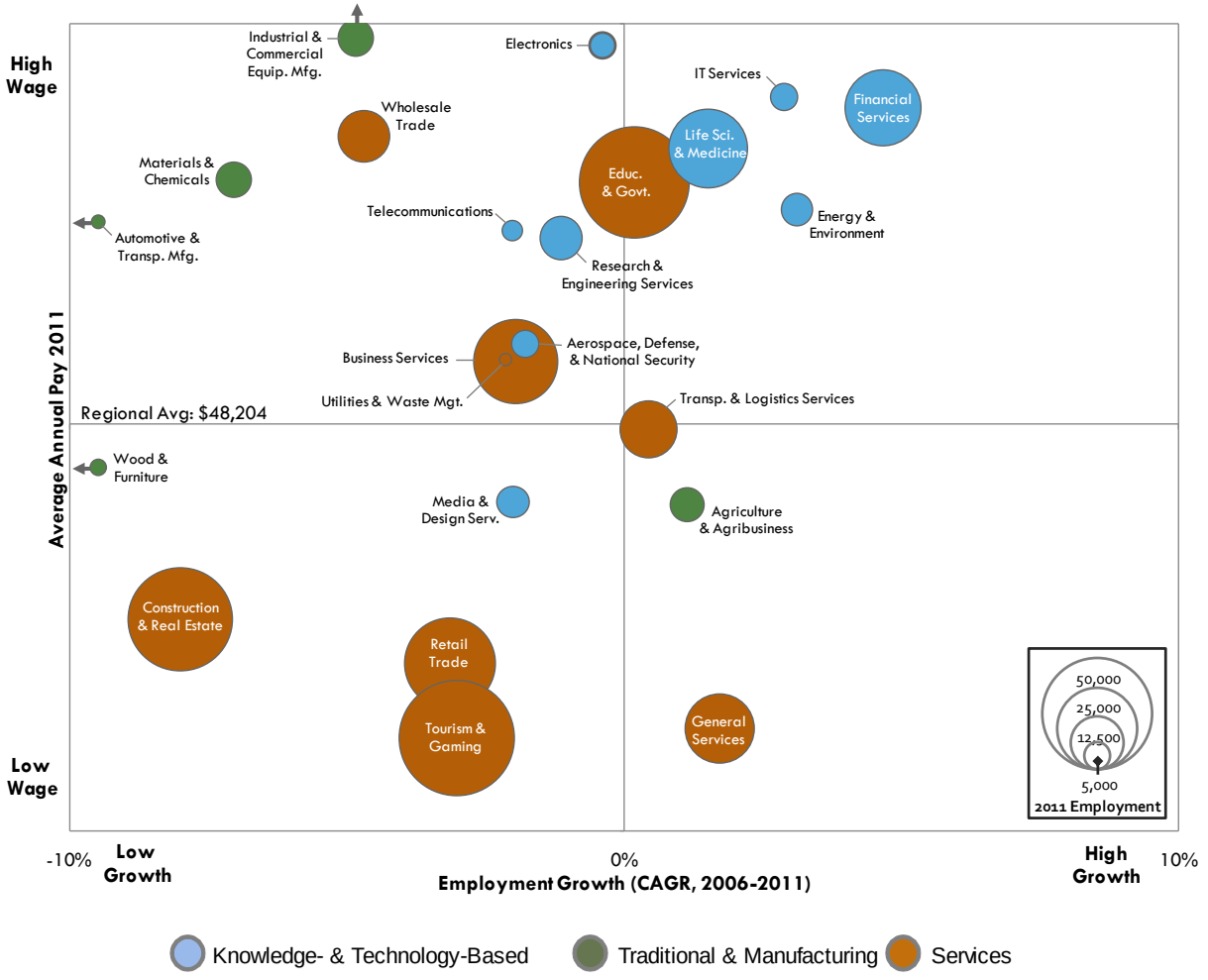
EMPLOYMENT GROWTH RATES: Only nine out of the twenty-five industry clusters in Reno/Carson City have experienced positive employment growth rates in recent years (2006-2011), with the highest growth rates in *Financial Services* (4.7% CAGR), *Energy & Environment* (3.1%), and *IT Services* (2.9%).

Reno/Carson City Industry Supersectors in Q2 2011

Industry Segment	2011 Total Employment*	Average Annual % Employment Growth (2006 2011) Reno/ Carson City	(2006 2011) U.S.	*Predicted* (2011 2016) Reno/ Carson City	*Predicted* (2011 2016) U.S.	2011 *National* Location Quotient	2010 # of Establish ments	2011 Average Annual Pay
Knowledge- & Technology Based	72,077	1.73%	1.49%	2.58%	1.97%	0.894	4,778	$65,690
Service-Based	242,899	-2.95%	-0.58%	1.12%	1.22%	1.085	13,691	$42,112
Traditional & Manuf.	16,417	-4.93%	-2.97%	1.21%	-0.92%	0.698	707	$61,182
Total Economy	**332,029**	**-2.14%**	**-0.28%**	**1.45%**	**1.24%**	**NA**	**19,434**	**$48,204**

** Figures do not include industries or NAICS codes with <10 employees, so actual employment is slightly higher than the figures shown.*
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

Overview of Reno/Carson City Industry Clusters, Q2 2011



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the employment size for that cluster in Q2 2011.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
- The horizontal axis represents employment growth expressed as a compound annual growth rate (CAGR) from 2006 to 2011. Industry clusters falling to the right of the midpoint have a positive employment growth rate, and industry clusters falling to the left of the midpoint have a negative employment growth rate.
- The vertical axis represents average annual pay in Q2 2011. Industries falling above the midpoint have an average annual pay that is greater than the overall average for Reno/Carson City ($48,204), and those falling below the midpoint have average annual pay levels falling below the regional average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth (e.g., *Construction & Real Estate*, *Retail Trade*).

INNOVATION ANALYSIS: RENO METRO AREA

While the State of Nevada lags the rest of the United States in most innovation input and output measures, the Reno metro area is home to the majority of innovation activities in the state and shows strengths in fields such as environmental sciences and geology. Key innovation indicators are summarized below:

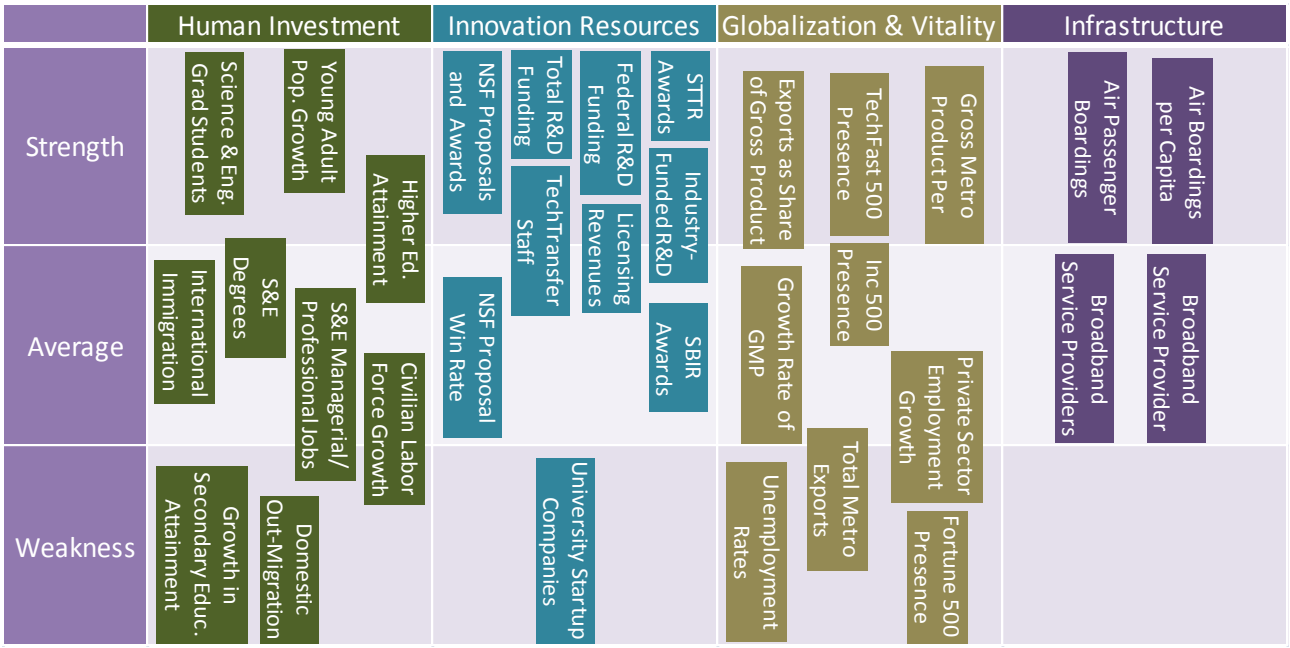
- Reno produces more than half of Nevada's doctoral degrees, including most of the state's life sciences, psychology, and geosciences doctoral degrees. Reno also accounts for 78% of the state's total academic R&D funding.
- While there is low overall availability of research facilities in Nevada, Reno is home to three-quarters of all laboratory space in the state. The University of Nevada, Reno reported an almost 36% increase in laboratory facilities between 2007 and 2009, with the most significant addition in lab space for *Physical Sciences – astronomy, astrophysics, chemistry, and physics*. Reno is also home to nearly all of Nevada's laboratory facilities related to agricultural and natural resources and physical sciences such as atmospheric, geological, meteorology, astronomy, and physics.
- Reno is home to two of Nevada's leading recipients of NSF awards, the University of Nevada, Reno and the Desert Research Institute, which together account for 66% of all NSF awards in the state.
- Reno-area firms received 46 SBIR/STTR awards from 2006 to 2010, 75% of all awards in Nevada during this time period. Notable SBIR/STTR recipients include: Advanced Materials & Devices, Inc.; Digital Solid State Propulsion LLC; Opticomp Corp.; and Software & Engineering Assoc., Inc.
- Scientific publication activity in Reno is heavily concentrated in fields related to environmental sciences and geology. On a per capita basis, scientific publishing activity in Reno is well above both the state average and national averages.

Reno Innovation Analysis Summary

Innovation Inputs	*Reno*	*Nevada*	*United States*	*Comparison*
Earned Doctorates (2006-2009)	377	660	192,072	57% of NV total in Reno
Laboratory Space (2009)	841,804 ft^2	1,115,245 ft^2	213,787,532 ft^2	75% of NV facilities in Reno
University R&D Spending ($000s) (2009)	$142,868	$182,016	$54,935,457	$248 per capita in Reno vs. $68 for the state
NSF Awards (2006-2010)	176	245	60,628	72% of NV awards in Reno
SBIR/STTR Awards (2006-2010)	46	61	25,570	75% of NV awards in Reno
Innovation Outputs	***Reno***	***Nevada***	***United States***	***Comparison***
Scientific Publications (2009-2010)	1,372	2,529	566,468	Reno produces 54% of NV total High concentration of environmental science and meteorology/geology publications

BENCHMARKING ANALYSIS: RENO METRO AREA

The graphic below summarizes how Reno ranks among seven peer benchmark cities for a number of key indicators of economic competitiveness.[4] Reno shows strong performance in the **Innovation Resources** and **Infrastructure** categories. Reno's performance is mixed, though, in the categories of **Human Investment** and **Globalization & Vitality**. Reno leads the benchmark regions for a few indicators in these categories, but several measurements suggest that the city has room to improve.



[4] The peer/benchmark group of cities for Reno includes: Atlantic City-Hammonton, NJ; Ogden-Clearfield, UT; Boise City-Nampa, ID; Salinas, CA; Colorado Springs, CO; Santa Barbara-Santa Maria-Goleta, CA; and Naples-Marco Island, FL.

LAS VEGAS METRO AREA – *PRELIMINARY DATA ANALYSIS*

INDUSTRY CLUSTER ANALYSIS: LAS VEGAS METRO AREA

Las Vegas's economy experienced dramatic job growth during the economic expansion from 2002-2007 (5.54% CAGR), followed by a major contraction during the 2007-2009 recession (-4.20% CAGR), from which it has yet to recover (-1.3% CAGR from 2009-2011). Las Vegas's 49,208 establishments currently employ 1,032,847 workers. Industry cluster characteristics and growth trajectories are illustrated by the bubble chart on the following page, and key findings are highlighted below:

INDUSTRY MIX: *Service-based industries* make up 79% of total employment in Las Vegas, and many of the region's largest industry clusters fall within this segment. Only 19% of Las Vegas's jobs are in *knowledge- & technology-based industries* (compared to 25% nationally), and only 2% are in *traditional & manufacturing industries* (compared to 7% nationally).

LEADING EMPLOYERS: *Tourism & Gaming* is by far the largest industry cluster (by employment) in Las Vegas, comprising 28% of all jobs, with 287,233 employees. *Tourism & Gaming* is followed by *Construction & Real Estate*, *Education & Government, Retail Trade,* and *Business Services* (together comprising 69% of all jobs in Las Vegas).

EMPLOYMENT CONCENTRATION: Six of the region's clusters are more concentrated than the national average: *Tourism & Gaming*, *Aerospace & Defense*, *Construction & Real Estate*, *Financial Services*, *Business Services*, and *Retail Trade*. Among these, *Tourism & Gaming* and *Aerospace & Defense* stand out as having unusually high concentration ratios (both are more than 2.5 times the average U.S. concentration).

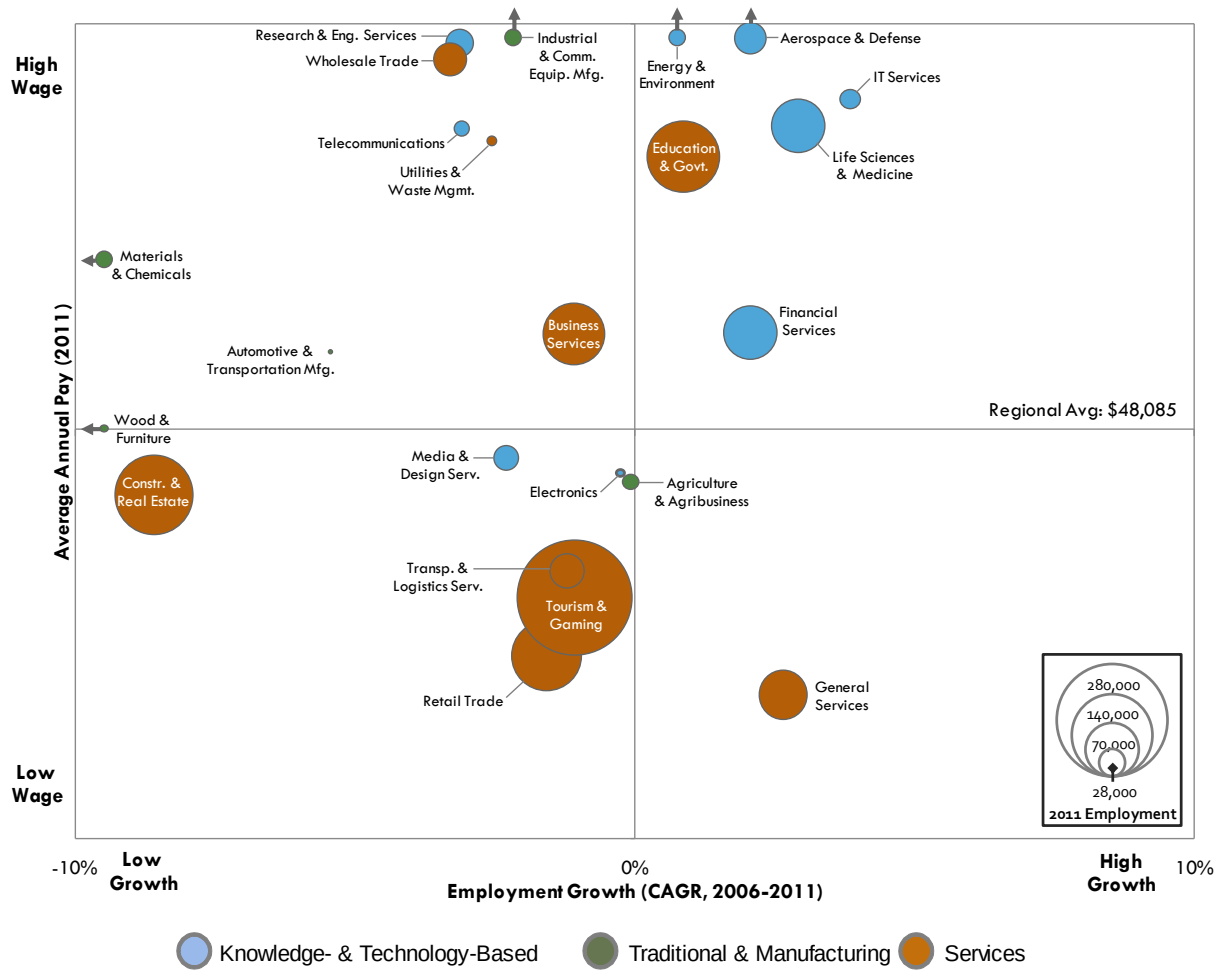
EMPLOYMENT GROWTH RATES: Eight industry clusters in Las Vegas have experienced positive employment growth rates over the past five years (2006-2011), led by *IT Services* (3.9% CAGR), *Medicine & Life Sciences* (2.9%), and *General Services* (2.7%).

Las Vegas Industry Supersectors in Q2 2011

Industry Segment	2011 Total Employment*	Average Annual % Employment Growth (2006 2011) Las Vegas	(2006 2011) U.S.	*Predicted* (2011 2016) Las Vegas	*Predicted* (2011 2016) U.S.	2011 *National* Location Quotient	2010 # of Establishments	2011 Average Annual Pay
Knowledge- & Technology-Based	193,509	1.33%	1.49%	2.51%	1.97%	0.772	13,293	$64,734
Service-Based	819,328	-2.29%	-0.58%	1.31%	1.22%	1.176	34,753	$43,779
Traditional & Manuf.	19,426	-6.43%	-2.97%	1.94%	-0.92%	0.265	911	$63,572
Total Economy	**1,032,847**	**-1.76%**	**-0.28%**	**1.55%**	**1.24%**	**NA**	**49,208**	**$48,085**

** Figures do not include industries or NAICS codes with <10 employees, so actual employment is slightly higher than the figures shown.*
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

Overview of Las Vegas Industry Clusters, Q2 2011



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the employment size for that cluster in Q2 2011.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
- The horizontal axis represents employment growth expressed as a compound annual growth rate (CAGR) from 2006 to 2011. Industry clusters falling to the right of the midpoint have a positive employment growth rate, and industry clusters falling to the left of the midpoint have a negative employment growth rate.
- The vertical axis represents average annual pay in Q2 2011. Industries falling above the midpoint have an average annual pay that is greater than the overall average for Las Vegas ($48,085), and those falling below the midpoint have average annual pay levels falling below the regional average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth (e.g., *Construction & Real Estate*, *Retail Trade*).

INNOVATION ANALYSIS: LAS VEGAS METRO AREA

The State of Nevada lags the rest of the United States in most innovation input and output measures, and on most indicators the Las Vegas metro area lags both the state and national averages. Key innovation indicators are summarized below:

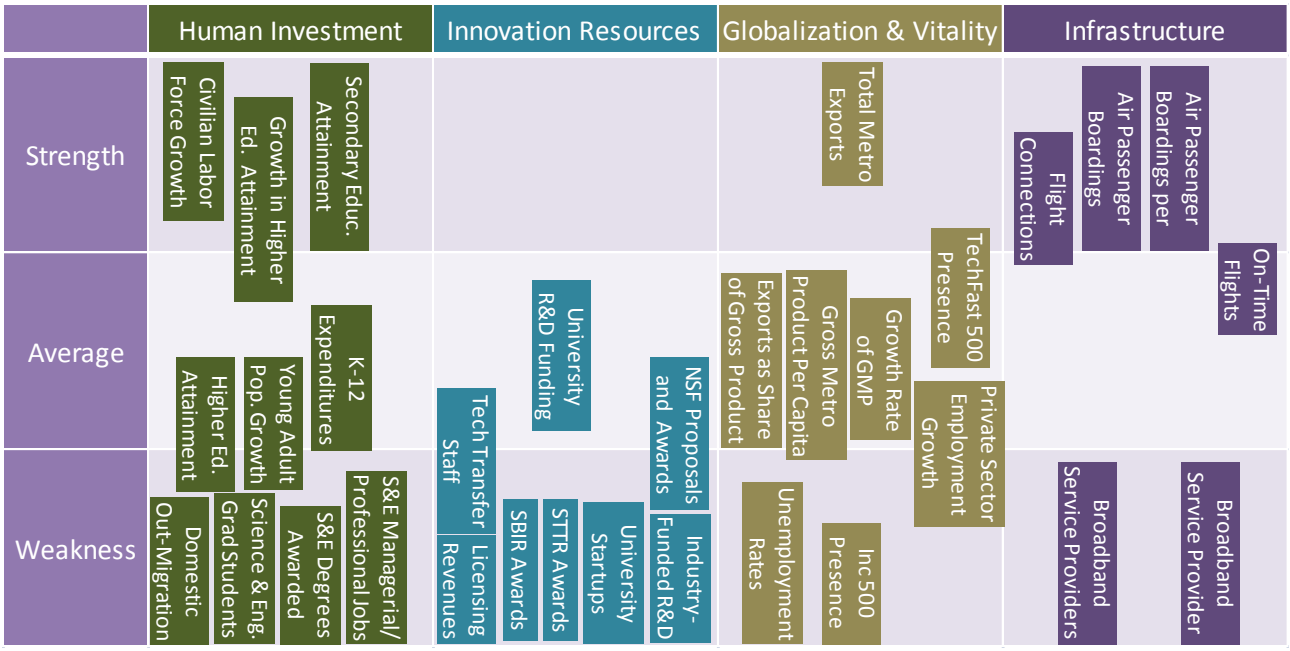
- The State of Nevada produces a relatively low number of doctorates relative to the national average. Las Vegas produces about 43% of Nevada's total doctorates, including a large majority of education doctoral degrees and all Nevada's business and management doctoral degrees.
- The University of Nevada, Las Vegas and the Nevada Cancer Institute are home to about one-quarter of Nevada's total laboratory space; nearly half of this space is dedicated to biological and biomedical sciences. Engineering fields also account for a significant share of Las Vegas research space.
- Las Vegas accounts for less than one-quarter of total academic R&D spending in the State of Nevada. The University of Nevada, Las Vegas is far more heavily dependent on federal funding for R&D activities than the state or national average (80% of R&D funding in Las Vegas is from federal sources, versus 68% for the State of Nevada, and 59% for the U.S. as a whole).
- Las Vegas accounts for 26% of all NSF awards in the State of Nevada, and Las Vegas metro area firms received less than a quarter of all SBIR/STTR awards in Nevada from 2006 to 2010. Notable SBIR/STTR recipients in Las Vegas include: Manufacturing Laboratories, Inc.; Exogi, LLC; K2 Energy Solutions, Inc.; and Latel Corporation.
- Las Vegas has a relatively high concentration of scientific publications in fields related to environmental and water technologies, and it produces 1.44% of all U.S. water publications (far higher than would be expected given its size). Overall, Las Vegas' rate of scientific publishing activity (on a per capita basis) lags both state and national averages.

Las Vegas Innovation Analysis Summary

Innovation Inputs	*Las Vegas*	*Nevada*	*United States*	*Comparison*
Earned Doctorates (2006-2009)	283	660	192,072	43% of NV total in Las Vegas
Laboratory Space (2009)	181,955 ft^2	1,115,245 ft^2	213,787,532 ft^2	25% of NV facilities in Las Vegas
University R&D Spending ($000s) (2009)	$31,270	$182,016	$54,935,457	$20 per capita in Las Vegas vs. $68 for the state
NSF Awards (2006-2010)	69	245	60,628	28% of NV awards in Las Vegas
SBIR/STTR Awards (2006-2010)	14	61	25,570	25% of NV awards in Las Vegas
Innovation Outputs	***Las Vegas***	***Nevada***	***United States***	***Comparison***
Scientific Publications (2009-2010)	1,172	2,529	566,468	Las Vegas produces 46% of NV total Very high concentration of water-related publications

BENCHMARKING ANALYSIS: LAS VEGAS METRO AREA

The graphic below summarizes how Las Vegas ranks among eight peer benchmark cities for a number of key indicators of economic competitiveness.[5] Benchmarking analysis revealed that Las Vegas is highly competitive in **Infrastructure**, moderately competitive in **Globalization & Vitality** and **Human Investment**, and not very competitive in **Innovation Resources**.



[5] The peer/benchmark group of cities for Las Vegas includes: Austin-Round Rock, TX; Sacramento--Arden-Arcade--Roseville, CA; Charlotte-Gastonia-Concord, NC-SC; Salt Lake City, UT; Tampa-St. Petersburg-Clearwater, FL; Denver-Aurora-Broomfield, CO; Tucson, AZ; Orlando-Kissimmee, FL.

Nevada Industry and Competitiveness Analysis

Preliminary Assessment and Benchmarking

November 14, 2011

I. INTRODUCTION

A. PURPOSE AND GOALS FOR THIS STUDY

The State of Nevada has experienced extreme economic volatility over the last decade. Following an extended period of expansion and growth – supported by robust population growth and the real estate boom – the last four years of recession have brought a severe economic downturn that has far outstripped the negative effects felt in most states around the country. Nevada's recent challenges and the causes behind them have been well-documented and thoroughly discussed over recent months, as state leaders and stakeholders have begun to think about how to rebuild the state's economy and spark an economic renewal.[1] There is a broad consensus in the state that a change in direction and strategy is sorely needed to achieve that renewal, and to ensure the future quality of life for the state's citizens. What the strategy and actions will be to achieve those goals, however, are yet to be determined and require careful, data-informed analysis and strategy-setting.

SRI International has been commissioned by the Nevada Commission for Economic Development, Secretary of State, and Lieutenant Governor to work with the Brookings Institution to conduct rigorous, objective industry research/analysis and to assist in crafting a new economic growth and target industry development agenda for the State of Nevada and its major metro areas. With significant bipartisan agreement in place among state leadership about the need for economic renewal in Nevada, this study is intended to provide a comprehensive, authoritative analysis of the composition, performance, and prospects of Nevada's key and emerging industries, with a particular focus on two critical metropolitan areas: Las Vegas and Reno/Carson City. The analysis will take a data- and market research-driven approach – thereby establishing an objective basis upon which to develop widespread, shared understanding of current economic realities. This analysis, combined with collaborative input from key stakeholders in the public and private sectors, will form the basis for devising an action-oriented strategy to address the deep challenges that Nevada and its metro areas face, and will also provide a foundation of guidance for the new state-level Advisory Council, Board, and Office of Economic Development (currently being formed under the auspices of AB 449).

[1] number of reports by the Brookings Metropolitan Policy Program and Brookings Mountain West have highlighted the ongoing economic plight of Nevada and its metro areas, as well as the emerging state movement toward new strategy-setting. For more information see http://brookingsmtnwest.unlv.edu/publications/ and various speeches by Brookings' Mark Muro (http://www.brookings.edu/speeches/2009/0908_las_vegas_muro.aspx and Robert Lang (http://nv20.unlv.edu/global/pdf/settingthestagefornevada.pdf), as well the proceedings of the recent *Nevada 2.0* stakeholder conference at UNLV in January 2011 (http://nv20.unlv.edu/).

There have already been a number of notable, broad-based efforts at the state level to assess Nevada's ongoing challenges and to lay out new plans and priorities. Some of the key efforts that are most salient to this study are noted in the box below. Some of these studies (such as the Nevada Vision Stakeholder Group/Moody's report) address the "big picture" regarding the state's overall structure, economy, and quality of life issues; some (such as the New Nevada Taskforce) focus more specifically on stakeholder-identified needs in various industry sectors; while others (such as the NIREC/NCED study) hone in on particular challenges such as innovation and technology development. All of them provide compelling information useful to those thinking about the state's future.

Notable Nevada Studies/Strategies that Inform and Support this Endeavor

Envisioning Nevada's Future: Goals & Strategies for Advancing Our Quality of Life (September 2010). This broadly-focused effort by the Nevada Vision Stakeholder Group (NVSG) and Moody's Analytics lays out a new vision for development in Nevada that revolves around a "triple bottom line" principle of "economic development, environmental sustainability, and equitable opportunity for the citizens of Nevada." The study reviews key state challenges/issues and sets new goals and initiatives in six areas of focus: the economy, energy & environment, transportation, education, healthcare & well-being, and public safety.

New Nevada Taskforce Report on Initiatives (March 2011). The New Nevada Taskforce was a group of 37 leading industry stakeholders convened in 2010 by the Lieutenant Governor to "chart the best course for Nevada's strategic economic development efforts to improve the state's economy and to create attractive jobs for our citizens." This report outlines nine initiatives identified by the Taskforce, focusing on actionable items that will spur diversification and support industry growth across a wide variety of sectors: technology commercialization; film & digital media production; international business development; renewable energy development; public-private partnership; BLM land acquisition & use; medical industry expansion; road, rail, & air transportation; and business expansion in national defense.

The Silver Spark for Nevada: Sustainable Innovation Leading a Vital Economic Renaissance (March 2011). This study conducted by the Nevada Institute for Renewable Energy Commercialization (NIREC), commissioned by the Nevada Commission on Economic Development (NCED), conducted a review of the Nevada's innovation and commercialization ecosystem and recommended changes to accelerate the creation of new technology-based jobs in the state. The study lays out five "targets of opportunity" for spurring innovation- and knowledge-based development in the state: simulation, modeling, & imaging; high-performance computational analysis; energy assessment, generation, transmission, & operations; 21st century mining & materials; and targeted mechanical & electrical engineering.

Technology Strategy for Nevada (December 2000). This ten-year-old study, conducted by Battelle Memorial Institute, laid out a number of ambitious strategies and actions for the State of Nevada to diversity its economy through support for technology-based industries. Key focus areas included: increasing the attention of state economic development efforts on technology-based opportunities; enhancing university R&D and collaboration activities; building a New Economy workforce; and supporting entrepreneurship; among others. The recent NIREC/NCED study (mentioned above) has emphasized the ongoing importance of the priorities set in the Battelle study for Nevada's long-term innovation competitiveness, as many of the strategies and actions have not yet been implemented.

It is critical to note here that this study is by no means a replacement or duplication of the efforts outlined above, but rather a complementary effort that aims to support and supplement the work already done by other state stakeholders and leaders in two ways:

Purpose of this Study

1. This study will provide an in-depth drill-down and focus into the specific economic and industry development needs and opportunities in the state. It will establish a rigorous and up-to-date pool of objective data on Nevada's economic/industry realities and opportunities, which not only will directly support the conclusions and strategies that come out of this study, but also may provide additional support for the plans and priorities laid out in other recent studies and efforts.
2. This study will have a particular focus on Nevada's two major metropolitan areas (Las Vegas and Reno/Carson City), because these regions contain the predominant share of the state's businesses, population, and economic activity. By setting forth and pursuing appropriate targets of opportunity in the two major metro areas, significant drivers of growth for the entire state can be catalyzed.[2]

While the recent studies and analyses noted in the table above have focused on wide-ranging aspects of Nevada's economic, industry, and living environment, these studies have pinpointed a remarkably similar set of key challenges and priorities for the state. In setting the overarching goals for this endeavor, the SRI and Brookings team have reviewed the major analyses and conclusions drawn in other recent state studies, and have also conducted an up-to-date, data-based economic assessment of the state's key issues.[3] Synthesizing our findings from those components, we have identified four overarching goals for the State of Nevada and its metro areas, which will provide an important framework for the analysis conducted throughout this study (presented in the table on the following page).

[2] While there is a focus here on the two metro areas, the rest of the state is certainly not ignored. All data have been assessed at the state level to provide a statewide context for the analysis, and instances where the rest of the state may differ from the two metro areas will be considered and addressed.

[3] The more detailed economic assessment and the data supporting these goals are presented in *Section II* of this report.

Statewide Goals Guiding this Study

1. **Restoring growth and jobs.** Following the recent period of extreme economic volatility and recession, Nevada must restore growth and jobs in a strategic and future-oriented way, especially in order to maintain and improve quality of life for the state's citizens. Given that the state's two major metro areas account for around 94% of the state's jobs, pursuing appropriate targets of opportunity in Las Vegas and Reno/Carson City will make great strides towards catalyzing a new growth trajectory for the entire state.
2. **Diversifying the economy.** Consumption-oriented industries (construction/real estate, tourism/gaming, and retail trade) have traditionally been the core drivers of growth in Nevada's economy. While these strengths have served the state well in periods of economic expansion, they have also made the state more susceptible to extreme volatility and recession (as evidenced by the massive job losses over the last several years). In looking to the future, Nevada needs to support development of a more diversified economy, in order to spur long-term growth and provide a cushion against future economic cycles.
3. **Catalyzing innovation.** Nevada's reliance on its core consumption-based industries has meant that its technology- and knowledge-based industries have not always received the attention and support offered by many other states around the nation. As a result, Nevada's performance on a number of indicators of innovation activity has lagged most states and the national average. Nevada needs to step up its policies and programs supporting the development of critical high-tech and knowledge-based jobs, industries, and entrepreneurship in order to build the innovation ecosystem necessary to be competitive in the future economy.
4. **Building new pillars of growth.** Nevada's economy is already starting to recover from the recent downturn, and future growth projections for the state are solid (and well above national averages). However, the extremely high growth figures achieved in the last decade are no longer viable, and the state's traditional industries can no longer serve reliably as the primary drivers of job growth and expansion. Job gains in the coming years are likely to come from a broad cross-section of industries, and Nevada needs to think strategically about how it can cultivate these new industries – building off of its traditional economic strengths and pivoting toward new high-potential drivers of growth.

B. ABOUT THIS REPORT

SRI's and Brookings' research and analysis for this study will focus on three major lines of inquiry:

- **Industry cluster analysis:** Providing a knowledge base on the current size, distribution, and growth trends of existing and emerging industries in the two major metro areas (Las Vegas and Reno/Carson City) as well as in the State of Nevada.
- **Economic foundations benchmarking, SWOT, and innovation analysis:** Identifying and measuring key strengths/assets and weaknesses/liabilities that serve as the "platform" for developing competitive industries in the state's two major metro areas, with an additional focus
  - the state's platform for innovation and knowledge-based industry development.
- **Industry trends and market analysis:** Analyzing the market dynamics and drivers that are shaping key industries in the state's two major metro areas, as well as how these dynamics might shape economic and industry development strategies moving forward.

This draft report, *Nevada Industry and Competitiveness Analysis – Preliminary Assessment and Benchmarking*, presents the research team's initial data analysis and findings for the first two components listed above: the industry cluster analysis and the benchmarking/innovation analysis. ***This report is an early-stage presentation of key findings gleaned only from the desk research portion of the study.*** The research team's next phase of analysis is to gather extensive stakeholder inputs and insights during a series of focus groups to be held with industry members and state leaders in the Las Vegas, Reno, and Carson City metro areas. These meetings will provide the additional "on-the-ground" insights and reality checks that are necessary to develop a full understanding and analysis of future industry opportunities and challenges in the state. For this reason, thoughtful, data-informed input from Nevada business leaders represents a crucial portion of the project.

Upon completion of these stakeholder consultation sessions and the next phase of research, SRI and Brookings will prepare a second report that will incorporate the information presented here, plus the information gathered in the stakeholder focus groups, as well as the in-depth industry information gathered through the market trends research. All of the analytical work will eventually build toward the recommendation of a new set of strategic target industries for the Las Vegas and Reno/Carson City metro areas, as well as a recommended set of initiatives and action steps to strengthen and develop those target industries.

ORGANIZATION OF THIS DRAFT/PRELIMINARY REPORT

This report provides an initial presentation of key data and findings and is intended to be reviewed by state stakeholders in preparation for the stakeholder focus groups to be conducted by the SRI and Brookings team. The report begins (*Section II*) with an analysis of the overall statewide context that frames this study, including up-to-date data analysis supporting the study's key goals as

outlined above. The rest of the report then presents the initial desk research and data analysis findings on industry cluster trends and innovation systems in the State of Nevada (*Section III*), and then industry cluster, innovation systems, and benchmarking analysis for the Las Vegas metro area (*Section IV*) and the Reno/Carson City metro area (*Section V*). The *Appendices* provide additional explanation and notes about the methodologies and data sources used for the analysis.

Notes About the Data Used for the Nevada Industry Cluster Analysis

All data for this analysis were derived from an Economic Modeling Specialists Inc. (EMSI) industry dataset. The dataset covers both private and public sector employment, including sole proprietors and self-employed workers. In order to create a detailed and accurate dataset, EMSI gathers and integrates data from a variety of state and federal sources, including the *Quarterly Census of Employment and Wages (QCEW)* produced by the Department of Labor, the *Regional Economic Information System (REIS)* published by the Bureau of Economic Analysis (BEA), and the *County/ZIP Business Patterns (CBP)* and *Nonemployer Statistics (NES)* published by the U.S. Census Bureau. By combining a variety of data sources, EMSI is able to fill gaps and suppressions in individual sources, yielding a composite, mathematically unsuppressed dataset.

Because EMSI aggregates data from multiple government datasets, the total state/regional employment figures shown in this report are likely to be higher than the figures shown in publicly-available government datasets. For example, commonly-used employment datasets such as Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW) typically exclude self-employed/sole proprietors, commission-based workers, military/armed forces, some state/local government workers, some agricultural workers, some domestic workers, and some railroad workers. The EMSI dataset includes those categories in the employment totals, so the aggregated figures may be higher than expected.

The dataset utilized in this report includes figures spanning from 2001 through Quarter 2 of 2011, as well as EMSI forecasts through the year 2016. EMSI projections are based on recent industry trends, national industry projections by the Bureau of Labor Statistics, and state and sub-state regional projections produced by individual states. While EMSI utilizes a rigorous methodology combining up-to-date data and state and federal industry expertise to develop annual projections going forward, there is significant uncertainty in these numbers and they are not intended to be short-term forecasts, especially in times of high economic volatility.

The 25 clusters and 85 sub-clusters analyzed in this report are defined according to North American Industry Classification System (NAICS) codes. NAICS classifies business establishments according to type of economic activity. Each establishment is classified in an industry according to its primary business activity; therefore, the full extent of activities of establishments that conduct a variety of operations are not always fully captured in NAICS-based analysis. High-tech industries (e.g., IT, microelectronics, biotechnology, medical devices, optics/photonics, digital media, marine electronics, etc.) are especially difficult to characterize and quantify using standardized NAICS-based data. Most high-tech activities are "hidden" within the NAICS codes for other more generalized activities, such as medical equipment manufacturing, pharmaceuticals, electronics manufacturing, colleges and universities, and many others, and it is impossible to identify the high-tech activities within these NAICS codes. A few of the clusters analyzed in this report, such as *IT Services* and *Research & Engineering Services*, do specifically capture high-tech activities; however, these clusters are particularly fluid and can be difficult to characterize given their important roles in other industries. For example, depending on the other major industries in the region, these clusters may have close synergies and linkages with other clusters such as *Life Sciences & Medical Services*; *Aerospace, Defense, & National Security*; *Electronics*; and others. However, it is not possible from a standardized, NAICS-based dataset to determine the extent to which these sectors are serving specific industries. For this reason, the NAICS-based cluster analysis is just a starting point for analyzing and understanding Nevada's industry clusters, and it will be supplemented by benchmarking and innovation analyses, as well as focus groups and stakeholder consultation, to build a more robust picture of the potential that exists in clusters and sub-clusters that cannot be measured through NAICS.

II. STATE-LEVEL ECONOMIC CONTEXT FOR THIS STUDY

As mentioned above in the discussion of the goals for this study, there is already a fairly broad consensus among state leaders about the long-term issues and challenges currently facing the State of Nevada and its economy. These issues have already been well-discussed in a number of recent state-level reports, and they are not new information for most state stakeholders. The purpose of this section is to summarize and synthesize a number of critical economic realities in the State of Nevada, and to provide updated data analysis supporting and explaining those issues. The broader economic issues outlined here will set the context for and shape the recommendations made in this study, which particularly focuses on the state's major metro areas of Las Vegas and Reno/Carson City.

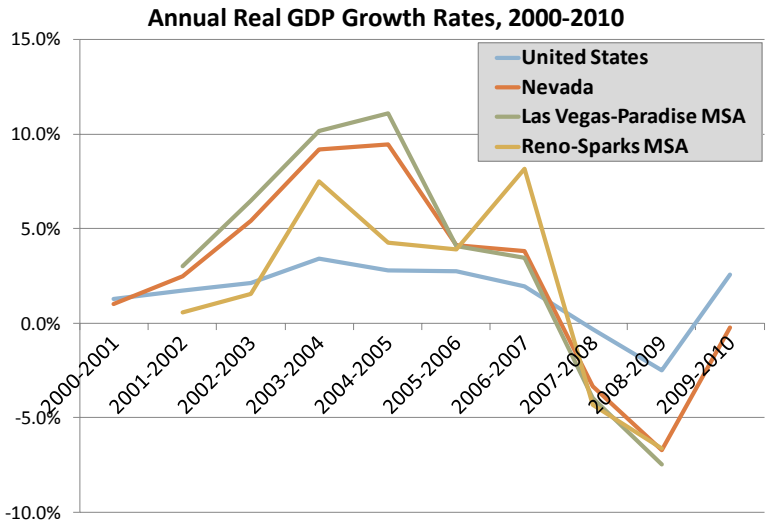
Based on an assessment of recent economic and industry data, as well as a review of the analysis and conclusions drawn in other recent state studies, the SRI and Brookings team have identified four major challenges currently facing the State of Nevada:

- Nevada has recently experienced a massive economic slowdown and has fared significantly worse than the national average for job losses, unemployment, and real estate struggles.
- Nevada's lack of economic diversity and dependence on consumption-based industries has contributed to its economic volatility.
- Nevada lags other states and the nation on many indicators of innovation activity, and the state's reliance on its traditional core industries has meant that critical knowledge- and technology-based sectors have not always received the support and attention they need to flourish.
- Nevada's economy will recover and grow in the coming years, but the state's traditional core industries can no longer be depended on as the primary drivers of growth.

NEVADA HAS RECENTLY EXPERIENCED A MASSIVE ECONOMIC SLOWDOWN AND HAS FARED SIGNIFICANTLY WORSE THAN THE NATIONAL AVERAGE FOR JOB LOSSES, UNEMPLOYMENT, AND REAL ESTATE STRUGGLES

NEVADA NEEDS TO RESTORE JOBS AND GROWTH IN A STRATEGIC AND FUTURE-ORIENTED WAY

As state leaders, citizens, and businesses are well aware, Nevada's economy has experienced an extreme boom-bust cycle over the last decade. From 2002-2007, the state's economic growth rate (as measured by year-on-year real GDP growth) ranged from 4% to 9%, ranking it among the top ten fastest-growing states in the nation most years. Once hit by the recession in 2007, however, Nevada's economy plummeted precipitously, ranking it among the bottom four states in the nation for economic growth over the last few years. In both boom and bust cycles, Nevada's growth rates have typically exceeded the national average by a factor of 1.5-2.0 or more. Growth trends in the state's two major metro areas – Las Vegas and Reno – have mirrored or exceeded the statewide trend.

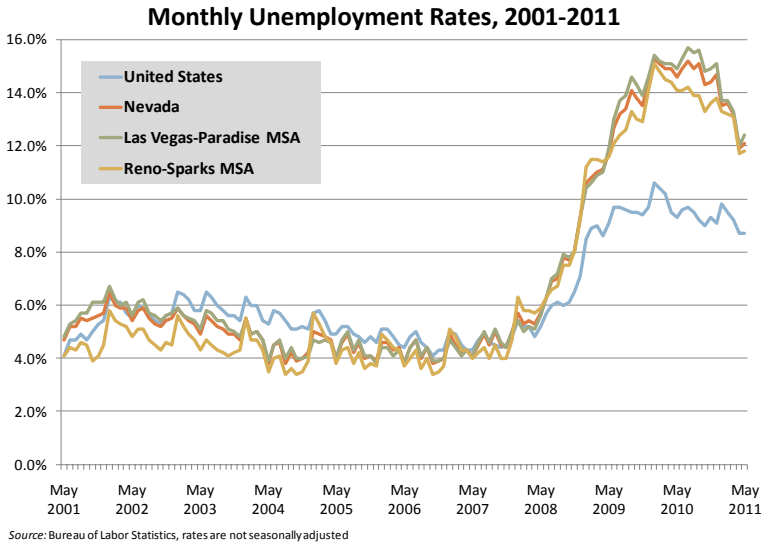


Source: Bureau of Economic Analysis. Data for Las Vegas and Reno MSAs are only available for 2001-2009

Annual Real GDP Growth Rates, 2000 2010										
	'00-'01	**'01-'02**	**'02-'03**	**'03-'04**	**'04-'05**	**'05-'06**	**'06-'07**	**'07-'08**	**'08-'09**	**'09-'10**
United States	1.3%	1.7%	2.1%	3.4%	2.8%	2.7%	1.9%	-0.3%	-2.5%	2.6%
Nevada (*50 state rank*)	1.0% *29th*	2.5% *18th*	5.4% *4th*	9.2% *1st*	9.4% *1st*	4.1% *10th*	3.8% *12th*	-3.4% *47th*	-6.7% *50th*	-0.2% *49th*
Las Vegas MSA	N/A	3.0%	6.5%	10.2%	11.1%	4.1%	3.4%	-4.0%	-7.5%	N/A
Reno MSA	N/A	0.6%	1.5%	7.5%	4.3%	3.9%	8.2%	-4.3%	-6.6%	N/A

Source: Bureau of Economic Analysis

The recent recession has hit hard in Nevada, as evidenced by the massive job losses in the state over the last several years and the accompanying high unemployment rates. From its peak employment level of 1,629,016 jobs in 2007, Nevada has lost about 169,000 jobs over the last four years, or 10.4% of it employment base; 99% of those job losses were in the Reno/Carson City and Las Vegas metro areas. By contrast, total job loss in the United States during the recession (2007-2011) has represented only 3.5% of total employment.[4] Nevada's job losses have of course been accompanied by high unemployment – unemployment rates in the state, and in the Las Vegas and Reno MSAs, have far exceeded the national average from 2008-2011.



Nevada's significant economic volatility is also reflected in its recent real estate bust, which has accompanied the recession (as both a cause and an ongoing symptom). Since reaching their peak in Q3 2006, housing prices statewide have plummeted by -49.2% (through Q1 2011), while housing prices in Las Vegas and Reno MSAs have fallen by -55.7% and -47.2%, respectively. By comparison, national average housing prices have fallen by only -13.5% over the same time period.[5]

Measuring Nevada's Economic Volatility

A September 2010 study by the Nevada Vision Stakeholder Group and Moody's Analytics also emphasized the impact of boom-bust cycles on Nevada's economy. Using an index score that measures economic volatility, Moody's analysis shows the Nevada economy is more than twice as volatile as the national average and significantly more volatile than its neighboring western/southwestern states.[6] Nevada's volatility index score is around 235, as compared to a national average of 100, and the next closest scoring neighboring states are Arizona (around 190), Idaho (around 160), and Utah (around 150). The study also emphasizes that Nevada's metro areas also have above average volatility, with index scores around 160 for Carson City, 218 for Reno, and 258 for Las Vegas.

[4] EMSI data, calculations by SRI.
[5] Federal Housing Finance Agency data (*quarterly index data for all transactions, not seasonally adjusted*), calculations by SRI.
[6] Se Moody's Analytics, *Envisioning Nevada's Future* September 2010 (http://nsla.nevadaculture.org/statepubs/epubs/31428002986095.pdf for more information. Index scores are based on 2009 data.

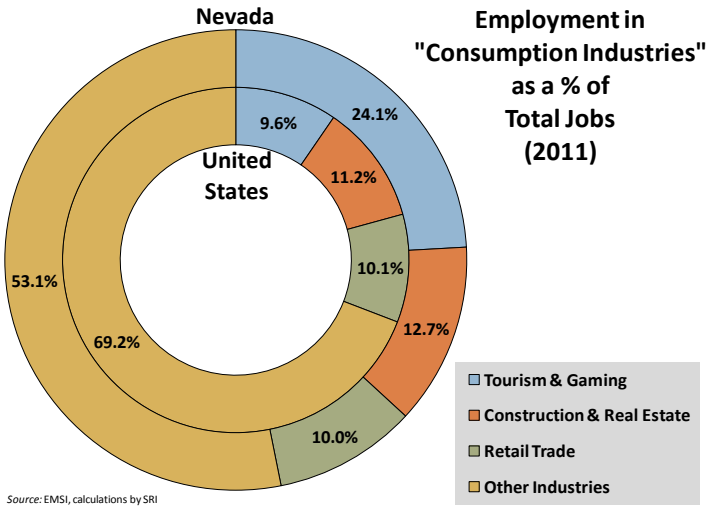
NEVADA' LACK OF ECONOMIC DIVERSITY AND DEPENDENCE ON CONSUMPTION-BASED INDUSTRIES HAS CONTRIBUTED TO ITS ECONOMIC VOLATILITY

NEVADA NEEDS TO DIVERSIFY ITS ECONOMY TO SPUR GROWTH AND PROVIDE A CUSHION AGAINST FUTURE ECONOMIC CYCLES

Nevada's economy is heavily dominated by consumption-oriented industries – that is, industries that are heavily influenced by consumer spending patterns and disposable income. In 2011, four industries each accounted for over 10% of total employment in Nevada, and three of those four are heavily consumption-focused (indicated by a ✱ below):

- ✱ *Tourism & Gaming* (351,808 jobs, 24.1% of total)
- ✱ *Construction & Real Estate* (186,019 jobs, 12.1% of total)
- ■ *Education & Government* (172,933 jobs, 11.9% of total)
- ✱ *Retail Trade* (145,884, 10.0% of total)

Nevada's three large consumption-oriented industries account for nearly half of the state's total employment base (as shown in the figure to the right). By contrast, the same three industries account for less than one-third of total employment nationwide.



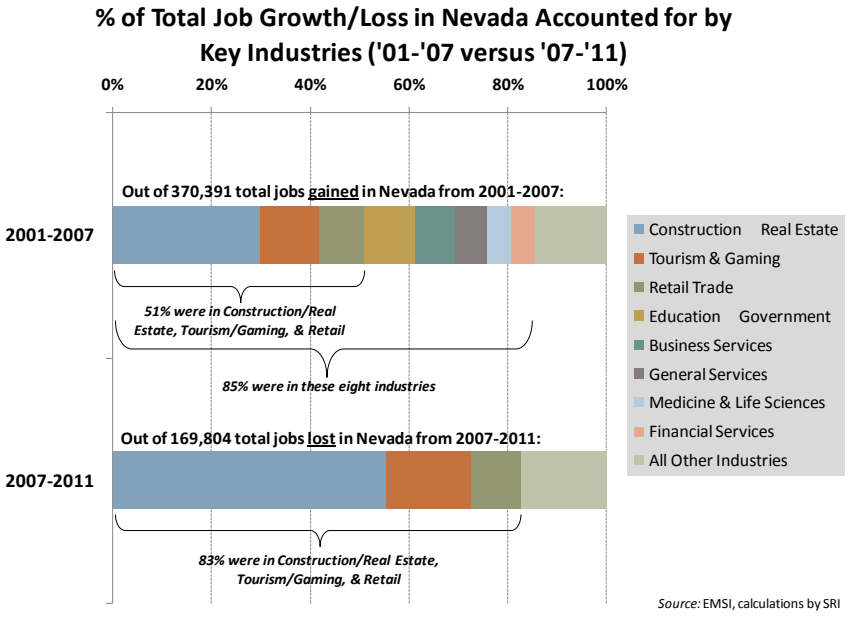
Measuring Nevada's Lack of Industrial Diversity

Nevada's heavy focus on consumption and lack of economic diversity has been emphasized in other recent state-level studies. In particular, the September 2010 report released by the Nevada Vision Stakeholder Group and Moody's Analytics presents a metric of industrial diversity (using data from Moody's *Industrial Diversity Index*), which compares the diversity in Nevada's economy to the national average.[7] Nevada's industrial diversity score in 2009 was around 0.3 (on a scale of 0 to 1), meaning that the state's economy is significantly less diverse than the national average (and is also less diverse than all U.S. states except for Alaska and the District of Columbia). Nevada's metro areas demonstrate similar patterns: industrial diversity scores were around 0.51 for Reno, 0.23 for Las Vegas, and 0.17 for Carson City.

[7] See Moody's Analytics, *Envisioning Nevada's Future*, September 2010 (http://nsla.nevadaculture.org/statepubs/epubs/31428002986095.pdf) for more information. The Moody's Industrial Diversity Index is measured on a scale of 0 to 1. A 1 means the state has the same industrial structure and level of diversity as the United States as a whole. A 0 means the state and U.S. structures have nothing in common, and the state's industrial structure is significantly less diverse than the nation.

Nevada's economic dependence on its core industries of tourism, gaming, construction, and retail has been both a positive and a negative for the state. Looking back over the last decade, these industries helped propel Nevada's economy through a significant period of economic expansion and job growth (supported by high levels of population growth, consumer spending, and the real estate bubble). During the expansion period of 2001-2007, Nevada's economy gained over 370,000 jobs. Over 50% of those jobs were in *Construction/Real Estate*, *Tourism/Gaming*, and *Retail Trade*, but this growth was also supported by job gains in other key industries, such as *Business Services*, *General Services*, *Medicine/Life Sciences*, and *Financial Services*. The recent recession has revealed, however, the pitfalls of an economy that is overly reliant on industries that are closely tied to consumer spending. From 2007-2011, Nevada's economy has lost nearly 170,000 jobs, and 83% of those job losses were in the region's three dominant consumption-based industries – *Construction/Real Estate, Tourism/Gaming, and Retail Trade*.[8] Other key industries, such as *Medicine/Life Sciences*, *Financial Services,* and *General Services*, have actually continued to grow in Nevada during the recession, offsetting some of the job-losses from the three dominant consumption industries.[9]

Nevada is clearly not alone in feeling the negative impacts of the recession, decline in consumer spending, and burst of the real estate bubble over the last few years. The impacts in Nevada have been exacerbated, however, by the state's extreme economic reliance on consumption-oriented industries (because when the economy falters, these industries get hit fastest and hardest).



Source: EMSI, calculations by SRI

[8] By comparison, *Construction/Real Estate Tourism/Gaming* and *Retail Trade* have accounted for 72% of total U.S. job losses from 2007-2011, and job losses in a number of other industries (including *Business Services Materials & Chemicals Wholesale Trade* and *Transportation/Logistics* have had a much greater impact on the U.S. economy than *Tourism/Gaming*.

[9] All data presented here are based o EMSI data and calculations made by SRI. Industry definitions and the data analysis methodology are explained further in *Appendix A*.

NEVADA' RELIANCE ON ITS CORE CONSUMPTION-BASED INDUSTRIES HAS MEANT THAT CRITICAL KNOWELDGE- AND TECHNOLOGY-BASED SECTORS HAVE NOT ALWAYS RECEIVED THE SUPPORT AND ATTENTION THAT THEY NEED TO FLOURISH

▶ ***NEVADA NEEDS TO STEP UP ITS POLICIES AND PROGRAMS SUPPORTING TECHNOLOGY DEVELOPMENT, INNOVATION, AND ENTREPRENEURSHIP IN ORDER TO CATALYZE THE INNOVATION ECOSYSTEM NECESSARY TO BE COMPETITIVE IN THE FUTURE ECONOMY***

Nevada lags the nation (and most of its peer/competitor states) on every indicator of innovation and R&D activity included in this study. Other sections of this report provide a much more extensive analysis of innovation and R&D, both at the state level and in the two major metro areas, but several comparisons between Nevada and U.S. averages are summarized in the table below.[10]

Selected Innovation Activity Indicators for Nevada

	Nevada	*United States*
Total doctorate degrees awarded per 10,000 people (2006-2009)	2.52	6.35
Total science & engineering research space – net assignable square feet per capita (2009)	0.42	0.70
Federal R&D obligations per capita (2007)	$114.92	$369.91
University R&D spending per capita (2009)	$67.80	$179.08
NSF awards per 10,000 people (2006-2010)	0.93	2.00
SBIR/STTR awards per 10,000 people (2006-2010)	0.23	0.84
Scientific publications per 10,000 people (2009-2010)	9.39	18.41
Patents per 10,000 people (2006-2010)	7.62	14.38

Source: NSF, National Center for Science and Engineering Statistics, SBA, Thomson Delphion; calculations by SRI

Nevada's lagging innovation activity is linked with its relatively low levels of spending on higher education as compared to peer states. With $558.9 million of state funding for higher education in FY2010-2011, Nevada provided the lowest amount of public support for higher education among states of a similar size (2-3 million people), and it ranked 35th among all 50 states for its level of state higher education funding on per capita basis ($211.44).

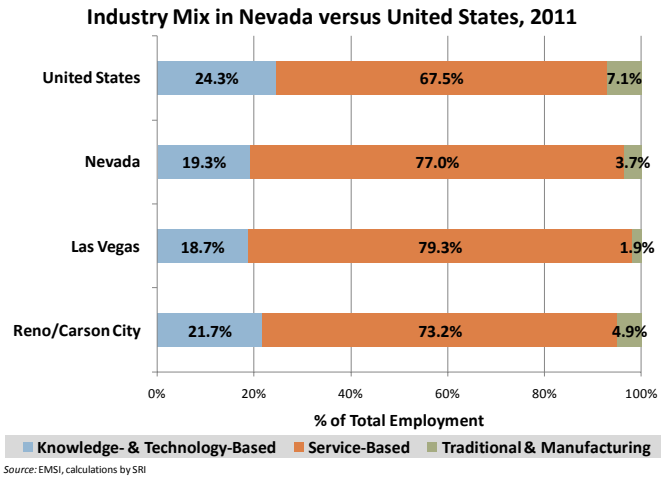
Higher Education Spending in Nevada Compared to Peer States, FY2010-2011

State	Population (millions)	Higher Ed. spending ($ millions)	Higher Ed. spending as % of GSP
Mississippi	2.97	$932.5	0.96%
Arkansas	2.92	$901.8	0.88%
Kansas	2.85	$754.8	0.59%
Utah	2.76	$714.8	0.62%
Nevada	**2.70**	**$558.9**	**0.44%**
New Mexico	2.06	$874.8	1.10%

Source: *Grapevine: An Annual Compilation of Data on State Fiscal Support for Higher Education* Bureau of Economic Analysis.

[10] *Sections III IV* and *V* provide more details about innovation activity and indicators in Nevada, Reno, and Las Vegas. A number of metro-level innovation indicators are also benchmarked against peer cities.

Nevada's lagging innovation activity is likely also intertwined with the nature of its dominant industries, which do not typically attain competitive advantage through R&D investments. Based on 2011 data, about 24% of total U.S. employment is in *knowledge- & technology-based industries*. By comparison, only about 19% of jobs in the State of Nevada are in *knowledge- & technology-based industries* (including 19% of jobs in the Las Vegas metro area and 22% of jobs in the Reno/Carson City metro area). Nevada's economy continues to be heavily weighted toward employment in the lower-skill *service-based* sectors, even in spite of the massive job losses in most of these industries during the recent recession, and service-based sectors tend to have lower levels of investments in innovation and R&D activities.[11]



These data do not imply that Nevada is not an innovative state. There are significant pockets of technology development and innovative activities taking place across the state – even in industries like gaming and mining, which are not typically considered to be "high-tech" – and the state does have a number of important R&D-producing assets to build upon.[12] However, what most leading innovation states around the country have found is that there are enough market hurdles and barriers for entrepreneurs and innovators that concerted collaboration and supporting programs are usually necessary to turn innovation potential into commercializable technologies and, ultimately, high-growth companies and real jobs. Nevada will need to step up its efforts to target and support entrepreneurs and knowledge- and technology-based industries if the state wants to succeed in growing the kinds of companies and jobs that will build a renewed and competitive economy for the future and support a better quality of life for its citizens.

[11] Further details on industry definitions and classification into *knowledge- & technology-based service-based* and *traditional & manufacturing* segments are provided in *Appendix A*.

[12] Many of these assets have already been well-documented in the recent NIREC/NCED study, *The Silver Spark for Nevada*, March 2011 (http://www.nirec.org/thesilverspark.html).

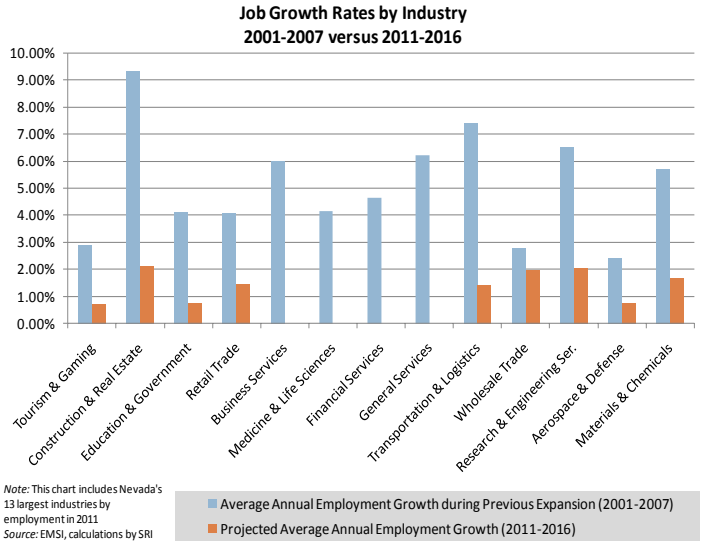
NEVADA' ECONOMY WILL RECOVER AND GROW IN THE COMING YEARS, BUT THE STATE'S TRADITIONAL CORE INDUSTRIES CAN NO LONGER BE DEPENDED O AS THE PRIMARY DRIVERS OF GROWTH

NEVADA NEEDS TO THINK STRATEGICALLY ABOUT WHAT INDUSTRIES CAN BE DEVELOPED AS NEW PILLARS OF THE ECONOMY, BUILDING OFF OF ITS TRADITIONAL ECONOMIC STRENGTHS

Future projections for Nevada's economy are solid. Employment growth is expected to resume this year (at a projected annual rate of 1.55% from 2011-2016), and these growth projections exceed the national average (1.24% annually over the same timeframe).[14] However, the positive economic forecasts do not mean that the state can or should take a passive approach or expect to easily achieve the successes of the last decade. The nationwide recession has changed a number of economic realities, and Nevada's future growth is not likely to look like it did during the previous period of expansion.

> *Nevada's severe downturn has brought to light many of the long-term challenges facing the state. Not only is its economy subject to painful swings, but Nevada's primary drivers – consumer services (primarily gaming, hospitality and housing) and resource extraction – will provide less support than they have in past business cycles. Less economic vitality will make it harder to offer Nevadans the quality of life they expect... Tight state and local budgets notwithstanding, now is the time to make the structural changes and investments Nevada needs, lest its obstacles become insurmountable in the years ahead.*[13]
>
> ~Nevada Vision Stakeholder Group

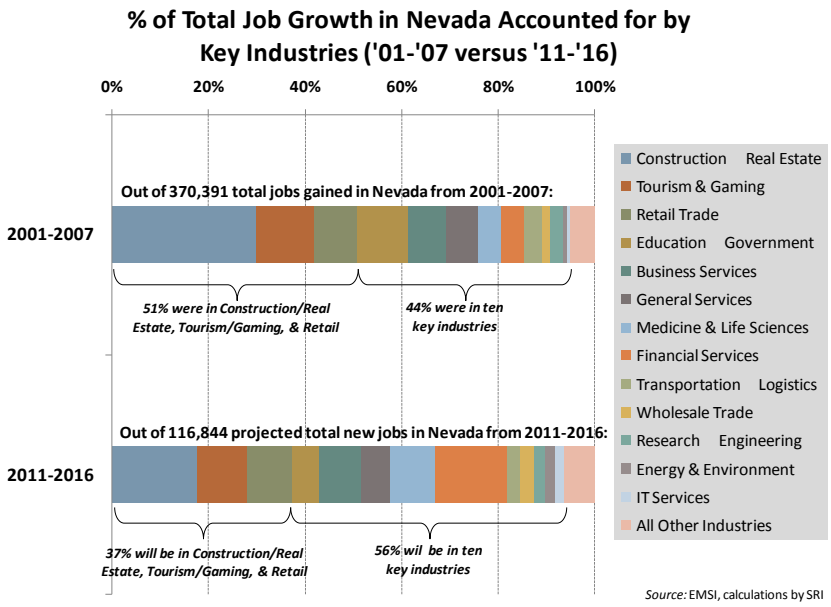
Projected employment growth rates for Nevada's largest industries are all positive over the next five years (as shown in the chart to the right), but the rates are nowhere near what was achieved in the state during the previous period of growth (2001-2007).



Note: This chart includes Nevada's 13 largest industries by employment in 2011
Source: EMSI, calculations by SRI

As mentioned previously, the state's dominant consumption-oriented industries (*Construction/Real Estate*, *Tourism/Gaming*, and *Retail Trade*) accounted for *over 50%* of all job growth from 2001-2007. During the coming five years, Nevada is projected to add nearly 117,000 jobs, but the consumption-oriented industries will account for *only 37%* of that growth.

[13] Moody's Analytics, *Envisioning Nevada's Future* September 2010 (http://nsla.nevadaculture.org/statepubs/epubs/31428002986095.pdf).
[14] EMSI data, calculations by SRI.



Recognizing that construction is no longer expected to be the primary driver of growth in Nevada, most of the state's job growth in the coming years will be driven by a wide cross-section of industries (as shown in the chart to the left) – notably, industries such as *Financial Services*, *Medicine & Life Sciences*, and *Business Services*.[15] This change is potentially a very healthy shift for the state's economy, and as state leaders think about building a more robust economy for the future, they can look to these and other industries as potential future engines for growth and innovation and as new pillars for economic development.

[15] Some of these sectors (*Financial Services*, *Medicine & Life Sciences*) and others (*Energy & Environment*, *IT Services*) have actually continued to grow in Nevada over the period 2007-2011, in spite of the recession, in addition to having strong future growth projections.

III. STATE OF NEVADA – *PRELIMINARY DATA ANALYSIS*

A. INDUSTRY CLUSTER ANALYSIS: STATE OF NEVADA

STATE OF NEVADA ECONOMIC PROFILE

The economy of the State of Nevada employs 1,459,214 workers, largely (nearly 94%) within the major metropolitan areas of Las Vegas and Reno/Carson City.[16] Average annual earnings per worker in the state are $48,077, slightly below the national average of $51,851.

Industry Profile of Nevada (2011)

Total Employment: 1,459,214

Employment Average Annual Growth Rate (2006-2011): -1.72%

Total # of Establishments (2010): 73,080

Average Annual Wage: $48,077

Employment Characteristics:

- 19.3% in Knowledge- & Technology-Based Industries
- 77.0% in Service Industries
- 3.7% in Traditional & Manufacturing Industries

Largest Industry Clusters (by employment):

- *Tourism & Gaming*
- *Construction & Real Estate*
- *Education & Government*
- *Retail Trade*
- *Business Services*

Service-based industries dominate the economy in the State of Nevada – and while this is also true nationally (68.3% *service-based* jobs in the U.S.), Nevada exceeds the U.S. average significantly (77.0% *service-based* jobs in Nevada). Each of the state's five largest industries (by employment) are service-based: *Tourism & Gaming*, *Construction & Real Estate*, *Education & Government*, *Retail Trade*, and *Business Services* – together these industries account for over 66% of all employment in the state. Among this group of *service-based* industries, the state's three major consumption-based industries (*Tourism & Gaming*, *Construction & Real Estate*, and *Retail Trade*) are the dominant employers, accounting for 46.9% of total state employment (as compared to 30.8% nationally). Roughly 19% of jobs in Nevada are in *knowledge- & technology-based industries* and less than 4% of jobs are in *traditional & manufacturing industries*.[17]

As noted in the previous section of this report, the State of Nevada has experienced a dramatic boom-and-bust cycle during the past decade – one that mirrors national trends, but exceeds them in relative magnitude. During the economic expansion of 2002-2007, employment in the State of Nevada grew at an average annual rate of +4.89%, nearly three times the national average of

[16] All industry cluster data presented here are drawn from EMSI, which aggregates data from multiple federal/state government datasets. EMSI data includes labor categories that are not typically included in standard government data (e.g., self-employed/sole proprietors, commission-based workers, military/armed forces, state/local government workers, agricultural workers, etc); therefore, the state employment figures shown here may be higher than the figures shown in other publicly-available datasets.

[17] The industry cluster data table on page 1 provides details on how each of the state's twenty-five industry clusters are categorized as *knowledge- & technology-based traditional & manufacturing* or *service-based*.

+1.77%. This rapid growth was followed by an equally dramatic decline – employment in Nevada fell by -10.42% in just two years during the recent economic recession (2007-2009), compared to a national decline of -3.48% during the same period. Employment in the State of Nevada has continued to contract during the initial economic recovery period (from 2009 to 2011), at an average annual rate of -1.17% (compared to -0.09% nationally).

Growth rates across individual industry clusters in Nevada have varied both in magnitude and volatility – though, as discussed previously in this report, the Nevada' economy is overall much more volatile than the national average. Mirroring national trends, the state's *knowledge & technology-based industries* have continued to grow in employment over the last five years (CAGR of +1.59% from 2006-2011), while the region's *service-based* and *traditional & manufacturing industries* have lost jobs (at -2.36% and -3.75% per year, respectively from 2006-2011). Three industry clusters have maintained positive growth in both Nevada and nationally throughout the recent fluctuations in the business cycle: *IT Services Energy & Environment* and *Medicine & Life Sciences*.[18]

SUMMARY OF INDUSTRY CLUSTER DATA

The table on the following page summarizes key statistics for the twenty-five industry clusters that comprise the economy in the State of Nevada. Many of Nevada's largest industry clusters (by employment) have experienced strong, negative growth from 2006-2011 as a result of the economic recession. However, EMSI forecasts indicate that this trend is expected to reverse, and growth rates for all industry clusters in Nevada are expected to be positive over the next five years (2011-2016).

[18] Defined by net growth over the periods of expansion, 2002-2007; recession, 2007-2009; and initial recovery, 2009-2011.

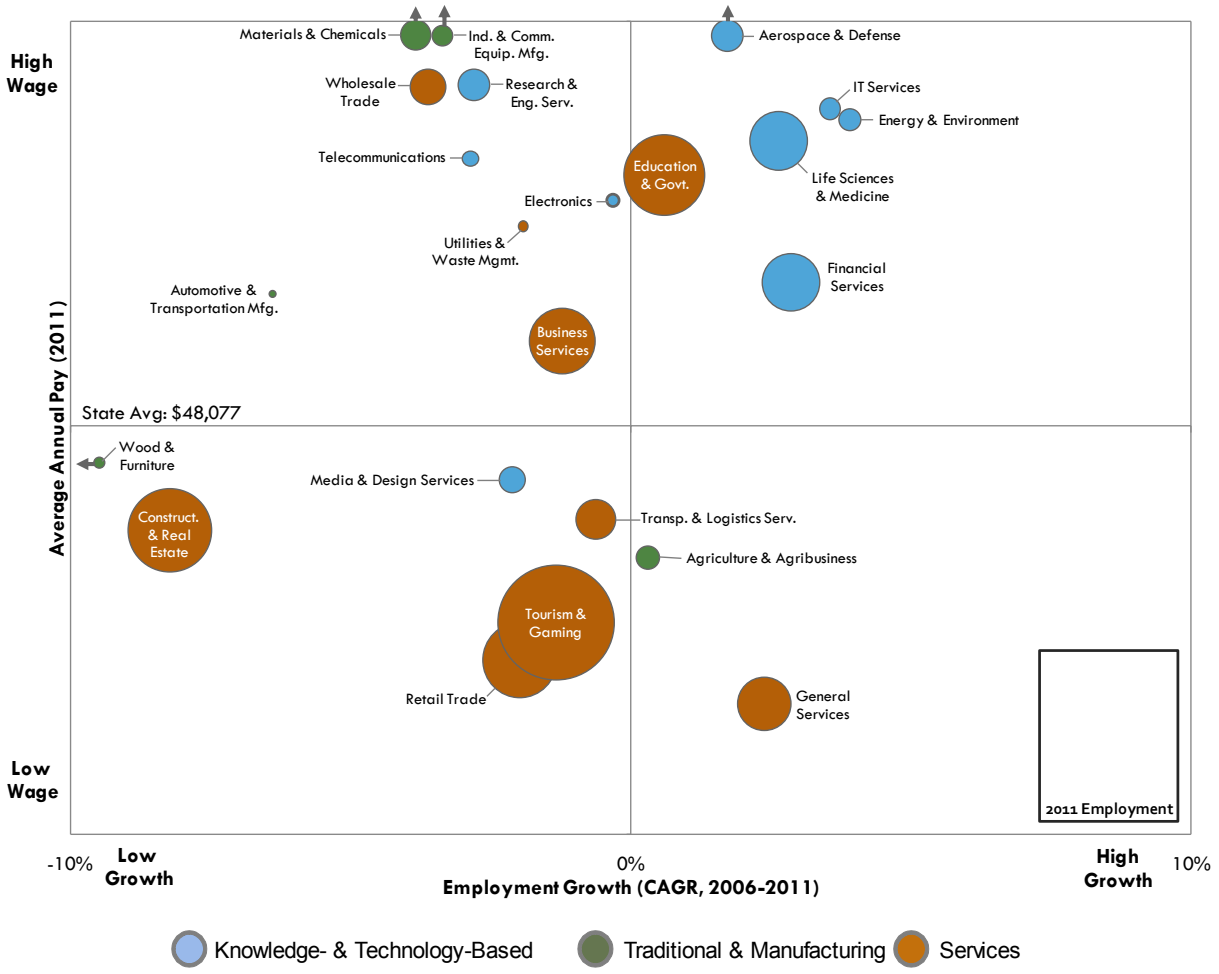
Nevada Industry Clusters in Q2 2011								
	2011 Total Employment*	Average Annual % Employment Growth (2006 2011)		*Predicted* (2011 2016)		2011 *National* Location Quotient	2010 # of Establishments	2011 Average Annual Pay
		Nevada	U.S.	Nevada	U.S.			
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	25,947	1.72%	-0.22%	0.72%	0.29%	0.907	287	$75,145
Energy & Environ.	13,101	3.90%	4.60%	3.32%	2.26%	0.539	559	$69,196
Electronics	4,133	-0.32%	-3.22%	2.29%	-1.89%	0.472	273	$63,626
Financial Services	86,371	2.86%	2.04%	3.71%	2.16%	1.096	4,926	$58,023
IT Services	11,798	3.56%	2.03%	3.56%	2.49%	0.515	2,037	$69,955
Medicine & Life Sci.	89,148	2.64%	2.03%	2.35%	2.22%	0.634	5,853	$67,734
Media & Design Serv.	17,912	-2.11%	-1.30%	0.90%	0.74%	0.791	1,574	$44,394
Research & Eng. Serv.	26,491	-2.80%	1.31%	2.07%	2.70%	0.765	3,096	$71,645
Telecommunications	6,740	-2.87%	-3.14%	0.47%	-0.31%	0.655	323	$66,521
Service-Based Clusters								
Business Services	113,441	-1.22%	-0.96%	1.75%	1.24%	1.018	8,485	$53,975
Constr. & Real Estate	186,019	-8.24%	-2.33%	2.11%	1.84%	1.141	12,445	$40,908
Education & Govt.	172,933	0.60%	0.54%	0.75%	1.16%	0.721	2,443	$65,422
Retail Trade	145,884	-1.99%	-1.44%	1.44%	0.28%	0.988	8,206	$31,980
General Services	75,097	2.38%	0.95%	1.79%	1.55%	0.812	5,136	$28,935
Transp. & Log. Serv.	41,036	-0.63%	-1.01%	1.42%	0.94%	1.028	1,627	$41,661
Tourism & Gaming	351,808	-1.34%	0.37%	0.69%	1.53%	2.524	8,330	$34,554
Util. & Waste Mgmt.	2,815	-1.92%	0.56%	1.61%	1.74%	0.936	125	$61,887
Wholesale Trade	34,325	-3.63%	-1.33%	1.97%	0.73%	0.721	4,952	$71,485
Traditional & Manufacturing Clusters								
Agriculture & Agribus.	13,593	0.31%	0.10%	1.03%	-0.29%	0.304	662	$39,045
Auto. & Transp. Mfg.	1,115	-6.40%	-6.77%	0.27%	-1.78%	0.137	53	$57,218
Industrial & Comm. Equipment Mfg.	11,109	-3.36%	-3.51%	2.34%	-1.24%	0.819	407	$83,072
Materials & Chem.	23,914	-3.85%	-4.00%	1.65%	-0.89%	1.023	746	$79,794
Paper	589	1.94%	-3.50%	2.64%	-2.83%	0.238	11	$66,337
Textiles & Apparel	847	-7.27%	-7.06%	2.04%	-4.61%	0.231	71	$35,989
Wood & Furniture	2,583	-15.80%	-7.49%	2.21%	-1.07%	0.342	208	$45,580
Total Economy	**1,459,214**	**-1.72%**	**-0.28%**	**1.55%**	**1.24%**	**NA**	**73,080**	**$48,077**

Figures do not include industries or NAICS codes with <1 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

The bubble charts on the following pages provide a summary snapshot of trends in the State of Nevada's industry clusters, the first chart depicting the current status in 2011, and the second chart depicting the projected status in 2016 (based on EMSI forecasts). In examining these charts, several trends become apparent:

- The *traditional & manufacturing* industries (indicated by green-shaded bubbles) in the State of Nevada are not large in terms of employment (indicated by bubble size). The wages and employment growth rates are scattered for these industries, with none experiencing both positive employment growth and above average wages over the last five years (2006-2011).
- The state's largest industry clusters, including *Tourism & Gaming Construction & Real Estate Services*, *Education & Government*, *Retail Trade*, and *Business Services*, are primarily *service-based* industries. These *service-based* clusters have generally posted low or negative employment growth rates over the last five years (with only *Education & Government* and *General Services* posting low but positive growth over the past five years). Wages for the largest industries are mixed – *Education & Government* and *Business Services* have higher-than-average wages, while wages in the state's core consumption-based industries (*Tourism & Gaming*, *Construction & Real Estate Services*, and *Retail Trade*) all fall well below the state average.
- Nevada's larger *knowledge- & technology-based* industries (indicated by blue-shaded bubbles) tend to group in the upper right-hand quadrant, indicating above average wages and positive growth rates. A number of smaller *knowledge- & technology-based* industries have experienced negative growth from 2006-2011, but (with the exception of *Media & Design Services*) all have above-average wages.
- Because they offer positive growth rates and above average wages, industry clusters that fall into the first quadrant (upper right-hand side in the bubble chart) may have especially strong potential in the region. These also tend to be in the higher-skill *knowledge- & technology-based industries*. Clusters that fit this profile in the State of Nevada include *Life Sciences & Medical Services*, *Financial Services*, *IT Services*, *Energy & Environment,* and *Aerospace & Defense*.
- The 2016 (projected) bubble chart depicts an expectation of strong, improved growth rates across all industry clusters. Predicted growth rates are generally highest for *knowledge- & technology-based* industries, which are expected to comprise a slightly larger segment of the economy in 2016 than in 2011.

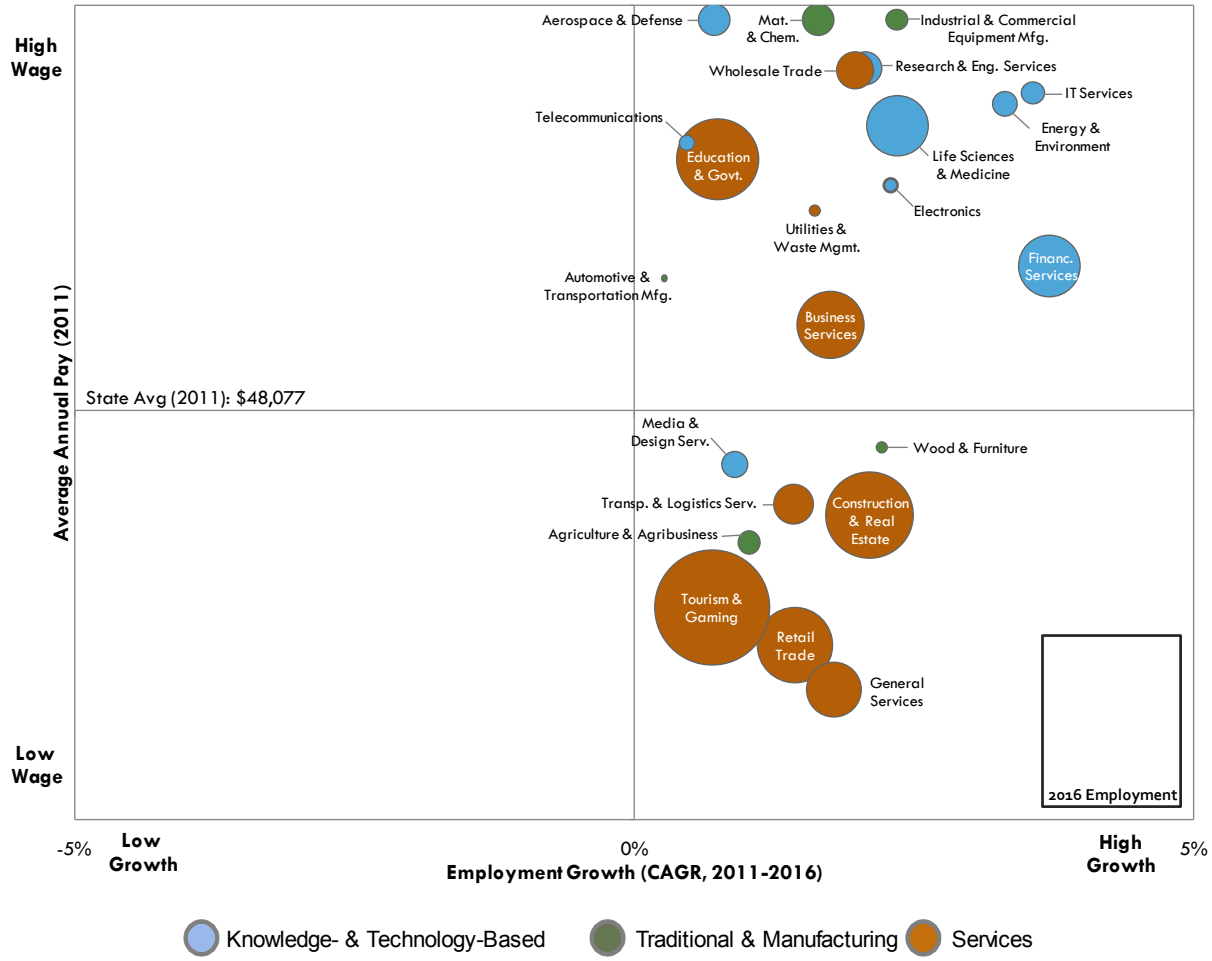
Overview of Nevada Industry Clusters, Q2 2011



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the employment size for that cluster in Q2 2011.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
- The horizontal axis represents employment growth expressed as a compound annual growth rate (CAGR) from 2006 to 2011. Industry clusters falling to the right of the midpoint have a positive employment growth rate, and industry clusters falling to the left of the midpoint have a negative employment growth rate.
- The vertical axis represents average annual pay in Q2 2011. Industries falling above the midpoint have an average annual pay that is greater than the overall average for Nevada ($48,077), and those falling below the midpoint have average annual pay levels falling below the state average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth (e.g., *Construction & Real Estate*, *Retail Trade*).

Overview of Nevada Industry Clusters, 2016 (projected)



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the predicted employment size for that cluster in 2016.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
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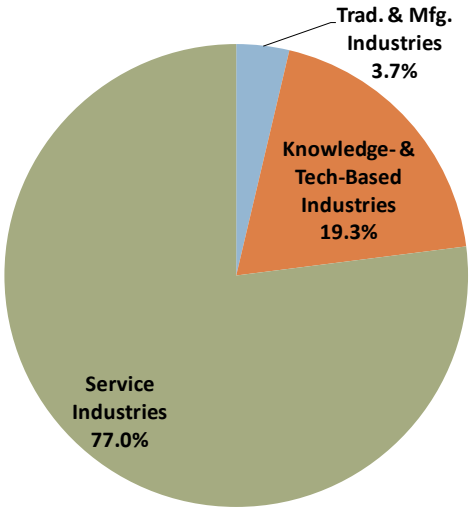
- The vertical axis represents average annual pay in Q2 2011 (note that projected pay levels for 2016 are not available). Industries falling above the midpoint have an average annual pay that is greater than the overall average for Nevada ($48,077), and those falling below the midpoint have average annual pay levels falling below the state average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth.

State of Nevada Industry Profiles in Q2 2011



Service-Based Industries:

- 77.0% of total employment (1,123,358 workers)
- -2.36% avg. annual decline in employment from 2006-2011
- 71.0% of total establishments (51,749 establishments) in 2010
- Average annual pay of $43,066

Knowledge- & Technology-Based Industries:

- 19.3% of total employment (281,641 workers)
- 1.59% avg. annual growth in employment from 2006-2011
- 26.0% of total establishments (18,931 establishments) in 2010
- Average annual pay of $64,394

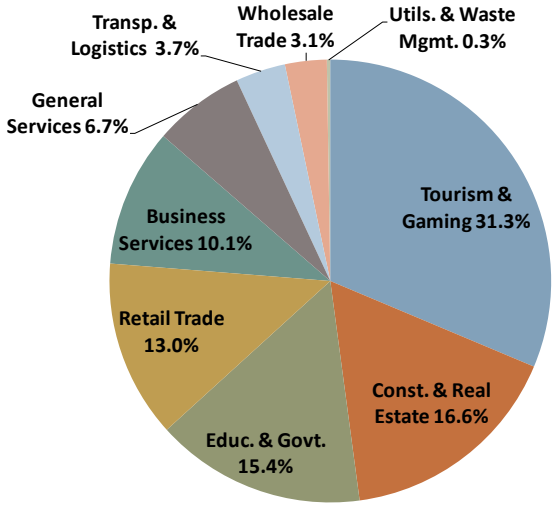
Traditional & Manufacturing Industries:

- 3.7% of total employment (53,750 workers)
- -3.75% avg. annual decline in employment from 2006-2011
- 3.0% of total establishments (2,158 establishments) in 2010
- Average annual pay of $67,216

As depicted in the chart above, the economy of the State of Nevada is heavily dominated by ***service-based industries***, representing about three-quarters of all state employment and establishments. Eight of the ten largest clusters in the state are *service industries*. Employment in the state's *service industries* is predominantly in lower-wage, lower-skill, consumption-based clusters, such as *Tourism & Gaming*, *Construction & Real Estate,* and *Retail Trade*. Average annual wages in the *service industries* were $43,066 in Q2 2011, well below the state average ($48,077).

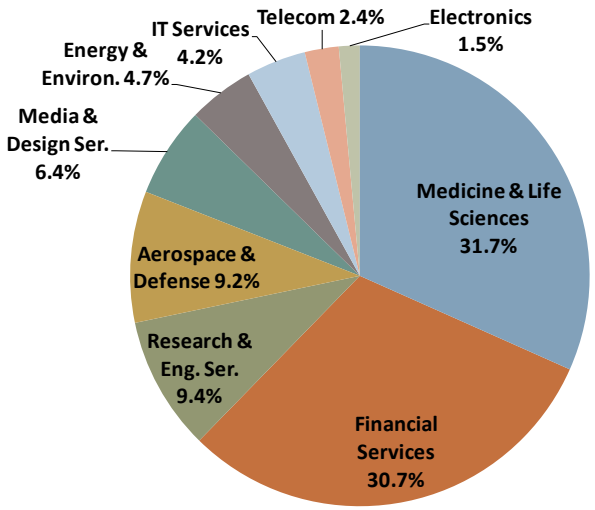
Overall employment in *service industries* has declined over the past five years in the State of Nevada, at an average annual rate of -2.36%. Over this time period (2006-2011), the majority of the state's *service-based industries* have declined, with only *General Services* (2.38% CAGR) and *Education & Government* (0.60% CAGR) experiencing some moderate positive employment growth.

State of Nevada *Service Industry* Employment, Q2 2011



Knowledge- & technology-based industries represent just under one-fifth of all employment and establishments in the State of Nevada. The State of Nevada's *knowledge- & technology-based industries* have experienced moderate, positive growth from 2006-2011 (1.59% CAGR) while *service-based* and *traditional & manufacturing industries* in the state have declined. The growth rates from 200 to 2011 amongst Nevada's *knowledge- & technology-based* clusters were mixed, with *Energy & Environment* (3.90% CAGR), *IT Services* (3.56% CAGR), *Financial Services* (2.86% CAGR), *Medicine & Life Science* (2.64% CAGR), and *Aerospace & Defense* (1.72% CAGR) posting positive growth (while employment in the remaining clusters declined).

State of Nevada *Knowledge- & Technology-Based Industry* Employment, Q2 2011

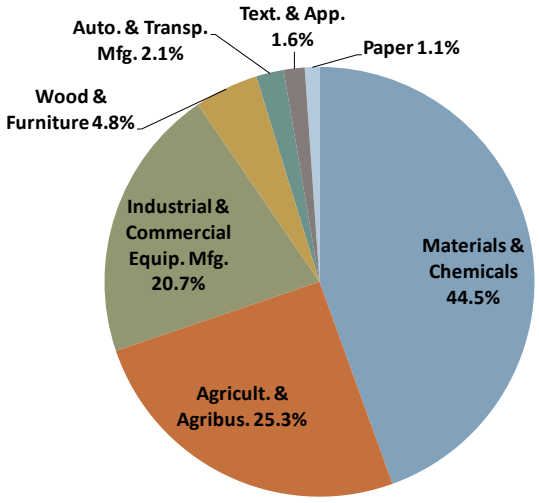


These industries are generally those that incorporate highly-skilled human capital, innovation, and higher-than-average levels of technological infrastructure or inputs. Due to their higher education and skill requirements, the *knowledge- & technology- based industries* also offer pay levels well above the state average, with annual earnings at $64,394 per worker (on average) – about 34% higher than the state average of $48,077.

Traditional & manufacturing industries represent a very small proportion of the Nevada's economy, accounting for just 3.7% of total employment and 3.0% of total establishments. Employment in these industries has declined rapidly over the past five years, at an average annual rate of -3.75% (2006-2011). This decline most likely reflects an ongoing national trend associated with the economic recession, the movement of traditional industries overseas, and increased productivity (i.e., maintaining or increasing output with few workers).

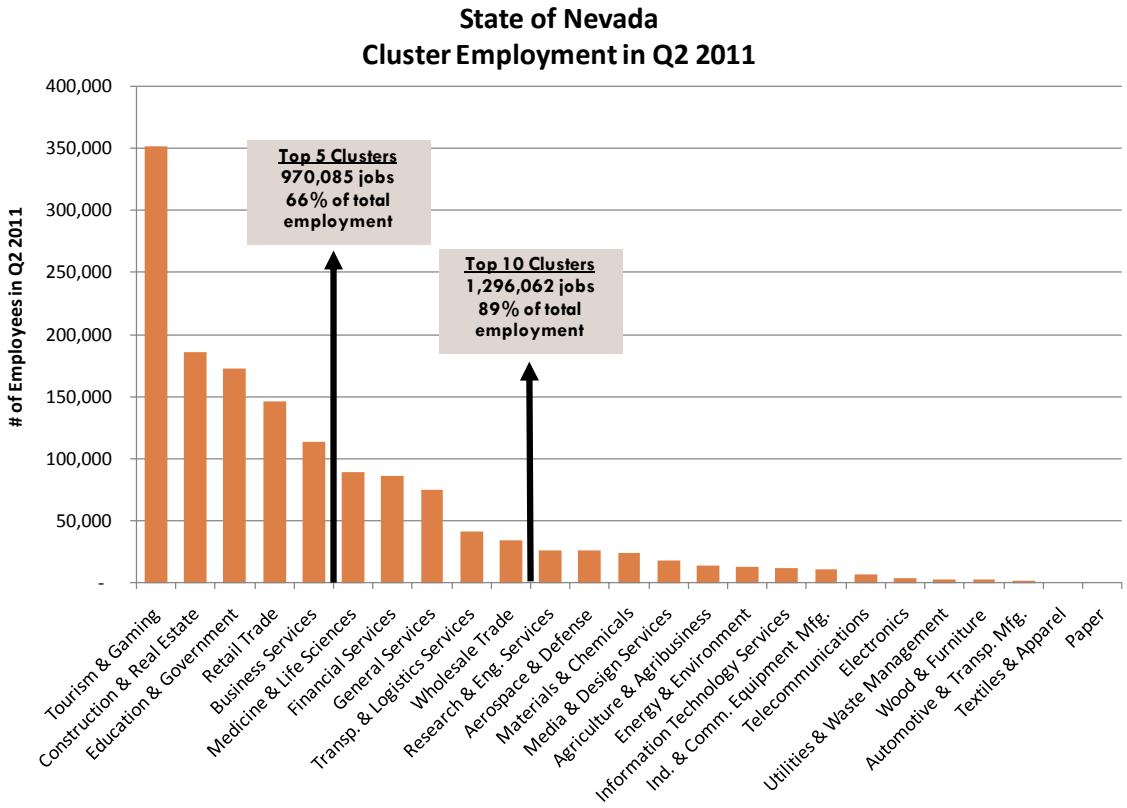
Materials & Chemicals is by far the largest *traditional & manufacturing industry* cluster in Nevada, followed by *Agriculture & Agribusiness*. Average annual wages in this sector were high, at $67,216 per worker per annum (well above the state average of $48,077).

State of Nevada *Trad. & Mfg. Industry* Employment, Q2 2011



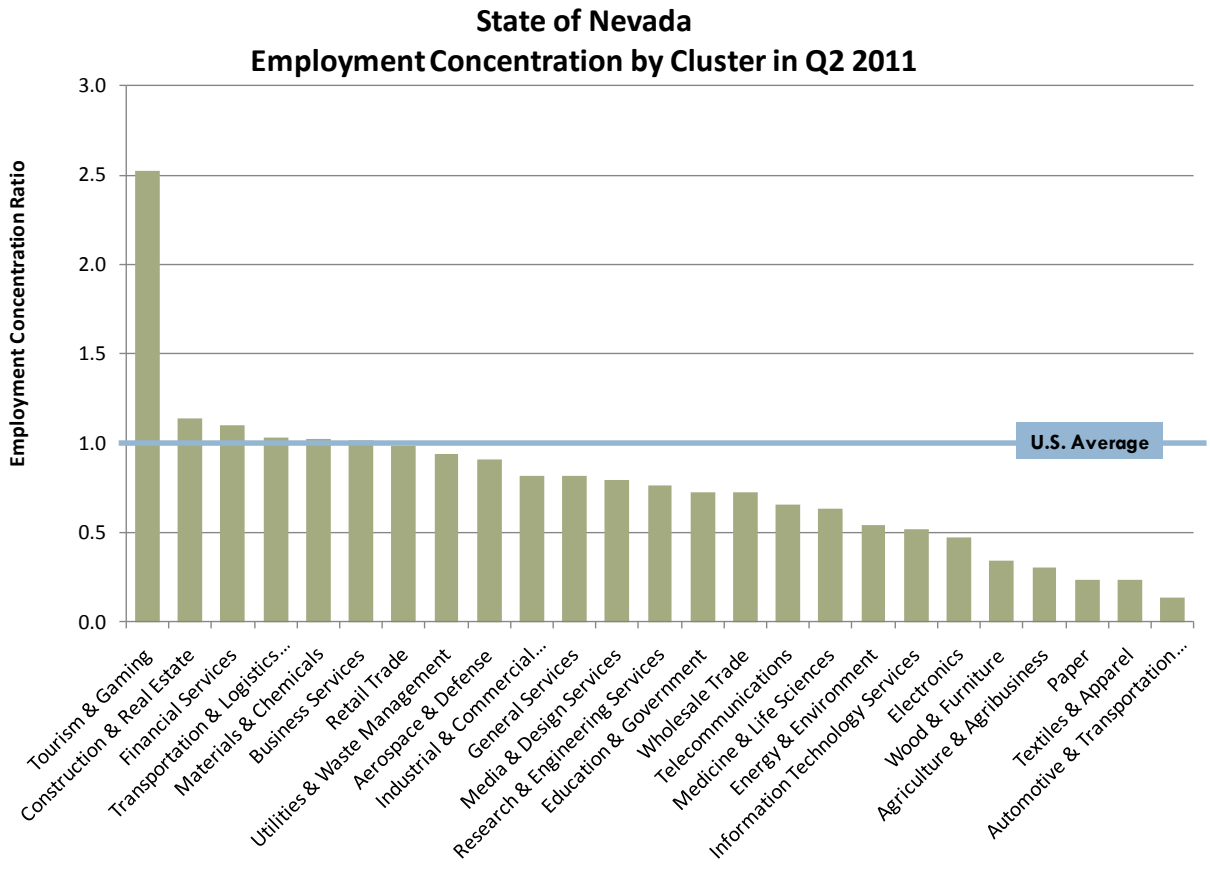
EMPLOYMENT

The chart below summarizes employment across all twenty-five industry clustered analyzed for the State of Nevada. *Tourism & Gaming* is by far the largest employer; with 351,808 jobs, this cluster alone accounts for 24% of total employment in the state. *Tourism & Gaming* is followed by *Construction & Real Estate*, *Education & Government, Retail Trade,* and *Business Services*. These five clusters account for over 970,085, or 66% of total employment in the state. The ten largest clusters, as shown in the chart below, represent 1,296,062 jobs, or 89% of Nevada's total employment.



EMPLOYMENT CONCENTRATION

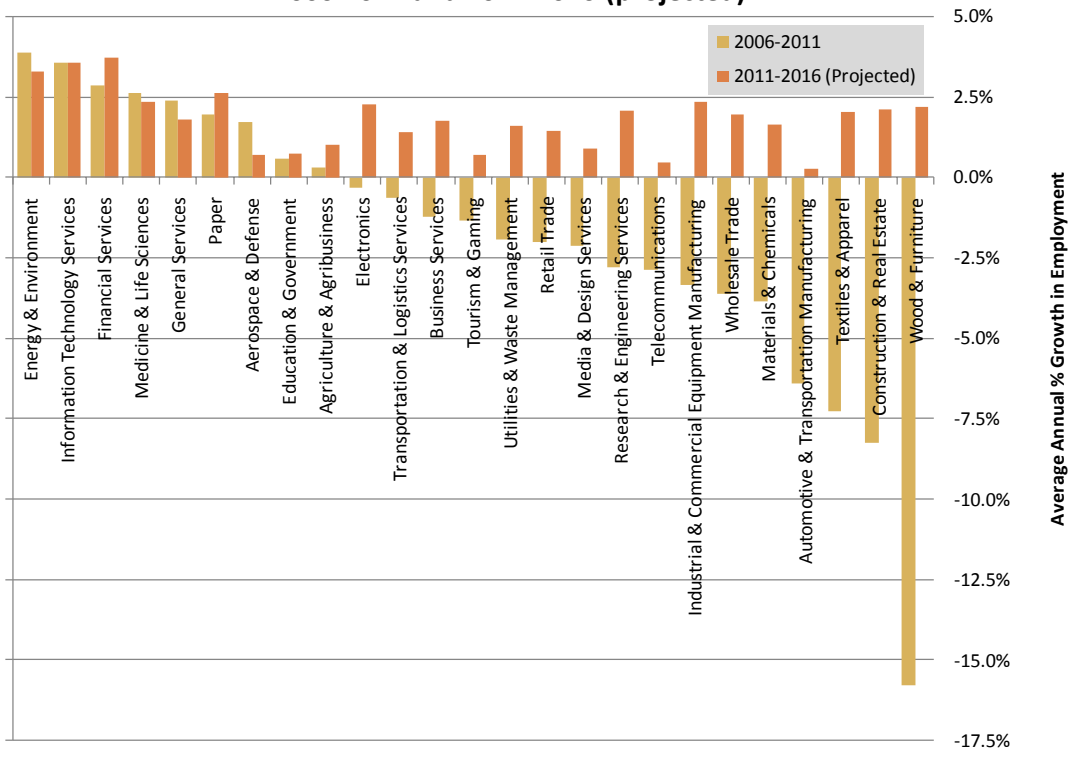
Employment concentration ratios (also known as *location quotients*) measure the relative importance of each industry cluster in the state's economy as compared to the nation as a whole, providing insight into the composition and character of Nevada's economy. An employment concentration ratio greater than one indicates that an industry is more concentrated in Nevada than in the overall U.S. economy, while clusters with ratios less than one are less concentrated than the national average. The following chart displays the concentration ratios for all twenty-five industry clusters in the State of Nevada. Six of the state's clusters are more concentrated than the national average: *Tourism & Gaming*; *Construction & Real Estate*; *Financial Services*; *Transportation & Logistics Services*; *Materials & Chemicals*; and *Business Services*. *Tourism & Gaming* is by far the most concentrated cluster in the State of Nevada, with an employment concentration ratio of 2.524.



EMPLOYMENT GROWTH RATES

The following chart depicts growth rates for each of the twenty-five industry clusters, both over the past five years (2006-2011), as well as the projected growth from 2011-2016. Only nine industry clusters in Nevada have experienced positive employment growth rates over the past five years, and the majority of these are *knowledge- & technology-based* clusters. However, as the economy recovers, nearly all industry clusters in the State of Nevada are expected to grow over the next five years.

State of Nevada Average Annual Employment Growth by Cluster, 2006-2011 and 2011-2016 (projected)



The table below presents a comparison of the industries that have experienced positive employment growth in Nevada over the past five years. A number of Nevada's industries with positive growth rates reflect a trend of increasing employment nationwide, including *Energy & Environment*; *Financial Services*; *Medicine & Life Sciences*; *IT Services*; *General Services*; *Education & Government*; and *Agriculture & Agribusiness*. In the case of six industries (*Financial Services*; *IT Services*; *General Services Agriculture & Agribusiness Aerospace & Defense* and *Paper*), the State of Nevada outperforms the national growth rates. This may be the result of population growth or other demographic changes, or may indicate a competitive advantage or opportunity in the state. Such trends will be examined more closely during the stakeholder focus groups in Nevada, as well as in further stages of analysis.

Industry Cluster Employment Growth Comparisons		
	Average Annual Employment Growth Rates 2006 to 2011	
	State of Nevada	United States
Clusters with positive growth trends in the State of Nevada and nationwide		
Energy & Environment	3.90%	4.60%
Financial Services	2.86%	2.04%
Medicine & Life Sciences	2.64%	2.03%
IT Services	3.56%	2.03%
General Services	2.38%	0.95%
Education & Government	0.60%	0.54%
Agriculture & Agribusiness	0.31%	0.10%
Clusters with positive growth trends in the State of Nevada, but negative growth nationwide		
Aerospace & Defense	1.72%	-0.22%
Paper *	1.94%	-3.50%

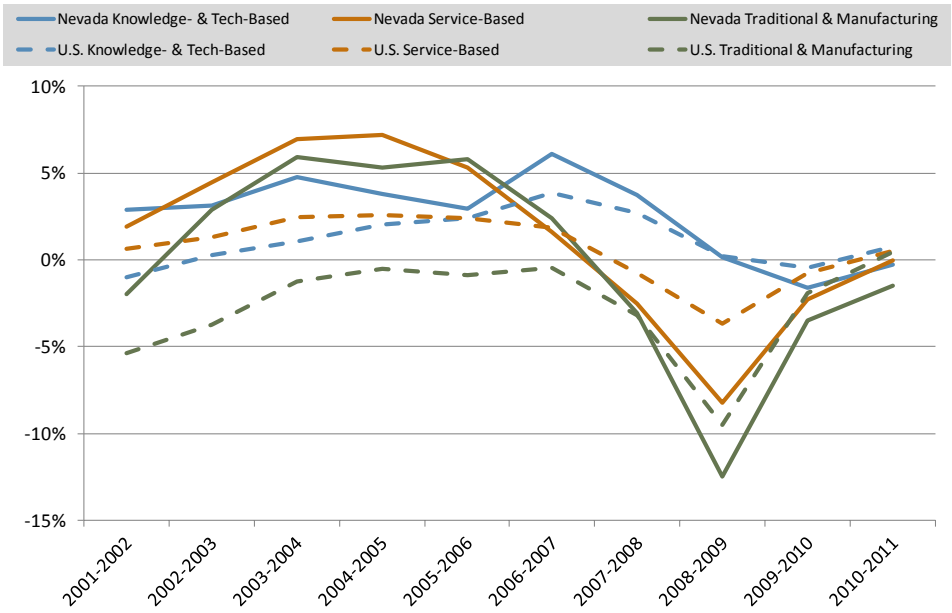
* When looking at the cluster growth rates, it is important to note that some fast-growing clusters actually had a very small level of employment in Nevada during this time period (e.g., among the industries shown in this table, *Paper* employed only 589 workers in 2011), so the high growth rates may be a bit deceptive (they are high because they are calculated from a very small base).

THE BUSINESS CYCLE

As shown in the table on the following page, many industry clusters that were strong and growing during the economic expansion of 2002-2007 contracted dramatically during the recent economic recession, and have yet to recover and resume growth. Many of the largest employer industries in Nevada, such as *Tourism & Gaming*, *Construction & Real Estate*, *Retail Trade*, and *Business Services* have contracted both in Nevada and in the U.S. overall (though in each of these examples the contraction was much more pronounced in the State of Nevada). In contrast, some *knowledge- and technology-based industries*, including *Energy & Environment*, *IT Services*, and *Medicine & Life Sciences*, have continued to grow through the recession and recovery periods (both in Nevada and nationwide).

As discussed in *Section II* of this report, Nevada's economy has experienced a dramatic boom-bust cycle during the last decade – demonstrating high volatility in growth rates, as compared to national averages. The state's economy is consumption-oriented and relies heavily on consumer spending. The chart below illustrates the changing annual employment growth rates in Nevada and the United States for the three major industry segments analyzed in this section of the report. In both Nevada and nationwide, *knowledge- & technology-based* industries have displayed the least volatility over the past decade, followed by *service-based* and *traditional- & manufacturing* industries. For each of these segments, it is clear that the economy of the State of Nevada fluctuates much more dramatically than the same segment of the national economy – with higher growth during expansion and stronger contraction during the recent economic recession.

Comparison of U.S. and Nevada
Annual Employment Growth Rates, 2001-2011



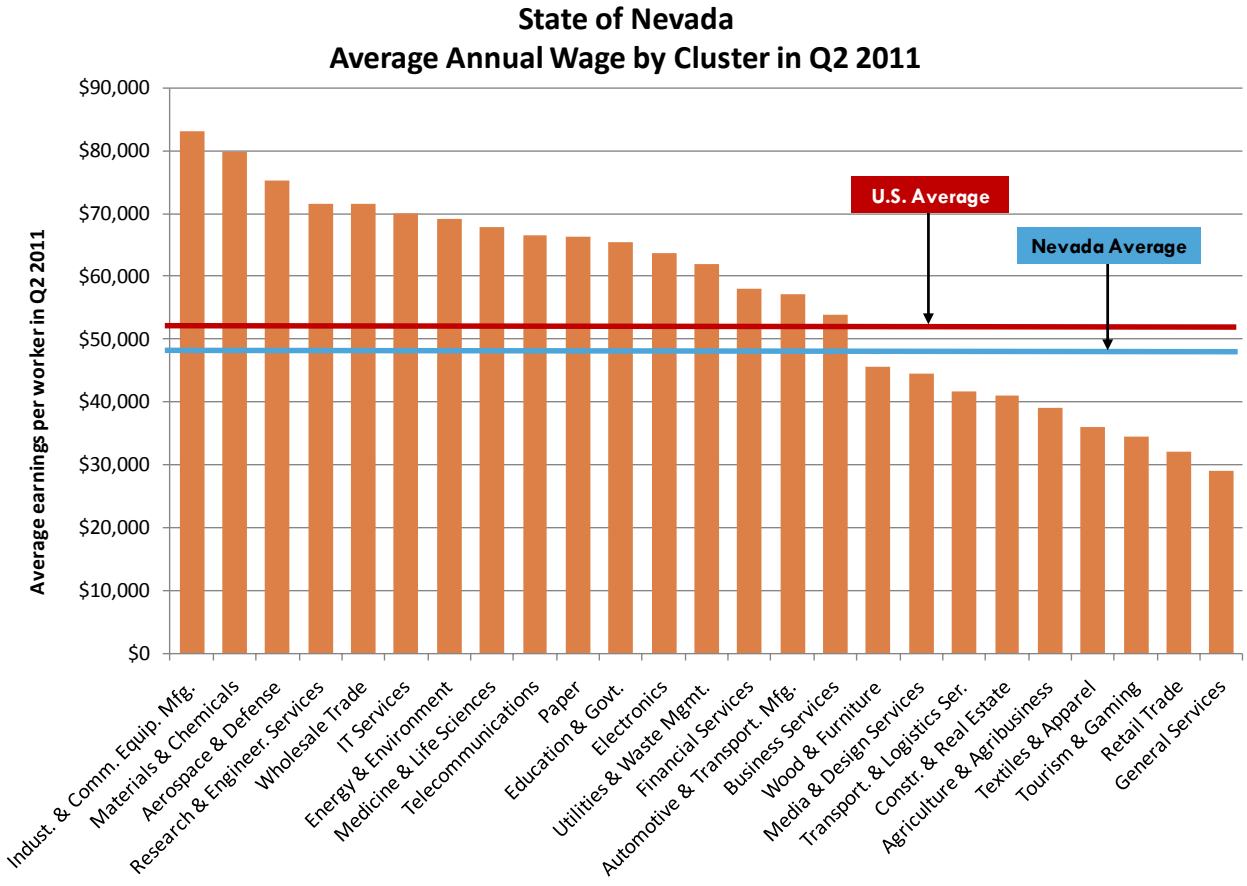
Business Cycle Growth Rates for the State of Nevada's Industry Clusters

	Expansion 2002 2007		The Recession 2007 2009		Initial Recovery 2009 2011		Predicted 2011 2016	
	Nevada	U.S.	Nevada	U.S.	Nevada	U.S.	Nevada	U.S.
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	2.39%	-0.39%	3.28%	0.14%	-2.65%	-1.11%	0.72%	0.29%
Energy & Environ.	2.03%	2.74%	8.73%	7.34%	0.01%	1.37%	3.32%	2.26%
Electronics	1.07%	-2.85%	-1.40%	-6.13%	-1.71%	-0.88%	2.29%	-1.89%
Financial Services	4.65%	2.33%	6.49%	3.51%	-2.52%	-0.98%	3.71%	2.16%
IT Services	6.38%	2.28%	1.78%	0.60%	1.60%	1.14%	3.56%	2.49%
Medicine & Life Sci.	4.15%	2.45%	2.29%	2.23%	1.84%	1.27%	2.35%	2.22%
Media & Design Serv.	5.86%	1.50%	-7.05%	-3.57%	-1.78%	-1.24%	0.90%	0.74%
Research & Eng. Serv.	6.54%	4.74%	-6.32%	-1.03%	-3.19%	0.30%	2.07%	2.70%
Telecommunications	-4.05%	-3.67%	-5.68%	-2.36%	-2.22%	-3.63%	0.47%	-0.31%
Service-Based Clusters								
Business Services	6.02%	1.87%	-5.50%	-4.40%	1.73%	1.44%	1.75%	1.24%
Constr. & Real Estate	9.33%	4.74%	-12.79%	-5.22%	-6.55%	-1.57%	2.11%	1.84%
Education & Govt.	4.11%	1.15%	0.07%	0.91%	-0.85%	-0.30%	0.75%	1.16%
Retail Trade	4.09%	0.77%	-4.53%	-3.66%	-1.00%	-0.22%	1.44%	0.28%
General Services	6.23%	2.35%	-0.87%	-0.39%	2.01%	1.07%	1.79%	1.55%
Transp. & Log. Serv.	7.39%	2.64%	-4.04%	-3.98%	-0.50%	-0.10%	1.42%	0.94%
Tourism & Gaming	2.88%	2.33%	-4.26%	-0.58%	0.37%	0.14%	0.69%	1.53%
Util. & Waste Mgmt.	2.30%	1.93%	-3.74%	-0.89%	1.16%	0.47%	1.61%	1.74%
Wholesale Trade	2.81%	1.57%	-5.67%	-3.40%	-3.72%	-0.49%	1.97%	0.73%
Traditional & Manufacturing Clusters								
Agriculture & Agribus.	3.19%	-0.81%	-2.02%	-0.68%	-0.81%	-0.46%	1.03%	-0.29%
Auto. & Transp. Mfg.	3.48%	-2.04%	-10.39%	-14.27%	-6.52%	0.15%	0.27%	-1.78%
Industrial & Comm. Equipment Mfg.	5.14%	-0.57%	-6.42%	-8.46%	-4.32%	-0.52%	2.34%	-1.24%
Materials & Chem.	5.70%	-0.95%	-9.32%	-8.60%	-1.83%	-0.63%	1.65%	-0.89%
Paper	8.13%	-3.83%	3.31%	-5.71%	0.17%	-1.52%	2.64%	-2.83%
Textiles & Apparel	0.43%	-6.92%	-16.49%	-12.05%	1.76%	-2.33%	2.04%	-4.61%
Wood & Furniture	0.51%	-1.62%	-20.90%	-12.77%	-8.32%	-2.69%	2.21%	-1.07%
Total Economy	**4.89%**	**1.77%**	**-4.24%**	**-1.66%**	**-1.17%**	**-0.09%**	**1.55%**	**1.24%**

Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

WAGES

The average annual wage in the State of Nevada in Q2 2011 is $48,077, slightly below the national average of $51,851. Sixteen of Nevada's industry clusters have annual wages that exceed the U.S. and state average annual wages. The state's highest-paying industry cluster is *Industrial & Commercial Equipment Manufacturing* with an annual average wage of $83,072, followed closely by *Materials & Chemicals* ($79,794) and *Aerospace & Defense* ($75,145).



INDUSTRY SKILL LEVELS (COMPARED TO WAGES)

SRI has developed a methodology that utilizes U.S. Department of Labor data to assess the skill levels associated with each of the industry clusters analyzed in this study.[19] This analysis provides an additional way to pinpoint clusters that offer opportunities for the state to build employment in industries that offer high-quality, high-skill, and high-wage jobs. The table below maps the skill levels and wages of Nevada's twenty-five industry clusters, with wages characterized according to the following scale:

- "***High wage***" clusters have average annual pay at least 15% greater than the average annual pay across all clusters in Nevada in 2011 ($48,077).
- "***Medium wage*** clusters have average annual pay within 15% above or below $48,077.
- "***Low wage*** clusters have average annual pay at least 15% below $48,077.

Note in the following table that cluster skill levels tend to be correlated with wages – the majority of the very high- and high-skill clusters are grouped in the "medium wage" and "high wage" categories, while low-skill clusters are all in the "low wage" category.

Skill Levels and Wages in the State of Nevada's Industry Clusters, Q2 2011

	Low Wage	Medium Wage	High Wage
Very High Skill			■ Aerospace & Defense ■ Financial Services ■ Information Technology Services ■ Research & Engineering Services
High Skill	■ General Services	■ Business Services ■ Media & Design Services	■ Automotive & Transportation Mfg. ■ Education & Government ■ Electronics ■ Medicine & Life Sciences ■ Telecommunications ■ Wholesale Trade
Medium Skill	■ Agriculture & Agribusiness ■ Construction & Real Estate ■ Textiles & Apparel	■ Wood & Furniture ■ Transportation & Logistics Services	■ Utilities & Waste Management ■ Energy & Environment ■ Materials & Chemicals ■ Industrial & Com. Equip. Mfg.
Low Skill	■ Retail Trade ■ Tourism & Gaming		

[19] For more information about SRI's methodology for assessing cluster skill levels, see *Appendix C*. The skill level ratings are based o national data; they are not tailored to Nevada.

B. INNOVATION ANALYSIS: STATE OF NEVADA

Innovation is the development of new ideas, products, and processes that create value for customers or citizens. Supporting innovation and promoting the development and commercialization of new knowledge requires significant support from public and private research institutions, as well as a robust entrepreneurial environment. This section first provides an overview analysis of key strengths and gaps in Nevada's innovation ecosystem. The section describes innovation activity in the State of Nevada in more detail by examining two classes of innovation indicators: *innovation inputs* and *innovation outputs*. No indicator provides a perfect picture of innovation activity within a state, but the indicators included below are commonly accepted proxy measures of innovation activity and describe, in broad strokes, recent innovation activity in Nevada.

NEVADA'S INNOVATION ECOSYSTEM – STRENGTHS AND GAPS

Human Capital. Nevada's workforce and educational assets need significant attention and investment to attract and grow the kinds of knowledge- and innovation-based firms Nevada is seeking to develop its future economy. Most business stakeholders interviewed for this study stated that it can be challenging to hire for IT and highly technical positions within Nevada. Companies frequently hire outside the state for these kinds of positions, but even out-of-state recruitment can be challenging as workers often have concerns about Nevada's weak K-12 educational system. Recent educational statistics validate these concerns. The level of higher education attainment in Nevada is well below the national average, with only 21.7% of adults holding a bachelor's degree or higher in 2009 (ranking Nevada 44th among all 50 states; U.S. average is 27.8%), and with 83.7% of adults holding a high school credential or higher (ranking 37th among all states; U.S. average is 84.9%). While educational attainment has improved in Nevada over the last several years, Nevada's national rankings on these indicators have not.[20] Currently, only 29% of adults over 25 in Nevada hold at least an associate's degree or higher[21], and at the current growth rate, this share will grow to 31% in 2018.[22] An estimated 54% of all jobs in Nevada will require post-high school training in 2018, meaning that there will be a wide gap of qualified job candidates in Nevada for such positions.[23]

Looking more specifically at the STEM workforce needed for innovation and knowledge creation, Nevada is similarly weak. Workers employed in S&E occupations represent only 2.2% of total jobs in

[20] Census Bureau, *2007-2009 American Community Survey 3-Year Estimates* and *2005 American Community Survey*, http://factfinder.census.gov.
[21] Census Bureau, *2007-2009 American Community Survey 3-Year Estimates* and *2005 American Community Survey*, http://factfinder.census.gov.
[22] SRI analysis of education attainment data from the *American Community Survey* and state population projections from the Census Bureau.
[23] State-level data from A. Carnevale, N. Smith, and J. Strohl, *Help Wanted: Projections of Jobs and Education Requirements Through 2018*, Georgetown University Center on Education and the Workforce, June 2010, http://cew.georgetown.edu/jobs2018/states/.

the State Nevada, at half the national average (4.4%) and ranking 49th among all states.[24] Nevada's higher education institutions produced 2,538 graduates with S&E degrees (at the bachelors and graduate levels) in 2009, ranking Nevada last among all states on a per capita basis.[25] Nevada's pipeline of students currently studying in S&E graduate programs ranks 48th on a per capita basis.[26] To prepare Nevada's future workforce, STEM-related education needs to be enhanced even within the K-12 system. The state's 8th graders rank 39th (among all states) for their science scores and 43rd for their mathematics scores on the National Assessment of Educational Progress.[27] Nevada's weak rankings on all of these indicators are largely driven by the weaknesses in the Las Vegas metro area. Looking at the regional level, the Reno region actually performs average to above average (and better than many peer metros) for its S&E workforce and pipeline, while Las Vegas benchmarks poorly on all S&E workforce and education indicators.

Infrastructure. In general, Nevada provides excellent physical and technology infrastructure to support its innovative companies and workforce. Air connectivity – which can be especially important for professional and knowledge workers who travel frequently for business – is excellent, with both Las Vegas and Reno boasting world-class airport facilities. As a state, Nevada ranks 3rd in the nation (behind Hawaii and Alaska) for its number of scheduled aircraft departures per capita.[28] Technology infrastructure and Internet connectivity is considered to be excellent in both the Reno and Las Vegas metro areas, but this strength has not been well-marketed and is nearly impossible to document statistically. A particular advantage for Nevada is that the state's technology infrastructure is relatively new (as compared to other states), so fiber optic cable is more prevalent, and there are often multiple service providers available. The Switch SuperNAP data center in Las Vegas represents a unique strength, in that it boasts Internet connectivity, speed, and reliability that, it claims, is second to no other data center in the world, with more than 20 Internet service providers on-site. This service also allows Switch to offer an aggregated telecom purchasing/pricing approach for its customers (and possibly even for other businesses in the state) that is highly competitive against any other region in the country.

Where Nevada needs improvement is in availability of the R&D infrastructure, such as laboratory space, required by academic and private researchers conducting cutting-edge and innovative research. Nevada offers 1.1 million square feet of total S&E research space (a proxy indicator for

[24] SRI analysis of 2009 BLS data. Bureau of Labor Statistics, *Occupational Employment Statistics*, http://www.bls.gov/oes/home.htm.
[25] SRI analysis of 2009 IPEDS data. National Center for Education Statistics, *Integrated Postsecondary Education Data System*, http://nces.ed.gov/ipeds/.
[26] SRI analysis of 2008 NSF data. National Science Foundation, *Survey of Graduate Students and Postdoctorates in Science and Engineering 2008* http://www.nsf.gov/statistics/srvygradpostdoc/pub_data.cfm.
[27] SRI analysis of 2005 (science) and 2009 (math) NAEP data. NAEP is the largest nationally representative assessment of student achievement by state. National Center for Education Statistics, *National Assessment of Educational Progress: The Nation's Report Card* http://nces.ed.gov/nationsreportcard/statecomparisons/.
[28] SRI analysis of 2009 USDOT data. U.S. Department of Transportation, Bureau of Transportation Statistics, *TranStats – Air Carriers: T-100 Segment (All Carriers)* http://www.transtats.bts.gov/DL_SelectFields.asp?Table_ID=293&DB_Short_Name=Air Carriers.

laboratory space) – or 0.42 sq.ft. per capita, well below the national average of 0.70 sq.ft. per capita. Nevada's S&E research space is heavily concentrated in Reno, with University of Nevada, Reno accounting for nearly 70% of all S&E research space in the state (and this region exceeds the national average on a per capita basis, at 1.46 sq.ft.). On the other hand, there is significant under-investment in S&E research space in the Las Vegas metro area, with only 0.14 sq.ft. per capita in this region (and Las Vegas accounts for only 25% of all research space in the state). In most fields, Nevada lags the U.S. average in the availability of laboratory S&E research facilities; however, the state does have substantially more Physical Sciences space than the national average (this is in part due to the extensive facilities reported by the Desert Research Institute).[29]

Finance. In general, Nevada lags other state and the national average for its level of funding for R&D, innovation, and entrepreneurial activities. Nevada receives less than 0.3% of all federal R&D funding in the United States, and measured on a per capita basis, federal R&D funding in Nevada is less than one-third of the national average (at $115 in Nevada versus $370 nationally). Nevada does, however, receive a higher-than-average level of federal R&D funding from the Department of Defense and the Environmental Protection Agency.[30] Looking more specifically at R&D spending at Nevada's higher education institutions, university R&D is heavily concentrated in the Reno metro area (and is above average on a per capita basis, at $248 in the Reno/Carson City region versus $179 nationally). On the other hand, university R&D spending in the Las Vegas metro area significantly lags the national average (at $20 per capita in Las Vegas). Nevada's universities are heavily reliant on federal sources for their R&D funding, with the federal government supporting 68% of all academic R&D in Nevada, versus only 59% nationally. These statistics indicate that there is a need to cultivate non-federal sources of R&D support in the state, included state/local government resources and especially private sector resources. Nevada has one of the lowest rates of industry financing for academic R&D in the nation (only 2.5% of all academic R&D comes from industry sources in Nevada, as compared to 12.3% in North Carolina, 8.0% in Washington, 6.8% in California, and 5.8% as the national average).[31]

As R&D activities move toward commercialization and company start-up, financing resources can also be scarce in Nevada. From 2005-2010, Nevada received venture capital (VC) investments that averaged $38.8 million per year, representing only 0.2% of the nationwide annual VC investments during this time period. By contrast, VC investments neighboring states Utah and Arizona were over four times the level in Nevada (at $170.9 and $168.9 annually, respectively). Nevada averaged only 6 VC deals per year during this period (as compared to 34 in Utah and 26 in Arizona).[32] While Nevada's level of VC financing is clearly low, what is less clear is whether this situation is simply due to a lack

[29] SRI analysis of 2009 NCSES data. National Center for Science and Engineering Statistics, *Survey of Science and Engineering Research Facilities* Fiscal Year 2009, http://www.nsf.gov/statistics/srvyfacilities/.
[30] SRI analysis of 2007 NSF data. NSF, *Survey of Federal Funds for Research and Development* 2007, http://www.nsf.gov/statistics/fedfunds/.
[31] SRI analysis of 2009 NSF data. NSF, *Survey of Research and Development Expenditures at Universities and Colleges* 2009, http://www.nsf.gov/statistics/srvyrdexpenditures/.
[32] SRI analysis of 2005-2010 PricewaterhouseCoopers/National Venture Capital Association *MoneyTree*™ data.

of VC investors in the state, or whether there is a more deep-rooted lack of high-potential ventures and start-ups to attract the interest of such investors.

Innovative Capacity. Innovative capacity represents the ability of a region not only to conduct innovative R&D activities, but also to win R&D grants/awards and to turn such activities into measurable innovation outputs such as publications and patents. As mentioned above, the overall level of R&D activity in Nevada is quite low relative to other states (as measured by R&D funding and expenditures). Nevada ranks 37th in the nation for its level of federal R&D funding, and the state ranks 41st for academic R&D expenditures and 35th for industrial R&D expenditures. When measured as a share of GDP, Nevada's rankings for these indicators fall even lower and also fall far below the national average.[33] Another indicator of a state's innovative capacity is the ability of its firms to win competitive and prestigious federal R&D grants and awards; in this regard, Nevada also performs poorly. Nevada' firms won only 61 SBIR and STTR awards total from 2006-2010 (only 0.2% of the U.S. total), or 23 awards for every 1 million people in the state – an award rate that is only one-third the national average (84 awards per million people).[34] Nevada received 245 NSF-funded awards from 2006-2010 (0.4% of the U.S. total), or 93 awards for every 1 million people in the state – an award rate that is half the national average (200 awards per million people).[35]

On several measures of innovation outputs, Nevada's performance is similarly weak. Nevada accounts for 0.86% of the U.S. population, but from 2009-2010, Nevada-based researchers produced 2,529 publications in peer-reviewed journals, or 0.45% of the U.S. total scientific publications. There were 2,006 patents granted in Nevada from 2006-2010, or 0.46% of the U.S. total patents. For both publications and patents, Nevada's per capita rate is half the national average (939 publications per million people in Nevada in 2009-2010, versus 1,841 publications per million people nationwide; 762 patents per million people in Nevada in 2006-2010, versus 1,438 patents per million people nationwide).[36] Nevada's innovative capacity in its higher education system is further hampered by the fact that it does not have a top-tier Carnegie-ranked doctoral research university (and it is the only state of over 2 million people to lack such an institution).[37]

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[33] Nevada's federal R&D funding is at $2.31 per $1,000 GSP (versus $8.12 nationally; 2007 data); academic R&D expenditures are at $1.46 per $1,000 GSP (versus $3.92 nationally; 2009 data); industrial R&D expenditures are at $4.38 per $1,000 GSP (versus $19.63 nationally; 2007 data). SRI analysis of NSF data. National Science Foundation, *Federal Funds for Research and Development: Fiscal Years 2005-07* http://www.nsf.gov/statistics/fedfunds/ *Academic Research an Development Expenditures: Fiscal Year 2009* http://www.nsf.gov/statistics/srvyrdexpenditures/ and *Research and Development in Industry: 2006-07* http://www.nsf.gov/statistics/industry/.

[34] SRI analysis of SBA data. Small Business Administration, *Tech-Net Database* http://tech-net.sba.gov/tech-net/public/dsp_search.cfm.

[35] SRI analysis of NSF Awards Database, http://www.nsf.gov/awardsearch/.

[36] SRI analysis of Thomson *Delphion* and ThomsonScientific data. Thomson *Delphion* http://www.delphion.com/. ThomsonScientific, *Science Citation Index – Expanded* http://www.thomsonscientific.com/cgi-bin/jrnlst/jloptions.cgi?PC=D.

[37] The Carnegie Foundation's "basic classification" for doctorate-granting universities provides three levels of rankings, the highest being "Research Universities (very high research activity)", and 108 institutions nationwide are ranked in this category. In Nevada, UNR and UNLV are both ranked in the second tier as "Research Universities (high research activity)". By contrast, most of Nevada's neighboring states (Arizona, California, Colorado, New Mexico, Utah) all have at least one research university in the top-tier Carnegie ranking. For more information, see: http://classifications.carnegiefoundation.org/.

Networks and Entrepreneurship. While innovation activity is an important measurement of a state's ability to compete in the global economy, the most important impact of innovation and R&D is when it is translated into commercializable and job-producing ventures and companies. Nevada generally falls in the bottom ten of all states for the ability of its research universities to commercialize their research outputs (ranking 41st for university licenses and options executed, 44th for university licensing income, and last for university invention disclosures/patents and university start-ups in 2008). Nevada's two major universities have spun off only one start-up company since 200 (the state's single university start-up was from UNR in 2004, and that company did not operate in Nevada). When benchmarked against peer metros and research institutions, however, Reno tends to perform more strongly against its peers for university commercialization activity, while Las Vegas typically falls at the bottom of the pack.[38] Nevada's research universities generally have very weak connections with private industry and companies in the state (except in a few fields such as tourism/gaming and mining), and this means that the research and innovation activities being performed by these institutions are not always connected to or relevant to the key industries in the state. One measure of university-industry networks is the amount of industry-sponsored R&D that is being performed in universities. With only $4.5 million in industry-funded R&D taking place at Nevada's universities and colleges in 2009, Nevada ranks 45th in the nation for its joint industry-university research activity.[39]

In spite of the weak entrepreneurial activity within Nevada's higher education system, the state actually has a very high level of entrepreneurism and business start-ups within the broader economy. Nevada ranks first among all states in the 2010 Kauffman Index of Entrepreneurial Activity, with 510 entrepreneurs for every 100,000 people in the state (a rate that is 1.5 times the national average).40 Nevada had a new business start-up rate of 7.1% in the last quarter of 2010, and the state has generally ranked in the top 10 of all states for its rate of new business starts in nearly every quarter over the last five years.[41]

[38] SRI analysis of AUTM data. Association of University Technology Managers, *AUTM Licensing Survey FY2008*, http://www.autm.net/index_ie.html For additional details on the benchmarking of the Reno and Las Vegas metro areas on these indicators, see *Section IV.C. and V.C.* in this report.

[39] SRI analysis of NSF data. National Science Foundation, *Academic Research an Development Expenditures: Fiscal Year 2009*, http://www.nsf.gov/statistics/srvyrdexpenditures/.

[40] Robert W. Fairlie, *Kauffman Index of Entrepreneurial Activity 1996-2010* March 2011, http://www.kauffman.org/uploadedFiles/KIEA_2011_report.pdf.

[41] SRI analysis of BLS data. Bureau of Labor Statistics, *Business Employment Dynamics* http://www.bls.gov/bdm/bdmstate.htm.

DETAILED INNOVATION INDICATORS

Summary of key innovation indicators:

- Overall, Nevada produces a relatively low number of doctorates, but it has a high concentration of psychology and geoscience doctorates.
- There is low overall availability of research facilities in the state, but higher than average availability of facilities in *Physical Sciences – atmospheric, earth, and geological sciences, meteorology and oceanography* and *Physical Sciences – astronomy, astrophysics, chemistry, an physics*.
- Total per capita federal R&D spending in Nevada is less than one-third of the national average, but Nevada receives higher than average R&D spending from the Department of Energy and the Environmental Protection Agency.
- Nevada's universities are heavily reliant on the federal government for R&D funding. The federal government supports 68% of all academic R&D in Nevada, versus 59% nationally. Academic R&D expenditures in Nevada have increased by 72% over the last 10 years, but United States as a whole increased at a faster rate (80%).
- Nevada receives relatively few National Science Foundation (NSF) awards in most fields (on a per capita basis), but does receive a higher than average number of awards in the fields of geosciences and polar research. The production of scientific publications in Nevada also reflects this trend, with a high location quotient for fields such as *Environmental Sciences Ecology Geology Meteorology Atmospheric Sciences* and *Water Resources*.
- Since July of 2007, the operating budget for the Nevada System of Higher Education has fallen by over $186 million, or -14.06%. This includes major operations budget reductions at the University of Nevada, Reno (-15.89%) and Las Vegas (-15.97%). Budgets are expected to decline further over the next two years; by 2013 the operational budget of the Nevada System of Higher Education is expected to fall to 71.29% of its 2007 level.[42]

[42] Nevada System of Higher Education budget accounts.

INNOVATION INPUTS

R&D PERSONNEL AND FACILITIES

The availability of highly educated human resources is an essential component of regional innovation systems. Ph.D.-level researchers provide key leadership and technical capabilities for R&D efforts that are often closely associated with technology innovation. The annual *NSF Survey of Earned Doctorates* has for decades served as the primary source of data regarding the development of these critical human resources.

Between 2006-2009, Nevada's higher education institutions granted 660 doctorate degrees, fewer than would be expected given the state's size (252 PhDs per million people in Nevada, as compared to 635 PhDs per million people for the entire United States). Education, psychology, life sciences, and engineering were the most commonly awarded degrees in Nevada. Psychology and geosciences are two of the state's strengths; each field shows a location quotient in excess of 2.5 in Nevada[43], and the state exceeds the national average in the number of degrees awarded on a per capita basis.

Nevada Earned Doctorates, 2006-2009

Academic Discipline	Ph.D.s awarded		Ph.D.s awarded per million people	
	Nevada	*United States*	*Nevada*	*United States*
Education	156	25,661	59.6	84.8
Psychology	**117**	**13,378**	**44.7**	**44.2**
Life Sciences	113	42,826	43.2	141.5
Engineering	90	30,423	34.4	100.5
Physical Sciences	48	16,399	18.4	54.2
Humanities	47	14,711	18.0	48.6
Geosciences	**33**	**3,377**	**12.6**	**11.2**
Business & Management	18	5,643	6.9	18.6
Social Sciences	16	16,743	6.1	55.3
Math & Computer Sciences	9	12,178	3.4	40.2
Arts & Music	5	3,783	1.9	12.5
Law	3	315	1.1	1.0
Other Non-Sciences or Unknown Discipline	3	889	1.1	2.9
Vocational Studies & Home Economics	2	208	0.8	0.7
Religion & Theology	0	1,560	0.0	5.2
Architecture & Environmental Design	0	342	0.0	1.1
Communication & Librarianship	0	2,371	0.0	7.8
Social Service Professions	0	1,265	0.0	4.2
Total	**660**	**192,072**	**252.3**	**634.7**

Source: NSF, *Survey of Earned Doctorates* 2006-2009

[43] The location quotient for doctoral degrees shows the relative concentration of doctoral degrees in each field in Nevada as compared to the national average. A location quotient greater than one indicates that a higher-than-average share of Nevada's doctoral degrees are in that field relative to the U.S. average.

Physical infrastructure for R&D – and laboratory space in particular – is a key indicator of a region's innovation capacity. The biannual *NSF Survey of Science and Engineering Research Facilities* shows that research space at universities across the United States has been growing at a declining rate over the past two decades. Nevada, however, has experienced significant growth in science and engineering (S&E) research space over the past two years. In particular, the University of Nevada, Reno reported an almost 36% increase in S&E research facilities between 2007 and 2009, with the most significant addition in space supporting the field of *Physical Sciences – astronomy, astrophysics, chemistry, and physics*.

Nevada Science & Engineerin Research Space, 2009

Field	Total Net Assignable Square Feet				Per Capita Net Assignable Square Feet	
	Desert Research Institute	*University of Nevada, Reno*	*University of Nevada, Las Vegas*	*Nevada Cancer Institute*	*Nevada*	*United States*
Agricultural & Natural Resources Sciences	5,657	144,171	936	0	0.056	0.095
Biological & Biomedical Sciences	21,572	118,469	47,489	86,965	0.102	0.211
Computer & Information Sciences	12,282	3,198	3,714	4,521	0.009	0.017
Engineering	0	111,746	52,994	0	0.061	0.099
Health & Clinical Sciences	0	46,038	10,331	0	0.021	0.128
Mathematics & Statistics	0	184	225	0	0.000	0.005
Physical Sciences – Atmospheric, earth, & geological sciences, meteorology and oceanography	**86,797**	**59,969**	**15,474**	**0**	**0.060**	**0.026**
Physical Sciences – Astronomy, astrophysics, chemistry, & physics	**0**	**158,300**	**36,935**	**0**	**0.073**	**0.066**
Psychology	0	22,203	5,656	0	0.010	0.018
Social Sciences	3,419	35,148	8,201	0	0.017	0.018
Other Science &Engineering Fields	0	12,651	0	0	0.005	0.014
Total	**129,727**	**712,077**	**181,955**	**91,486**	**0.415**	**0.697**

Source: National Center for Science and Engineering Statistics, *Survey of Science and Engineering Research Facilities* 2009

S&E research space at federally-funded research organizations in the State of Nevada is heavily concentrated in Reno, with University of Nevada, Reno accounting for nearly 70% of all S&E research space in the state. The majority of the state's research laboratory space is also housed at the University of Nevada, Reno (353,484 ft², or 58.0%), followed by the University of Nevada, Las Vegas (208,408 ft²) and the Desert Research Institute (48,061 ft²).[44] In most fields, Nevada lags the U.S. average in the availability of S&E research facilities; however, the state has substantially more

[44] Nevada System of Higher Education FY2011 property inventory

Physical Sciences space than the national average. This is in part due to the extensive facilities reported by the Desert Research Institute.

R&D SPENDING

Investment in R&D has been shown to have an important role in stimulating economic growth. Federal R&D funding accounts for more than a quarter of all R&D investment in the United States and nearly 60% of "basic" research.[45] The ability to attract federal R&D investment, as measured by NSF's *Survey of Federal Funds for Research and Development*, is therefore critical to a region's ability to maintain a world-class capacity to innovate. Overall, Nevada attracts relatively low federal R&D spending per capita for most agencies, averaging less than one-third the U.S. average. However, the state does attract significant per capita investments from the Department of Energy ("Defense Programs") and the Environmental Protection Agency.

Nevad Federa R&D Funding, 2007

Federal Agency	Federal R&D obligations ($000s)		Federal R&D obligations per capita	
	Nevada	*United States*	*Nevada*	*United States*
Department of Agriculture	$4,681	$2,244,436	$1.80	$7.45
Department of Commerce	$774	$1,027,556	$0.30	$3.41
Department of Defense	$60,620	$58,417,321	$23.31	$193.93
Department of Energy	**$160,872**	**$7,874,947**	**$61.85**	**$26.14**
Centers for Disease Control & Prevention	$594	$520,499	$0.23	$1.73
Department of Health & Human Services (HHS) – Centers for Medicare and Medicaid Services	$458	$57,317	$0.18	$0.19
HHS – Food & Drug Administration	$0	$128,952	$0.00	$0.43
HHS – Health Resources & Services Administration	$0	$23,243	$0.00	$0.08
HHS – National Institutes of Health	$22,154	$27,820,988	$8.52	$92.36
HHS – Other	$650	$398,427	$0.25	$1.32
Department of Homeland Security	$1	$861,693	$0.00	$2.86
Department of Transportation	$2,069	$789,865	$0.80	$2.62
Department of the Interior	$3,829	$614,068	$1.47	$2.04
Environmental Protection Agency	**$19,364**	**$575,326**	**$7.44**	**$1.91**
National Aeronautics & Space Administration (NASA)	$6,549	$6,119,977	$2.52	$20.32
National Science Foundation (NSF)	$16,309	$3,953,823	$6.27	$13.13
Total	**$298,924**	**$111,428,438**	**$114.92**	**$369.91**

Source: NSF, *Survey of Federal Funds for Research and Development* 2007

[45] National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources: 2008 Data Update*, NSF 10-314, Arlington, VA (2010), http://www.nsf.gov/statistics/nsf10314/.

Universities play a leading role in conducting R&D, both in Nevada and in the nation as a whole. Nationally, the federal government provides about 59% of all university R&D funding, but Nevada's universities are significantly more dependent on federal government support, relying on federal funds for 68% of their R&D expenditures. While the ten-year trend is positive ($106.2 million in 2000, $182.0 million in 2009), academic R&D expenditures in Nevada have declined for three straight years (2007-2009), largely due to a decrease in federal R&D support to the state's universities.[46] R&D funding from industry sources and other institutional sources has increased somewhat to compensate over this time period, but funding from these sources is also down from peak levels in 2004 and 2006, respectively.

Nevada Universit R&D Spending, 2009

Institution	R&D spending ($000s)			Comparison	
	Federally Financed	*Non-Federally Financed*	*Total*	*% Federally Financed*	*Per Capita Spending*
Desert Research Institute	$29,544	$6,946	**$36,490**	81%	N/A
University of Nevada-Las Vegas	$31,270	$7,878	**$39,148**	80%	N/A
University of Nevada-Reno	$63,709	$42,669	**$106,378**	60%	N/A
Nevada Total	**$124,523**	**$57,493**	**$182,016**	**68%**	**$67.80**
U.S. Total	**$32,587,529**	**$22,347,928**	**$54,935,457**	**59%**	**$179.08**

Source: NSF, *Survey of Research and Development Expenditures at Universities and Colleges* 2009

[46] Budget figures from the Nevada System of Higher Education, FY2008-2010, also show a decline in research expenditures.

FUNDING FROM COMPETITIVE R&D AWARDS

The National Science Foundation funds education, science, and engineering research at academic institutions through grants, contracts, and cooperative agreements. NSF awards are competitively reviewed and funded, and the ability to secure such awards is an indicator of a region's research capacity and stature. Nevada is well behind the national average in total NSF awards on a per capita basis, but the state is home to significant research activity in the fields of geosciences and polar research.

Nevada NSF funded grants, contracts, and cooperative agreements, 2006-2010

NSF directorate / research office	# of NSF awards		NSF awards per million people	
	Nevada	*United States*	*Nevada*	*United States*
Biological Sciences	33	7,175	12.5	23.6
Computer & Information Science & Engineering	10	7,583	3.8	25.0
Education & Human Resources	12	4,777	4.6	15.7
Engineering	34	10,714	12.9	35.3
Geosciences	**69**	**7,583**	**26.2**	**25.0**
Mathematical & Physical Sciences	40	12,641	15.2	41.6
Office of Cyber Infrastructure	0	568	0.0	1.9
Office of International Science & Engineering	0	1,852	0.0	6.1
Office of Polar Programs	**18**	**1,543**	**6.8**	**5.1**
Social, Behavioral, & Economic Sciences	20	6,007	7.6	19.8
Other	9	185	3.4	0.6
Total	**245**	**60,628**	**93.1**	**199.5**

Source: NSF Awards Database

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards serve as an indicator of funding availability for small businesses developing new technologies for commercialization. Companies in Nevada have received these awards from a variety of federal agencies, but the Department of Defense and the National Science Foundation together account for nearly three-quarters of all SBIR/STTR awards in the state.

Several Nevada firms received multiple SBIR awards between 2006 and 2010, including Advanced Materials & Devices, Inc., in Reno; Digital Solid State Propulsion LLC in Reno; Opticomp Corp. in Zephyr Cove; and Software & Engineering Assoc., Inc., in Carson City. Each of these firms received 4 awards and accounted for more than a quarter of Nevada's total SBIR activity during this time period.

Nevada SBIR/STTR Awards, 2006-2010

Funding Agency	SBIR/STTR awards		Share of SBIR/STTR awards by agency	
	Nevada	*United States*	*Nevada*	*United States*
Department of Homeland Security	0	293	0%	1.1%
Department of Commerce	0	83	0%	0.3%
Department of Defense	**36**	**13,005**	**59%**	**50.9%**
Department of Energy	5	1,909	8.2%	7.5%
Department of Transportation	1	79	1.6%	0.3%
Department of Education	0	188	0%	0.7%
Environmental Protection Agency	1	185	1.6%	0.7%
Department of Health & Human Services	4	5,461	6.6%	21.4%
National Aeronautics & Space Administration (NASA)	3	1,867	4.9%	7.3%
National Institute of Standards & Technology	0	74	0%	0.3%
National Science Foundation (NSF)	**9**	**1,967**	**14.8%**	**7.7%**
Department of Agriculture	2	459	3.3%	1.8%
Total	**61**	**25,570**	**100.0%**	**100.0%**

Source: Small Business Administration, *TechNet Database*

TOTAL SPONSORED PROJECT AWARDS AT NEVADA'S HIGHER EDUCATION RESEARCH INSTITUTIONS

In addition to outside funding and awards for R&D, Nevada's higher education research institutions also receive outside sponsorships, grants, and contracts for other purposes, including instruction, public service, scholarships/fellowships, student services, and other activities. These funds come via government sources (federal, state, and local), from the private sector, and from nonprofits.

The total dollar amount of sponsored project awards at Nevada's three higher education research institutions has increased each year from FY2008-2011. This growth was largely driven by a net increase in sponsored project awards from federal government sources, which include funding from the American Recovery and Reinvestment Act of 2009. Sponsored project awards by state and local government sources and by private sources have decreased in Nevada over the FY2008-2011 period.

Total Sponsored Project Awards at Nevada's Higher Education Research Institutions, FY2008-2011

	Total Amount Awarded ($000s)*				# of Grants and Contracts Received
Funding Source	*FY 2008*	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2011*
Federal	129,142	146,553	170,231	165,940	437
Federal Pass-through	41,153	48,430	52,384	58,055	534
State of Nevada	9,776	7,990	6,384	7,082	75
Other state and local govt.	9,631	6,458	3,796	4,191	79
Private, For-Profit (Industry)	5,866	4,807	6,202	4,323	69
Private, Non-Profit	7,158	4,724	4,080	5,251	104
Total	**202,726**	**218,962**	**243,079**	**244,842**	**1,298**

Source: Nevada System of Higher Education budget accounts, FY2008-2011
* Data includes sponsored project awards to UNR, UNLV, and DRI. Sponsored project awards include funding for research, instruction, public service, scholarship/fellowships, student services, and other categories.

VENTURE CAPITAL

Venture capital is an important source of cash flow for high-tech business startups that are limited in resources to finance product development, research and development, initial marketing, and rapid company expansion. However, venture capital is a very competitive source of funding, and startup companies often are required to give up an equity stake in their company in return for the investment.

Compared to a set of peer states, Nevada rates well below average for its venture capital activity. Nevada received venture capital investments averaging around $39 million per year from 2005-2010, and among the group of states presented in the table below, Nevada ranks only better than Idaho and South Carolina. Furthermore, Nevada performs especially poorly in obtaining seed and early-stage venture capital investments, placing last among the peer states for both the investment amount and number of deals secured (see the table on the following pages). However, other than California, which secures nearly half of all venture capital investments made in the United States each year, the other peer states do not perform that well in *absolute* numbers, each constituting around one to four percent of total U.S. venture capital investments.

Comparison of Venture Capital Investments
Nevada versus Other States
Annual Average, 2005-2010

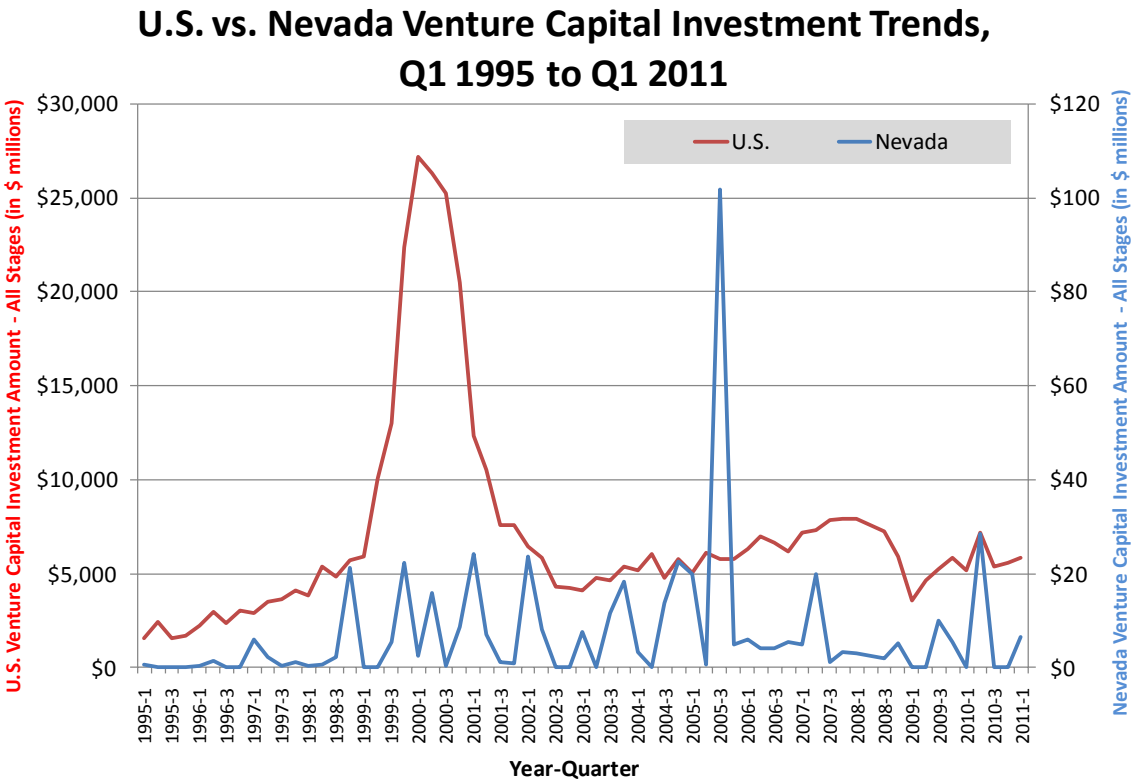
	Total VC Investments ($ millions)	% of Total U.S. VC Investments	# of VC Deals
California	$12,343.1	49.2%	1,476
Texas	$1,173.6	4.7%	165
New Jersey	$667.5	2.7%	86
Colorado	$615.2	2.5%	95
North Carolina	$412.8	1.6%	55
Florida	$334.2	1.3%	47
Arizona	$168.9	0.7%	25
Utah	$170.9	0.7%	34
Nevada	**$38.8**	**0.2%**	**6**
South Carolina	$26.5	0.1%	6
Idaho	$13.1	0.1%	5
United States	**$25,083.9**		**3,612**

Source: PricewaterhouseCoopers/National Venture Capital Association *MoneyTree*™ Report

Comparison of Startup/Seed & Early Stage Venture Capital Investments *Nevada versus Other States* Annual Average, 2005-2010			
	Total Startup/Seed & Early Stage VC Investments ($ millions)	% of Total U.S. Startup/Seed & Early Stage VC Investments	# of Startup/Seed & Early Stage VC Deals
California	$2,981.0	46.8%	569
Texas	$239.8	3.8%	47
New Jersey	$180.7	2.8%	28
Colorado	$160.5	2.5%	38
North Carolina	$102.7	1.6%	18
Florida	$68.7	1.1%	12
Utah	$56.8	0.9%	14
Arizona	$31.3	0.5%	7
South Carolina	$4.2	0.1%	2
Idaho	$3.9	0.1%	2
Nevada	**$1.7**	**0.0%**	**1**
United States	**$6,368.2**	**0.5%**	**1,416**

Source: PricewaterhouseCoopers/National Venture Capital Association *MoneyTree*™ Report

The margin of Nevada's performance in venture capital investments has been historically very small, creating a boom-and-bust cycle of activity in this metric. As the graph below demonstrates, Nevada's venture capital investments have fluctuated widely from quarter-to-quarter, stemming from the fact that Nevada secured one to three venture capital deals per quarter on average from 1995 to 2010. Starting from 1998 to 2006, aside from the spike in the third quarter of 2005 (which represents an outlier that can be attributed to one major venture capital deal), Nevada oscillated between less than $5 million and around $20 million per quarter in venture capital investments. The state's venture capital investments dropped significantly from 2006 to 2009, a trend that has coincided with the economic recession. During that timeframe, there were even some quarters in which Nevada failed to secure any venture capital deals. Furthermore, the graph below demonstrates that Nevada's venture capital investment activities have been independent of U.S. trends in venture capital investment. For instance, during the tech-boom in the early 2000s, venture capital investments were at its peak nationally, but largely skipped over Nevada.



Source: *PricewaterhouseCoopers/National Venture Capital Association MoneyTree(tm) Report*

Note on this chart that the scales for U.S. VC (left axis) and Nevada VC (right axis) are different, so that fluctuations over time can be more easily compared. In any given quarter, the overall level of U.S. VC investments is exponentially higher than the amount of VC investments in Nevada.

INNOVATION OUTPUTS

SCIENTIFIC PUBLICATIONS

It is difficult to quantify the outputs of R&D, but scientific publications are commonly used as a proxy measure for R&D activity. Nevada accounts for 0.86% of the U.S. population, but from 2009-2010, Nevada-based researchers produced 2,529 publications in peer-reviewed journals, or 0.45% of the U.S. total scientific publications, a little more than half the average rate. There were 939 publications per million people in Nevada in 2009-2010, as compared to 1,841 publications per million people nationwide.

The University of Nevada, Reno and University of Nevada, Las Vegas account for the vast majority of scientific publications in Nevada, followed by the Desert Research Institute. Key institutions outside of Nevada that have collaborated with Nevada researchers on scientific publications include UC Berkeley, Los Alamos National Laboratory, Penn State University, UCLA, and Harvard University, among many other institutions.

Nevada Scientific Publications by Institution, 2009-2010

Institution	*Number of Publications*
University of Nevada, Reno	1,024
University of Nevada, Las Vegas	741
Desert Research Institute	158
Nevada Cancer Institute	72
U.S. Geological Survey	67
U.S. Environmental Protection Agency	49
U.S. Forest Service	32
U.S. Department of Agriculture, Agricultural Research Service	26
Southern Nevada Water Authority	20
Touro University Nevada	18
Nevada Total Publications	**2,529**

Source: *Science Citation Index – Expanded*

Scientific publication activity in Nevada is heavily concentrated in fields related to environmental sciences and geology. *Environmental Sciences Ecology*, *Geology*, *Meteorology Atmospheric Sciences*, and *Water Resources* all have very high location quotients in Nevada, as indicated in the table o the following page.[47] In addition, related fields such as *Geochemistry Geophysics*, *Zoology*, and *Biodiversity Conservation* also have relatively high levels of activity.

[47] The location quotient for scientific publications shows the relative concentration of publications in each field in Nevada as compared to the national average. A location quotient greater than one indicates that a higher-than-average share of Nevada's scientific publications are in that field relative to the U.S. average.

Nevada Scientific Publication Topics, 2009-2010		
Field	*Number of Publications*	*Location Quotient*
Environmental Sciences Ecology	**361**	**3.43**
Engineering	304	1.38
Physics	270	1.22
Chemistry	161	0.80
Geology	**143**	**3.49**
Materials Science	122	1.06
Meteorology Atmospheric Sciences	**117**	**3.75**
Water Resources	**95**	**5.03**

Source: *Science Citation Index – Expanded* SRI analysis

PATENTS

Patents are another important indicator of regional innovation and R&D outputs. From 2006-2010, Nevada researchers and companies were awarded 2,006 patents, or 762 patents for every million people in the state. Nevada's per capita rate of patenting is about half the national average (at 1,438 patents per million people). Nevada's patenting activity is heavily dominated by the gaming industry, with over 40% of the state's patents in the "amusement devices" classification.

Nevada Patent Awards, 2006-2010			
Classification	*Number of Patents in Nevada*	*of Total Patents in Nevada*	*of Total Patents in U.S.*
Amusement Devices	807	40.2%	1.2%
Computers & Communications	337	16.8%	35.4%
Electrical & Electronic	259	12.9%	18.8%
Others	213	10.6%	11.5%
Mechanical	206	10.3%	12.1%
Drugs & Medical	98	4.9%	11.4%
Chemical	86	4.3%	9.7%
Nevada Total Patents	**2,006**	**100.0%**	**100.0%**

Source: *Thomson Delphion* database, SRI analysis

IV. RENO METRO AREA – *PRELIMINARY DATA ANALYSIS*

A. INDUSTRY CLUSTER ANALYSIS: RENO/CARSON CITY METRO AREA

RENO/CARSON CITY[48] ECONOMIC PROFILE

The Reno/Carson City economy employs 332,029 workers in 19,434 establishments.[49] The average annual wage in Reno/Carson City is $48,204, which is slightly lower than the national average ($51,851) and roughly on par with the state average ($48,077).

Industry Profile of Reno/Carson City, NV (2011)

Total Employment: 332,029

Employment Average Annual Growth Rate (2006-2011): -2.14%

Total # of Establishments (2010): 19,434

Average Annual Wage: $48,204

Employment Characteristics:

- 21.8% in Knowledge- & Technology-Based Industries
- 73.3% in Service Industries
- 5.0% in Traditional & Manufacturing Industries

Largest Industry Clusters (by employment):

- *Tourism & Gaming*
- *Education & Government*
- *Construction & Real Estate*
- *Retail Trade*
- *Business Services*

The Reno/Carson City economy is largely dominated by *service-based industries*, with over 73% of jobs in those sectors. Reno/Carson City's largest employer industries are all *service-based industries*: *Tourism & Gaming*, *Education & Government*, *Construction & Real Estate*, *Retail Trade*, and *Business Services*, together accounting for over 60% of all employment in the region. Among these, the consumption-based industries (*Tourism & Gaming*, *Construction & Real Estate*, *Retail Trade*) are less dominant in Reno/Carson City than they are for the state as a whole; the three consumption-based industries account for 37.6% of total Reno/Carson City employment (as compared to 46.9% for the whole state, and 30.8% nationally). Roughly 22% of jobs in Reno/Carson City are in *knowledge- & technology-based industries* and only 5% of jobs are in *traditional & manufacturing industries*.[50]

Reno/Carson City's economy has experienced a significant downturn during the recent nationwide economic recession, with an overall -9.58% net decrease in employment from 2007-2009 (an

[48] The analysis presented in this section covers the combined Reno and Carson City metropolitan areas. This includes: Storey and Washoe Counties (which comprise the Reno MSA), Carson City, and Lyon and Douglas Counties (suburban areas adjacent to Carson City).

[49] All industry cluster data presented here are drawn from EMSI, which aggregates data from multiple federal/state government datasets. EMSI data includes labor categories that are not typically included in standard government data (e.g., self-employed/sole proprietors, commission-based workers, military/armed forces, state/local government workers, agricultural workers, etc); therefore, the regional employment figures shown here may be higher than the figures shown in other publicly-available datasets.

[50] The industry cluster data table on page 42 provides details on how each of the region's twenty-five industry clusters are categorized as *knowledge- & technology-based traditional & manufacturing* or *service-based*.

average annual decrease of -4.91%). While this contraction has slowed, Reno/Carson City has continued to lose jobs during the last two years of initial economic recovery, with an average annual contraction of -1.24% per year from 2009-2011. While this has been a difficult period for many regions, Reno/Carson City has fared substantially worse than national averages; total employment nationwide fell by -1.66% annually during the recession (2007-2009), and by -0.09% during the initial recovery period (2009-2011).

Growth trends for individual industry clusters in Reno/Carson City have varied widely in recent years, but in general the region's *knowledge & technology-based industries* have continued to grow over the last five years (CAGR of +1.73% from 2006-2011), while the region's *service-based* and *traditional & manufacturing industries* have lost jobs (at -2.95% and -4.93% per year, respectively from 2006-2011). Three industry clusters have maintained positive growth in both Reno/Carson City and nationally throughout the recent fluctuations in the business cycle: *IT Services*, *Energy & Environment* and *Medicine & Life Sciences*.[51]

SUMMARY OF INDUSTRY CLUSTER DATA

The following table summarizes key statistics for the twenty-five industry clusters that comprise the Reno/Carson City economy. Many of Reno/Carson City's largest industry clusters (by employment) have experienced strong, negative growth from 2006-2011 as a result of the economic recession. However, all are expected to experience positive growth from 2011-2016 (according to EMSI forecasts).

[51] Defined by net growth over the periods of expansion, 2002-2007; recession, 2007-2009; and initial recovery, 2009-2011.

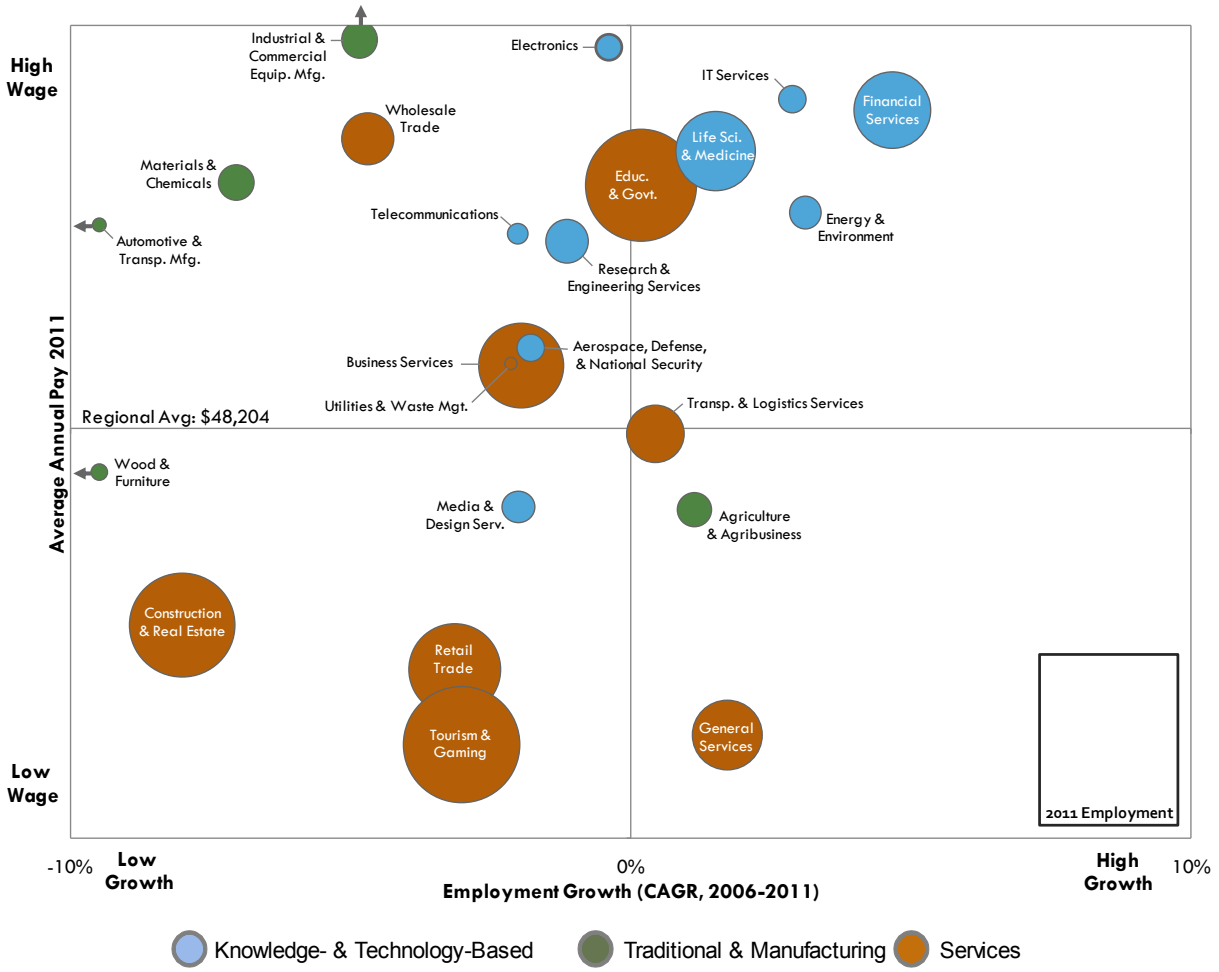
Reno/Carson City Industry Clusters i Q2 2011								
	2011 Total Employment*	Average Annual % Employment Growth (2006 2011)		*Predicted* (2011 2016)		2011 *National* Location Quotient	2010 # of Establishments	2011 Average Annual Pay
		Reno/ Carson City	U.S.	Reno/ Carson City	U.S.			
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	2,832	-1.80%	-0.22%	1.24%	0.29%	0.435	74	$53,781
Energy & Environ.	4,068	3.12%	4.60%	3.83%	2.26%	0.736	188	$63,063
Electronics	2,690	-0.39%	-3.22%	1.91%	-1.89%	1.350	102	$74,483
Financial Services	22,402	4.67%	2.04%	3.78%	2.16%	1.249	1,130	$70,126
IT Services	2,941	2.89%	2.03%	2.89%	2.49%	0.564	544	$70,927
Medicine & Life Sci.	24,174	1.52%	2.03%	2.00%	2.22%	0.756	1,394	$67,303
Media & Design Serv.	4,072	-2.00%	-1.30%	0.67%	0.74%	0.790	337	$42,793
Research & Eng. Serv.	7,230	-1.14%	1.31%	2.00%	2.70%	0.918	914	$61,127
Telecommunications	1,668	-2.03%	-3.14%	0.95%	-0.31%	0.712	95	$61,625
Service-Based Clusters								
Business Services	27,600	-1.96%	-0.96%	1.42%	1.24%	1.089	2,183	$52,546
Constr. & Real Estate	41,946	-8.02%	-2.33%	2.15%	1.84%	1.130	3,534	$34,654
Education & Govt.	47,975	0.18%	0.54%	0.60%	1.16%	0.879	823	$64,993
Retail Trade	31,921	-3.14%	-1.44%	0.85%	0.28%	0.950	1,890	$31,590
General Services	18,674	1.71%	0.95%	1.42%	1.55%	0.888	1,529	$27,112
Transp. & Log. Serv.	12,872	0.43%	-1.01%	1.38%	0.94%	1.417	597	$47,861
Tourism & Gaming	51,127	-3.03%	0.37%	0.50%	1.53%	1.612	1,857	$26,427
Util. & Waste Mgmt.	654	-2.15%	0.56%	1.60%	1.74%	0.956	52	$52,698
Wholesale Trade	10,130	-4.70%	-1.33%	1.29%	0.73%	0.935	1,226	$68,178
Traditional & Manufacturing Clusters								
Agriculture & Agribus.	4,303	1.13%	0.10%	1.26%	-0.29%	0.423	185	$42,606
Auto. & Transp. Mfg.	626	-10.27%	-6.77%	-1.38%	-1.78%	0.339	26	$62,246
Industrial & Comm. Equipment Mfg.	4,905	-4.85%	-3.51%	0.98%	-1.24%	1.588	164	$78,429
Materials & Chem.	4,986	-7.05%	-4.00%	0.83%	-0.89%	0.937	233	$65,141
Paper	272	1.78%	-3.50%	4.25%	-2.83%	0.482	5	$50,674
Textiles & Apparel	217	-7.93%	-7.06%	1.26%	-4.61%	0.261	15	$40,471
Wood & Furniture	1,108	-10.58%	-7.49%	4.14%	-1.07%	0.645	79	$45,195
Total Economy	**332,029**	**-2.14%**	**-0.28%**	**1.45%**	**1.24%**	**NA**	**19,434**	**$48,204**

Figures do not include industries or NAICS codes with <1 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

The bubble charts on the following pages provide a summary snapshot of trends in Reno/Carson City's industry clusters, the first chart depicting the current status in 2011, and the second chart depicting the projected status in 2016 (based on EMSI forecasts). In examining these charts, several trends become apparent:

- The *traditional & manufacturing* industries (indicated by green-shaded bubbles) in Reno/Carson City are not large in terms of employment (indicated by bubble size). The wages and employment growth rates are scattered for these industries, with none experiencing both positive employment growth and above average wages over the last five years.
- Reno/Carson City's largest industry clusters, including *Tourism & Gaming*, *Education & Government*, *Business Services*, *Construction & Real Estate Services*, and *Retail Trade*, are primarily *service-based* industries. These clusters have generally posted low or negative employment growth rates over the last five years. Wages for the largest industries are mixed – *Education & Government* and *Business Services* have higher-than-average wages, while the consumption-based industries (*Tourism & Gaming*, *Construction & Real Estate Services* and *Retail Trade*) all fall well below the regional average wage.
- Reno/Carson City's *knowledge- & technology-based* industries (indicated by blue-shaded bubbles) tend to group in the upper right-hand quadrant, indicating above average wages and positive growth rates.
- Because they offer positive growth rates and above average wages, industry clusters that fall into the first quadrant (upper right-hand side in the bubble chart) may have especially strong potential in the region. These also tend to be in the higher-skill *knowledge- & technology-based industries*. Clusters that fit this profile in Reno/Carson City include *Life Sciences & Medical Services*, *Financial Services*, *IT Services*, and *Energy & Environment*.
- The 2016 (projected) bubble chart depicts an expectation of strong, improved growth rates across all industry clusters. Predicted growth rates are generally highest for *knowledge- & technology-based* industries, which are expected to comprise a slightly larger segment of the regional economy in 2016 than in 2011.

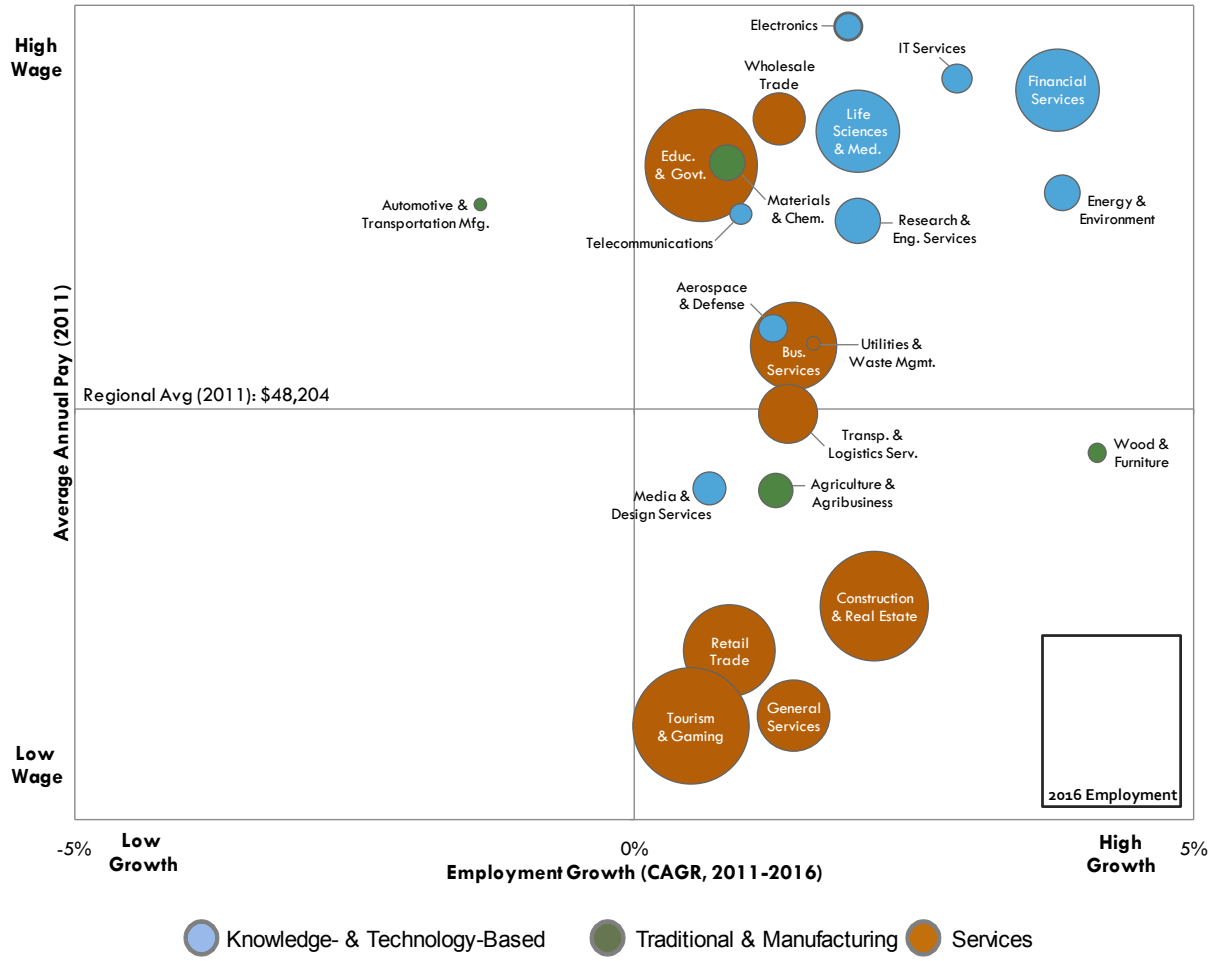
Overview of Reno/Carson City Industry Clusters, Q2 2011



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the employment size for that cluster in Q2 2011.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
- The horizontal axis represents employment growth expressed as a compound annual growth rate (CAGR) from 2006 to 2011. Industry clusters falling to the right of the midpoint have a positive employment growth rate, and industry clusters falling to the left of the midpoint have a negative employment growth rate.
- The vertical axis represents average annual pay in Q2 2011. Industries falling above the midpoint have an average annual pay that is greater than the overall average for Reno/Carson City ($48,204), and those falling below the midpoint have average annual pay levels falling below the regional average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth (e.g., *Construction & Real Estate*, *Retail Trade*).

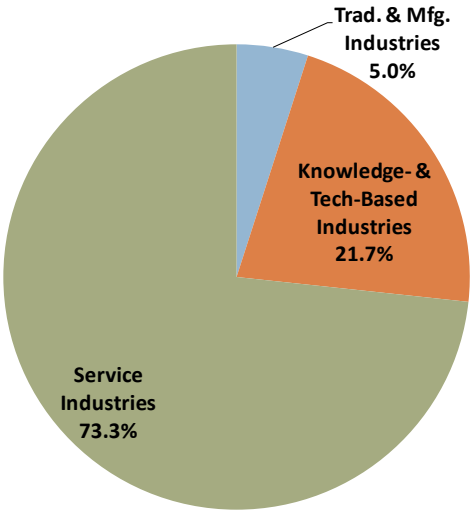
Overview of Reno/Carson City Industry Clusters, 2016 (projected)



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the employment size for that cluster in Q2 2016.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
- The horizontal axis represents employment growth expressed as a compound annual growth rate (CAGR) from 2011 to 2016. Industry clusters falling to the right of the midpoint have a positive employment growth rate, and industry clusters falling to the left of the midpoint have a negative employment growth rate.
- The vertical axis represents average annual pay in Q2 2011 (note that projected pay levels for 2016 are not available). Industries falling above the midpoint have an average annual pay that is greater than the overall average for Reno/Carson City ($48,204), and those falling below the midpoint have average annual pay levels falling below the regional average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth.

Reno/Carson City Industry Profiles in Q2 2011



Service-Based Industries:
- 73.3% of total employment (242,899 workers)
- -2.95% avg. annual decline in employment from 2006-2011
- 71.4% of total establishments (13,691 establishments) in 2010
- Average annual pay of $42,112

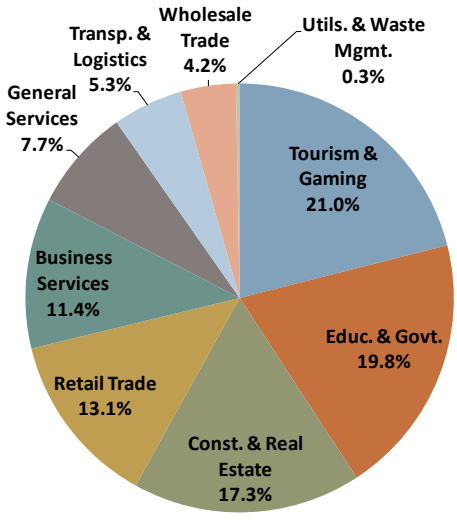
Knowledge- & Technology-Based Industries:
- 21.7% of total employment (72,077 workers)
- 1.73% avg. annual growth in employment from 2006-2011
- 24.9% of total establishments (4,778 establishments) in 2010
- Average annual pay of $65,690

Traditional & Manufacturing Industries:
- 5.0% of total employment (16,417 workers)
- -4.93% avg. annual decline in employment from 2006-2011
- 3.7% of total establishments (707 establishments) in 2010
- Average annual pay of $61,182

As depicted in the chart above, the economy of Reno/Carson City is heavily dominated by ***service-based industries***, representing nearly one-quarter of all regional employment in Q2 2011. Eight of the ten largest clusters in the region are *service industries*. Employment in the region's *service industries* is predominantly in lower-wage, lower-skill, consumption-based clusters, such as *Tourism & Gaming*, *Construction & Real Estate,* and *Retail Trade*. Average annual wages in the *service industries* were $42,112 in Q2 2011, well below the regional average for Reno/Carson City ($48,204).

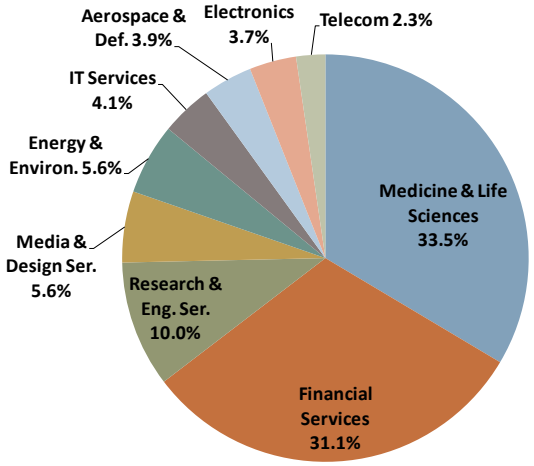
Overall employment in *service industries* has declined over the past five years in Reno/Carson City, at an average annual rate of -2.95% (2006-2011). Over this time period, the majority of *service-based industries* have declined, with only *General Services, Transportation & Logistics* and *Education & Government* posting low but positive employment growth.

Reno/Carson City *Service Industry* Employment, Q2 2011



Knowledge- & technology-based industries represent just over one-fifth of all employment and establishments in Reno/Carson City. The region's *knowledge- & technology-based industries* have experienced moderate, positive growth from 2006-2011 (1.73% CAGR) while *service-based* and *traditional & manufacturing industries* in the Reno/Carson City region have declined. The growth rates from 2006 to 2011 amongst the area's *knowledge- & technology-based* clusters were mixed, with *Financial Services* (4.67% CAGR), *Energy & Environment* (3.12% CAGR), *IT Services* (2.89% CAGR), and *Medicine & Life Science* (1.52% CAGR) posting positive growth (while employment in the remaining clusters declined).

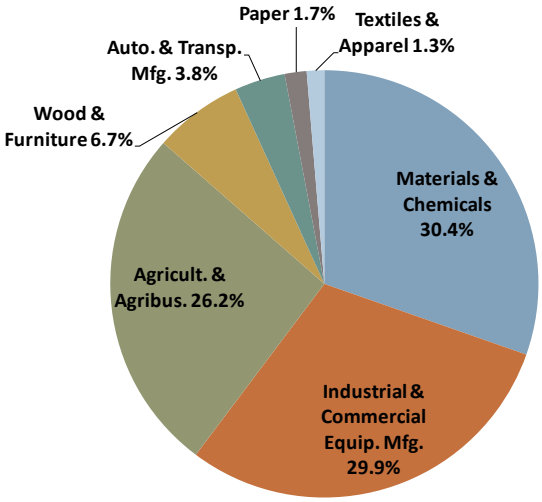
Reno/Carson City *Knowledge- & Tech-Base Industry* Employment, Q2 2011



These industries are generally those that incorporate highly-skilled human capital, innovation, and higher-than-average levels of technological infrastructure or inputs. Due to their higher education and skill requirements, industries in this sector are also high-paying. At $65,690 in average annual pay, *knowledge- & technology-based* jobs pay 36% more than the Reno/Carson City average salary of $48,204.

Traditional & manufacturing industries represent a small proportion of the Reno/Carson City economy, accounting for just 5.0% of total employment – higher than the State of Nevada (3.7%), but still below the national average (7.2%). Employment in these industries has declined rapidly over the past five years, at an average annual rate of -4.93% (2006-2011), mirroring the national trend in this sector. Only *Agriculture & Agribusiness* (1.13% CAGR) and *Paper* (1.78% CAGR) posted positive growth from 200 to 2011 in Reno/Carson City.

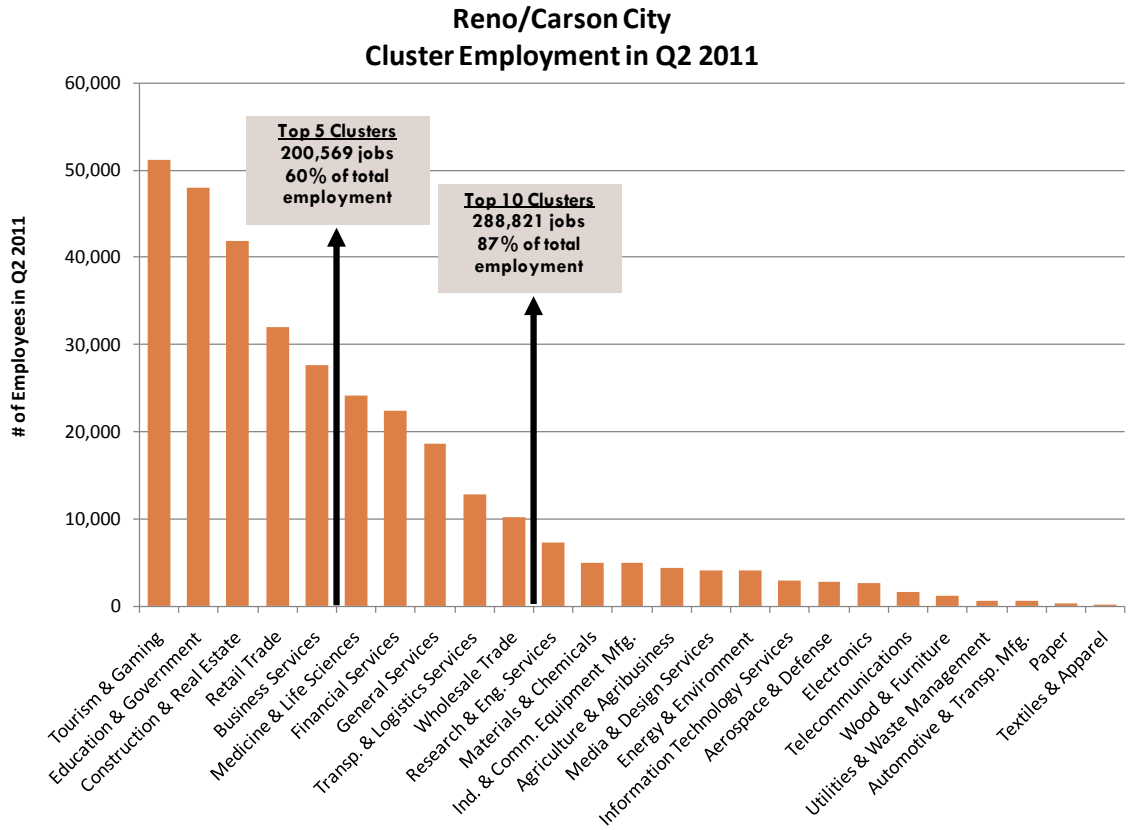
Reno/Carson City *Trad. & Mfg. Industry* Employment, Q2 2011



Materials & Chemicals and *Industrial & Commercial Equipment Manufacturing* are the largest of the *traditional & manufacturing* industry clusters in Reno/Carson City. Average annual wages in this sector are high, at $61,182 per worker per annum (well above the regional average of $48,204).

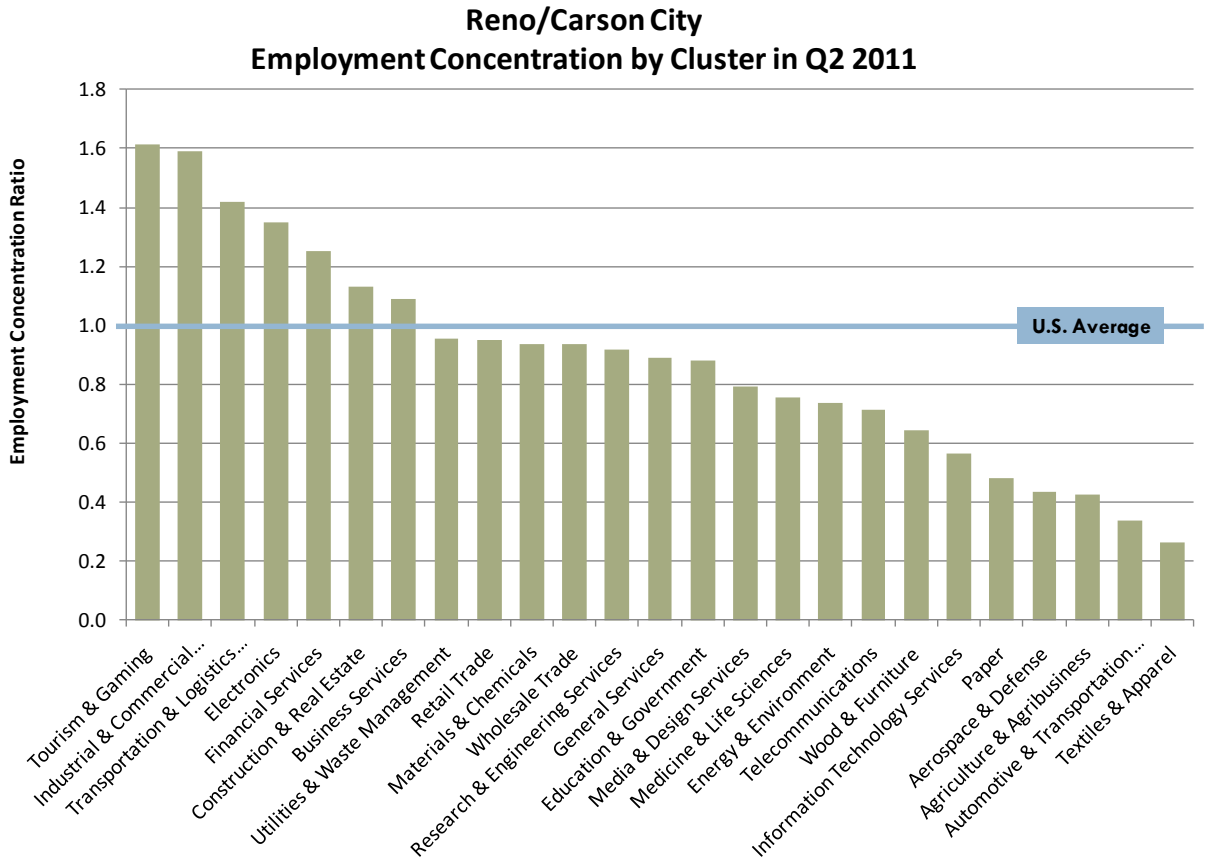
EMPLOYMENT

A summary of Reno/Carson City's employment patterns across all twenty-five industry clusters analyzed is presented in the figure below. *Tourism & Gaming* and *Education & Government* are the largest employer clusters (with 51,127 and 47,975 jobs, respectively in 2011), followed by *Construction & Real Estate, Retail Trade,* and *Business Services*. These five clusters account for over 200,000 jobs, or 60% of total employment in the region. The ten largest clusters, as shown in the chart below, represent 288,821 jobs, or 87% of total employment in the Reno/Carson City region.



EMPLOYMENT CONCENTRATION

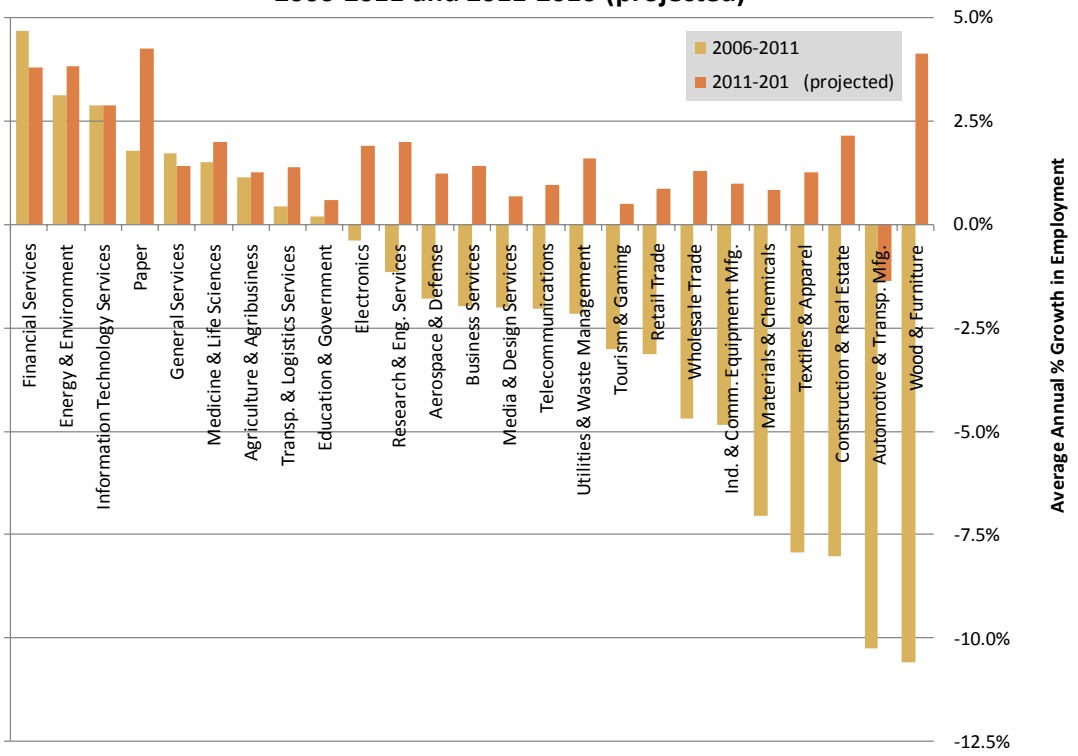
Employment concentration ratios (also known as *location quotients*) measure the relative importance of each industry cluster in the region's economy as compared to the nation as a whole, providing insight into the composition and character of the Reno/Carson City economy. An employment concentration ratio greater than one indicates that an industry is more concentrated in Reno/Carson City than in the overall U.S. economy, while clusters with ratios less than one are less concentrated than the national average. The following chart shows the concentration ratios for all twenty-five industry clusters in the Reno/Carson City region. Seven of the region's clusters have concentration ratios that are above the national average: *Tourism & Gaming*; *Industrial & Commercial Equipment Manufacturing*; *Transportation & Logistics Services*; *Electronics*; *Financial Services*; *Construction & Real Estate*; and *Business Services*. A large number of clusters also have concentration ratios that are just slightly below the national average (in the range of 0.8 to 1.0).



EMPLOYMENT GROWTH RATES

As shown in the following chart, only nine industry clusters in Reno/Carson City have experienced positive employment growth rates in recent years (2006-2011), and the majority of the region's growing industries are *knowledge- & technology-based* clusters. However, as the economy recovers, nearly all clusters are expected to grow during the 2006-2011 period.

Reno/Carson City Average Annual Employment Growth by Cluster, 2006-2011 and 2011-2016 (projected)



The table below presents a comparison of industries that have experienced positive economic growth in Reno/Carson City over the past five years. A number of Reno/Carson City's industries with positive growth rates reflect a trend of increasing employment both statewide and nationwide, including *Energy & Environment*, *Financial Services*, *Medicine & Life Sciences*, *IT Services*, *General Services*, *Education & Government*, and *Agriculture & Agribusiness*. In the case of six industries (*Financial Services*, *IT Services*, *General Services*, *Agriculture & Agribusiness*, *Transportation & Logistics Services*, and *Paper*), Reno/Carson City outperforms the national growth rates. This may be the result of population growth or other demographic changes, or may indicate a competitive advantage or opportunity for the region. Such trends will be examined more closely during the stakeholder focus groups in Nevada, as well as in further stages of analysis.

Industry Cluster Employment Growth Comparisons			
	Average Annual Employment Growth Rates 200 to 2011		
	Reno/ Carson City	United States	State of Nevada
Clusters with positive growth trends in Reno/Carson City, the State of Nevada, and nationwide			
Energy & Environment	3.12%	4.60%	3.90%
Financial Services	4.67%	2.04%	2.86%
Medicine & Life Sciences	1.52%	2.03%	2.64%
Information Technology Services	2.89%	2.03%	3.56%
General Services	1.71%	0.95%	2.38%
Education & Government	0.18%	0.54%	0.60%
Agriculture & Agribusiness	1.13%	0.10%	0.31%
Clusters with positive growth trends in Reno/Carson City, but negative growth nationwide and/or statewide			
Transportation & Logistics Services	0.43%	-1.01%	-0.63%
Paper *	1.78%	-3.50%	1.94%

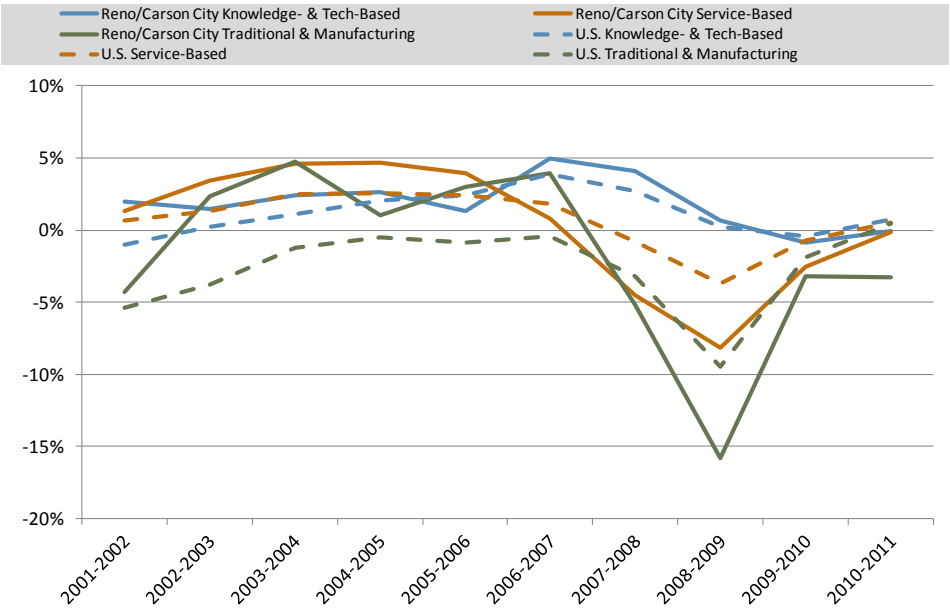
* When looking at the cluster growth rates, it is important to note that some fast-growing clusters actually had a very small level of employment in Reno/Carson City during this time period (e.g., among the industries shown in this table, *Paper* employed only 272 workers in 2011), so the high growth rates may be a bit deceptive (they are high because they are calculated from a very small base).

THE BUSINESS CYCLE

As shown in the table on the following page, many of Reno/Carson City's previously strong and growing industries have experienced contraction during the recent economic recession, and have yet to recover and experience positive employment growth. Many of the largest employer industries in the Reno/Carson City metro areas, such as *Tourism & Gaming*, *Construction & Real Estate*, *Retail Trade*, and *Business Services* have contracted both in Reno/Carson City and in the United States overall (though in each of these examples, contraction was more pronounced in Reno/Carson City). In contrast, some *knowledge- and technology-based industries*, including *Energy & Environment*, *IT Services*, and *Medicine & Life Sciences*, have continued to grow both in Reno/Carson City and nationally through the recession and recovery periods.

Over the past decade, the Reno/Carson City economy has experienced an expansion and contraction that mirrors national trends, but employment growth rates in Reno/Carson City have fluctuated more dramatically than national averages. The chart below illustrates the changing annual employment growth rates in Reno/Carson City and the United States for the three major industry segments analyzed in this section of the report. In both Reno/Carson City and nationwide (as is true for the State of Nevada), *knowledge- & technology-based* industries have displayed the least volatility over the past decade, followed by *service-based* and *traditional- & manufacturing industries*. Reno/Carson City displays higher volatility than the national economy in each of these segments, and most notably in *traditional & manufacturing industries*.

Comparison of U.S. and Reno/Carson City
Annual Employment Growth Rates, 2001-2011

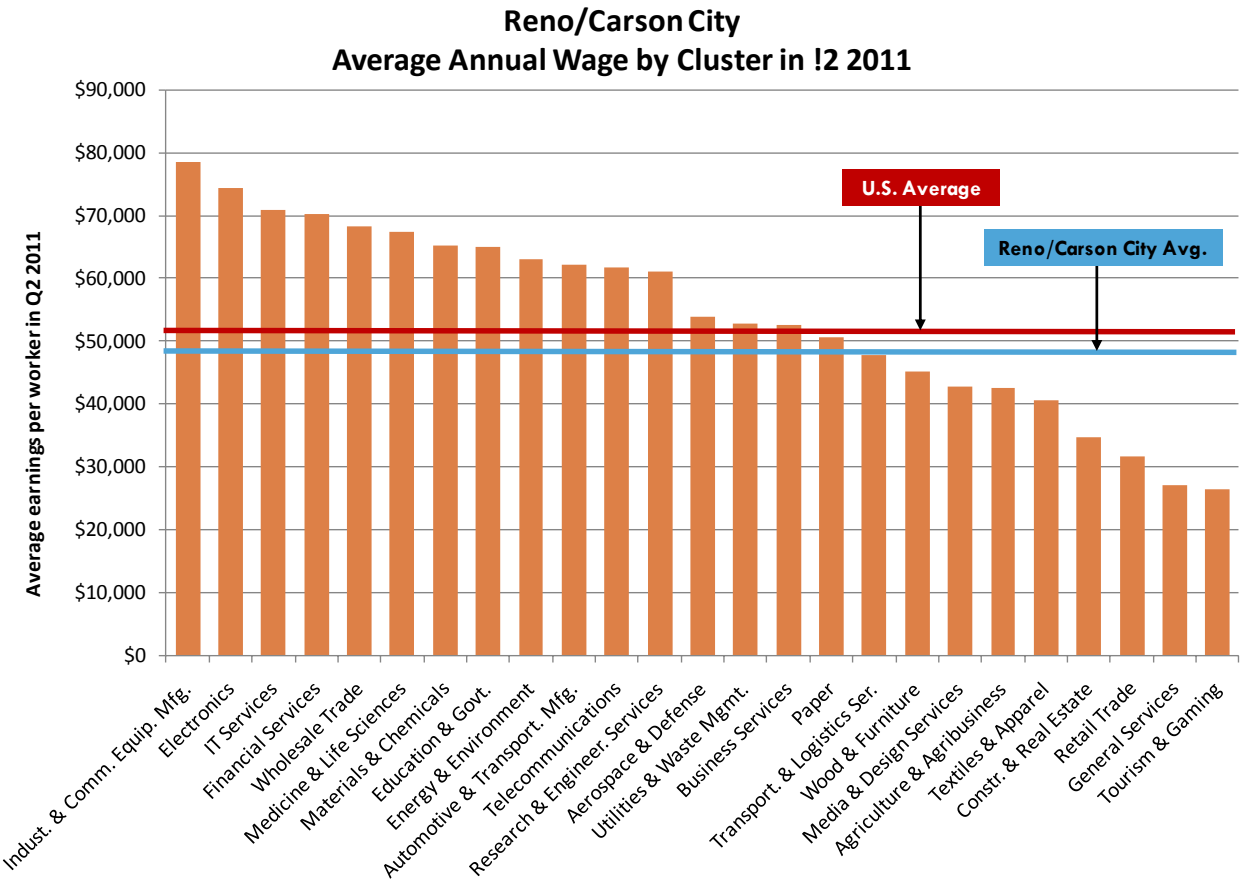


Business Cycle Growth Rates for Reno/Carson City's Industry Clusters								
	Expansion 2002 2007		The Recession 2007 2009		Initial Recovery 2009 2011		Predicted 2011 2016	
	Reno/ Carson City	U.S.	Reno/ Carson City	U.S.	Reno/ Carson City	U.S.	Reno/ Carson City	U.S.
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	-2.72%	-0.39%	-0.72%	0.14%	-3.24%	-1.11%	1.24%	0.29%
Energy & Environ.	1.25%	2.74%	9.21%	7.34%	1.75%	1.37%	3.83%	2.26%
Electronics	0.51%	-2.85%	-1.30%	-6.13%	-2.00%	-0.88%	1.91%	-1.89%
Financial Services	3.11%	2.33%	9.47%	3.51%	-1.69%	-0.98%	3.78%	2.16%
IT Services	5.42%	2.28%	1.83%	0.60%	1.89%	1.14%	2.89%	2.49%
Medicine & Life Sci.	2.31%	2.45%	0.51%	2.23%	1.50%	1.27%	2.00%	2.22%
Media & Design Serv.	4.12%	1.50%	-6.37%	-3.57%	-1.99%	-1.24%	0.67%	0.74%
Research & Eng. Serv.	6.38%	4.74%	-4.24%	-1.03%	-2.03%	0.30%	2.00%	2.70%
Telecommunications	-5.02%	-3.67%	-2.17%	-2.36%	-2.12%	-3.63%	0.95%	-0.31%
Service-Based Clusters								
Business Services	5.26%	1.87%	-6.70%	-4.40%	1.13%	1.44%	1.42%	1.24%
Constr. & Real Estate	7.09%	4.74%	-13.32%	-5.22%	-4.40%	-1.57%	2.15%	1.84%
Education & Govt.	2.43%	1.15%	-0.30%	0.91%	-0.53%	-0.30%	0.60%	1.16%
Retail Trade	2.64%	0.77%	-5.47%	-3.66%	-1.87%	-0.22%	0.85%	0.28%
General Services	4.94%	2.35%	-1.40%	-0.39%	1.55%	1.07%	1.42%	1.55%
Transp. & Log. Serv.	7.73%	2.64%	-3.50%	-3.98%	-0.50%	-0.10%	1.38%	0.94%
Tourism & Gaming	0.38%	2.33%	-7.21%	-0.58%	-0.89%	0.14%	0.50%	1.53%
Util. & Waste Mgmt.	2.12%	1.93%	-4.47%	-0.89%	-1.13%	0.47%	1.60%	1.74%
Wholesale Trade	0.44%	1.57%	-6.29%	-3.40%	-4.72%	-0.49%	1.29%	0.73%
Traditional & Manufacturing Clusters								
Agriculture & Agribus.	3.72%	-0.81%	-1.28%	-0.68%	-0.05%	-0.46%	1.26%	-0.29%
Auto. & Transp. Mfg.	2.17%	-2.04%	-17.85%	-14.27%	-6.50%	0.15%	-1.38%	-1.78%
Industrial & Comm. Equipment Mfg.	2.87%	-0.57%	-9.26%	-8.46%	-4.72%	-0.52%	0.98%	-1.24%
Materials & Chem.	2.86%	-0.95%	-15.91%	-8.60%	-3.81%	-0.63%	0.83%	-0.89%
Paper	4.56%	-3.83%	11.06%	-5.71%	2.48%	-1.52%	4.25%	-2.83%
Textiles & Apparel	-5.00%	-6.92%	-17.63%	-12.05%	1.41%	-2.33%	1.26%	-4.61%
Wood & Furniture	4.36%	-1.62%	-16.14%	-12.77%	-5.89%	-2.69%	4.14%	-1.07%
Total Economy	**3.27%**	**1.77%**	**-4.91%**	**-1.66%**	**-1.24%**	**-0.09%**	**1.45%**	**1.24%**

Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

WAGES

The average annual wage in the Reno/Carson City metro area in Q2 2011 is $48,204, slightly below the national average of $51,851 and comparable to the state average of $48,077. Fifteen of Reno/Carson City's industry clusters have annual wages that exceed the U.S. average annual wage. The region's highest-paying industry cluster is *Industrial & Commercial Equipment Manufacturing*, with an annual average wage of $78,429 followed closely by *Electronics* ($74,483) and *IT Services* ($70,927).



INDUSTRY SKILL LEVELS (COMPARED TO WAGES)

SRI has developed a methodology that utilizes U.S. Department of Labor data to assess the skill levels associated with each of the industry clusters analyzed in this study.[52] This analysis provides an additional way to pinpoint clusters that offer opportunities for the region to build employment in industries that offer high-quality, high-skill, and high-wage jobs. The table below maps the skill levels and wages of Reno/Carson City's twenty-five industry clusters, with wages characterized according to the following scale:

- "***High wage***" clusters have average annual pay at least 15% greater than the average annual pay across all clusters in Reno/Carson City in 2011 ($48,204).
- "***Medium wage*** clusters have average annual pay within 15% above or below $48,204.
- "***Low wage*** clusters have average annual pay at least 15% below $48,204.

Note in the following table that cluster skill levels tend to be correlated with wages – the majority of the very high- and high-skill clusters are grouped in the "medium wage" and "high wage" categories, while low-skill clusters are all in the "low wage" category.

Skill Levels and Wages in Reno/Carson City's Industry Clusters, Q2 2011

	Low Wage	Medium Wage	High Wage
Very High Skill		■ Aerospace & Defense	■ Financial Services ■ Information Technology Services ■ Research & Engineering Services
High Skill	■ General Services	■ Business Services ■ Media & Design Services	■ Automotive & Transportation Mfg. ■ Education & Government ■ Electronics ■ Medicine & Life Sciences ■ Telecommunications ■ Wholesale Trade
Medium Skill	■ Construction & Real Estate ■ Textiles & Apparel	■ Agriculture & Agribusiness ■ Wood & Furniture ■ Transportation & Logistics Services ■ Utilities & Waste Management	■ Energy & Environment ■ Materials & Chemicals ■ Industrial & Com. Equip. Mfg.
Low Skill	■ Retail Trade ■ Tourism & Gaming		

[52] For more information about SRI's methodology for assessing cluster skill levels, see *Appendix C*. The skill level ratings are based o national data; they are not tailored to Nevada or Reno/Carson City.

B. INNOVATION ANALYSIS: RENO METRO AREA

Innovation is the development of new ideas, products, and processes that create value for customers or citizens. Supporting innovation and promoting the development and commercialization of new knowledge requires significant support from public and private research institutions, as well as a robust entrepreneurial environment. This section describes innovation activity in the Reno metro area by examining two classes of innovation indicators: *innovation inputs* and *innovation outputs*. No indicator provides a perfect picture of innovation activity within a region, but the indicators included below are commonly accepted proxy measures of innovation activity and describe, in broad strokes, recent innovation activity in Reno.

Summary of key innovation indicators:

- The State Nevada produces a relatively low number of doctoral degrees relative to the national average, but Reno produces more than half of the state's total, including most of the life sciences, psychology, and geosciences doctoral degrees.

- There is low overall availability of research facilities Nevada, but higher than average availability of facilities in *Physical Sciences – atmospheric, earth, and geological sciences, meteorology and oceanography* and *Physical Sciences – astronomy, astrophysics, chemistry, an physics* Reno is home to three-quarters of all laboratory space in the State of Nevada.

- Reno is home to two of Nevada's leading recipients of NSF awards, the University of Nevada, Reno and the Desert Research Institute, which together account for 66% of all NSF awards in the state.

- Reno-area firms received 75% of all SBIR/STTR awards in Nevada from 2006 to 2010. Several Reno-area firms received multiple SBIR awards between 2006 and 2010, including Advanced Materials & Devices, Inc. (fuel cells / nanomaterials); Digital Solid State Propulsion LLC (rocket motors); Opticomp Corp, in Zephyr Cove (optoelectronics); and Software & Engineering Assoc., Inc. in Carson City (rocket motor modeling).

- Scientific publication activity in Reno is above the national average (on a per capita basis) and is heavily concentrated in fields related to environmental sciences and geology.

- Since July 2007, operating budgets have fallen by -15.89% at the University of Nevada, Reno and by -14.27% at the Desert Research Institute. Over the next two years budgets will decline further; by FY2013 University of Nevada, Reno's operational budget is expected to fall to 68.25% of FY2007 levels and the Desert Research Institute's to 75.68%.[53]

[53] Nevada System of Higher Education budget accounts.

INNOVATION INPUTS

R&D PERSONNEL AND FACILITIES

The availability of highly educated human resources is an essential component of regional innovation systems. Ph.D.-level researchers provide key leadership and technical capabilities for R&D efforts that are often closely associated with technology innovation. The annual *NSF Survey of Earned Doctorates* has for decades served as the primary source of data regarding the development of these critical human resources.

Between 2006-2009, the University of Nevada, Reno awarded 377 doctoral degrees, or 57% of the state total. Life sciences, psychology and engineering were the most commonly awarded degrees in Reno. Reno was also responsible for 100% of the state's geosciences degrees, one of the few fields where the state produces doctoral degrees at a higher level than the national average.

Reno Earned Doctorates, 2006-2009

Academic Discipline	Ph.D.s awarded			Comparison
	Nevada	*United States*	*Reno*	*Reno's Share of Nevada Ph.D.s*
Life Sciences	113	42,300	87	77%
Psychology	117	13,378	81	69%
Engineering	90	30,423	49	54%
Education	156	25,661	48	31%
Physical Sciences	48	16,399	41	85%
Geosciences	33	3,377	26	79%
Humanities	46	13,840	25	54%
Social Sciences	17	18,140	9	53%
Math & Computer Sciences	9	12,178	6	67%
Law	3	315	3	100%
Arts & Music	5	3,783	1	20%
Vocational Studies & Home Economics	2	208	1	50%
Business & Management	18	5,643	0	0%
Other Non-sciences or Unknown Disciplines	3	404	0	0%
Social Service Professions	0	1,265	0	0%
Religion & Theology	0	2,045	0	0%
Communication & Librarianship	0	2,371	0	0%
Architecture & Environmental Design	0	342	0	0%
Total	**660**	**192,072**	**377**	**57%**

Source: NSF, *Survey of Earned Doctorates* 2006-2009

Physical infrastructure for R&D – and science and engineering (S&E) research space in particular – is key indicator of a region's innovation capacity. The biannual *NSF Survey of Science and Engineering Research Facilities* shows that research space at universities across the United States has been growing at a declining rate over the past two decades. Nevada, however, has experienced significant growth in S&E research space over the past two years. In particular, the University of Nevada, Reno reported an almost 36% increase in research facilities between 2007 and 2009, with the most significant addition in space for *Physical Sciences – astronomy, astrophysics, chemistry, and physics*.

S&E research space at federally funded research organizations in the state is heavily concentrated in Reno, with University of Nevada, Reno alone accounting for nearly 70% of all such research space in the state. The majority of the state's research laboratory space is also housed at the University of Nevada, Reno (353,484 ft², or 58.0%), with the Desert Research Institute housing an additional 48,061 square feet.[54] Reno is also home to another of Nevada's four major research facilities, the Desert Research Institute. In most fields, Nevada lags the U.S. average in availability of research facilities; however, the state has substantially more *Physical Sciences* space than the national average. Reno is home to nearly all of Nevada's research facilities related to agricultural and natural resources and physical sciences such as atmospheric, geological, meteorology, astronomy, and physics.

Reno Science & Engineering Research Space, 2009

Field	Total Net Assignable Square Feet		Comparison
	Desert Research Institute	*University of Nevada, Reno*	*Reno's Share of Nevada S&E Research Space*
Agricultural & Natural Resources Sciences	5,657	144,171	99%
Biological & Biomedical Sciences	21,572	118,469	51%
Computer & Information Sciences	12,282	3,198	65%
Engineering	0	111,746	68%
Health & Clinical Sciences	0	46,038	82%
Mathematics & Statistics	0	184	45%
Physical Sciences – atmospheric, earth, and geological sciences, meteorology & oceanography	**86,797**	**59,969**	**90%**
Physical Sciences – astronomy, astrophysics, chemistry, & physics	**0**	**158,300**	**81%**
Psychology	0	22,203	80%
Social Sciences	3,419	35,148	82%
Other Science & Engineering Fields	0	12,651	100%
Total	**129,727**	**712,077**	**75%**

Source: National Center for Science and Engineering Statistics, *Survey of Science and Engineering Research Facilities*, Fiscal Year 2009

[54] Nevada System of Higher Education FY2011 property inventory

R&D SPENDING

Investment in R&D has been shown to have an important role in stimulating economic growth. Federal R&D funding accounts for more than a quarter of all R&D investment in the United States and nearly 60% of "basic" research.[55] The ability to attract federal R&D investment, as measured by NSF's *Survey of Federal Funds for Research and Development*, is therefore critical to a region's ability to maintain a world-class capacity to innovate. Overall, the State of Nevada attracts relatively low federal R&D spending per capita from most agencies, averaging less than one-third the U.S. average. However, Reno attracts more than 74% of all federal support for academic R&D in the state and also accounts for more than 78% of total academic R&D funding in the state. The University of Nevada, Reno is Nevada's leading research institution in terms of R&D expenditures, accounting for nearly 60% of Nevada's total R&D expenditures. While continuing to lead R&D expenditure in the state, from FY2008-2010 research expenditure has declined at the University of Nevada, Reno, at an average annual rate of -6.64% (CAGR) – slightly less than the statewide rate of decline (-7.74% CAGR).[56] On a per capita basis, the rate of university R&D spending in Reno is double the national average, as shown in the table below.

Reno Universit R&D Spending, 2009

Institution	R&D Spending ($000s)			Comparison	
	Federally Financed	*Non-Federally Financed*	*Total*	*% Federally Financed*	*Per Capita Spending*
Desert Research Institute	$29,544	$6,946	$36,490	81%	N/A
University of Nevada, Reno	$63,709	$42,669	$106,378	60%	N/A
Reno Total	**$93,253**	**$49,615**	**$142,868**	**65%**	**$248.05**
Nevada Total	**$124,523**	**$57,493**	**$182,016**	**68%**	**$67.80**
U.S. Total	**$32,587,529**	**$22,347,928**	**$54,935,457**	**59%**	**$179.08**

Source: NSF, *Survey of Research and Development Expenditures at Universities and Colleges* 2009

[55] National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources: 2008 Data Update*, NSF 10-314, Arlington, VA (2010), http://www.nsf.gov/statistics/nsf10314/.

[56] Nevada System of Higher Education FY2011 budget accounts.

FUNDING FROM COMPETITIVE R&D AWARDS

The National Science Foundation (NSF) funds education, science, and engineering research at academic institutions through grants, contracts, and cooperative agreements. NSF awards are competitively reviewed and funded, and the ability to secure such awards is an indicator of a region's research capacity and stature. Nevada is well behind the national average in total NSF awards based on its population size, but the state is home to significant research activity related to geosciences and polar research. Reno is home to two of Nevada's leading recipients of NSF awards, the University of Nevada, Reno and the Desert Research Institute, which together account for 66% of all NSF awards in the state.

Reno NSF funded grants, contracts, and cooperative agreements, 2006-2010

NSF directorate / research office	NSF awards			Comparison
	Nevada	*United States*	*Reno*	*Reno's Share of Nevada NSF Awards*
Biological Sciences	33	7,175	23	70%
Computer & Information Science & Engineering	10	7,583	8	80%
Education & Human Resources	12	4,777	7	58%
Engineering	34	10,714	27	79%
Geosciences	69	7,583	51	74%
Mathematical & Physical Sciences	40	12,641	25	63%
Office of Cyber Infrastructure	0	568	0	0%
Office of International Science & Engineering	0	1,852	0	0%
Office of Polar Programs	18	1,543	17	94%
Social, Behavioral & Economic Sciences	20	6,007	14	70%
Other	9	185	4	44%
Total	**245**	**60628**	**176**	**72%**

Source: NSF Awards Database

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards serve as an indicator of funding availability for small businesses developing new technologies for commercialization. Companies in Nevada have received funding from a variety of federal agencies, but the Department of Defense and the National Science Foundation together account for nearly three-quarters of all SBIR/STTR awards in the state.

Reno-area firms received 75% of all SBIR/STTR awards in Nevada from 2006 to 2010. Several Reno-area firms received multiple SBIR awards between 2006 and 2010, including Advanced Materials & Devices, Inc. (fuel cells / nanomaterials); Digital Solid State Propulsion LLC (rocket motors); Opticomp Corp, in Zephyr Cove (optoelectronics); and Software & Engineering Assoc., Inc. in Carson City (rocket motor modeling). Each of these firms received 4 awards and together accounted for more than one-quarter of Nevada's SBIR activity.

Reno SBIR/STTR Awards, 2006-2010

Funding Agency	SBIR/STTR Awards			Comparison
	Nevada	*United States*	*Reno*	*Reno's Share of Nevada SBIR/STTR Awards*
Department of Homeland Security	0	293	0	N/A
Department of Commerce	0	83	0	N/A
Department of Defense	36	13,005	25	69%
Department of Energy	5	1,909	4	80%
Department of Transportation	1	79	1	100%
Department of Education	0	188	0	N/A
Environmental Protection Agency	1	185	1	100%
Department of Health & Human Services	4	5,461	2	50%
National Aeronautics & Space Administration (NASA)	3	1,867	3	100%
National Institute of Standards & Technology	0	74	0	N/A
National Science Foundation (NSF)	9	1,967	8	89%
Department of Agriculture	2	459	2	100%
Total	**61**	**25,570**	**46**	**75%**

Source: Small Business Administration, *TechNet Database*

TOTAL SPONSORED PROJECT AWARDS AT THE UNIVERSITY OF NEVADA, RENO AND DESERT RESEARCH INSTITUTE

In addition to outside funding and awards for R&D, Nevada's higher education research institutions also receive outside sponsorships, grants, and contracts for other purposes, including instruction, public service, scholarships/fellowships, student services, and other activities. These funds come via government sources (federal, state, and local), from the private sector, and from nonprofits.

The total dollar amount of sponsored project awards at the University of Nevada, Reno has increased each year from FY2008-2011. This growth was largely driven by a net increase in sponsored project awards from federal government sources, which include funding from the American Recovery and Reinvestment Act of 2009. Sponsored project awards by state and local government and industry sources has dropped dramatically from FY2008-2011, while funding from nonprofits has remained stable.

Total Sponsored Project Awards at the University of Nevada, Reno, FY2008-2011

	Total Amount Awarded ($000s)*				# of Grants and Contracts Received
Funding Source	*FY 2008*	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2011*
Federal	57,120	66,294	72,914	71,333	217
Federal Pass-through	23,481	26,079	24,506	32,888	260
State of Nevada	6,054	5,155	4,459	4,049	42
Other state and local govt.	7,904	3,532	1,696	2,264	39
Private, For-Profit (Industry)	4,281	3,295	4,186	1,539	29
Private, Non-Profit	2,854	2,286	2,411	2,890	68
Total	**101,694**	**106,640**	**110,172**	**114,963**	**655**

Source: Nevada System of Higher Education budget accounts, FY2008-2011
Sponsored project awards include funding for research, instruction, public service, scholarship/fellowships, student services, and other categories.

The total dollar amount of sponsored project awards at the Desert Research Institute has increased substantially over the FY2008-2011 period, climbing from $27 million (FY2008) to $42 million (FY2011). Growth was largely the result of federal sponsored project funding increases; awards by state government and private non-profits declined from FY2008-2011. Industry (private, for-profit) funding increased dramatically over this period, from under $200,000 in FY2008 to over $2 million in awards in FY2011.

Total Sponsored Project Awards at the Desert Research Institute, FY2008-2011					
	Total Amount Awarded ($000s)*				# of Grants and Contracts Received
Funding Source	*FY 2008*	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2011*
Federal	17,466	24,514	25,665	27,422	76
Federal Pass-through	5,216	7,144	7,489	10,317	53
State of Nevada	208	20	45	0	0
Other state and local govt.	737	2,099	1,732	1,644	27
Private, For-Profit (Industry)	198	407	850	2,100	22
Private, Non-Profit	3,494	1,681	1,086	819	12
Total	**27,320**	**35,864**	**36,867**	**42,301**	**190**

Source: Nevada System of Higher Education budget accounts, FY2008-2011

Sponsored project awards include funding for research, instruction, public service, scholarship/fellowships, student services, and other categories.

INNOVATION OUTPUTS

SCIENTIFIC PUBLICATIONS

It is difficult to quantify the outputs of R&D, but scientific publications are commonly used as a proxy measure for R&D activity. Nevada accounts for 0.86% of the U.S. population, but from 2009-2010, Nevada-based researchers produced 2,529 publications in peer-reviewed journals, or 0.45% of the U.S. total scientific publications, a little more than half the average rate.

Reno-based researchers produced a total of 1,372 publications from 2009-2010, or 23.7 per ten thousand people in the Reno area – well above the state average (9.4 publications per ten thousand people in the State of Nevada), and also above the national average (18.4 publications per ten thousand people for the United States).

Reno Scientific Publications by Institution, 2009-2010

Institution	*Number of Publications*
University of Nevada, Reno	1,024
Desert Research Institute	136
U.S. Geological Survey	44
U.S. Forest Service	32
U.S. Department of Agriculture, Agricultural Research Service	35
Reno Total Publications	**1,372**

Source: *Science Citation Index – Expanded*

The University of Nevada, Reno and the Desert Research Institute are two of the leading research institutions in Nevada in terms of publication output. Scientific publication activity in Reno is heavily concentrated in fields related to environmental sciences and geology. *Environmental Sciences Ecology*, *Geology*, *Meteorology Atmospheric Sciences*, and *Water Resources* all have very high location quotients[57], as indicated in the table o the following page.

[57] The location quotient for scientific publications shows the relative concentration of publications in each field in Reno as compared to the national average. A location quotient greater than one indicates that a higher-than-average share of Reno's scientific publications are in that field relative to the U.S. average.

Reno Scientific Publication Topics, 2009-2010		
Field	***Number of Publications***	***Location Quotient***
Environmental Sciences Ecology	237	4.15
Engineering	182	1.52
Physics	150	1.25
Meteorology Atmospheric Sciences	109	6.44
Geology	94	4.22
Chemistry	76	0.70
Materials Science	63	1.01
Biochemistry Molecular Biology	50	0.55

Note: *Science Citation Index – Expanded* includes more than 138 subject classifications, only the top 8 classifications are included in this table.
Source: *Science Citation Index – Expanded* SRI analysis

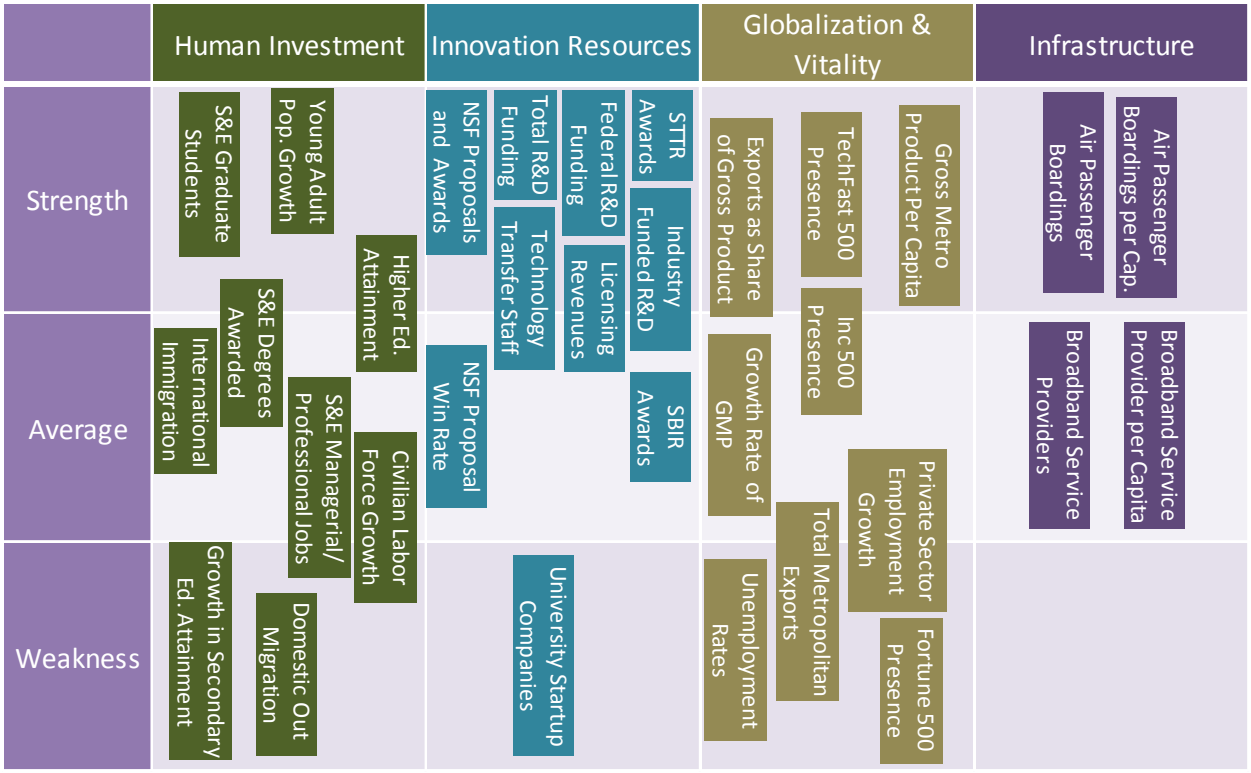
C. BENCHMARKING ANALYSIS: RENO METRO AREA

To illuminate strengths and weaknesses in the Reno metropolitan area, a benchmarking analysis was conducted to compare Reno with seven other metropolitan areas, listed below:

- Atlantic City-Hammonton, New Jersey
- Boise City-Nampa, Idaho
- Colorado Springs, Colorado
- Naples-Marco Island, Florida
- Ogden-Clearfield, Utah
- Salinas, California
- Santa Barbara-Santa Maria-Goleta, California

These benchmark cities were selected because they show similarities to Reno in terms of size, growth rates, industrial composition, and presence of unique industry activity. The graphic below summarizes how Reno ranks among the benchmark cities for a number of indicators collected in this study. Reno showed strong performance in the categories of **Innovation Resources** and **Infrastructure**. Reno's performance was mixed, though, in the categories of **Human Investment** and **Globalization & Vitality**. Reno led the benchmark regions for a few indicators in these categories, but several measurements suggest that the city has room to improve.

The following sections, with data tables and rankings, detail the strengths and weaknesses of the Reno metropolitan area compared to the selected benchmark cities.



HUMAN INVESTMENT IN RENO

WHERE DOES RENO STAND?

Reno Human Investment	
Quality Of Education	
+	High growth rate of higher education attainment
O	Average K12 expenditures per pupil
O	Moderate levels of high school and higher education attainment
O	Average growth rate of secondary education attainment
Workforce Characteristics	
+	Strong growth in the young adult population
+	Large number of S&E graduate students
O	Average number of S&E degrees granted
O	Moderate base of S&E and managerial/professional jobs
O	Moderate levels of international immigration
O	Average to below average growth in the civilian labor force
–	High levels of domestic out-migration

Reno's major strength in the *Human Investment* category is the city's creation of new workforce talent. A well-educated population can provide the workforce skills that innovative and high-tech firms require. The proportion of Reno's over-25 population with a post-secondary degree (62%) is average compared to the benchmark cities, but the proportion of degreed adults is increasing rapidly. Of the eight benchmarked cities, Reno had the second highest growth rate for higher education attainment (3.3% growth from 2005 to 2009). Additionally, Reno's colleges and universities grant an above-average number of degrees in science and engineering (S&E) fields and host a large number of S&E graduate students, reinforcing the tech-savvy entry-level workforce that many employers desire. At the secondary education level, Reno is moderately competitive in the peer rankings, placing fourth in both secondary education attainment and the growth rate of secondary education attainment. Approximately 86% of Reno's adults have at least a high school diploma (or equivalent), and this number grew by 1.8% annually from 2005-2009. These factors bode well for the future, as competitiveness in the global economy is increasingly dependent on innovative, creative, and highly-skilled workers.

In spite of these positive aspects, Reno still has room for improvement. For one, Reno had a high level of out-migration – that is, individuals who leave Reno to move elsewhere in the United States. The metropolitan area lost about 1,800 people[58] (0.4% of the total metro population) in 2009. This is a reversal of recent trends as, until 2009, several thousand U.S. residents relocated *to* Reno each year. This trend is echoed in Reno's labor force statistics: Reno's labor force has grown at an average rate over the long term (+8.23% over 10 years) compared to the benchmark cities, but its recent dip (-3.8% from 2010 to 2011) is troubling. These figures may be the result of workers' frustration with the recessionary job market, or they may signal the beginning of a wave of baby boomer retirement. In either case, Reno should continue investing in creating new workforce talent and upgrading existing talent to prepare itself for future growth.

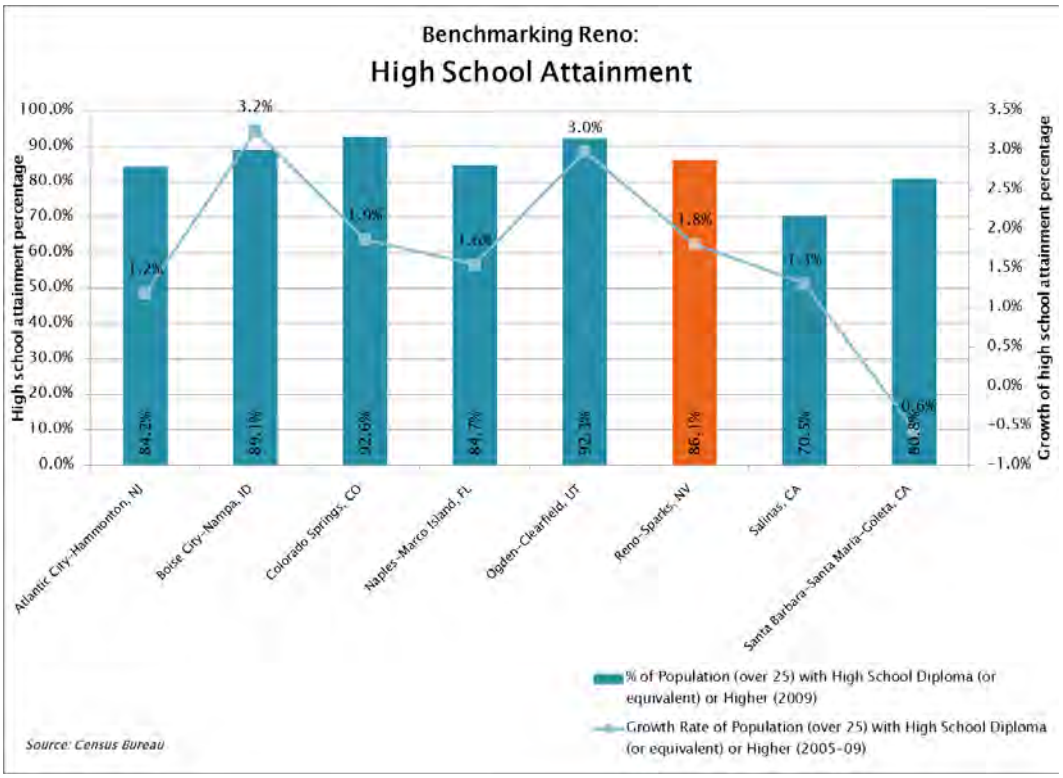
[58] The Census data are unclear as to whether the individuals leaving Reno moved elsewhere in Nevada, or moved outside the state.

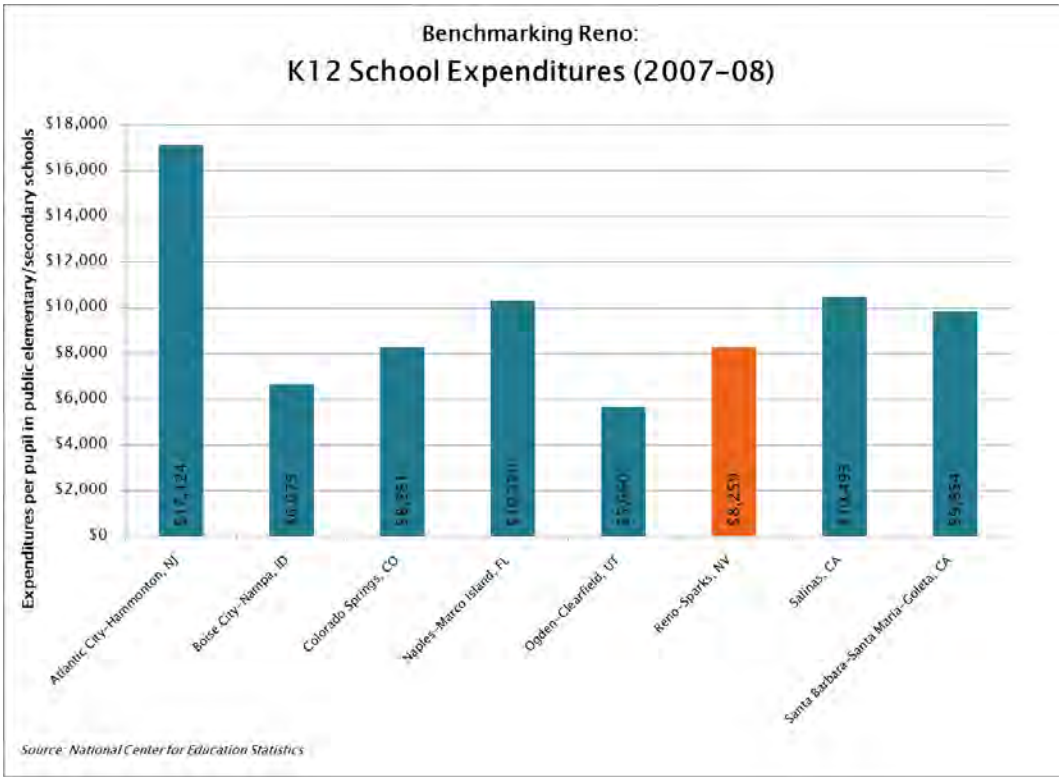
Reno: Human Investment
Summary of Benchmarking Indicators

	Indicator Value for Reno	Reno's Ranking Among 8 Peer Metros
A) Quality Of Education		
1) Secondary Education Performance		
Secondary Education Attainment: % of population over 25 with a high school diploma (or equivalent) or higher (2009)	86.1%	4
Growth rate of Secondary Education Attainment (2005-09)	1.8%	4
Expenditure per pupil in public elementary and secondary schools (2007-08)	$8,259	6
2) Higher Education Performance		
Higher Education Attainment: % of population over 25 with an associate's, bachelor's, master's, doctorate, or professional degree (2009)	61.6%	5
Growth rate of Higher Education Attainment (2005-09)	3.3%	2
B) Workforce Characteristics		
1) Workforce Growth & Migration		
5-year growth rate of civilian labor force (2006-11)	1.5%	5
10-year growth rate of civilian labor force (2001-11)	8.2%	6
Net domestic migration of population (2009)	-1,786	7
Net international migration of population (2009)	1,592	4
2) Next Generation Workforce		
Growth rate of young adult population (ages 25-34) (2005-09)	10.6%	2
Number of science & engineering graduate students (2008)	1,460	3
Number of science & engineering graduate students per 10,000 people (2008)	35.8	3
Number of science & engineering degrees granted (at the bachelor's, master's, and doctorate levels) (2008)	673	4
Number of science & engineering degrees granted (at the bachelor's, master's, and doctorate levels) per 10,000 people (2008)	16.2	4
3) Knowledge & Innovation Economy Workforce		
Total employment in S&E occupations (2010)	16,350	5
S&E jobs as a % of total MSA employment (2010)	8.62%	5
Total employment in managerial, professional, & technical occupations (2010)	34,030	4
Managerial, professional, & technical jobs as a % of total MSA employment (2010)	18.0%	6

A) Quality Of Education:

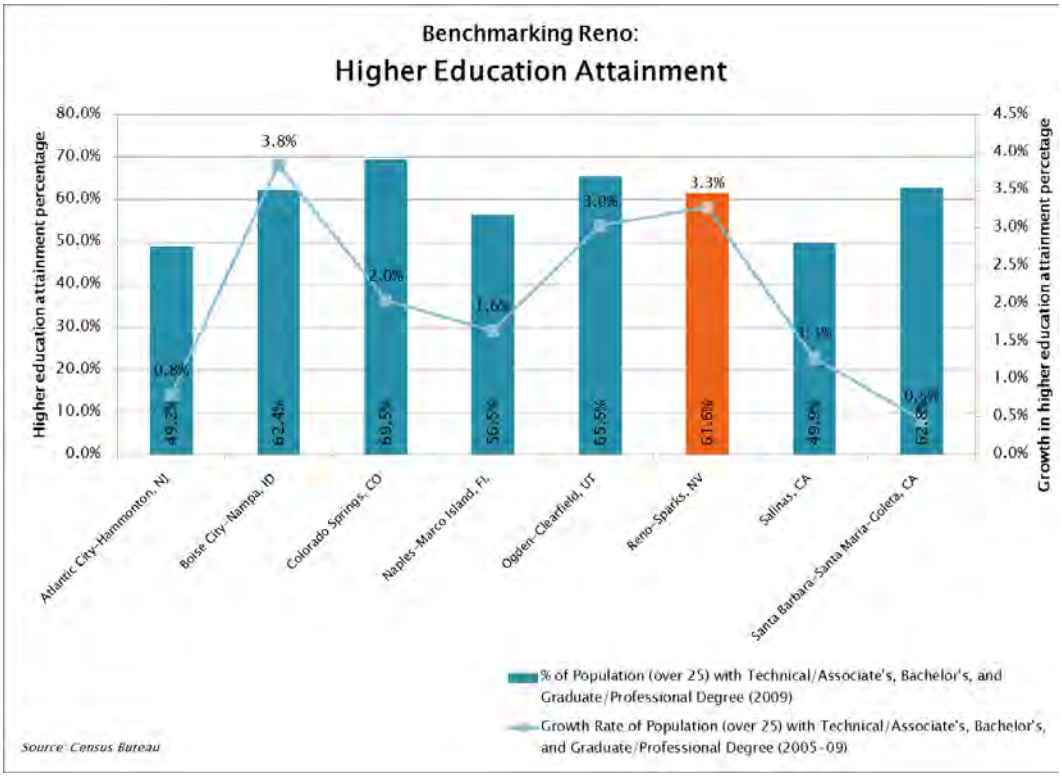
1) Secondary Education Performance





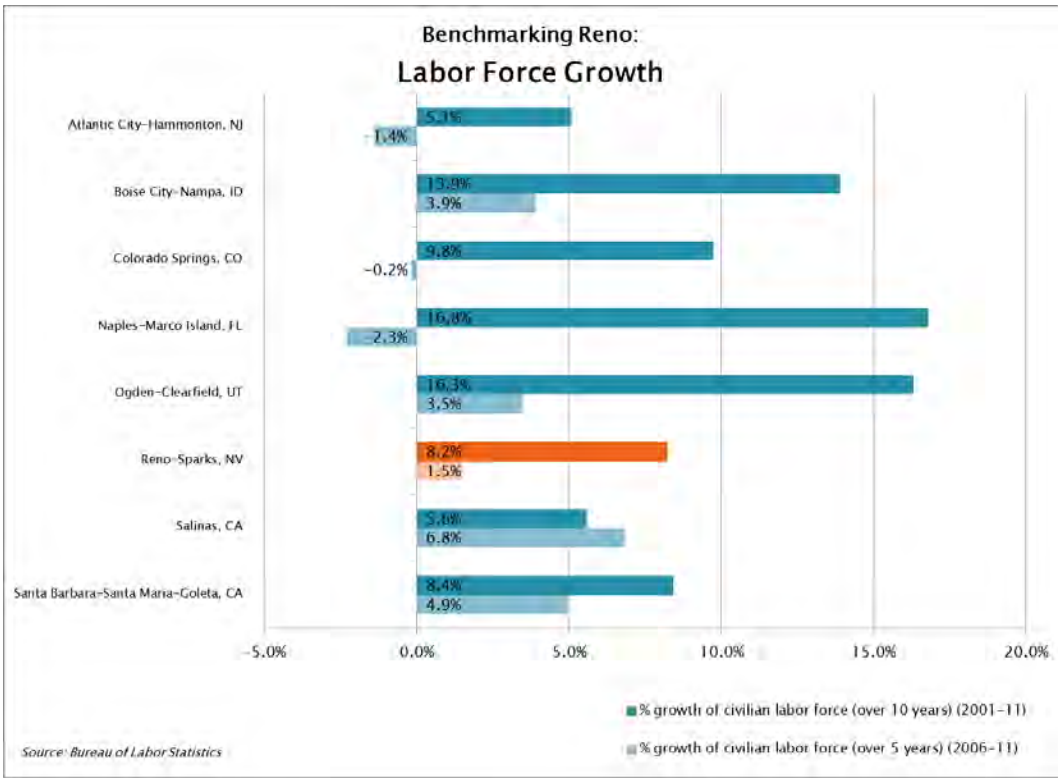
A) Quality Of Education:

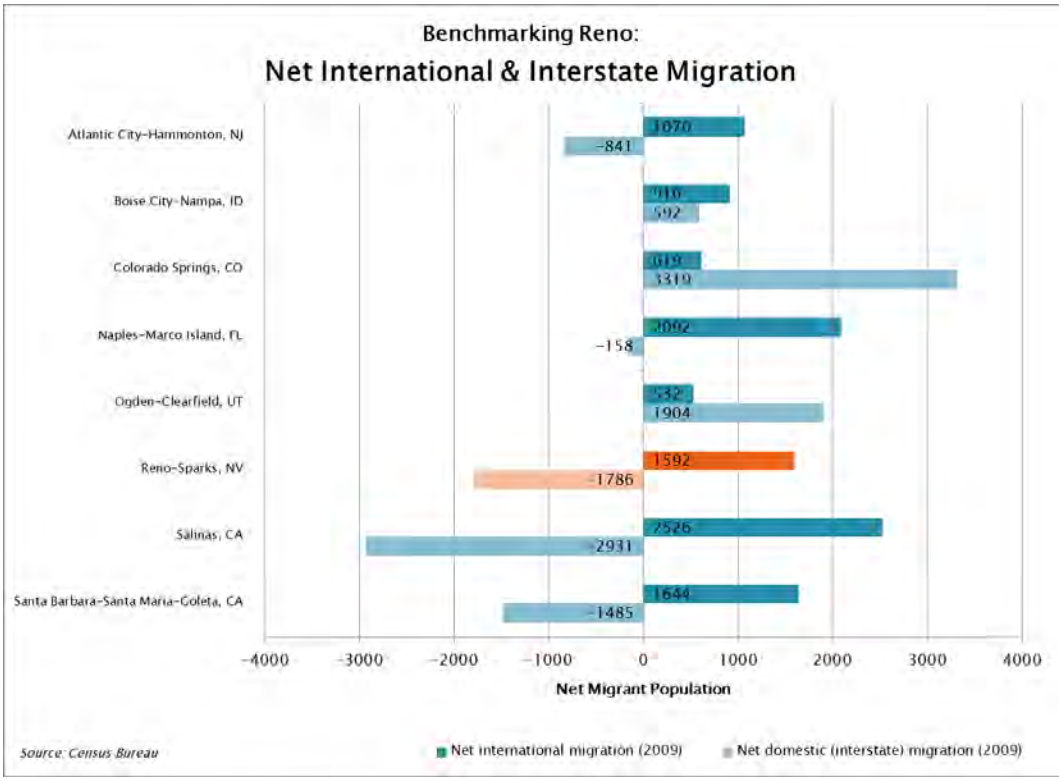
2) Higher Education Performance



B) Workforce Characteristics:

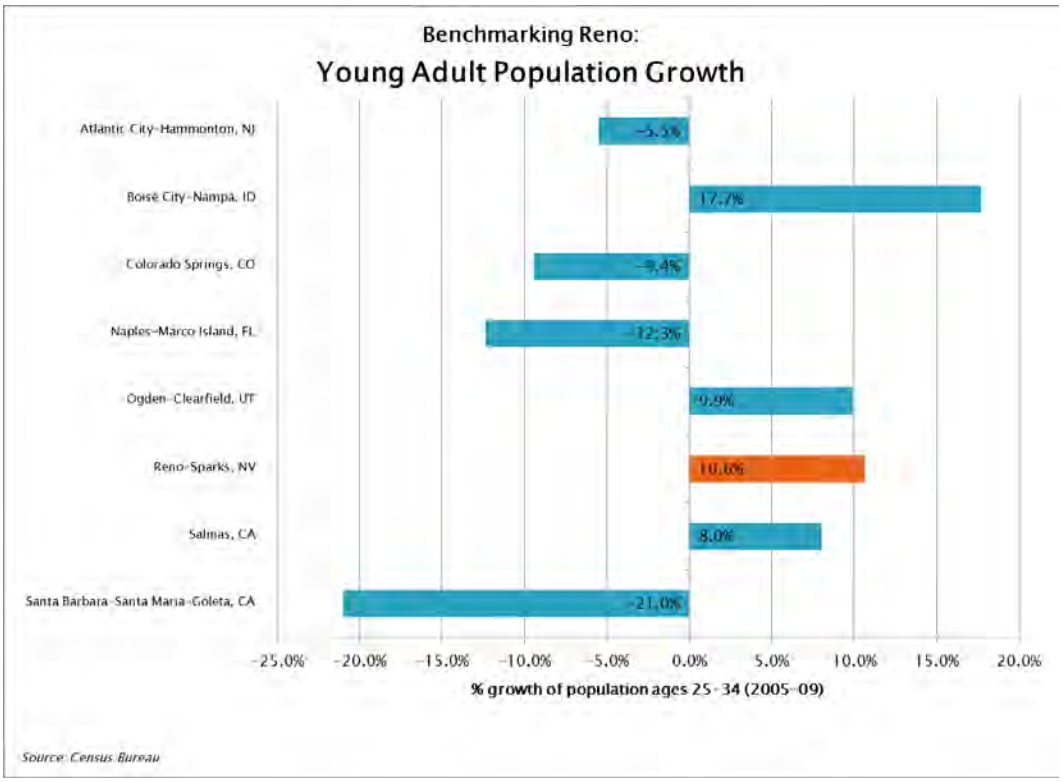
1) Workforce Growth & Migration

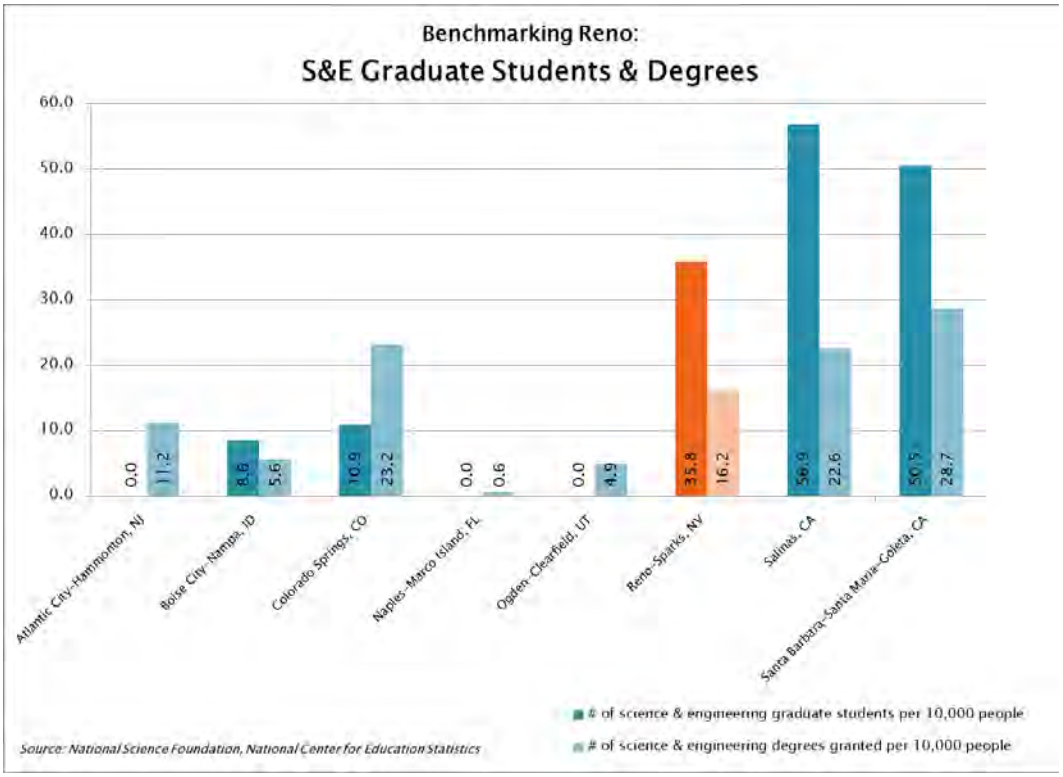




B) Workforce Characteristics:

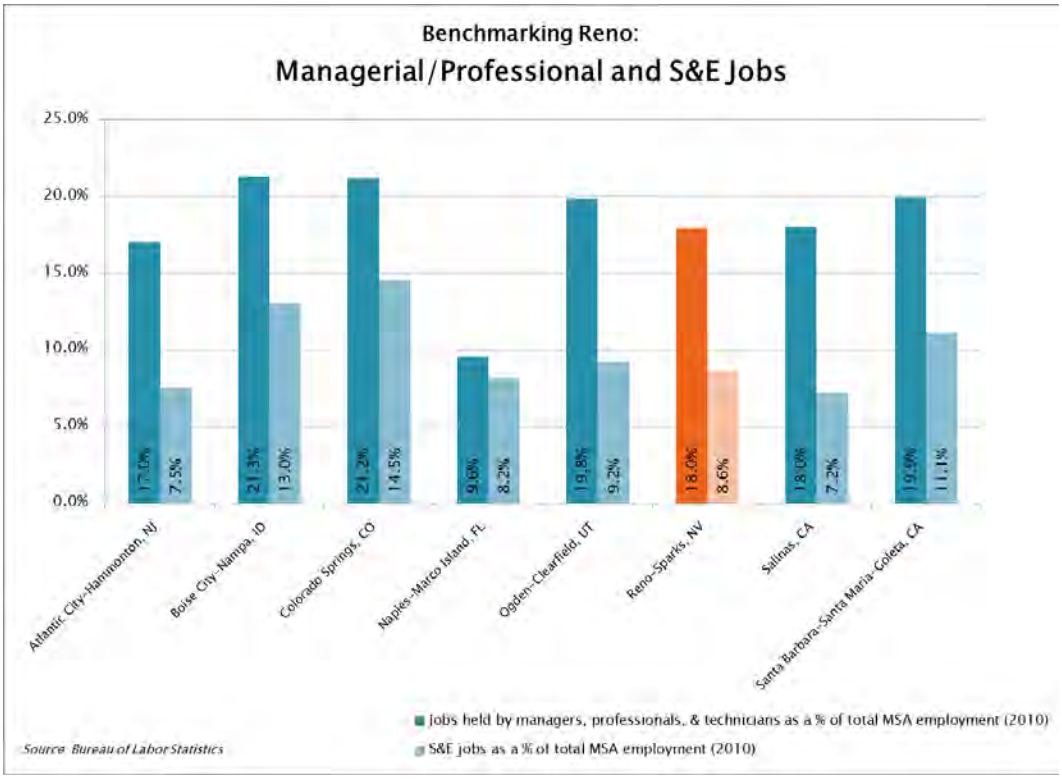
2) Next Generation Workforce





B) Workforce Characteristics:

3) Knowledge & Innovation Economy Workforce



INNOVATION RESOURCES IN RENO

WHERE DOES RENO STAND?

Innovation Resources is Reno's most competitive category in this benchmarking study, and the city ranks well across many R&D and commercialization metrics. Reno's innovation strengths are largely grounded in the strong research capacity of the University of Nevada-Reno, which ranks above average among the benchmarked cities for R&D investments (both in absolute and in per-GDP terms). One disadvantage of Reno's innovation capabilities is that industrial R&D has not kept pace with university and federally-supported R&D. This is notable, because to derive economic benefit from R&D beyond licensing revenue, discoveries and inventions must typically be advanced by private enterprise. As a whole, the State of Nevada ranks low in industrial R&D expenditures.

Reno
Innovation Resources

R&D Support

- \+ Strong levels of total and federal R&D expenditures
- \+ Above average number and funding levels of STTR awards
- \+ High number of NSF proposals and awards
- O Average number and funding levels of SBIR awards
- O Average win rate for NSF proposals

Collaboration & Innovation

- \+ Strong levels of industry-funded and total sponsored R&D
- \+ Competitive number of invention disclosures issued
- \+ Several full-time staff in tech-transfer offices
- \+ Strong amount of licensing revenues
- O Several licenses/options executed
- — Lack of recent university startups

Funding for small business research and innovation is key to supporting emerging industry sectors. Reno received $1.6 million of small business support via Small Business Technology Transfer (STTR) awards over the years 2007-2010, which was above average for the benchmark group. For Small Business Innovation Research (SBIR) awards, Reno was in the middle of the benchmark group, with its receipt of $3.2 million of SBIR awards over the period 2007-2010. This is a strong showing for Reno, given the city's size, but continued support for small businesses will be needed to bolster Reno's innovative potential.

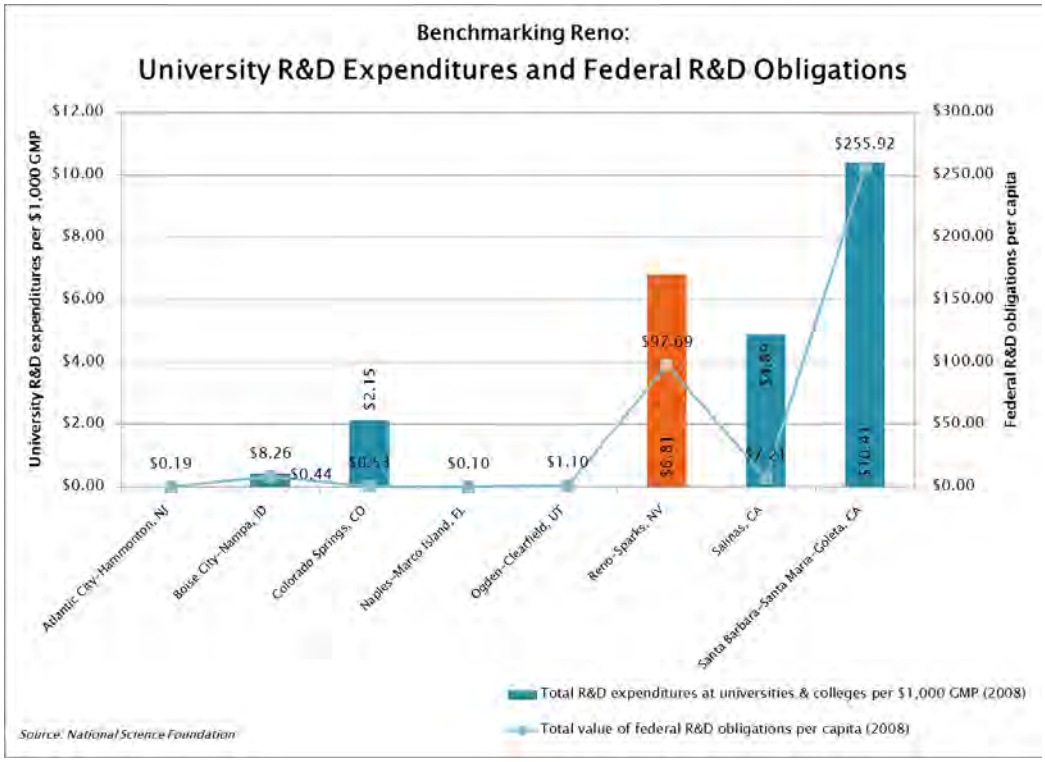
Reno stands out from its peer cities because of the amount of commercialization activity that takes place in its main research university. Aside from Santa Barbara and Boise, few of the benchmark cities reported any invention licensing or commercialization activity. In 2009, the University of Nevada-Reno produced a significant amount of intellectual property: 22 invention disclosures and 13 patents. UNR could be more effective with transferring inventions into the commercial space, though. The university executed licenses on only two inventions in 2009, and the university has not reported the formation of any startup companies since 2004.

Reno: Innovation Resources
Summary of Benchmarking Indicators

	Indicator Value for Reno	Reno's Ranking Among 8 Peer Metros
A) Research & Development Support		
1) R&D Activity		
Total R&D expenditures at universities and colleges (2008)	$140,118	2
Total R&D expenditures at universities and colleges per $1,000 GMP (2008)	$6.81	1
Total value of federal R&D obligations (2008)	$39,220	2
Total value of federal R&D obligations per capita (2008)	$97.69 /person	2
2) Funding from Competitive R&D Awards		
Total number of SBIR awards (2007-10)	13	4
Total SBIR award funding amount (2007-10)	$3,167,002	5
Total number of STTR awards (2007-10)	5	3
Total STTR award funding amount (2007-10)	$1,595,806	3
Total # of competitive NSF proposals submitted (2010)	178	2
Total # of competitive NSF awards (2010)	25	2
Total # of competitive NSF awards as a % of total competitive NSF proposals (2010)	14.0%	5
B) Collaboration and Innovation		
1) University Commercialization Activity		
# of licenses & options executed by major research universities (2009)	2	2
Number of full-time equivalent staff in major research university technology transfer offices (including licensing and other FTEs) (2009)	5	2
Average number of FTE staff in technology transfer offices per university	5.0	2
Number of FTE staff per $100 million in sponsored research expenditures	6.8	2
Total licensing income received by major research universities (2009)	$164,366	2
# of invention disclosures and U.S. patents issued at major research universities (2009)	35	2
# of start-up companies formed by major research universities (dependent on the licensing of the university's technology for initiation) (2009)	0	2
# of start-ups operating in home state (2009)	0	2
2) University-Industry Collaboration		
Amount of industry-funded R&D performed at universities & colleges (2008)	$2,411,000	2
Total sponsored research expenditures at major research universities (2009)	$73,914,403	2

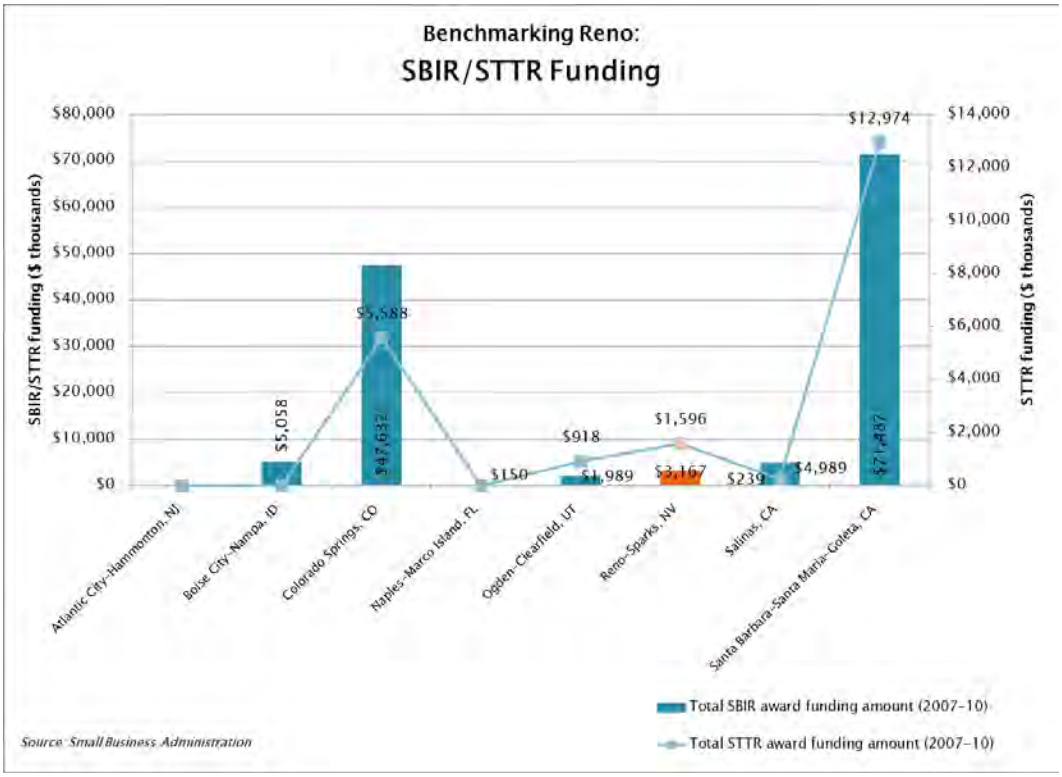
A) Research & Development Support:

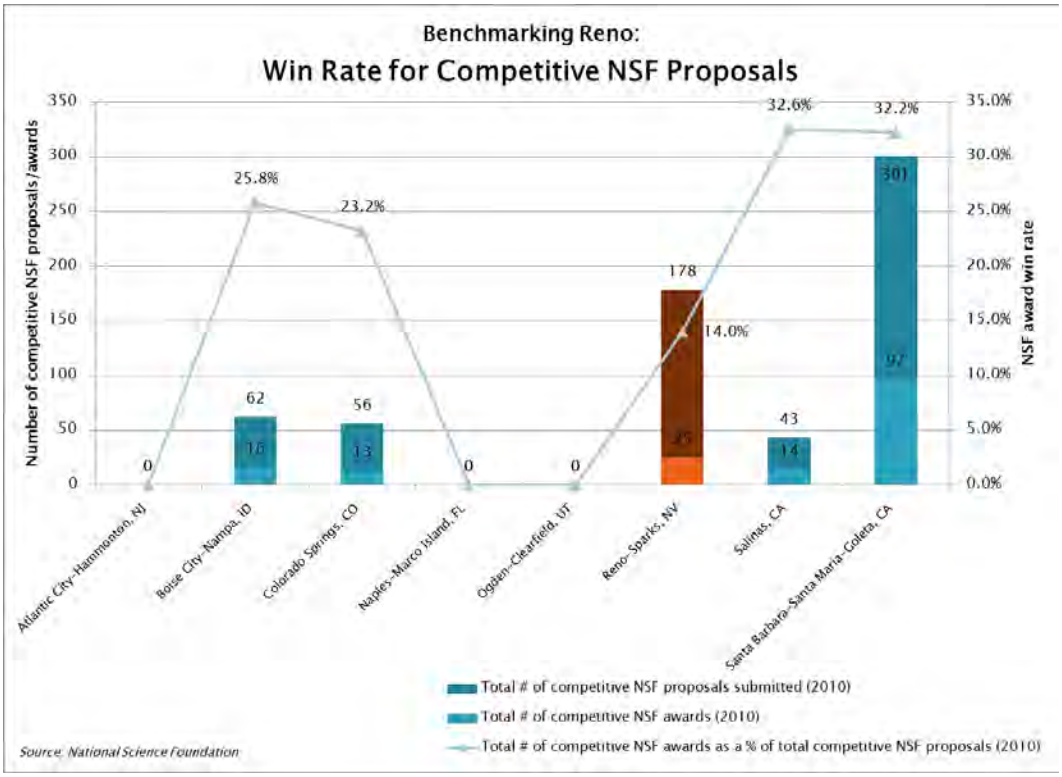
1) R&D Activity



A) Research & Development Support:

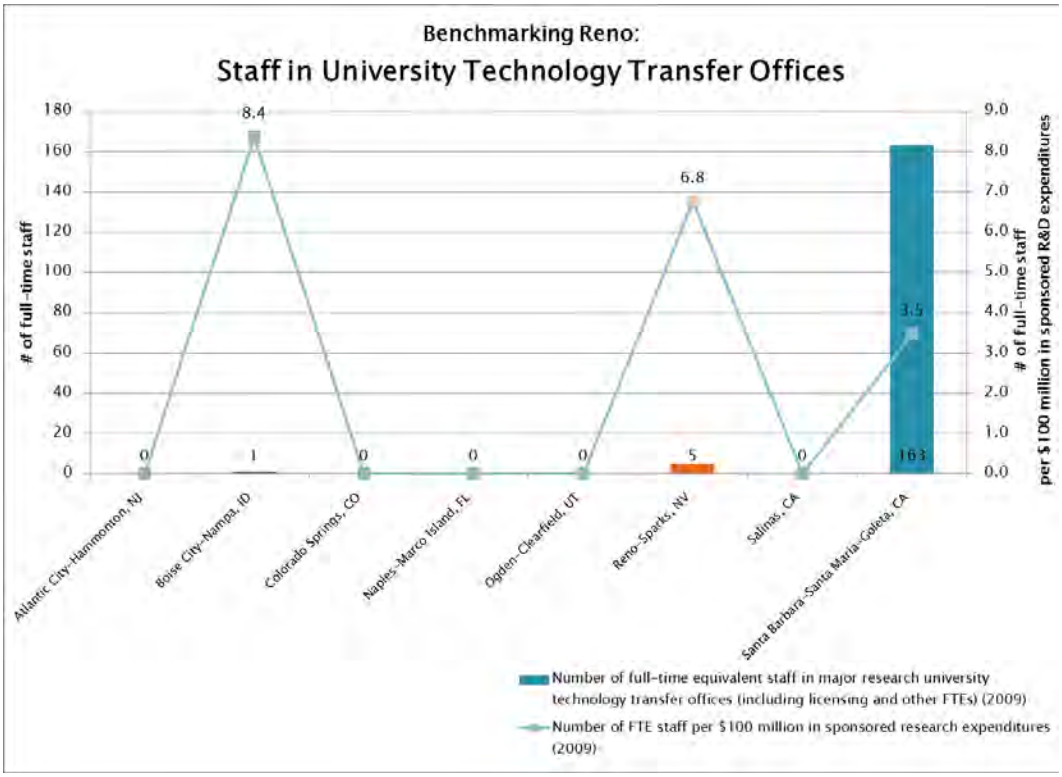
2) Funding from Competitive R&D Awards

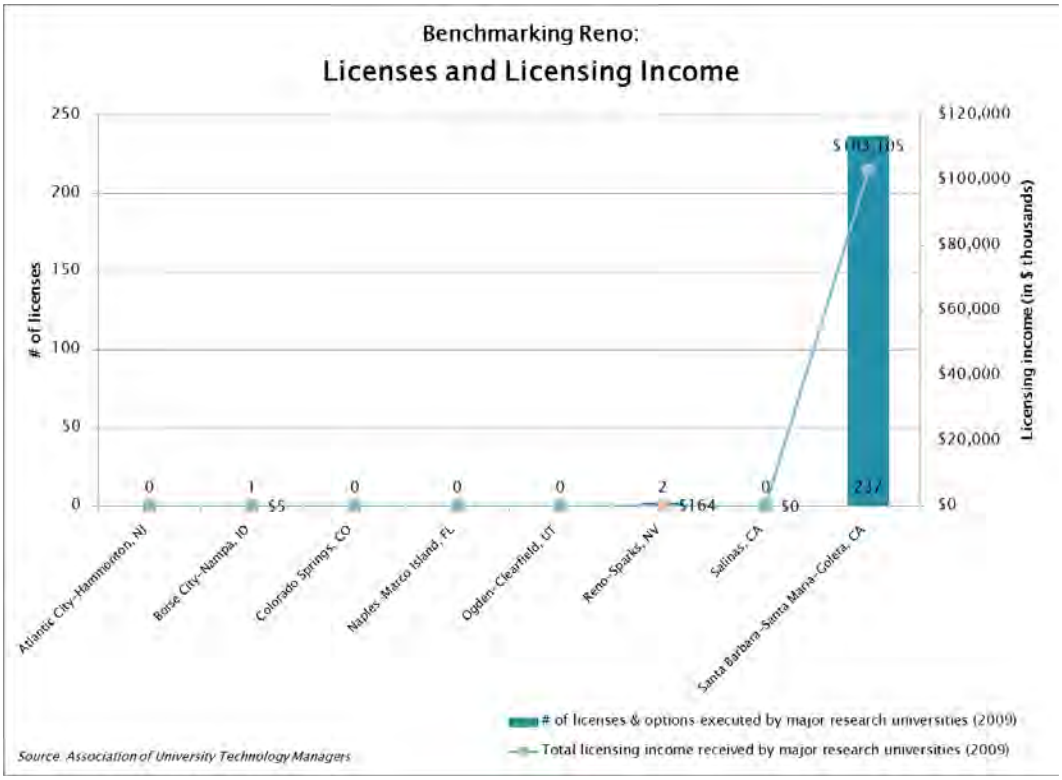


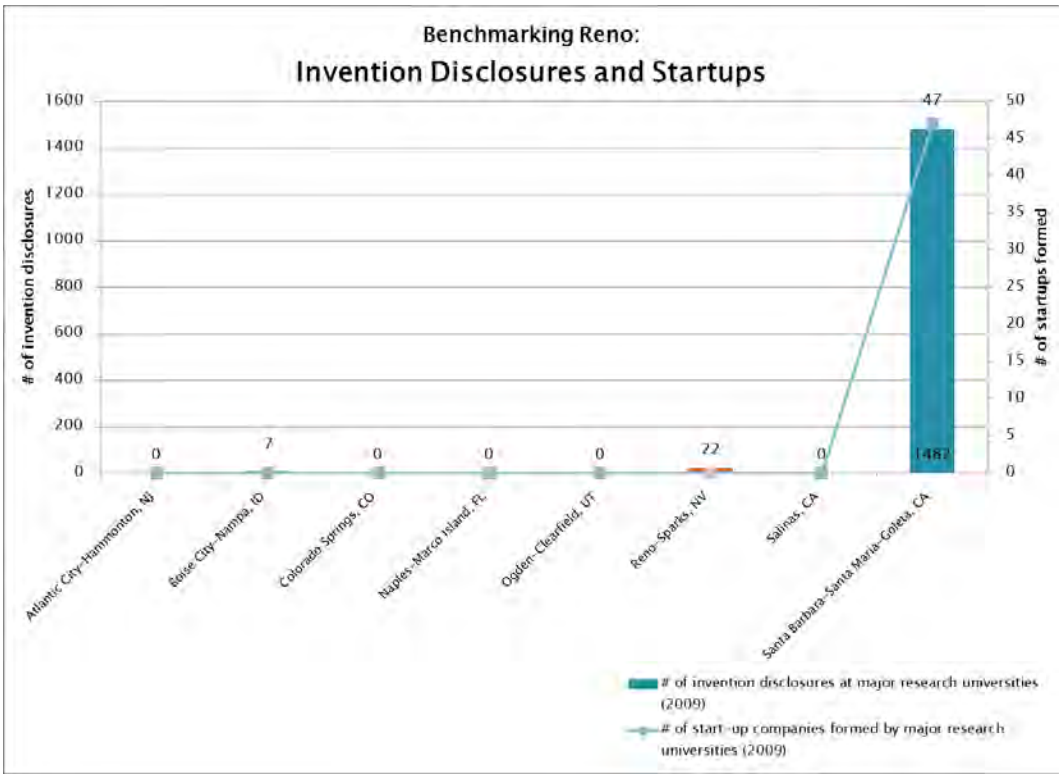


B) Collaboration and Innovation:

1) University Commercialization Activity

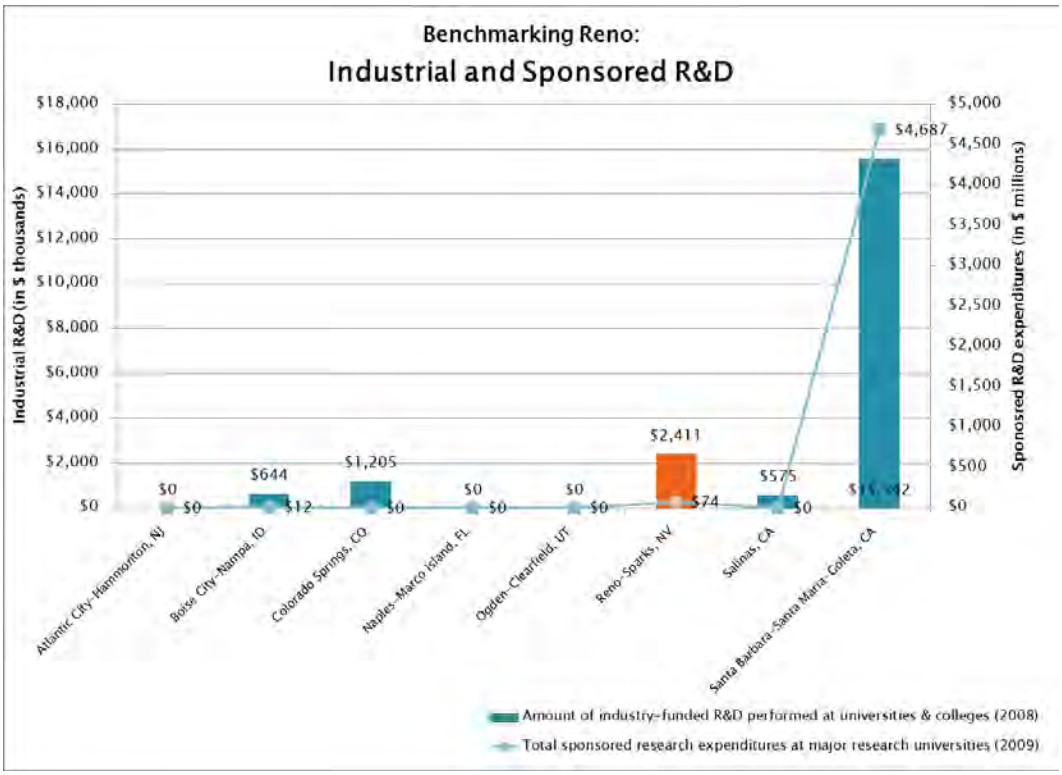





Benchmarking Reno:
Invention Disclosures and Startups
# of invention disclosures
# of startups formed
1600
1400
1200
1000
800
600
400
200
0
50
45
40
35
30
25
20
15
10
5
0
0
7
0
0
0
22
0
1482
47
Atlantic City-Hammonton, NJ
Boise City-Nampa, ID
Colorado Springs, CO
Naples-Marco Island, FL
Ogden-Clearfield, UT
Reno-Sparks, NV
Salinas, CA
Santa Barbara-Santa Maria-Goleta, CA
# of invention disclosures at major research universities (2009)
# of start-up companies formed by major research universities (2009)

B) Collaboration and Innovation:

2) University-Industry Collaboration



GLOBALIZATION & VITALITY IN RENO

WHERE DOES RENO STAND?

Reno showed mixed rankings in the *Globalization & Vitality* category. Largely because the job market in Reno was hit harder than most benchmarked cities by the recent economic downturn, the Reno metro area has experienced high unemployment and negative private sector employment growth in recent years. While none of the benchmark cities saw increased private sector employment over the past five years, Reno's contraction has been especially bad, with private sector employment shrinking by -4.0% since 2006. As a result, total unemployment in the metro area has exceeded 10% since 2009.

Reno Globalization & Vitality	
Globalization	
+	Very competitive value of metropolitan exports as a share of gross metropolitan product
–	Weak total metropolitan export levels
Business Vitality	
+	Presence of one Tech Fast 500 and two Inc 500 companies
+	Above average gross metropolitan product and gross metropolitan product per capita
+	Moderate growth rate of gross metropolitan product
–	Below average to poor rate of private sector employment growth
–	High unemployment
–	Lack of Fortune 500 companies

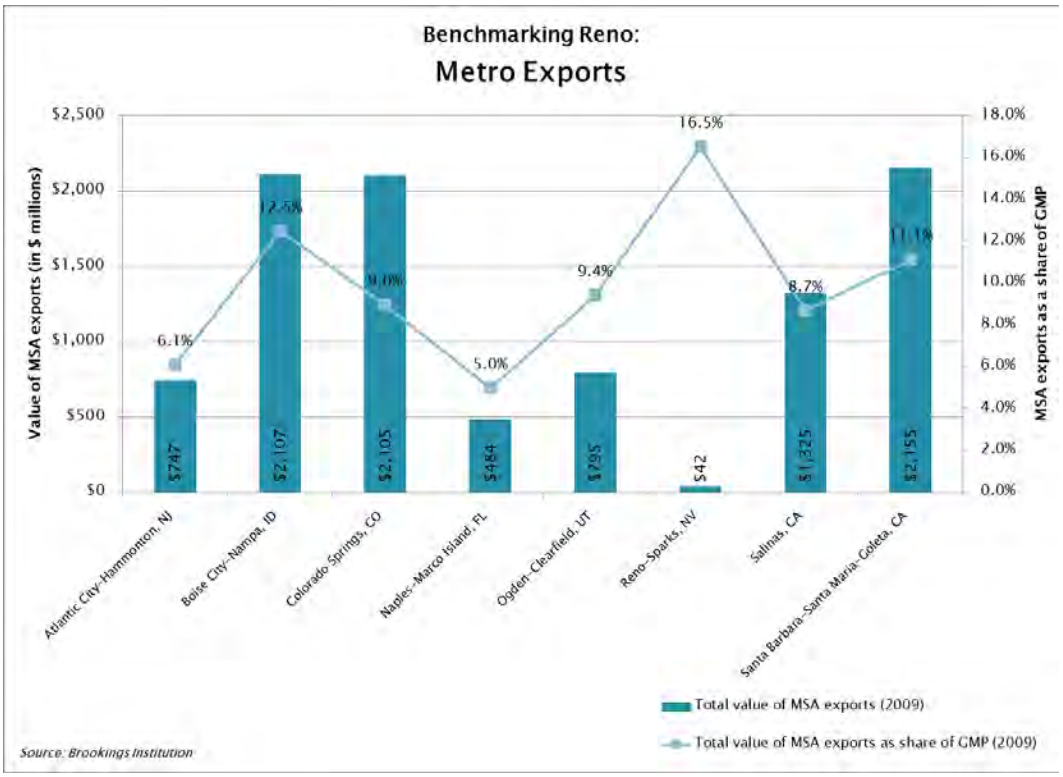
On the positive side, Reno has a high gross metropolitan product (GMP) for its size, and Reno's GMP grew by 3.3% over the period 2004-2009. Statistics show that Reno's economy is very export-oriented, with exports making up 16.5% of GMP. Reno is also home to several high-profile companies, as ranked by the *Technology Fast 500* and *Inc 500* rankings.

Reno: Globalization and Vitality
Summary of Benchmarking Indicators

	Indicator Value for Reno	Reno's Ranking Among 8 Peer Metros
A) Globalization		
1) Exports		
Total value of MSA exports ($ millions) (2009)	$42	8
Total value of MSA exports as share of GMP (2009)	16.5%	1
B) Business Vitality		
1) Economic Prosperity & Growth		
Gross domestic product by metro area ($ millions) (2009)	$19,546	3
Gross domestic product per capita by metro area (2009)	$39,975	3
Average annual GMP growth rate over 5 years (CAGR) (2004-09)	3.3%	5
Average annual private sector employment growth rate over 5 years (CAGR) (2006-11)	-4.0%	7
Average annual private sector employment growth rate over 10 years (CAGR) (2001-11)	-0.9%	6
% of labor force unemployed (April 2011)	11.7%	6
2) Top Performing Companies		
# of Fortune 500 Companies (2010)	0	3
# of Fortune 500 Companies per 10,000 businesses (2010)	0.0	3
# of Inc 500 Companies (2009)	2	5
# of Inc 500 Companies per 10,000 businesses (2009)	1.4	7
# of Tech Fast 500 Companies (2010)	1	2

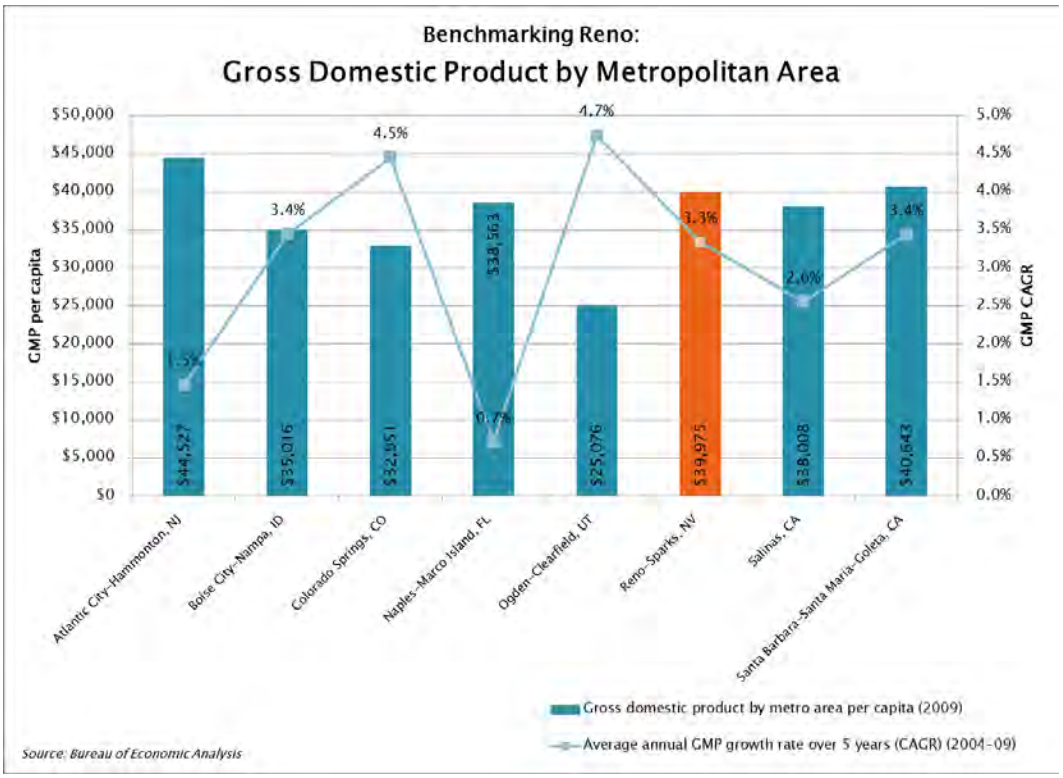
A) Globalization:

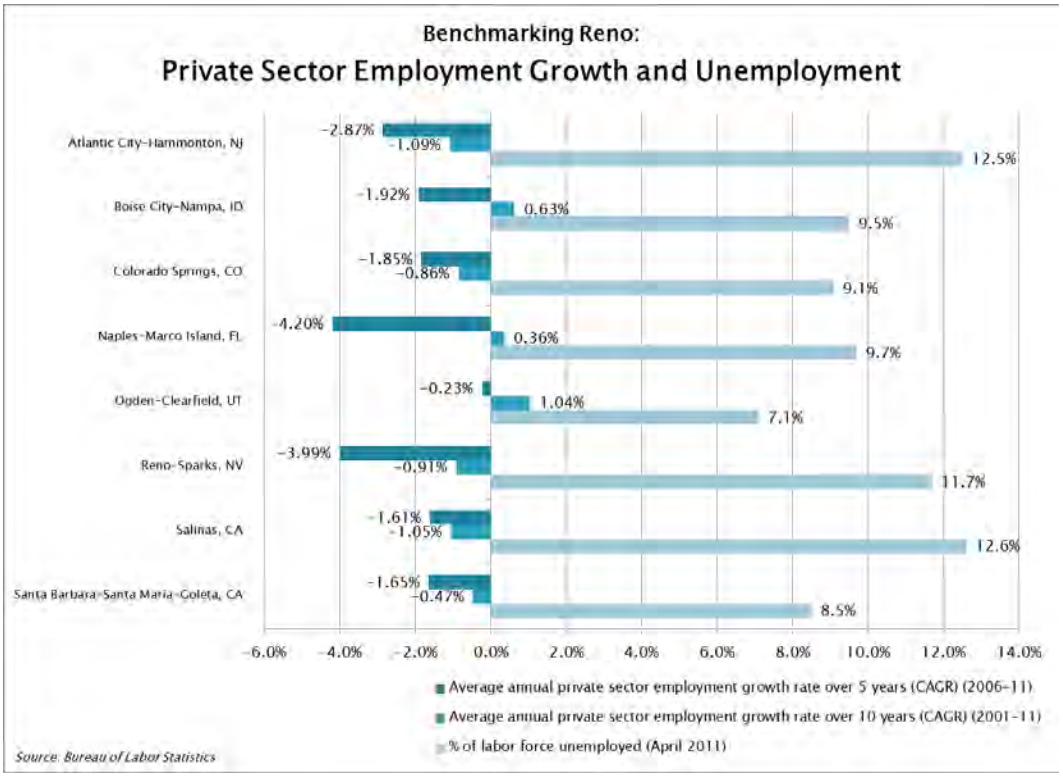
1) Exports



B) Business Vitality:

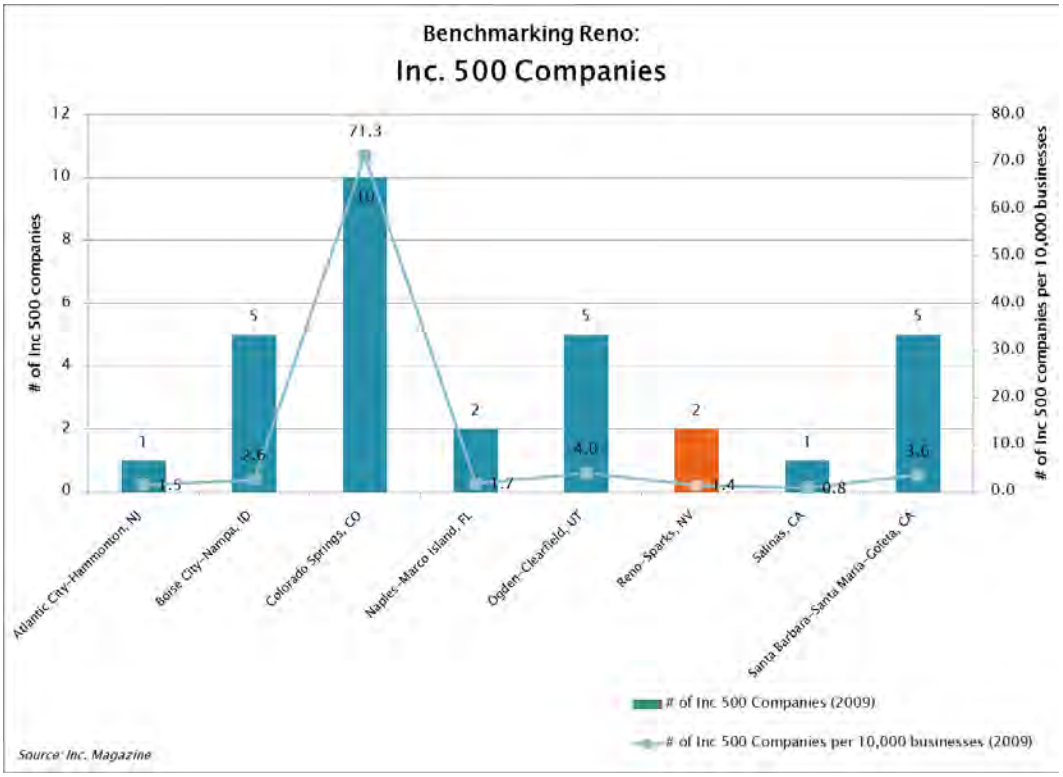
1) Economic Prosperity & Growth

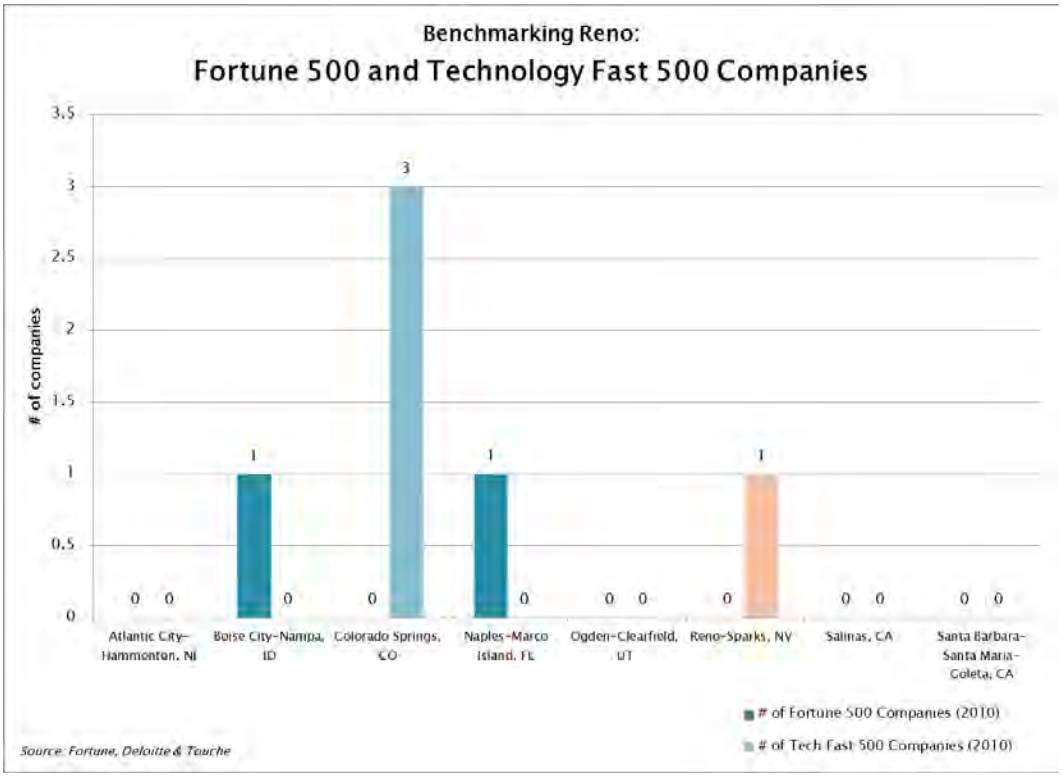




B) Business Vitality:

2) Top Performing Companies





INFRASTRUCTURE IN RENO

WHERE DOES RENO STAND?

Looking at indicators of Reno's *Infrastructure*, the city's performance is above average. The number of air passengers departing from Reno is the highest of the benchmarked metro areas, both in absolute and per capita figures. Reno's airports bring a large number of travelers to the region, for touristic and other purposes.

Reno Infrastructure
Technology and Physical Infrastructure
+ Very high number of total and per capita air passenger boardings
+ High download/upload speeds on average for Internet connections
O Average number of broadband/high-speed service providers and providers per capita

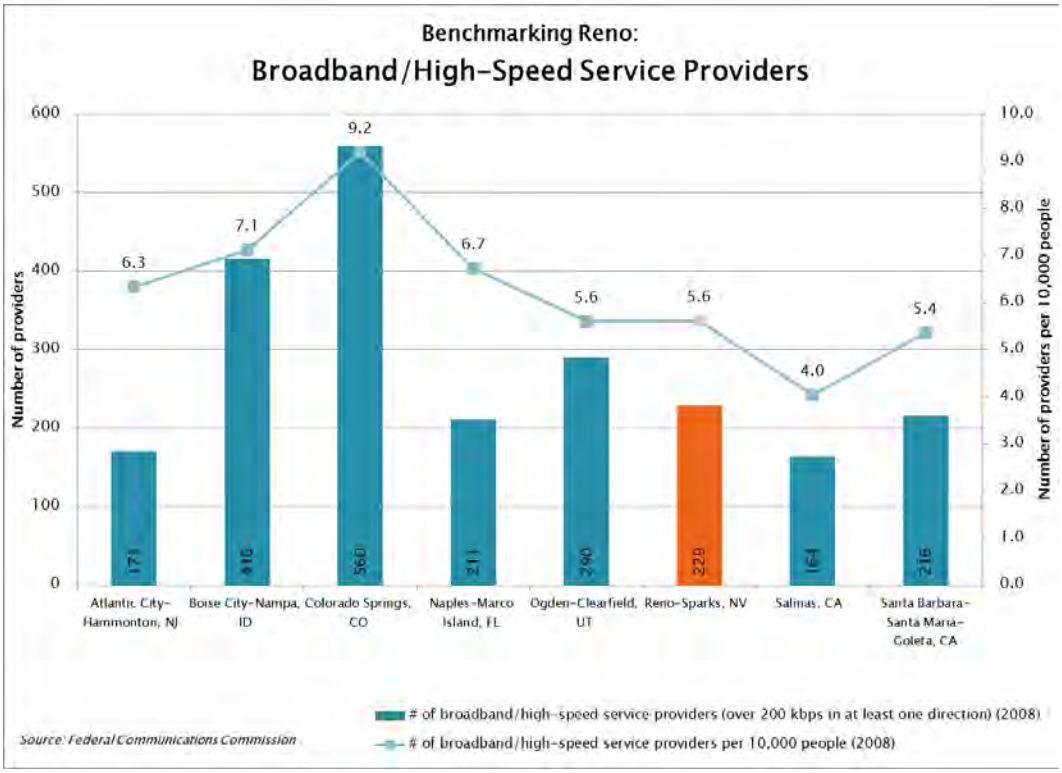
The Reno area reports that local internet customers experience high upload and download speeds, helping the population to stay connected and to conduct online commerce. However, the number of service providers for high-speed internet (speeds over 200 kbps for upload and/or download) in Reno is average compared to benchmarked metros. Colorado Springs, CO and Ogden, UT lead the benchmark group in number of high-speed service providers.

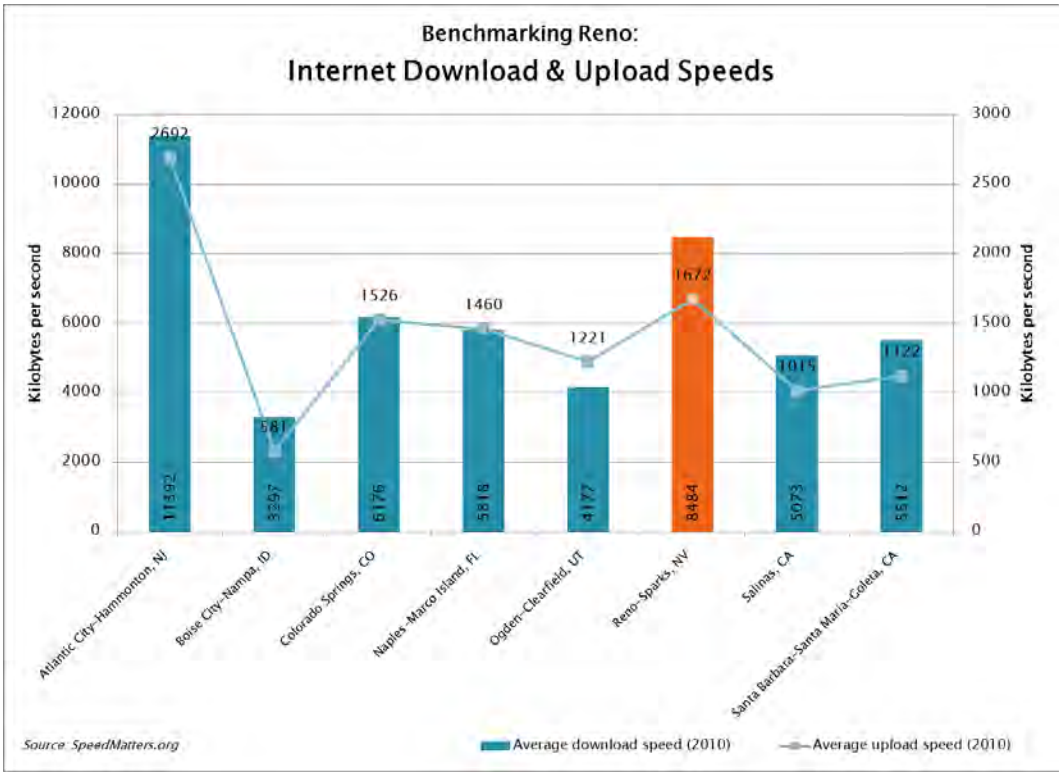
Reno: Infrastructure
Summary of Benchmarking Indicators

	Indicator Value for Reno	Reno's Ranking Among 8 Peer Metros
A) Technology Infrastructure		
Broadband / High-Speed Telecom Connections		
# of broadband/high-speed service providers (over 200 kbps in at least one direction) (2008)	229	4
# of broadband/high-speed service providers (over 200 kbps in at least one direction) per 10,000 people (2008)	5.6	5
Average internet download speed (2010)	8,484 kbps	2
Average internet upload speed (2010)	1,972 kbps	2
B) Physical Infrastructure		
2) Air Transportation Services		
Number of passenger boardings (2009)	1,828,823	1
Number of passenger boardings per 1,000 people (2009)	4,409	1

A) Technology Infrastructure:

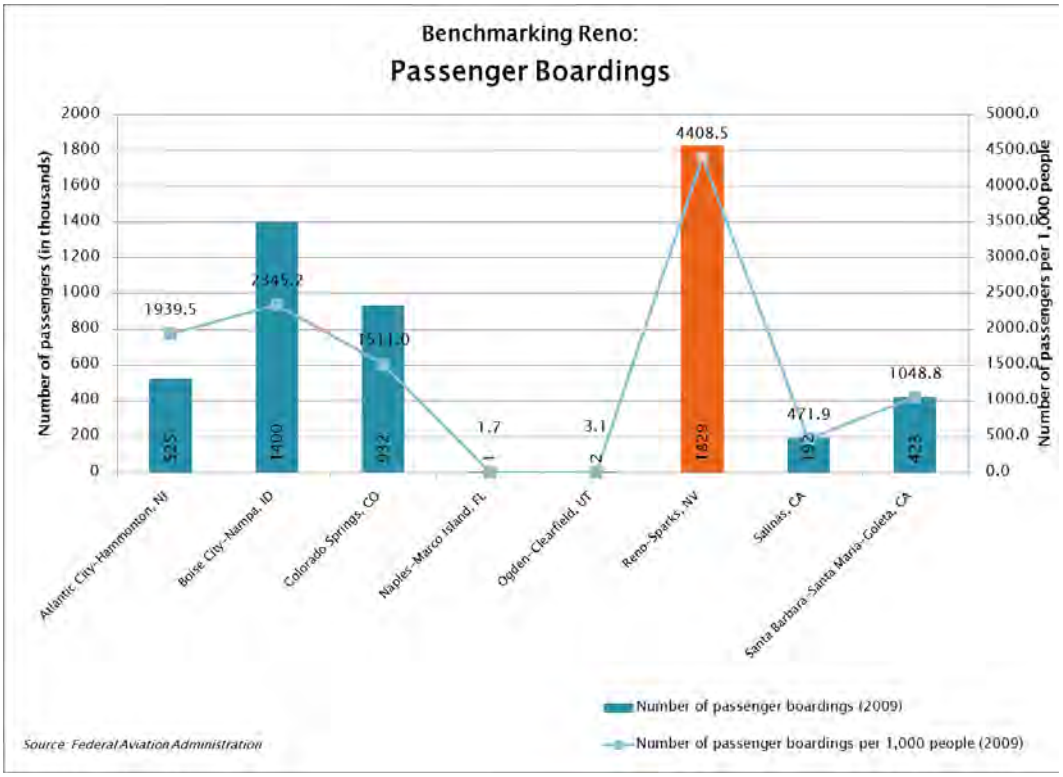
Broadband/High-speed Telecommunications Connections





B) Physical Infrastructure:

Air Transportation Services



V. LAS VEGAS METRO AREA – *PRELIMINARY DATA ANALYSIS*

A. INDUSTRY CLUSTER ANALYSIS: LAS VEGAS METRO AREA

LAS VEGAS[59] ECONOMIC PROFILE

Industry Profile of Las Vegas, NV (2011)

Total Employment: 1,032,847

Employment Average Annual Growth Rate (2006-2011): -1.76%

Total # of Establishments (2010): 49,208

Average Annual Wage: $48,085

Employment Characteristics:

- 18.7% in Knowledge- & Technology-Based Industries
- 79.4% in Service Industries
- 1.9% in Traditional & Manufacturing Industries

Largest Industry Clusters (by employment):

- *Tourism & Gaming*
- *Construction & Real Estate*
- *Education & Government*
- *Retail Trade*
- *Business Services*

Las Vegas's 49,208 establishments employ 1,032,847 workers – accounting for nearly 71% of total employment in the State of Nevada.[60] The average annual earnings per worker in Las Vegas is $48,085, approximately equal to the state average ($48,077), but slightly lower than national average earnings ($51,851).

Service-based industries comprise 79% of total employment in Las Vegas, and many of the region's largest industry clusters fall within this segment, including Las Vegas's five biggest employer industries: *Tourism & Gaming*, *Construction & Real Estate*, *Education & Government*, *Retail Trade*, and *Business Services*. Among this group of *service-based* industries, the three core consumption-based industries (*Tourism & Gaming*, *Construction & Real Estate*, and *Retail Trade*) are by far the dominant employers, accounting for 51.0% of total jobs in Las Vegas (as compared to 46.9% statewide and 30.8% nationally). Only 19% of Las Vegas's jobs are in *knowledge- & technology-based industries* (compared to 25% nationally), and only 2% are in *traditional & manufacturing industries* (compared to 7.2% nationally).[61]

Las Vegas's economy has experienced a significant downturn during the recent nationwide economic recession, with an overall -8.23% net decrease in employment from 2007-2009 (an average annual decrease of -4.20%). While this contraction has slowed, Las Vegas has continued to

[59] The analysis presented in this section covers the Las Vegas-Paradise Metropolitan Statistical Area.

[60] All industry cluster data presented here are drawn from EMSI, which aggregates data from multiple federal/state government datasets. EMSI data includes labor categories that are not typically included in standard government data (e.g., self-employed/sole proprietors, commission-based workers, military/armed forces, state/local government workers, agricultural workers, etc); therefore, the regional employment figures shown here may be higher than the figures shown in other publicly-available datasets.

[61] The industry cluster data table on page 73 provides details on how each of the region's twenty-five industry clusters are categorized as *knowledge- & technology-based traditional & manufacturing* or *service-based*.

lose jobs during the initial economic recovery phase over the last two years, with an average annual employment contraction of -1.33% per year from 2009-2011. Like the entire state and Reno/Carson City, Las Vegas's employment has fallen more dramatically than national averages.

The trends of growth and contraction across the different industry clusters in Las Vegas have been varied, but as in the State of Nevada and the United States overall, the region's *knowledge & technology-based industries* have grown over the last five years (with a CAGR of +1.33% in Las Vegas from 2006-2011), while the *service-based* and *traditional & manufacturing industries* have lost jobs (at -2.29% and -6.43% per year in Las Vegas, respectively, from 2006-2011). In Las Vegas and nationally, both the *IT Services* and *Medicine & Life Sciences* industry clusters have maintained positive employment growth rates throughout the recent fluctuations in the business cycle.[62]

SUMMARY OF INDUSTRY CLUSTER DATA

The table below presents key summary statistics for the twenty-five industry clusters that comprise the Las Vegas economy. Many of Las Vegas's largest industry clusters (by employment) have experienced strong, negative growth both regionally and nationally from 2006-2011 as a result of the economic recession. However, according to EMSI forecasts, these industries are expected to rebound and experience positive average annual growth rates over the next five years (2011-2016).

[62] Defined by net growth over the periods of expansion, 2002-2007; recession, 2007-2009; and initial recovery, 2009-2011.

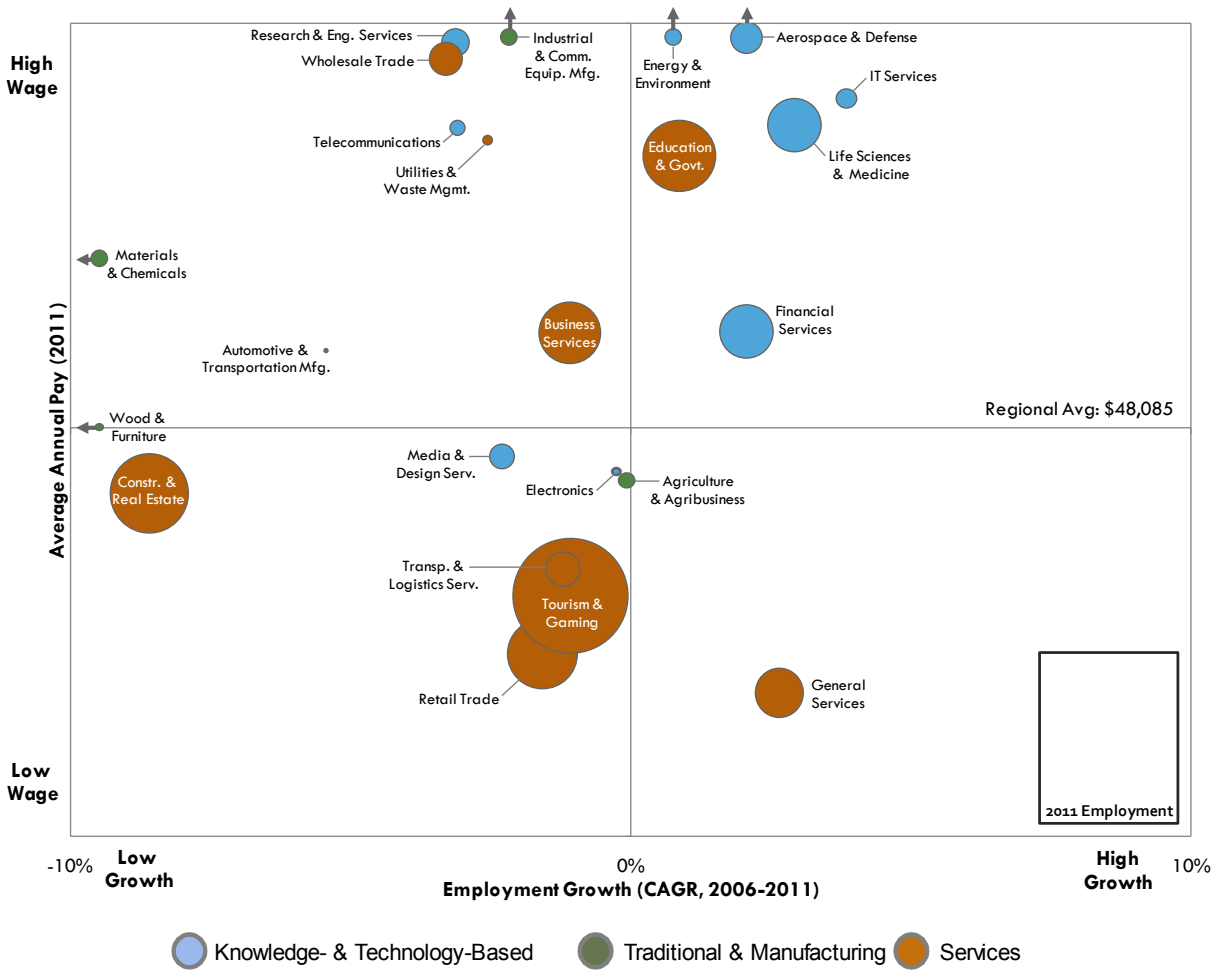
La Vegas Industry Clusters in Q 2011								
	2011 Total Employment*	Average Annual % Employment Growth (2006 2011)		*Predicted* (2011 2016)		2011 *National* Location Quotient	2010 # of Establishments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	21,014	2.06%	-0.22%	0.60%	0.29%	1.038	188	$76,984
Energy & Environ.	5,809	0.75%	4.60%	2.04%	2.26%	0.338	231	$84,320
Electronics	1,285	-0.26%	-3.22%	3.06%	-1.89%	0.207	156	$45,122
Financial Services	60,819	2.06%	2.04%	3.65%	2.16%	1.090	3,626	$54,786
IT Services	8,471	3.85%	2.03%	3.75%	2.49%	0.523	1,450	$70,823
Medicine & Life Sci.	61,057	2.93%	2.03%	2.48%	2.22%	0.614	4,199	$69,002
Media & Design Serv.	13,093	-2.31%	-1.30%	0.95%	0.74%	0.816	1,179	$46,166
Research & Eng. Serv.	17,126	-3.14%	1.31%	2.01%	2.70%	0.699	2,070	$74,675
Telecommunications	4,835	-3.10%	-3.14%	0.26%	-0.31%	0.663	194	$68,792
Service-Based Clusters								
Business Services	81,034	-1.10%	-0.96%	1.82%	1.24%	1.028	5,989	$54,673
Constr. & Real Estate	134,323	-8.60%	-2.33%	2.01%	1.84%	1.164	8,183	$43,573
Education & Govt.	110,252	0.87%	0.54%	0.84%	1.16%	0.650	1,157	$66,848
Retail Trade	104,850	-1.58%	-1.44%	1.62%	0.28%	1.003	5,767	$32,524
General Services	51,125	2.65%	0.95%	1.92%	1.55%	0.781	3,287	$29,844
Transp. & Log. Serv.	25,995	-1.21%	-1.01%	1.41%	0.94%	0.920	906	$38,370
Tourism & Gaming	287,233	-1.08%	0.37%	0.71%	1.53%	2.911	5,918	$36,523
Util. & Waste Mgmt.	1,826	-2.56%	0.56%	1.26%	1.74%	0.858	40	$67,916
Wholesale Trade	22,690	-3.31%	-1.33%	2.21%	0.73%	0.673	3,506	$73,522
Traditional & Manufacturing Clusters								
Agriculture & Agribus.	5,069	-0.08%	0.10%	1.53%	-0.29%	0.160	265	$44,471
Auto. & Transp. Mfg.	316	-5.44%	-6.77%	3.59%	-1.78%	0.055	8	$53,415
Industrial & Comm. Equipment Mfg.	5,846	-2.18%	-3.51%	3.24%	-1.24%	0.609	189	$89,547
Materials & Chem.	6,067	-9.76%	-4.00%	1.36%	-0.89%	0.367	293	$59,770
Paper	317	2.81%	-3.50%	0.56%	-2.83%	0.181	6	$79,779
Textiles & Apparel	532	-7.72%	-7.06%	2.06%	-4.61%	0.205	44	$36,899
Wood & Furniture	1,279	-19.73%	-7.49%	0.00%	-1.07%	0.239	106	$48,179
Total Economy	**1,032,847**	**-1.76%**	**-0.28%**	**1.55%**	**1.24%**	**NA**	**49,208**	**$48,085**

Figures do not include industries or NAICS codes with <1 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

The bubble charts on the following pages provide a summary snapshot of trends in Las Vegas's industry clusters, the first chart depicting the current status in 2011, and the second chart depicting the projected status in 2016 (based on EMSI forecasts). In examining these charts, several trends become apparent:

- The *traditional & manufacturing* industries (indicated by green-shaded bubbles) in Las Vegas comprise only a small segment of the regional economy in terms of employment (indicated by bubble size). The wages are scattered for these industries, with none experiencing positive employment growth over the last five years.
- Las Vegas's largest industry clusters, including *Tourism & Gaming*, *Construction & Real Estate Services*, *Education & Government*, *Retail Trade*, and *Business Services*, are primarily *service-based* industries. These *service-based* clusters have generally posted low or negative employment growth rates over the last five years (with only *Education & Government* and *General Services* posting low but positive growth over the last five years). Wages for the largest industries are mixed – *Education & Government* and *Business Services* have higher-than-average wages, while *Tourism & Gaming*, *Construction & Real Estate Services*, and *Retail Trade* all fall well below the regional average.
- The region's larger *knowledge- & technology-based* industries (indicated by blue-shaded bubbles) tend to group in the upper right-hand quadrant, indicating above average wages and positive growth rates. A number of smaller *knowledge- & technology-based* industries have experienced negative growth during the last five years, but the majority have above average wages.
- Because they offer positive growth rates and above average wages, industry clusters that fall into the first quadrant (upper right-hand side in the bubble chart) may have especially strong potential in the region. These also tend to be in the higher-skill *knowledge- & technology-based industries*. Clusters that fit this profile in Las Vegas include *Life Sciences & Medical Services*, *Financial Services*, *IT Services*, *Energy & Environment,* and *Aerospace & Defense*.
- The 2016 (projected) bubble chart depicts an expectation of strong, improved growth rates across all industry clusters. Predicted growth rates are generally highest for *knowledge- & technology-based industries* which are expected to comprise a slightly larger segment of the regional economy in 2016 than in 2011.

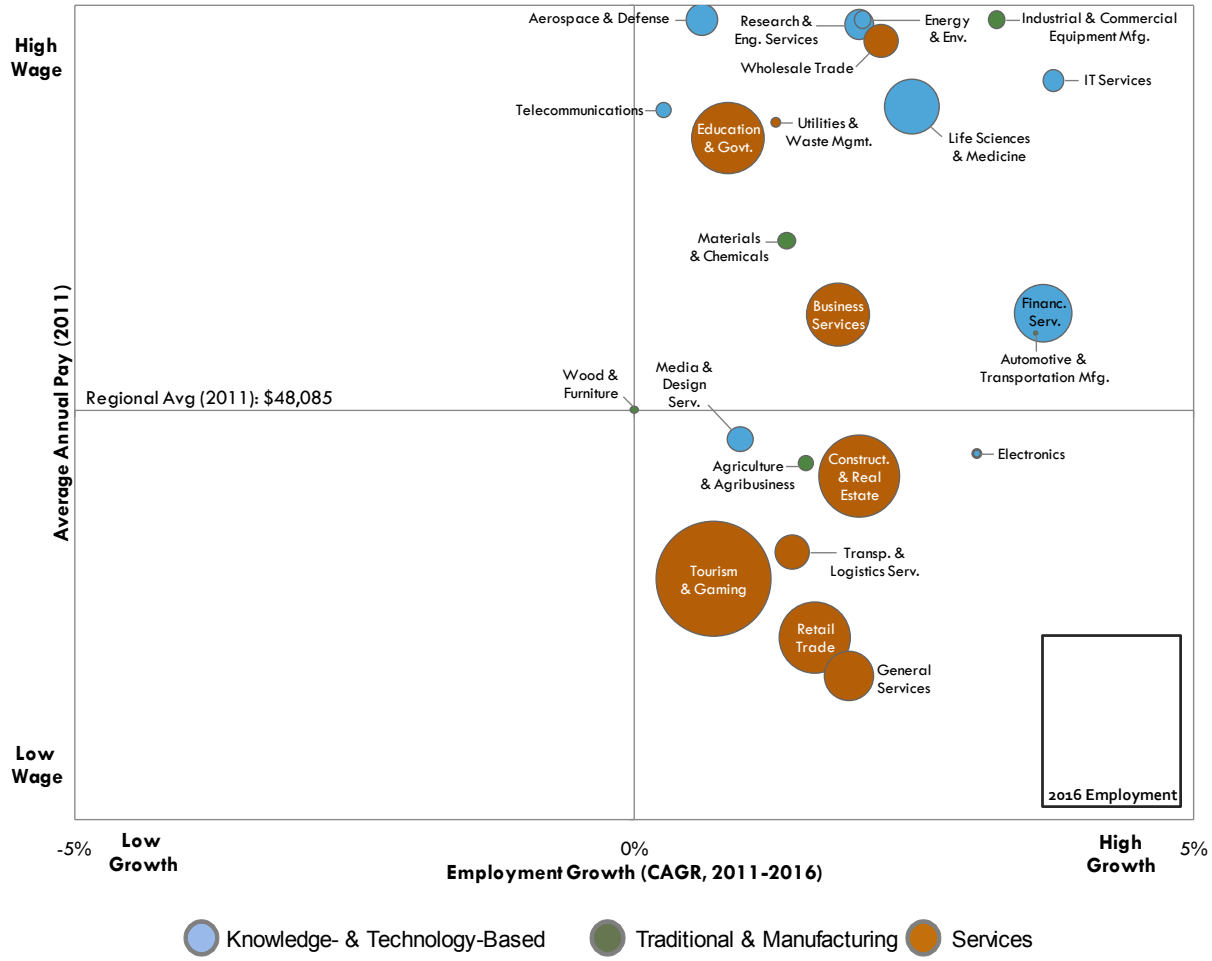
Overview of Las Vegas Industry Clusters, Q2 2011



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the employment size for that cluster in Q2 2011.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
- The horizontal axis represents employment growth expressed as a compound annual growth rate (CAGR) from 2006 to 2011. Industry clusters falling to the right of the midpoint have a positive employment growth rate, and industry clusters falling to the left of the midpoint have a negative employment growth rate.
- The vertical axis represents average annual pay in Q2 2011. Industries falling above the midpoint have an average annual pay that is greater than the overall average for Las Vegas ($48,085), and those falling below the midpoint have average annual pay levels falling below the regional average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth (e.g., *Construction & Real Estate*, *Retail Trade*).

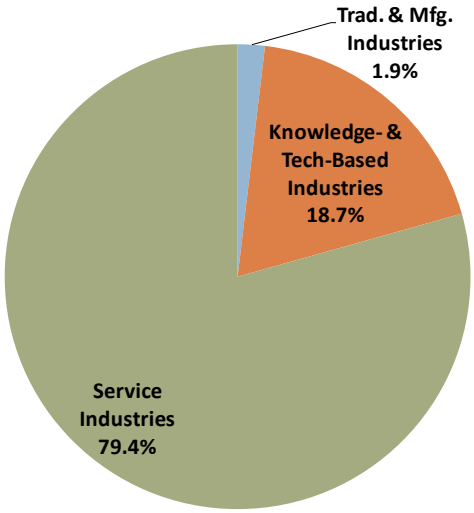
Overview of Las Vegas Industry Clusters, 2016 (projected)



How to Interpret the Industry Cluster Bubble Chart

- The size of each industry cluster's "bubble" represents the employment size for that cluster in Q2 2016.
- The color of the bubble represents the industry categorization of each cluster: *knowledge- & technology-based industries* (blue), *traditional & manufacturing industries* (green), and *service industries* (orange).
- The horizontal axis represents employment growth expressed as a compound annual growth rate (CAGR) from 2011 to 2016. Industry clusters falling to the right of the midpoint have a positive employment growth rate, and industry clusters falling to the left of the midpoint have a negative employment growth rate.
- The vertical axis represents average annual pay in Q2 2011 (note that projected pay levels for 2016 are not available). Industries falling above the midpoint have an average annual pay that is greater than the overall average for Las Vegas ($48,085), and those falling below the midpoint have average annual pay levels falling below the regional average.
- Thus, the industries that fall in the first quadrant (upper right-hand side) are higher-wage/higher-growth (e.g., *Medicine & Life Sciences*, *Financial Services*), and the industries that fall in the third quadrant (lower left-hand side) are lower-wage/negative-growth.

La Vegas Industry Profiles in Q2 2011



Service-Based Industries:

- 79.4% of total employment (819,328 workers)
- -2.29% avg. annual decline in employment from 2006-2011
- 71.0% of total establishments (34,753 establishments) in 2010
- Average annual pay of $43,779

Knowledge- & Technology-Based Industries:

- 18.7% of total employment (193,509 workers)
- 1.33% avg. annual growth in employment from 2006-2011
- 27.2% of total establishments (13,293 establishments) in 2010
- Average annual pay of $64,734

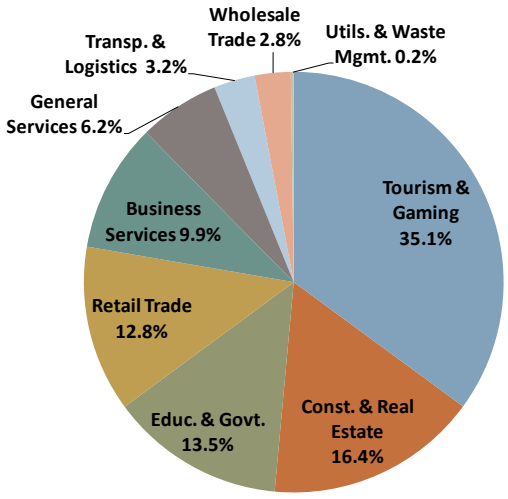
Traditional & Manufacturing Industries:

- 1.9% of total employment (19,426 workers)
- -6.43% avg. annual decline in employment from 2006-2011
- 1.9% of total establishments (911 establishments) in 2010
- Average annual pay of $63,572

With nearly eighty-percent of employment in ***service-based industries*** (see chart above), this sector is far more concentrated in Las Vegas than nationally (68.3% of U.S. jobs are *service-based*). Eight of the ten largest clusters in the region are *service industries* including *Tourism & Gaming* – Las Vegas's largest industry cluster. Employment in the region's *service industries* is predominantly in lower-wage, lower-skill, consumption-based clusters, such as *Tourism & Gaming*, *Construction & Real Estate,* and *Retail Trade.* Average annual wages in the *service industries* were $43,779 in Q2 2011, well below the regional average for Las Vegas ($48,085).

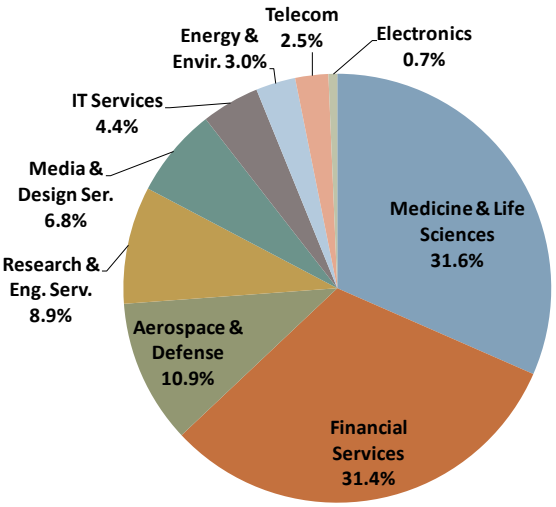
Overall employment in *service industries* has declined over the past five years in Las Vegas, at an average annual rate of -2.29%. Over this time period (2006-2011), the majority of Las Vegas's *service-based industries* have declined, with only *General Services* and *Education & Government* posting positive growth.

Las Vegas *Service Industry* Employment, Q2 2011



Knowledge- & technology-based industries represent just under one-fifth of all employment in Las Vegas and just under one-third of all establishments. The region's *knowledge- & technology-based industries* have experienced moderate, positive growth from 2006-2011 (1.33% CAGR) while *service-based* and *traditional & manufacturing industries* in the region declined. The growth rates from 2006 to 2011 amongst the area's *knowledge- & technology-based* clusters were mixed, with *IT Services* (3.85% CAGR), *Medicine & Life Science* (2.93% CAGR), *Aerospace & Defense* (2.06% CAGR), *Financial Services* (2.06% CAGR), and *Energy & Environment* (0.75% CAGR) posting positive growth (while employment in the remaining clusters declined).

La Vegas *Knowledge- & Tech-Based Industry* Employment, Q2 2011

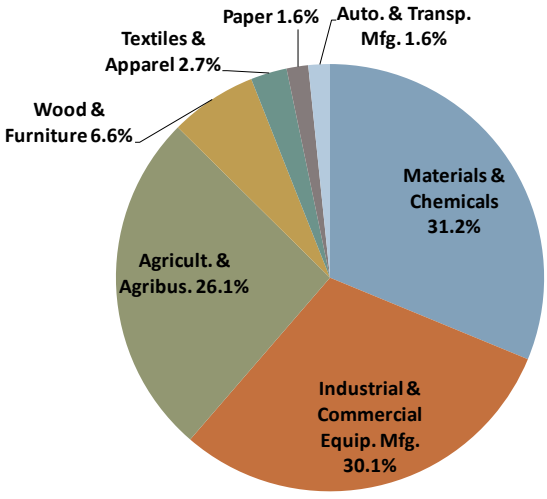


These industries tend to require high levels of human capital – with high employee skill levels resulting in above-average pay. At $64,734 in average annual pay, *knowledge- & technology-based industries in* Las Vegas (on average) pay more than the *service-based* and *traditional & manufacturing* sector jobs.

Traditional & manufacturing industries are a tiny and rapidly shrinking proportion of the Las Vegas economy - accounting for less than two percent of total employment and establishments. Over the past 5 years, employment in *traditional & manufacturing industries* in Las Vegas has fallen at an average annual rate of -6.43% (2006-2011), mirroring the national trend in this sector but exceeding the national rate of decline (-2.97% CAGR, 2006-2011). Nearly all *traditional & manufacturing industries* in Las Vegas declined in employment from 2006 to 2011 (only the *Paper* cluster grew).

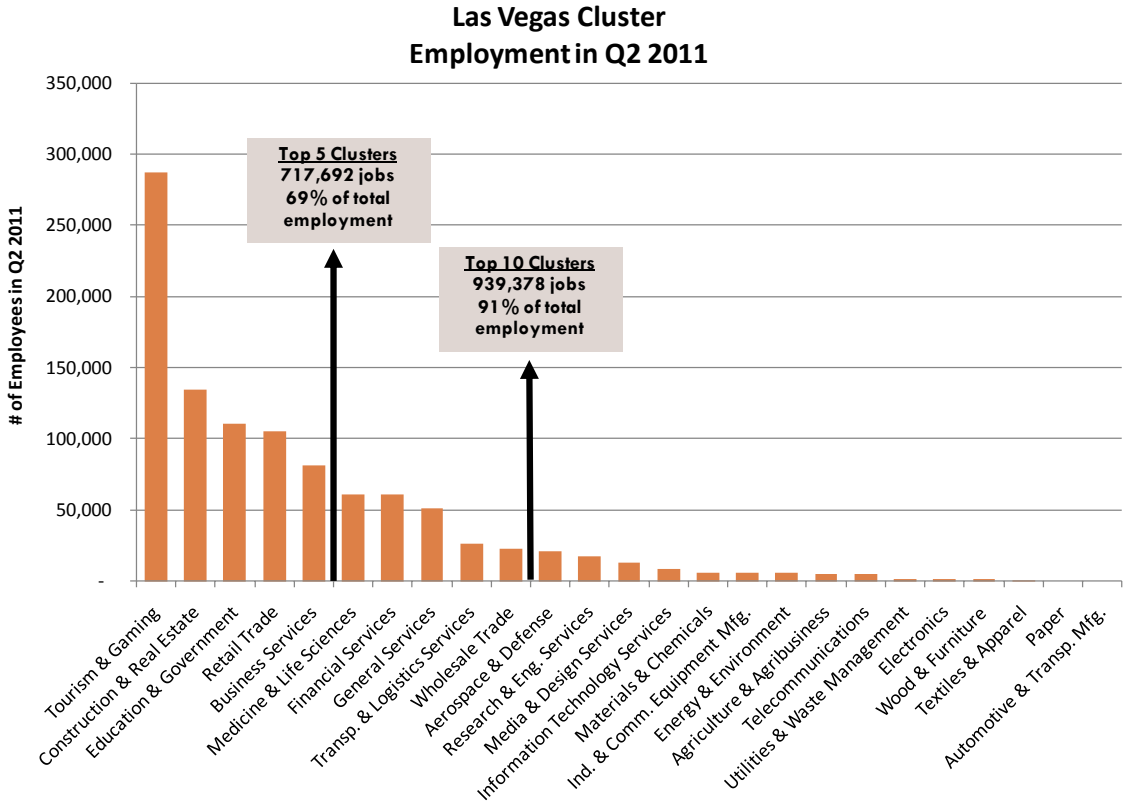
As illustrated, *Materials & Chemicals* and *Industrial & Commercial Equipment Manufacturing* are the largest of the *traditional & manufacturing* industry clusters in Las Vegas. Average annual wages in this sector are high, at $63,572 per worker per annum (well above the regional average of $48,085).

La Vegas *Trad. & Mfg. Industry* Employment, Q2 2011



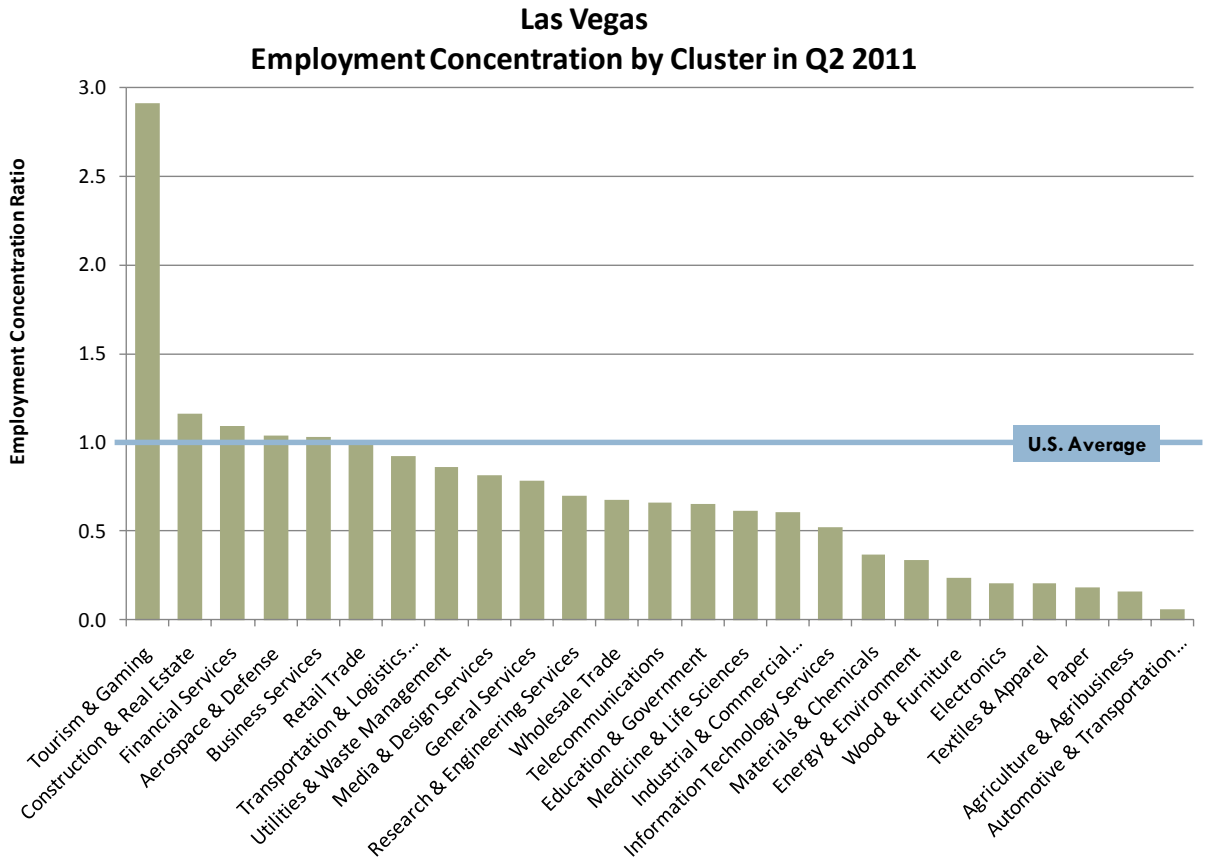
EMPLOYMENT

A summary of employment patterns in Las Vegas across all twenty-five industry clusters analyzed is presented in the figure below. *Tourism & Gaming* is by far the largest industry cluster (by employment) in Las Vegas, comprising 28% of all jobs, with 287,233 employees in 1,857 establishments. *Tourism & Gaming* is followed by *Construction & Real Estate*, *Education & Government, Retail Trade,* and *Business Services*. These five clusters account for over 717,692 jobs, or 69% of total employment in the Las Vegas. The ten largest clusters, as shown in the chart below, represent 939,378 jobs, or 91% of total employment in Las Vegas.



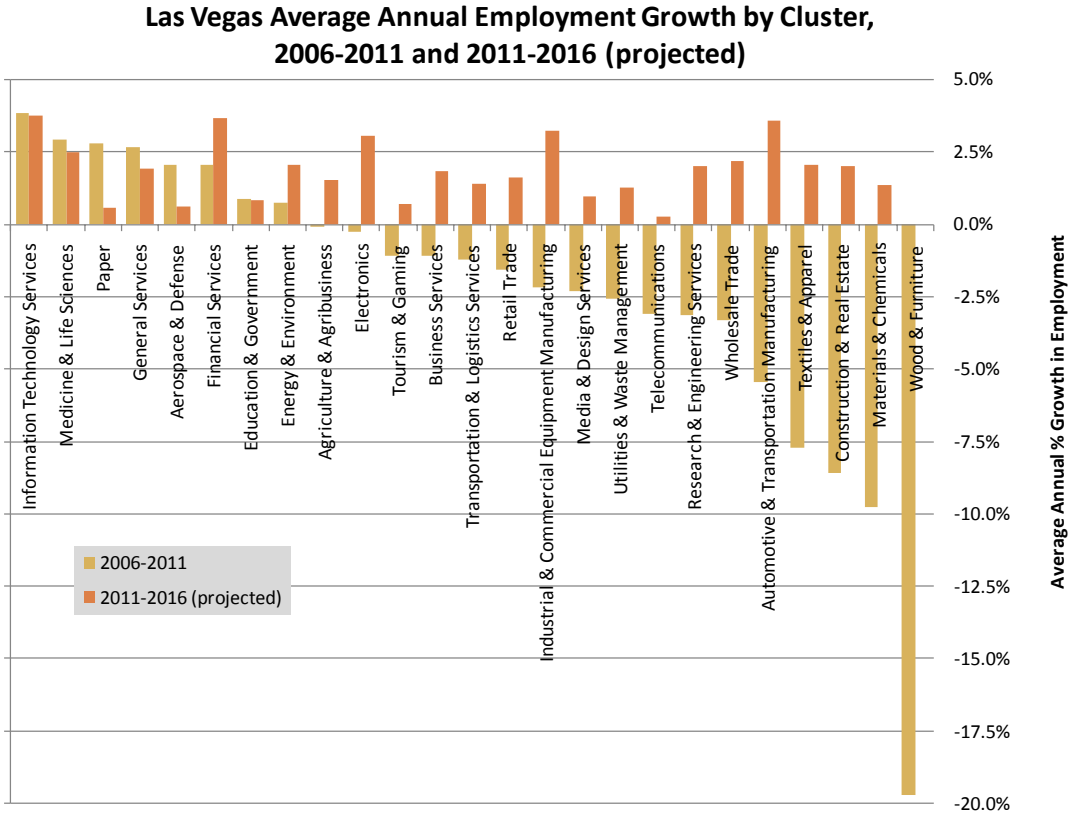
EMPLOYMENT CONCENTRATION

Employment concentration ratios (also known as *location quotients*) measure the relative importance of each industry cluster in the region's economy as compared to the nation as a whole, providing insight into the composition and character of the regional economy. An employment concentration ratio greater than one indicates that an industry is more concentrated in Las Vegas than in the overall U.S. economy, while clusters with ratios less than one are less concentrated than the national average. The following chart depicts the concentration ratios in Las Vegas for all of the twenty-five industry clusters analyzed. Six of the region's clusters have concentration ratios that are above the national average: *Tourism & Gaming*, *Construction & Real Estate*, *Financial Services*, *Aerospace & Defense*, *Business Services*, and *Retail Trade*. Among these, *Tourism & Gaming* stands out for its unusually high concentration ratio of 2.911 - nearly three times the national average.



EMPLOYMENT GROWTH RATES

As displayed in the chart below, only eight industry clusters in Las Vegas have experienced positive employment growth rates over the past five years (2006-2011). The majority of the region's growing industries are *knowledge- & technology-based* clusters, whereas many *service-based* and *traditional- & manufacturing-based industries* have contracted. As the economy recovers, nearly all clusters are expected to grow during the 2006-2011 period.



The table below highlights industries that have experienced positive employment growth in Las Vegas over the past five years. A number of Las Vegas's industries with positive growth rates, such as *Energy & Environment*, *Financial Services*, *Medicine & Life Sciences*, *IT Services*, *General Services*, and *Education & Government*, reflect a trend of increasing employment both statewide and nationwide. Some industries, including *Medicine & Life Sciences, IT Services, General Services, Aerospace & Defense*, and *Paper*, outperform national growth rates. This may be the result of population growth or other demographic changes, or may indicate a competitive advantage or opportunity for the region. Such trends will be examined more closely during the stakeholder focus groups in Nevada, as well as in further stages of analysis.

Industry Cluster Employment Growth Comparisons			
	Average Annual Employment Growth Rates 200 to 2011		
	Las Vegas	United States	State of Nevada
Clusters with positive growth trends in Las Vegas, the State of Nevada, and nationwide			
Energy & Environment	0.75%	3.90%	4.60%
Financial Services	2.06%	2.86%	2.04%
Medicine & Life Sciences	2.93%	2.64%	2.03%
IT Services	3.85%	3.56%	2.03%
General Services	2.65%	2.38%	0.95%
Education & Government	0.87%	0.60%	0.54%
Clusters with positive growth trends in Las Vegas, but negative growth nationwide and/or statewide			
Aerospace & Defense	2.06%	1.72%	-0.22%
Paper *	2.81%	1.94%	-3.50%

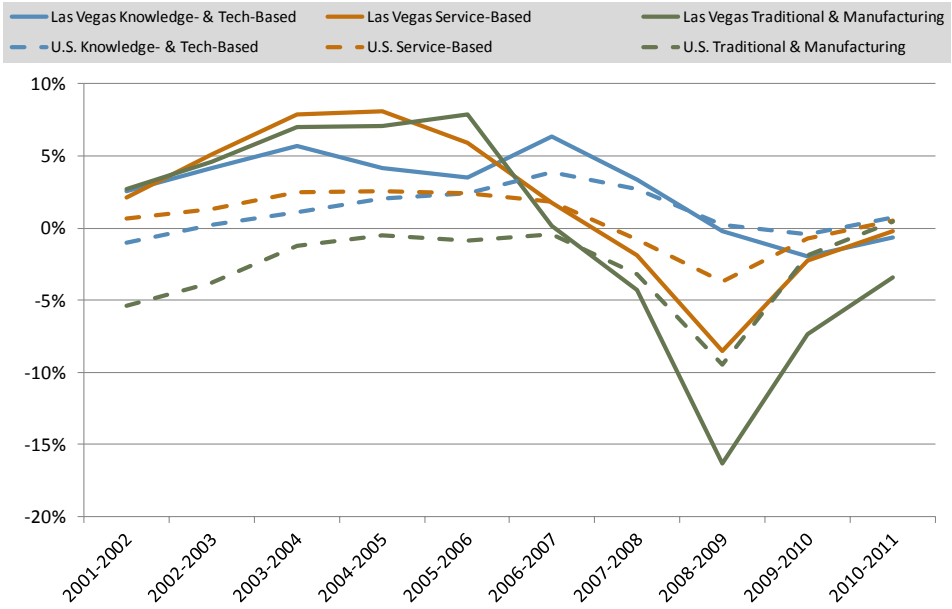
* When looking at the cluster growth rates, it is important to note that some fast-growing clusters actually had a very small level of employment in Las Vegas during this time period (e.g., among the industries shown in this table, *Paper* employed only 317 workers in 2011), so the high growth rates may be a bit deceptive (they are high because they are calculated from a very small base).

THE BUSINESS CYCLE

As shown in the table on the following page, many industries that experienced robust growth in Las Vegas during the economic expansion of 2002-2007 have contracted during the recent recession, and have yet to rebound. Many of the largest employer industries in Las Vegas, such as *Tourism & Gaming*, *Construction & Real Estate*, *Retail Trade*, and *Business Services* have contracted both in Las Vegas and in the United States overall, though the contraction has been much more dramatic in Las Vegas. In contrast, some *knowledge- and technology-based industries*, including *IT Services* and *Medicine & Life Sciences*, have continued to growth through both the recession and recovery periods.

Like the State of Nevada, the Las Vegas economy has experienced a boom-bust cycle during the last decade that far surpasses national trends. The region has experienced high volatility in its growth rates, both high and low, as compared to national averages. The chart below illustrates the changing annual employment growth rates in Las Vegas and the United States for the three major industry segments analyzed in this section of the report. In both Las Vegas and nationwide (as is true for the State of Nevada), *knowledge- & technology-based* industries have displayed the least volatility over the past decade, followed by *service-based* and *traditional- & manufacturing* industries. For each of these segments, the Las Vegas economy fluctuated much more dramatically than the national economy during the expansion and recent economic recession.

Comparison of U.S. and Las Vegas
Annual Employment Growth Rates, 2001-2011



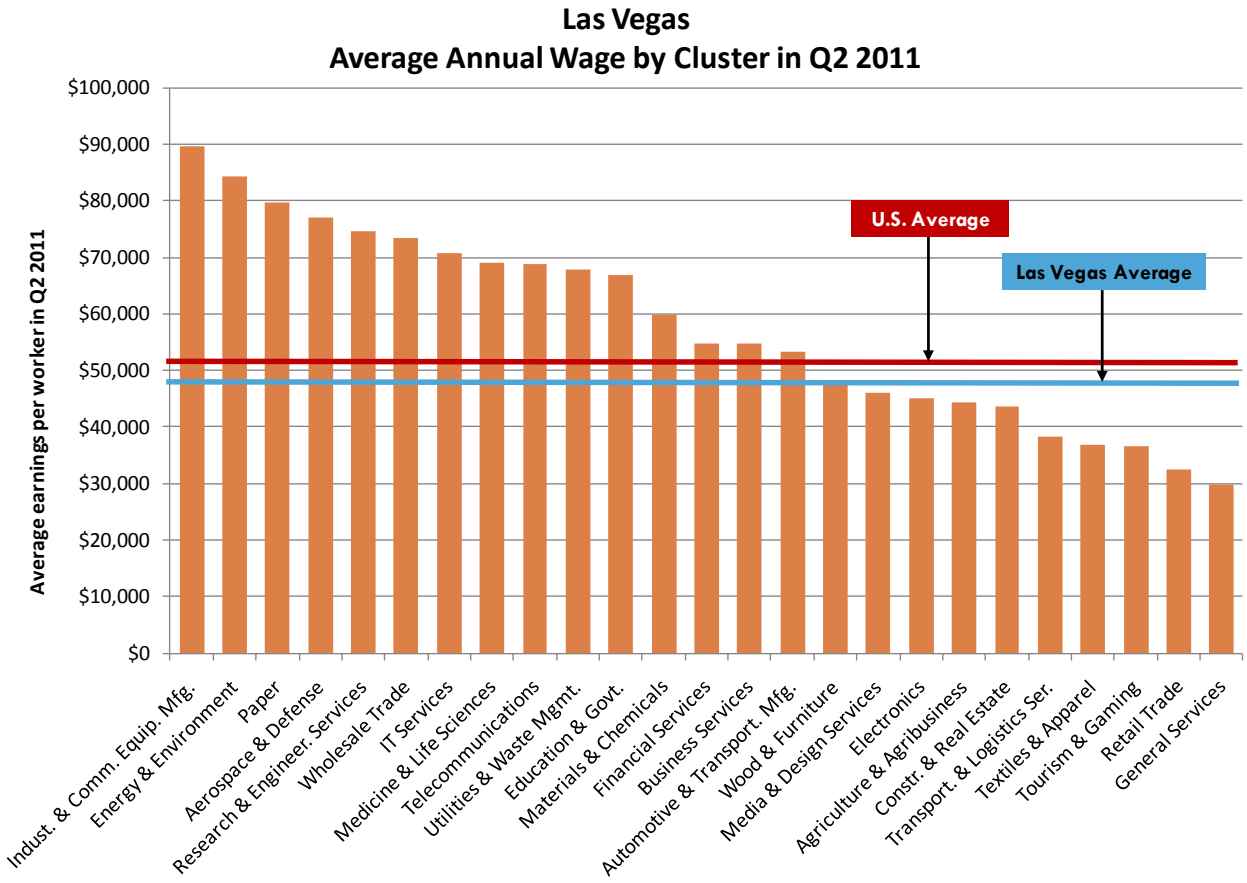
Business Cycle Growth Rates for the State of Las Vegas's Industry Clusters

	Expansion 2002 2007		The Recession 2007 2009		Initial Recovery 2009 2011		Predicted 2011 2016	
	Las Vegas	U.S.	Las Vegas	U.S.	Las Vegas	U.S.	Las Vegas	U.S.
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	3.49%	-0.39%	3.34%	0.14%	-2.76%	-1.11%	0.60%	0.29%
Energy & Environ.	1.21%	2.74%	2.65%	7.34%	-2.26%	1.37%	2.04%	2.26%
Electronics	2.31%	-2.85%	-2.38%	-6.13%	-1.89%	-0.88%	3.06%	-1.89%
Financial Services	5.14%	2.33%	5.37%	3.51%	-2.96%	-0.98%	3.65%	2.16%
IT Services	6.77%	2.28%	1.49%	0.60%	1.37%	1.14%	3.75%	2.49%
Medicine & Life Sci.	4.90%	2.45%	2.89%	2.23%	1.79%	1.27%	2.48%	2.22%
Media & Design Serv.	6.42%	1.50%	-7.34%	-3.57%	-1.87%	-1.24%	0.95%	0.74%
Research & Eng. Serv.	7.51%	4.74%	-6.28%	-1.03%	-3.91%	0.30%	2.01%	2.70%
Telecommunications	-3.92%	-3.67%	-6.69%	-2.36%	-2.39%	-3.63%	0.26%	-0.31%
Service-Based Clusters								
Business Services	6.50%	1.87%	-5.28%	-4.40%	1.86%	1.44%	1.82%	1.24%
Constr. & Real Estate	10.06%	4.74%	-12.83%	-5.22%	-7.61%	-1.57%	2.01%	1.84%
Education & Govt.	5.36%	1.15%	0.39%	0.91%	-1.10%	-0.30%	0.84%	1.16%
Retail Trade	4.65%	0.77%	-4.26%	-3.66%	-0.76%	-0.22%	1.62%	0.28%
General Services	6.68%	2.35%	-0.42%	-0.39%	2.14%	1.07%	1.92%	1.55%
Transp. & Log. Serv.	7.41%	2.64%	-4.40%	-3.98%	-0.75%	-0.10%	1.41%	0.94%
Tourism & Gaming	3.48%	2.33%	-3.72%	-0.58%	0.59%	0.14%	0.71%	1.53%
Util. & Waste Mgmt.	1.19%	1.93%	-3.12%	-0.89%	1.11%	0.47%	1.26%	1.74%
Wholesale Trade	3.99%	1.57%	-5.56%	-3.40%	-3.51%	-0.49%	2.21%	0.73%
Traditional & Manufacturing Clusters								
Agriculture & Agribus.	4.98%	-0.81%	-4.15%	-0.68%	-1.65%	-0.46%	1.53%	-0.29%
Auto. & Transp. Mfg.	4.77%	-2.04%	-4.66%	-14.27%	-9.87%	0.15%	3.59%	-1.78%
Industrial & Comm. Equipment Mfg.	7.38%	-0.57%	-3.79%	-8.46%	-4.37%	-0.52%	3.24%	-1.24%
Materials & Chem.	6.72%	-0.95%	-15.06%	-8.60%	-8.45%	-0.63%	1.36%	-0.89%
Paper	10.16%	-3.83%	-2.45%	-5.71%	0.32%	-1.52%	0.56%	-2.83%
Textiles & Apparel	3.13%	-6.92%	-17.25%	-12.05%	2.74%	-2.33%	2.06%	-4.61%
Wood & Furniture	-1.52%	-1.62%	-25.91%	-12.77%	-11.64%	-2.69%	0.00%	-1.07%
Total Economy	**5.54%**	**1.77%**	**-4.20%**	**-1.66%**	**-1.33%**	**-0.09%**	**1.55%**	**1.24%**

Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

WAGES

The average annual wage in the Las Vegas in 2011 is $48,085, slightly below the national average of $51,851. Fifteen of Nevada's industry clusters have annual wages that exceed the U.S. and state average annual wages. The region's highest-paying industry cluster is *Industrial & Commercial Equipment Manufacturing*, with an annual average wage of $89,547, followed closely by *Energy & Environment* ($84,320) and *Aerospace & Defense* ($76,984).



INDUSTRY SKILL LEVELS (COMPARED TO WAGES)

SRI has developed a methodology that utilizes U.S. Department of Labor data to assess the skill levels associated with each of the industry clusters analyzed in this study.[63] This analysis provides an additional way to pinpoint clusters that offer opportunities for the region to build employment in industries that offer high-quality, high-skill, and high-wage jobs. The table below maps the skill levels and wages of Las Vegas's twenty-five industry clusters, with wages characterized according to the following scale:

- "***High wage***" clusters have average annual pay at least 15% greater than the average annual pay across all clusters in Las Vegas in 2011 ($48,085).
- "***Medium wage*** clusters have average annual pay within 15% above or below $48,085.
- "***Low wage*** clusters have average annual pay at least 15% below $48,085.

Note in the following table that cluster skill levels tend to be correlated with wages – the majority of the very high- and high-skill clusters are grouped in the "medium wage" and "high wage" categories, while low-skill clusters are all in the "low wage" category.

Skill Levels and Wages in Las Vegas's Industry Clusters, Q2 2011

	Low Wage	Medium Wage	High Wage
Very High Skill		■ Financial Services	■ Aerospace & Defense ■ Information Technology Services ■ Research & Engineering Services
High Skill	■ General Services	■ Automotive & Transportation Mfg. ■ Business Services ■ Electronics ■ Media & Design Services	■ Education & Government ■ Medicine & Life Sciences ■ Telecommunications ■ Wholesale Trade
Medium Skill	■ Textiles & Apparel ■ Transportation & Logistics Services	■ Agriculture & Agribusiness ■ Construction & Real Estate ■ Wood & Furniture	■ Utilities & Waste Management ■ Energy & Environment ■ Materials & Chemicals ■ Industrial & Com. Equip. Mfg.
Low Skill	■ Retail Trade ■ Tourism & Gaming		

[63] For more information about SRI's methodology for assessing cluster skill levels, see *Appendix C*. The skill level ratings are based o national data; they are not tailored to Nevada or Las Vegas.

B. INNOVATION ANALYSIS: LAS VEGAS METRO AREA

Innovation is the development of new ideas, products, and processes that create value for customers or citizens. Supporting innovation and promoting the development and commercialization of new knowledge requires significant support from public and private research institutions, as well as a robust entrepreneurial environment. This section describes innovation activity in Las Vegas by examining two classes of innovation indicators: innovation inputs and innovation outputs. No indicator provides a perfect picture of innovation activity within a region, but the indicators included below are commonly accepted proxy measures of innovation activity and describe, in broad strokes, innovation activity in Las Vegas.

Summary of key innovation indicators:

- The State of Nevada produces a relatively low number of doctorates relative to the national average; Las Vegas produces about 43% of Nevada's total, including a large majority of education doctoral degrees and all Nevada's business and management doctoral degrees.
- The University of Nevada, Las Vegas and the Nevada Cancer Institute are home to about one-quarter of Nevada's laboratory space; nearly half of this space is dedicated to biological and biomedical sciences.
- Las Vegas accounts for less than one-quarter of total academic R&D spending in the State of Nevada. The University of Nevada, Las Vegas is far more heavily dependent on federal funding for R&D activities than the state or national average.
- Las Vegas accounts for 26% of all NSF awards in the State of Nevada, and Las Vegas metro area firms received less than a quarter of all SBIR/STTR awards in Nevada from 2006 to 2010.
- Las Vegas has a relatively high concentration of scientific publications in fields related to environmental and water technologies, and it produces 1.44% of all U.S. water publications, far higher than would be expected given its size.
- Since July of 2007, the University of Nevada, Las Vegas's operating budget has fallen by over $66 million, or -15.97%. These cuts are expected to deepen over the next two years, with the University of Nevada, Las Vegas's operational budget falling to 71.48% of FY2007 levels by 2013.[64]

[64] Nevada System of Higher Education budget accounts

INNOVATION INPUTS

R&D PERSONNEL AND FACILITIES

The availability of highly educated human resources is an essential component of regional innovation systems. Ph.D.-level researchers provide key leadership and technical capabilities for R&D efforts that are often closely associated with technology innovation. The annual *NSF Survey of Earned Doctorates* has for decades served as the primary source of data regarding the development of these critical human resources.

Between 2006-2009, the University of Nevada, Las Vegas awarded 283 doctoral degrees, or 43% of the state's total degrees during this time period. Education, engineering, and psychology were the most commonly awarded doctoral degrees in Las Vegas. While Las Vegas accounted for less than half of doctoral degrees awarded in the state, it awarded a large majority of education (69%) degrees and all of the state's business and management degrees.

La Vegas Earned Doctorates, 2006-2009

Academic Discipline	Ph.D.s awarded			Comparison
	Nevada	*United States*	*Las Vegas*	*Las Vegas's Share of Nevada Ph.D.s*
Education	**156**	**25,661**	**108**	**69%**
Engineering	90	30,423	41	46%
Psychology	117	13,378	36	31%
Life Sciences	113	42,300	26	23%
Humanities	46	13,840	21	46%
Business & Management	**18**	**5,643**	**18**	**100%**
Social Sciences	17	18,140	8	47%
Geosciences	33	3,377	7	21%
Physical Sciences	48	16,399	7	15%
Arts & Music	5	3,783	4	80%
Math & Computer Sciences	9	12,178	3	33%
Other Non-sciences or Unknown Disciplines	3	404	3	100%
Vocational Studies & Home Economics	2	208	1	50%
Architecture & Environmental Design	0	342	0	0%
Communication & Librarianship	0	2,371	0	0%
Law	3	315	0	0%
Religion & Theology	0	2,045	0	0%
Social Service Professions	0	1,265	0	0%
Total	**660**	**192,072**	**283**	**43%**

Source: NSF, *Survey of Earned Doctorates* 2006-2009

Physical infrastructure for R&D – and science and engineering (S&E) research space in particular – is key indicator of a region's innovation capacity. The biannual *NSF Survey of Science and Engineering Research Facilities* shows that research space at universities across the United States has been growing at a declining rate over the past two decades. Nevada, however, has experienced significant growth in S&E research space over the past two years – but that growth was centered outside of the Las Vegas area.

The University of Nevada, Las Vegas and the Nevada Cancer Institute are home to about one-quarter of Nevada's S&E research space; nearly half of this space is dedicated to biological and biomedical sciences. Engineering fields also account for a significant share of Las Vegas research space, but the facilities in Las Vegas represent less than one-third of the state's total engineering research facilities.

La Vegas Scienc Engineering Research Space, 2009

Field	Total Net Assignable Square Feet		Comparison
	University of Nevada, Las Vegas	*Nevada Cancer Institute*	*Las Vegas's Share of Nevada S&E Research Space*
Agricultural & Natural Resources Sciences	936	0	1%
Biological & Biomedical Sciences	**47,489**	**86,965**	**49%**
Computer and Information Sciences	3,714	4,521	35%
Engineering	**52,994**	**0**	**32%**
Health & Clinical Sciences	10,331	0	18%
Mathematics & Statistics	225	0	55%
Physical Sciences – atmospheric, earth, and geological sciences, meteorology & oceanography	15,474	0	10%
Physical Sciences – astronomy, astrophysics, chemistry, & physics	36,935	0	19%
Psychology	5,656	0	20%
Social Sciences	8,201	0	18%
Other Science & Engineering Fields	0	0	0%
Total	**181,955**	**91,486**	**25%**

Source: National Center for Science and Engineering Statistics, *Survey of Science and Engineering Research Facilities*, Fiscal Year 2009

R&D SPENDING

Investment in R&D has been shown to have an important role in stimulating economic growth. Federal R&D funding accounts for more than a quarter of all R&D investment in the United States and nearly 60% of "basic" research.[65] The ability to attract federal R&D investment, as measured by NSF's *Survey of Federal Funds for Research and Development*, is therefore critical to a region's ability to maintain a world-class capacity to innovate. Overall, Nevada attracts relatively low federal R&D spending per capita from most agencies, averaging less than one-third the U.S. average. Las Vegas attracts about one-quarter of the total federal support for academic R&D in the state and accounts for less than one-quarter of total academic R&D spending in the state. In addition, from FY2008-201 research expenditure has declined at the University of Nevada, Las Vegas, at an average annual rate of -12.37% (CAGR).[66] The University of Nevada, Las Vegas is the leading research institution in the area, but it is very heavily dependent on federal support for its research activities (80% of R&D funding in Las Vegas, versus 68% for the State of Nevada, and 59% for the U.S. as a whole). The per capita level of university R&D spending in Las Vegas falls below the state average, and is also significantly below the national average (as shown in the table below).

Las Vegas University R&D Spending, 2009

Institution	R&D Spending ($000s)			Comparison	
	Federally Financed	*Non-Federally Financed*	*Total*	*Federally Financed*	*Per Capita Spending*
University of Nevada-Las Vegas	$31,270	$7,878	$39,148	80%	
Las Vegas Total	**$31,270**	**$7,878**	**$39,148**	**80%**	**$20.19**
Nevada Total	**$124,523**	**$57,493**	**$182,016**	**68%**	**$67.80**
U.S. Total	**$32,587,529**	**$22,347,928**	**$54,935,457**	**59%**	**$179.08**

Source: NSF, *Survey of Research and Development Expenditures at Universities and Colleges* 2009

[65] National Science Foundation, Division of Science Resources Statistics, *National Patterns of R&D Resources: 2008 Data Update*, NSF 10-314, Arlington, VA (2010), http://www.nsf.gov/statistics/nsf10314/.
[66] Nevada System of Higher Education FY2011 budget accounts.

FUNDING FROM COMPETITIVE R&D AWARDS

The National Science Foundation (NSF) funds education, science, and engineering research at academic institutions through grants, contracts, and cooperative agreements. NSF awards are competitively reviewed and funded, and the ability to secure such awards is an indicator of a region's research capacity and stature. Las Vegas is home to one of Nevada's leading recipients of NSF awards, the University of Nevada, Las Vegas and which accounts for 26% of all NSF awards in the State of Nevada.

Las Vegas NSF funded grants, contracts, and cooperative agreements, 2006-2010

NSF directorate / research office	NSF awards			Comparison
	Nevada	*United States*	*Las Vegas*	*Las Vegas's Share of Nevada NSF Awards*
Biological Sciences	33	7,175	10	30%
Computer & Information Science & Engineering	10	7,583	2	20%
Education & Human Resources	12	4,777	5	42%
Engineering	34	10,714	7	21%
Geosciences	69	7583	18	26%
Mathematical & Physical Sciences	40	12,641	15	38%
Office of Cyber Infrastructure	0	568	0	N/A
Office of International Science & Engineering	0	1852	0	N/A
Office of Polar Programs	18	1,543	1	6%
Social, Behavioral & Economic Sciences	20	6,007	6	30%
Other	9	185	5	56%
Total	**245**	**60,628**	**69**	**28%**

Source: NSF Awards Database

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards serve as an indicator of funding availability for small businesses developing new technologies for commercialization. Companies in Nevada have received funding from a variety of federal agencies, but the Department of Defense and the National Science Foundation together account for nearly three-quarters of all SBIR/STTR awards in the state.

Las Vegas-area firms received less than a quarter of all SBIR/STTR awards in Nevada from 2006 to 2010. Leading recipients in the Las Vegas metro area included Manufacturing Laboratories, Inc. (3 awards, machine tools); Exogi, LLC (2 awards, computational sciences); K2 Energy Solutions, Inc. (2 awards, lithium ion batteries); Latel Corporation (2 awards, sensors); and Idea International, Inc. (1 award, dental training system).

Las Vegas SBIR/STTR Awards, 2006-2010

Funding Agency	SBIR/STTR Awards			Comparison
	Nevada	*United States*	*Las Vegas*	*Las Vegas's Share of Nevada SBIR/STTR Awards*
Department of Homeland Security	0	293	0	0%
Department of Commerce	0	83	0	0%
Department of Defense	36	13005	11	31%
Department of Energy	5	1909	1	20%
Department of Transportation	1	79	0	0%
Department of Education	0	188	0	N/A
Environmental Protection Agency	1	185	0	0%
Department of Health & Human Services	4	5461	1	50%
National Aeronautics & Space Administration (NASA)	3	1867	0	0%
National Institute of Standards and Technology	0	74	0	N/A
National Science Foundation (NSF)	9	1967	1	11%
Department of Agriculture	2	459	0	0%
Total	**61**	**25,570**	**14**	**25%**

Source: Small Business Administration, *TechNet Database*

TOTAL SPONSORED PROJECT AWARDS AT THE UNIVERSITY OF NEVADA, LAS VEGAS

In addition to outside funding and awards for R&D, Nevada's higher education research institutions also receive outside sponsorships, grants, and contracts for other purposes, including instruction, public service, scholarships/fellowships, student services, and other activities. These funds come via government sources (federal, state, and local), from the private sector, and from nonprofits.

The total dollar amount of sponsored project awards at University of Nevada, Las Vegas increased from FY2008-2010, peaking at $96 million, followed by a moderate decline in FY2011. As elsewhere in the state, the net growth over this period was largely the result of federal sponsored project funding increases. Sponsored project awards by state and local government and industry sources declined from FY2008-2011, while funding from non-profits grew dramatically in FY2011.

Total Sponsored Project Awards at the University of Nevada, Las Vegas, FY2008-2011

	Total Amount Awarded ($000s)*				# of Grants and Contracts Received
Funding Source	*FY 2008*	*FY 2009*	*FY 2010*	*FY 2011*	*FY 2011*
Federal	54,556	55,745	71,653	67,186	144
Federal Pass-through	12,455	15,208	20,389	14,849	221
State of Nevada	3,513	2,815	1,881	3,033	33
Other state and local govt.	991	828	368	283	13
Private, For-Profit (Industry)	1,386	1,105	1,166	684	18
Private, Non-Profit	810	757	584	1,543	24
Total	**73,712**	**76,459**	**96,041**	**87,577**	**453**

Source: Nevada System of Higher Education budget accounts, FY2008-2011

***** Sponsored project awards include funding for research, instruction, public service, scholarship/fellowships, student services, and other categories.

INNOVATION OUTPUTS

SCIENTIFIC PUBLICATIONS

It is difficult to quantify the outputs of R&D, but scientific publications are commonly used as a proxy measure for R&D activity. Nevada accounts for 0.86% of the U.S. population, but from 2009-2010, Nevada-based researchers produced 2,529 publications in peer-reviewed journals, or 0.45% of the U.S. total scientific publications, a little more than half the average rate.

Las Vegas-based researchers produced 1,172 publications from 2009-2010, or 6.0 per ten thousand people in the Las Vegas area. This rate of publishing activity is well below both the state average (9.4 publications per ten thousand people in Nevada) and the national average (18.4 publications per ten thousand people for the United States).

Las Vegas Scientific Publications by Institution, 2009-2010

Institution	*Number of Publications*
University of Nevada, Las Vegas	741
Nevada Cancer Institute	72
U.S. Environmental Protection Agency	49
U.S. Forest Service	32
U.S. Geological Survey	26
Southern Nevada Water Authority	20
Touro University Nevada	18
Las Vegas Total Publications	**1,172**

Source: *Science Citation Index – Expanded*

The University of Nevada, Las Vegas is one of the leading research institutions in Nevada in terms of publication output. Scientific publication activity in Las Vegas is heavily concentrated in environmental and water topics, as shown by the location quotients in the table on the following page.[67] Las Vegas produces 1.44% of all U.S. water publications, far higher than would be expected given its size.

[67] The location quotient for scientific publications shows the relative concentration of publications in each field in Las Vegas as compared to the national average. A location quotient greater than one indicates that a higher-than-average share of Las Vegas's scientific publications are in that field relative to the U.S. average.

Las Vegas Scientific Publication Topics, 2009-2010		
Field	***Number of Publications***	***Location Quotient***
Environmental Sciences Ecology	**131**	**2.68**
Engineering	130	1.27
Physics	114	1.11
Chemistry	87	0.94
Oncology	63	1.57
Materials Science	61	1.15
Water Resources	**61**	**6.97**
Geology	55	2.89
Neurosciences Neurology	52	0.75
Astronomy Astrophysics	52	1.80

Note: *Science Citation Index – Expanded* includes more than 138 subject classifications, only the top 10 classifications are included in this table.
Source: *Science Citation Index – Expanded* SRI analysis

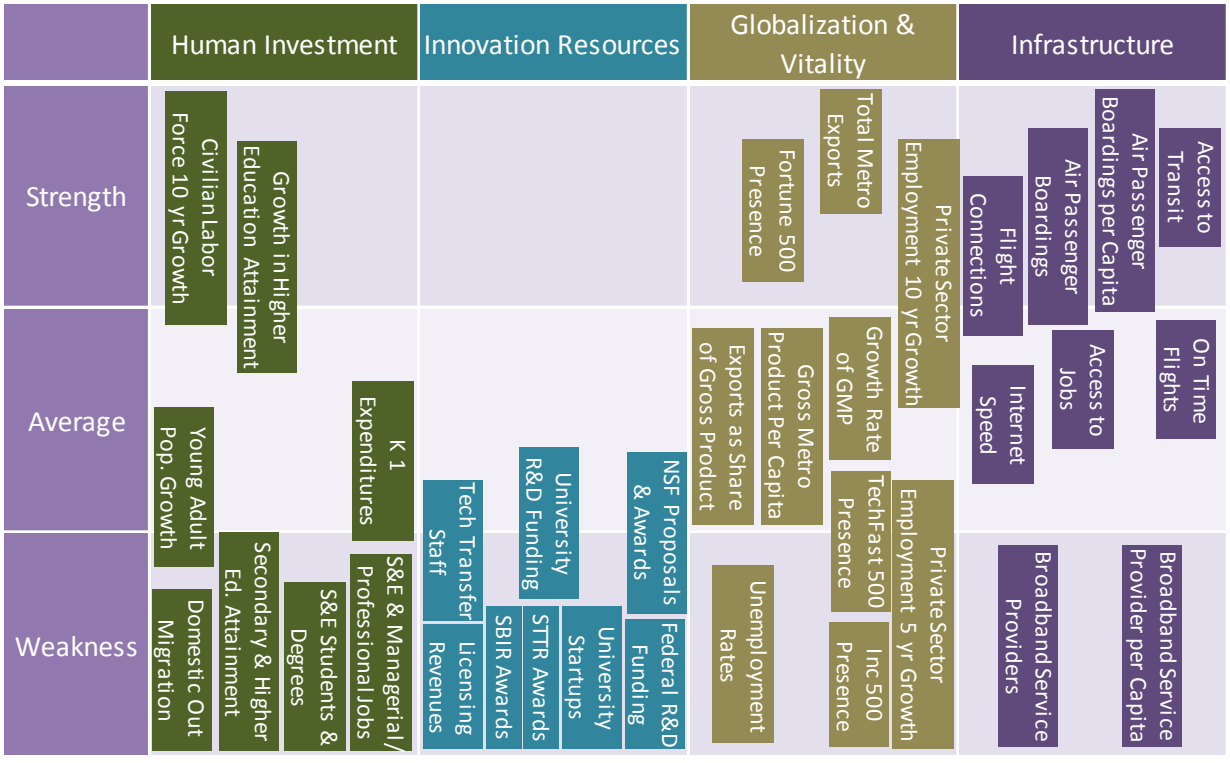
C. BENCHMARKING ANALYSIS: LAS VEGAS METRO AREA

To illuminate the strengths and weaknesses of the Las Vegas metro area, a benchmarking analysis was conducted to compare Las Vegas with eight other metropolitan areas (MSAs), listed below:

- Austin-Round Rock, Texas
- Charlotte-Gastonia-Concord, North Carolina-South Carolina
- Denver-Aurora-Broomfield, Colorado
- Orlando-Kissimmee, Florida
- Sacramento--Arden-Arcade--Roseville, California
- Salt Lake City, Utah
- Tampa-St. Petersburg-Clearwater, Florida
- Tucson, Arizona

These benchmark cities were selected because they show similarities to Las Vegas in terms of size, growth rates, industrial composition, and presence of unique industry sectors. The graphic below summarizes how Las Vegas ranks among the benchmark cities across the number of indicators included in this study. The benchmarking analysis revealed that Las Vegas was highly competitive in **Infrastructure**, moderately competitive in **Globalization & Vitality** and **Human Investment**, and not very competitive in **Innovation Resources**. With added attention to its human capital and financial resources for innovation, Las Vegas should be able to leverage its strong infrastructure and global brand to build a sustainable and globally competitive economy for the future.

The following sections, with data tables and rankings, describe the strengths and weaknesses of the Las Vegas metropolitan area, compared to the selected benchmark cities.



HUMAN INVESTMENT IN LAS VEGAS

WHERE DOES LAS VEGAS STAND?

Human Investment is important in supplying Las Vegas with a steady source of high-skill workers. Las Vegas produced mixed results in this category of indicators, measuring poorly in some and well in others, such as growth in higher education attainment. Approximately 83% of Las Vegas' over-25 population holds a high school diploma at minimum, which is the worst measurement in the peer rankings, while the growth rate of Las Vegas' high school educated population over the past four years is moderately competitive compared to its peers (ranking 4th). Secondary education expenditures per pupil ($8,052) in Clark County are slightly below average in the peer group, placing 6th in the rankings. In addition, according to a study conducted by *Education Week*, Clark County School District posted one of the lowest high school graduation rates (43.1%) in 2008 among the nation's 50 largest school districts, trailing the school districts of New York City and Los Angeles.[68]

Las Vegas Human Investment	
Quality Of Education	
+	High growth rate of higher education attainment
O	Slightly below average K12 expenditures per pupil
O	Moderate growth rate of secondary education attainment
–	Low level of secondary and higher education attainment
–	Slow growth of high school diploma attainment
Workforce Characteristics	
+	Influx of international immigrants
+	Very high 10-year civilian workforce growth rate
O	Medium-to-low degree of young adult population growth
–	High levels of domestic out-migration
–	Mostly low-skill immigrants
–	Low number of S&E graduate students and S&E degrees conferred
–	Absence of S&E and managerial/professional jobs

Las Vegas needs to increase the skill level of its workforce to become competitive in today and tomorrow's knowledge economy. Compared to its peer MSAs, Las Vegas performed the worst for the share of the population with an associate's, bachelor's, or graduate/professional degree (53%). In particular, Las Vegas lacks a pool of science and engineering (S&E) workers needed in the next-generation economy, as indicated by Las Vegas' low number of S&E graduate students; low number of S&E degrees conferred at the bachelor's, master's, and doctorate levels; and low number of S&E occupations as a share of Las Vegas' total employment.

In the other indicators for the *Human Investment* category, Las Vegas produced mixed results. Civilian labor force growth was high over a 10-year period (at 24%, ranking 1st), but slowed down dramatically to 5% over the five-year period since 2006 (ranking 6th), reflecting the economic/housing boom and bust during that time period. Las Vegas has also experienced

[68] "Analysis finds graduation rates moving up," *Education Week,* May 31, 2011, http://www.edweek.org/ew/articles/2011/06/09/34analysis.h30.html.

significant levels of international immigration, most of which have come from an influx of the Hispanic population[69]; however, only 15% of Las Vegas' international immigrant population has "high skills" (ranking 8th). The recent net out-migration of population from Las Vegas (over 1,200 in 2009), slightly below average growth in the young adult population (10.9% from 2005-2009), and the low share of managerial/professional jobs (14% of total jobs) are also areas of improvement that need to be addressed for Las Vegas' future competitiveness.

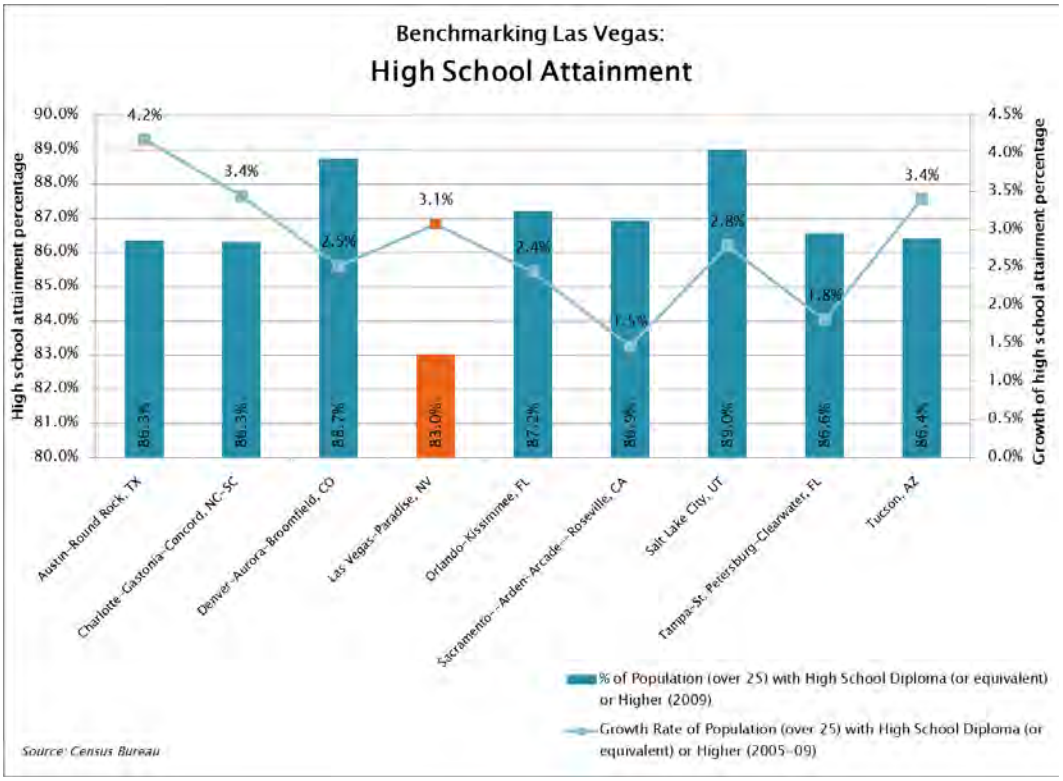
[69] "The "Invisible" Hispanic Economy in Las Vegas," *Education News*, June 7, 2011, http://www.educationnews.org/ednews_today/157665.html.

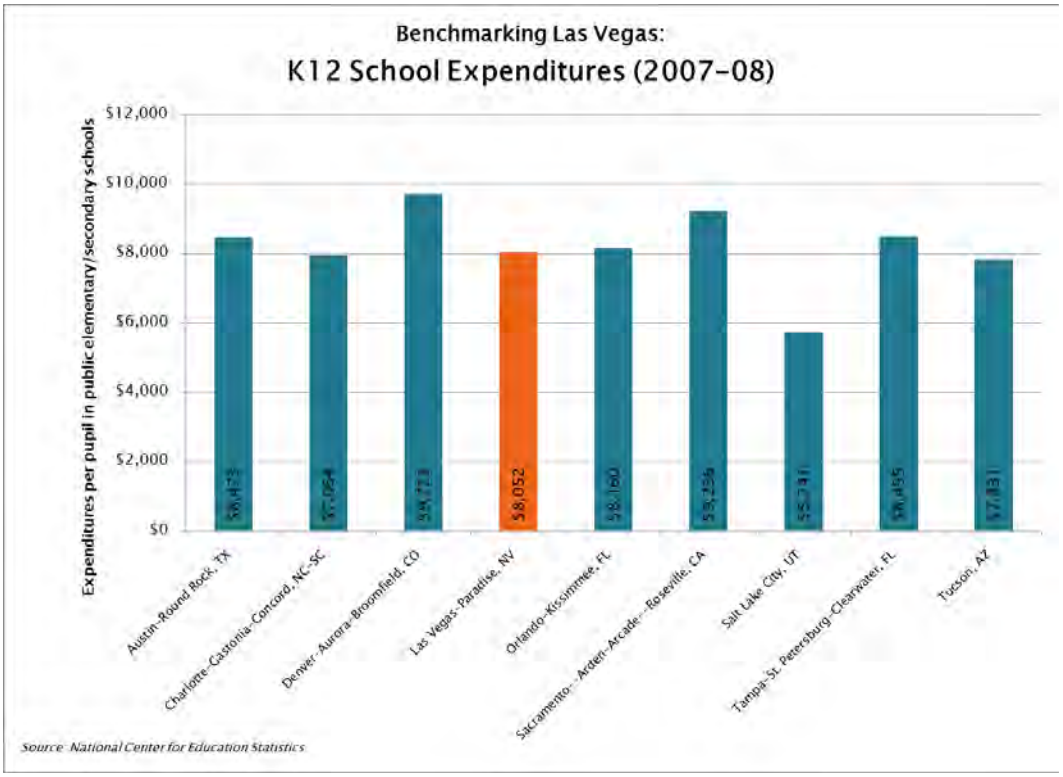
Las Vegas: Human Investment
Summary of Benchmarking Indicators

	Indicator Value for Las Vegas	Las Vegas' Ranking Among 9 Peer Metros
A) Quality Of Education		
1) Secondary Education Performance		
Secondary Education Attainment: % of population over 25 with a high school diploma (or equivalent) or higher (2009)	83.0%	9
Growth rate of Secondary Education Attainment (2005-09)	3.1%	4
Expenditure per pupil in public elementary and secondary schools (2007-08)	$8,052	6
2) Higher Education Performance		
Higher Education Attainment: % of population over 25 with an associate's, bachelor's, master's, doctorate, or professional degree (2009)	53.4%	9
Growth rate of Higher Education Attainment (2005-09)	3.9%	3
B) Workforce Characteristics		
1) Workforce Growth & Migration		
5-year growth rate of civilian labor force (2006-11)	5.1%	6
10-year growth rate of civilian labor force (2001-11)	24.4%	1
Net domestic migration of population (2009)	-1,256	8
Net international migration of population (2009)	8,800	2
2) Next Generation Workforce		
Growth rate of young adult population (ages 25-34) (2005-2009)	10.9%	6
Number of science & engineering graduate students (2008)	1,606	9
Number of science & engineering graduate students per 10,000 people (2008)	8.8	9
Number of science & engineering degrees granted (at the bachelor's, master's, and doctorate levels) (2008)	513	9
Number of science & engineering degrees granted (at the bachelor's, master's, and doctorate levels) per 10,000 people (2008)	2.7	9
% of immigrant population with high skills	15.2%	8
3) Knowledge & Innovation Economy Workforce		
Total employment in S&E occupations (2010)	53,160	8
S&E jobs as a % of total MSA employment (2010)	6.6%	9
Total employment in managerial, professional, & technical occupations (2010)	115,410	7
Managerial, professional, & technical jobs as a % of total MSA employment (2010)	14.3%	9

A) Quality Of Education:

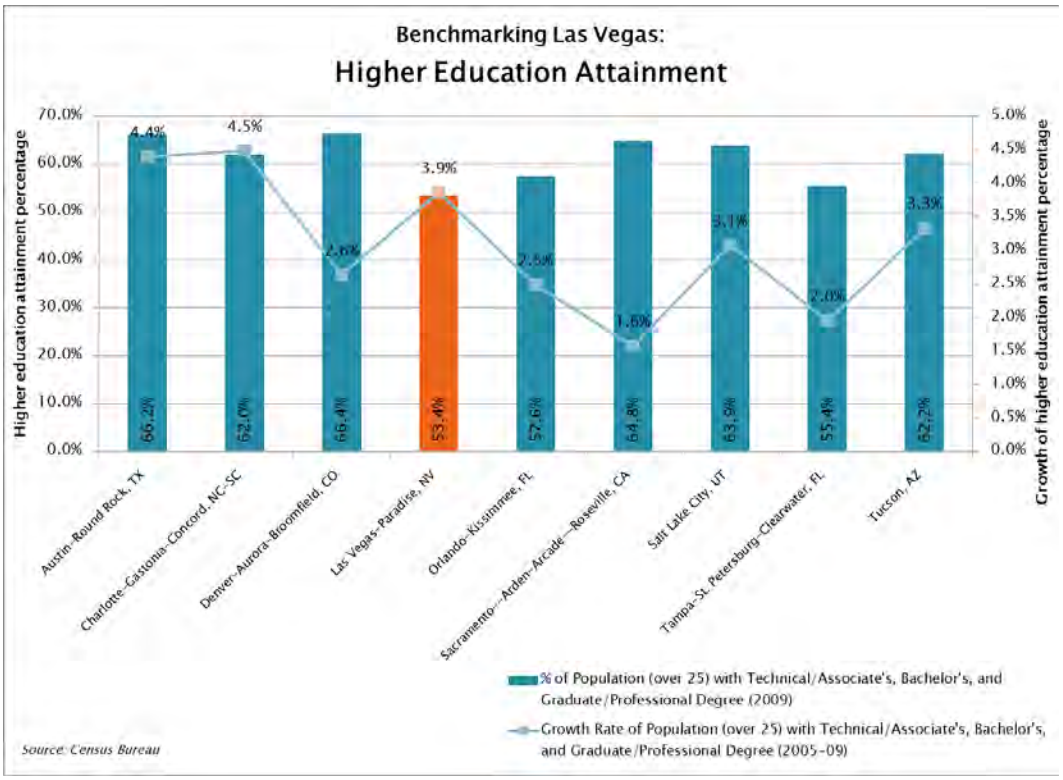
1) Secondary Education Performance





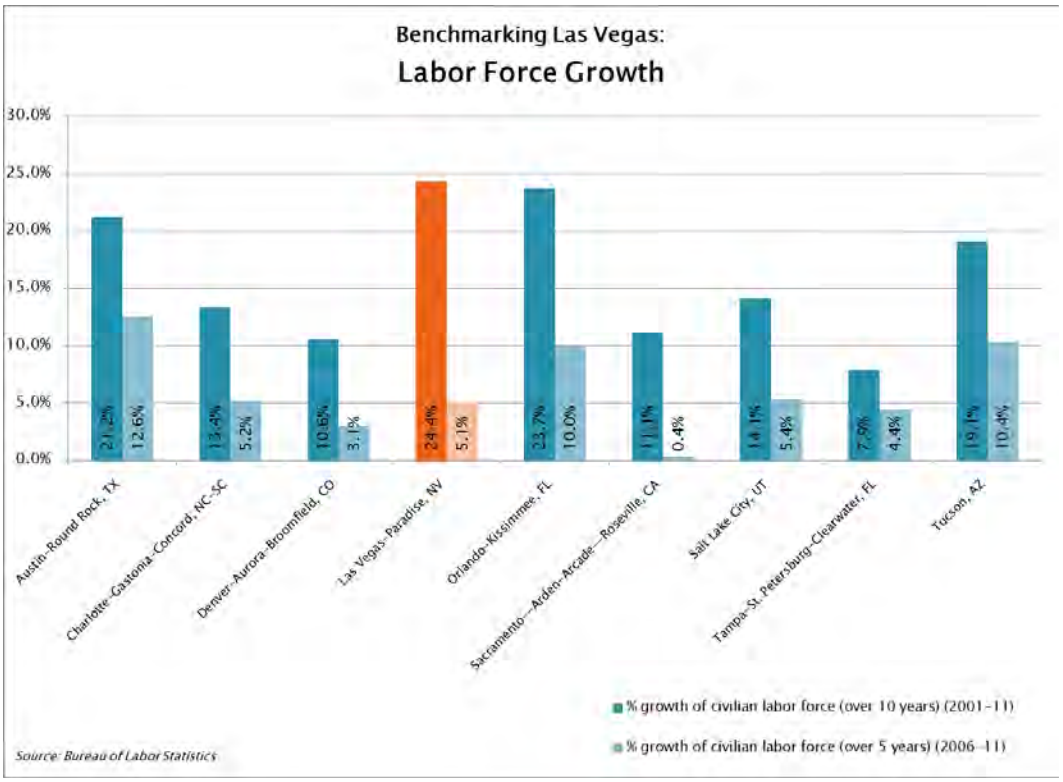
A) Quality Of Education:

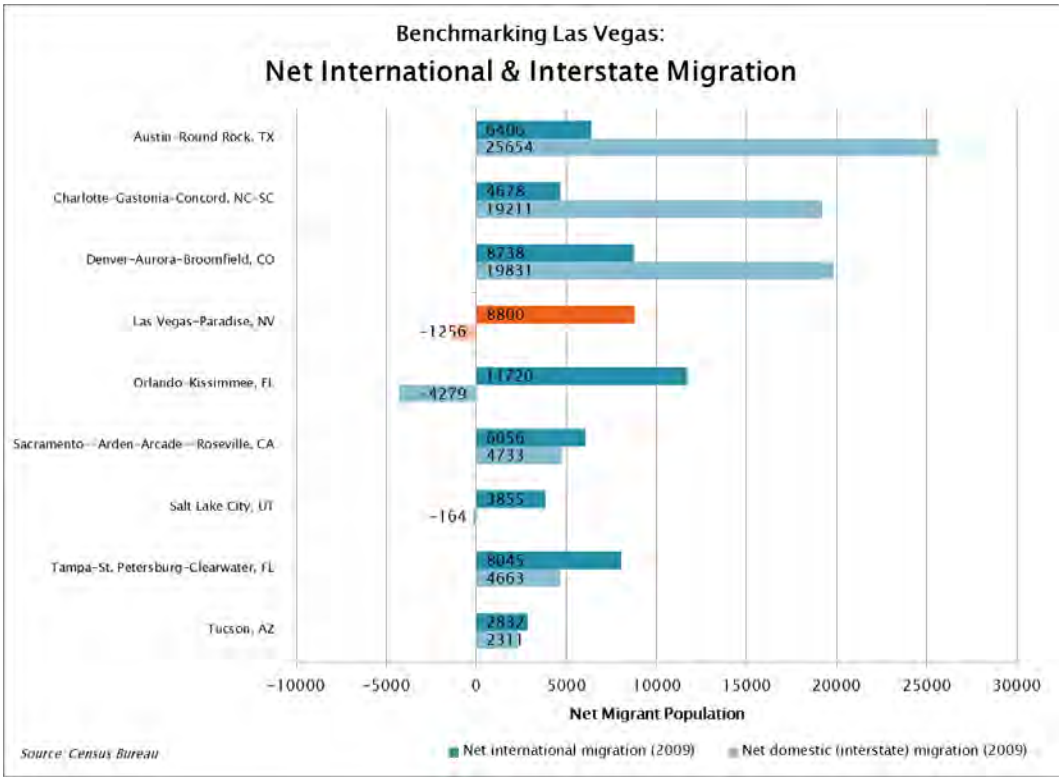
2) Higher Education Performance



B) Workforce Characteristics:

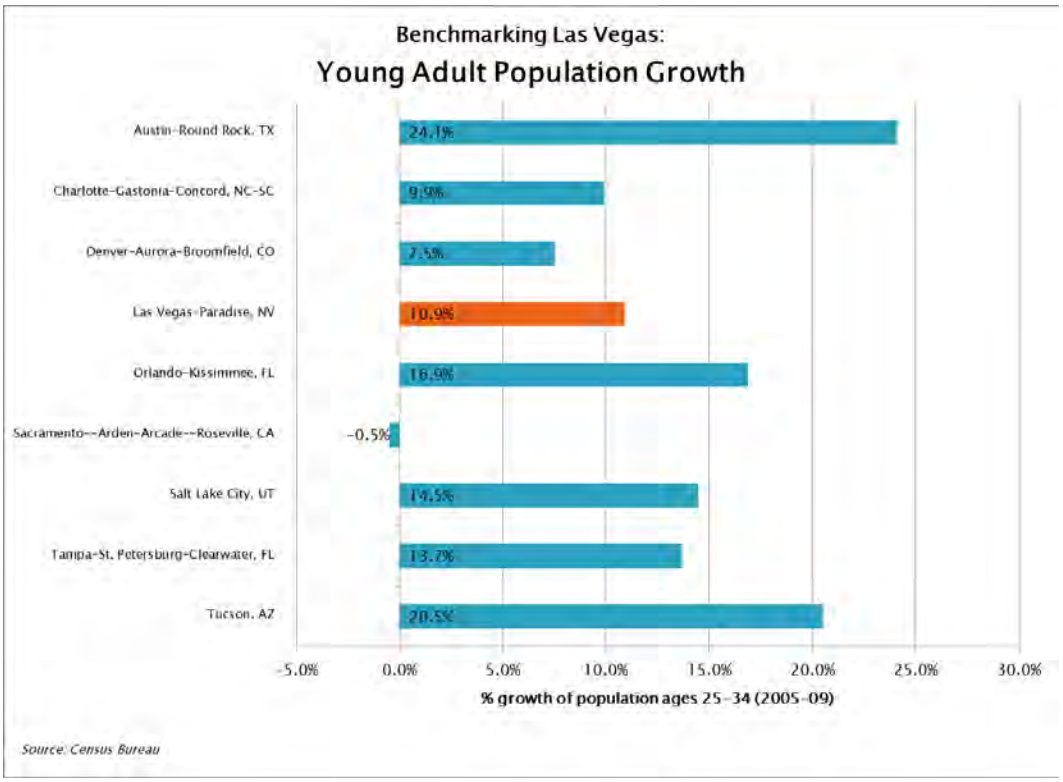
1) Workforce Growth & Migration

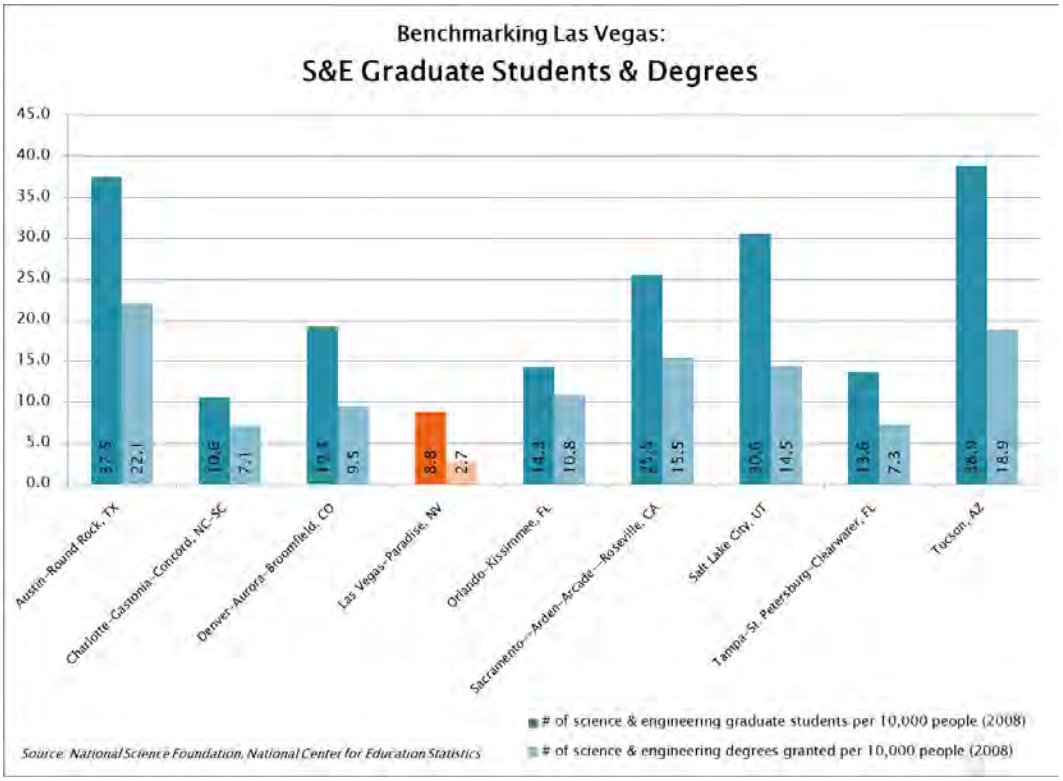


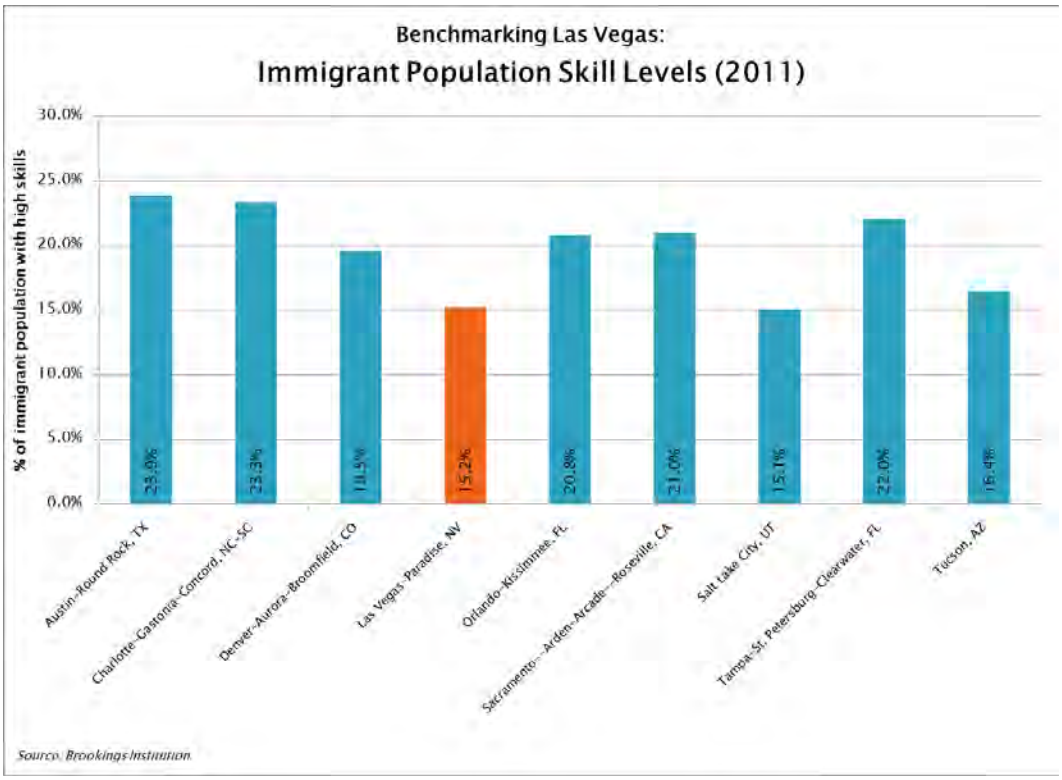


B) Workforce Characteristics:

2) Next Generation Workforce

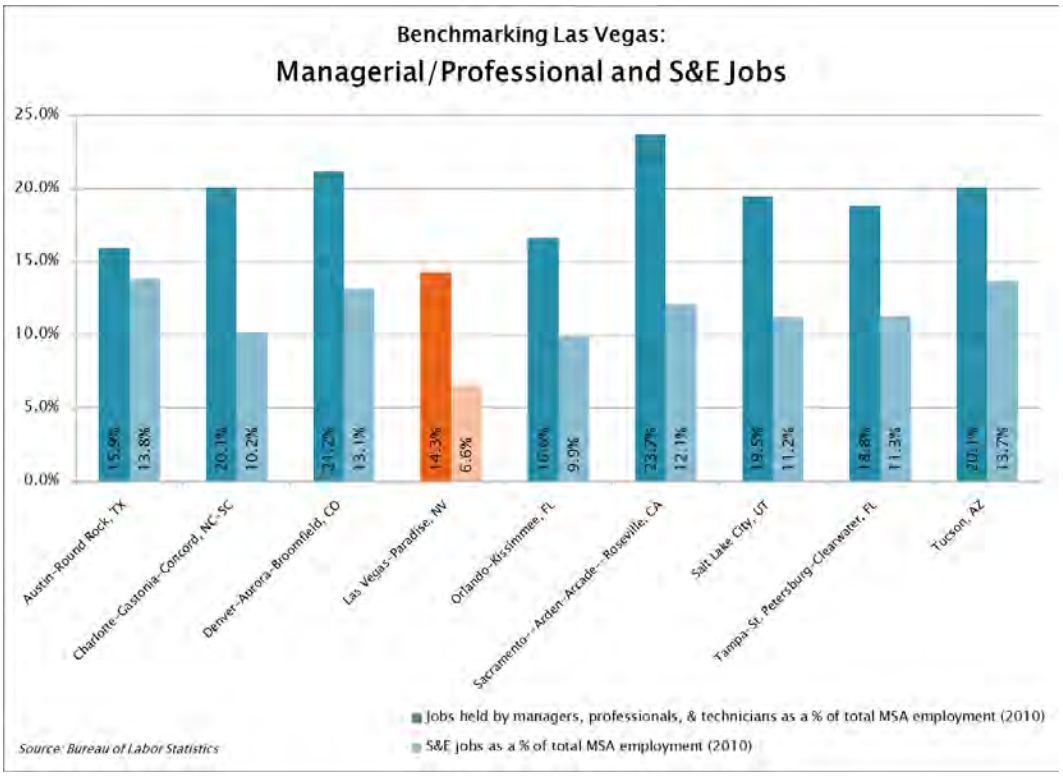





Benchmarking Las Vegas:
Immigrant Population Skill Levels (2011)
% of immigrant population with high skills
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
23.6%
23.3%
19.5%
15.2%
20.8%
21.0%
15.1%
22.0%
16.4%
Austin-Round Rock, TX
Charlotte-Gastonia-Concord, NC-SC
Denver-Aurora-Broomfield, CO
Las Vegas-Paradise, NV
Orlando-Kissimmee, FL
Sacramento--Arden-Arcade--Roseville, CA
Salt Lake City, UT
Tampa-St. Petersburg-Clearwater, FL
Tucson, AZ
Source: Brookings Institution

B) Workforce Characteristics:

3) Knowledge & Innovation Economy Workforce



INNOVATION RESOURCES IN LAS VEGAS

WHERE DOES LAS VEGAS STAND?

Las Vegas Innovation Resources

R&D Support

- Low amount of total and per GMP levels of university R&D expenditures
- Weak levels of total and per capita federal R&D obligations
- Absence of SBIR and STTR awards/funds
- Low NSF win rate and number of NSF proposals/awards

Collaboration & Innovation

- Low amount of industry-funded and total sponsored R&D expenditures
- Weak levels of licensing revenue
- Low number of licenses/options executed and invention disclosures issued
- Lack of university startups and full-time staff in tech-transfer offices

Support for collaboration, innovation, and investments in R&D are critical in today's knowledge-based economy. However, Las Vegas is the least competitive in the *Innovation Resources* when benchmarked against the eight other MSAs, ranking 8th or worse in almost every indicator measured. Las Vegas was ahead of only Charlotte for total university R&D expenditures and value of federal R&D obligations, while most of the other peer MSAs had at least two or three times the value of Las Vegas' figures for those R&D categories. From 2007 to 2010, Las Vegas also ranked as the worst MSA among its peers in the number of and funding amounts for SBIR and STTR awards, with Charlotte (which was 2nd worst in those categories) performing at two times the level of Las Vegas. Regarding the number of competitive NSF awards submitted and awarded, Las Vegas also ranked last in the peer rankings, though it outperformed Orlando in terms of its NSF proposal win rate (14.4% as compared to Orlando's 12.1%) to place at 8th in the peer rankings.

Las Vegas did not perform any better in university commercialization activities.[70] The University of Nevada-Las Vegas (UNLV) performed better than only Sacramento, which failed to register any significant number in any of these indicators. With only 3 licenses/options executed, 15 invention disclosures, and $26,500 in licensing income, Las Vegas significantly trailed the seven other peer MSAs. UNLV also failed to produce a university startup or issue a patent, and employed only 1.4 full-time staff in its tech transfer office for every $100 million sponsored research expenditures (ranking 8th). The level of university-industry collaboration in Las Vegas fared slightly better in the peer rankings, though it still rated poorly overall. Industry-funded R&D at universities amounted to only $943,000 in Las Vegas, while the eight other MSAs exceeded $6 million in such collaborative research. However, Las Vegas rated slightly better in total sponsored R&D expenditures at universities, topping Sacramento and Charlotte to achieve 7th in the peer rankings.

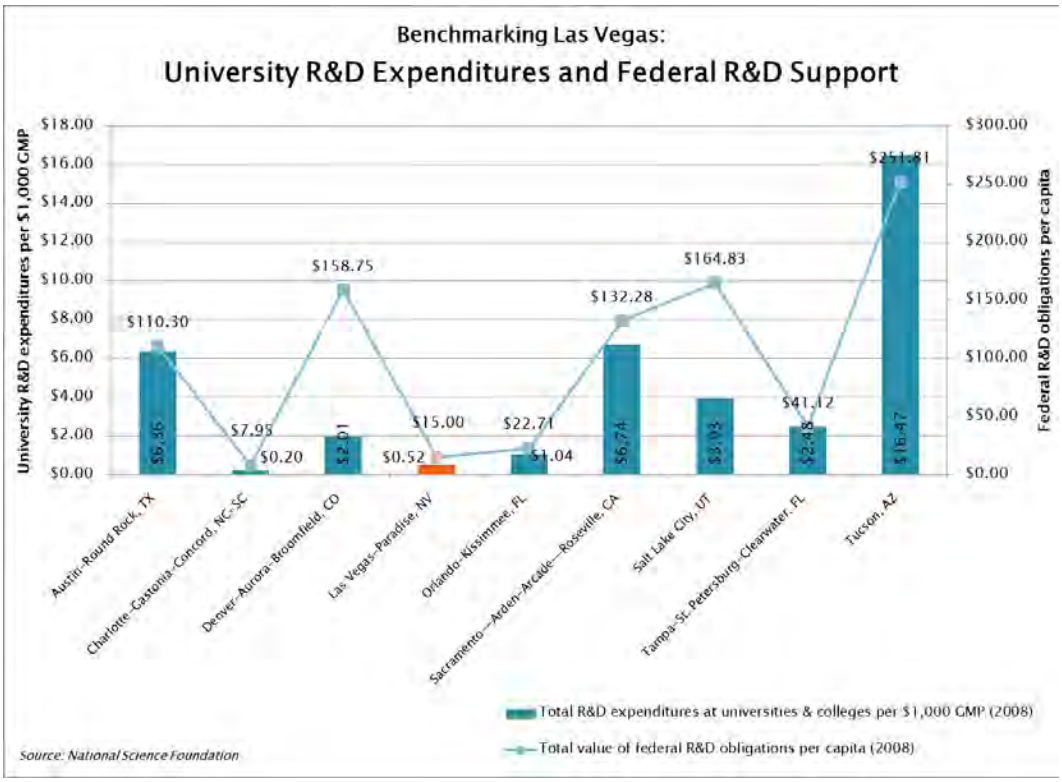
[70] Data for the University of Nevada-Las Vegas was drawn from 2007 because data from 2008 and 2009 were not available from the Association of University Technology Managers. UNLV's tech-transfer office was closed in 2008 and 2009, contributing to the absence of commercialization activity.

Las Vegas: Innovation Resources
Summary of Benchmarking Indicators

	Indicator Value for Las Vegas	Las Vegas' Ranking Among 9 Peer Metros
A) Research & Development Support		
1) R&D Activity		
Total R&D expenditures at universities and colleges (2008)	$50,775,000	8
Total R&D expenditures at universities and colleges per $1,000 GMP (2008)	$0.52	8
Total value of federal R&D obligations (2008)	$26,615,000	8
Total value of federal R&D obligations per capita (2008)	$15.00 /person	8
2) Funding from Competitive R&D Awards		
Total number of SBIR awards (2007-10)	12	9
Total SBIR award funding amount (2007-10)	$5,036,918	9
Total number of STTR awards (2007-10)	3	9
Total STTR award funding amount (2007-10)	$1,499,969	9
Total # of competitive NSF proposals submitted (2010)	90	9
Total # of competitive NSF awards (2010)	13	9
Total # of competitive NSF awards as a % of total competitive NSF proposals (2010)	14.4%	8
B) Collaboration and Innovation		
1) University Commercialization Activity		
# of licenses & options executed by major research universities (2007)	3	8
Number of full-time equivalent staff in major research university technology transfer offices (including licensing and other FTEs) (2007)	1	8
Average number of FTE staff in technology transfer offices per university (2007)	1.5	8
Number of FTE staff per $100 million in sponsored research expenditures (2007)	1.4	8
Total licensing income received by major research universities (2007)	$26,500	8
# of invention disclosures and U.S. patents issued at major research universities (2007)	15	8
# of start-up companies formed by major research universities (dependent on the licensing of the university's technology for initiation) (2007)	0	8
# of start-ups operating in home state (2007)	0	8
2) University-Industry Collaboration		
Amount of industry-funded R&D performed at universities & colleges (2008)	$943,000	9
Total sponsored research expenditures at major research universities (2007)	$104,936,865	7

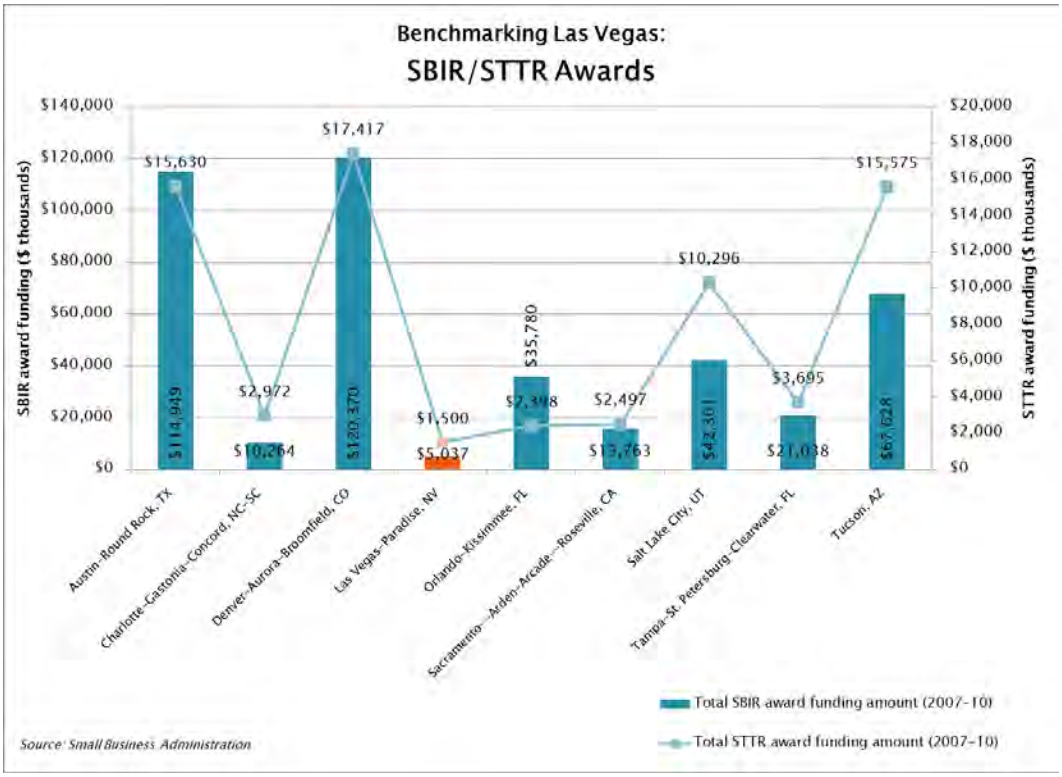
A) Research & Development Support:

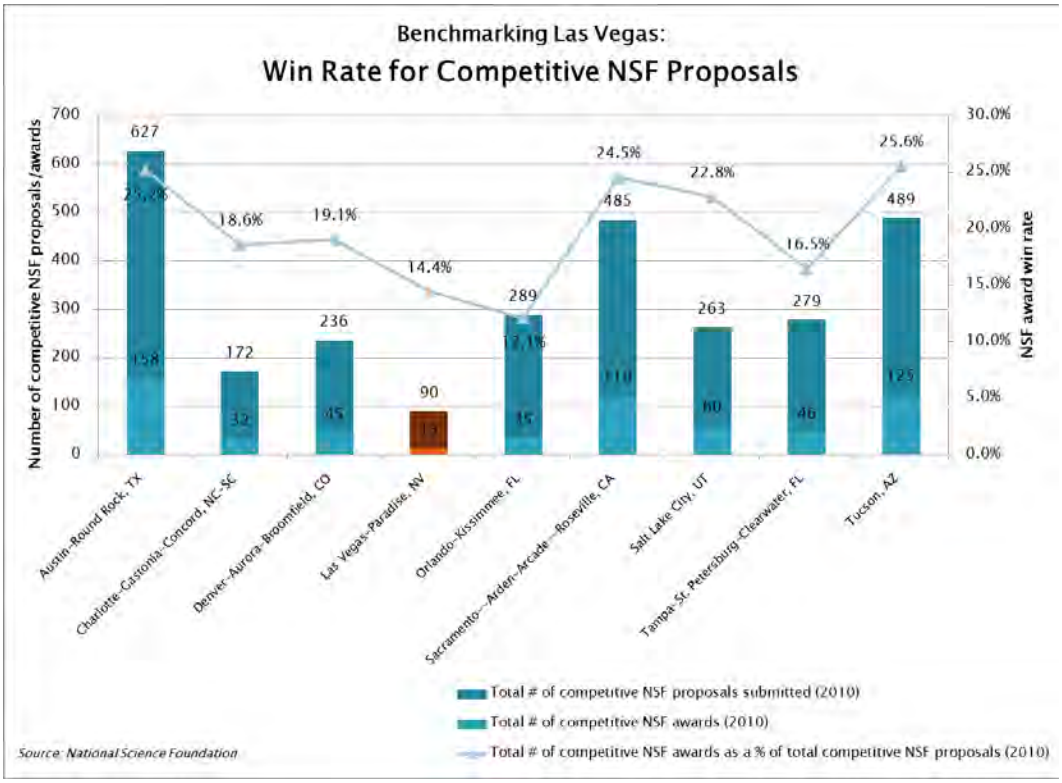
1) R&D Activity



A) Research & Development Support:

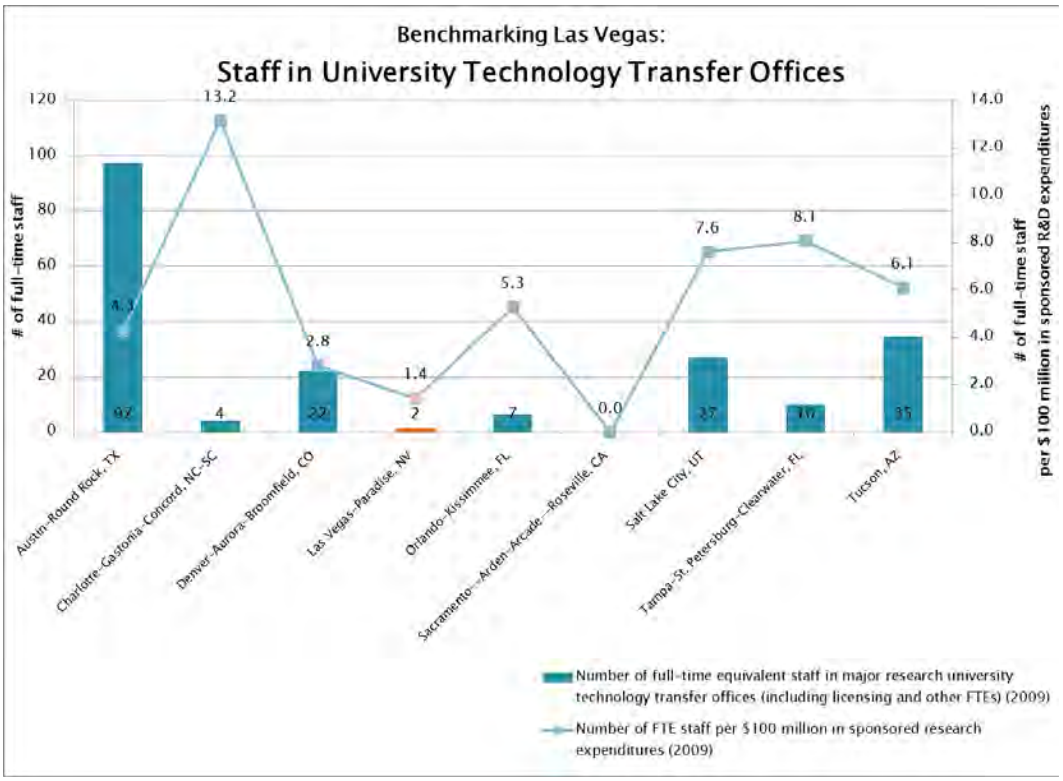
2) Funding from Competitive R&D Awards

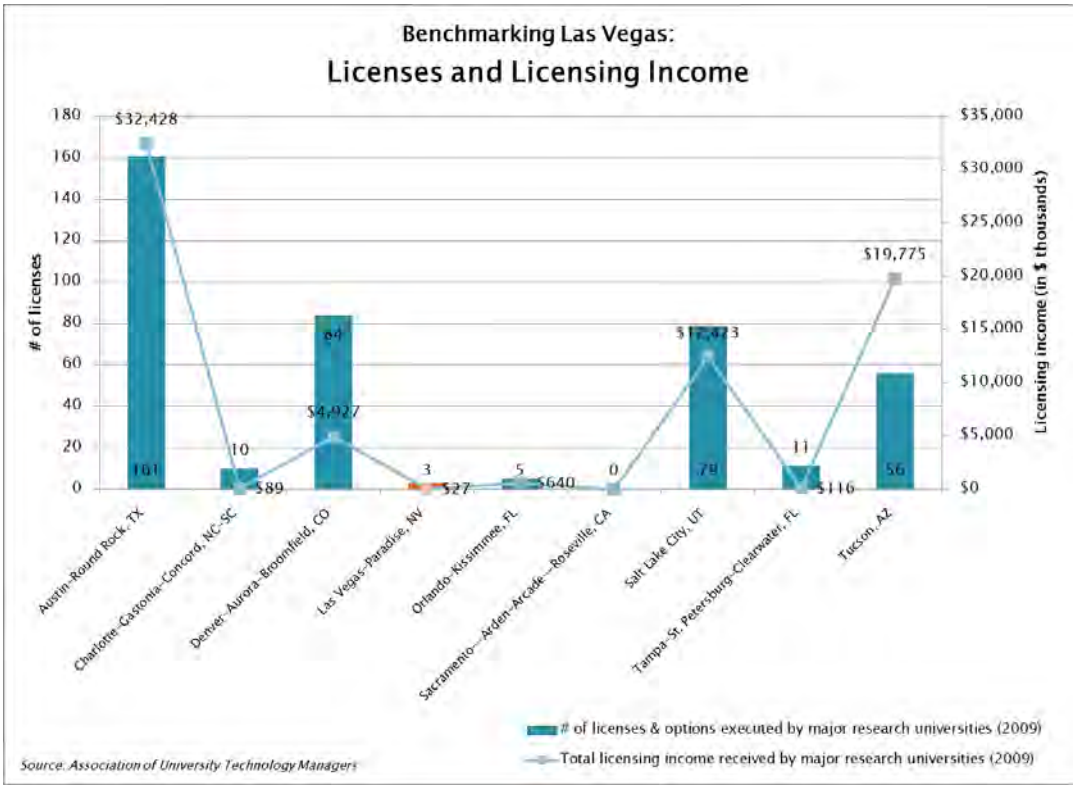


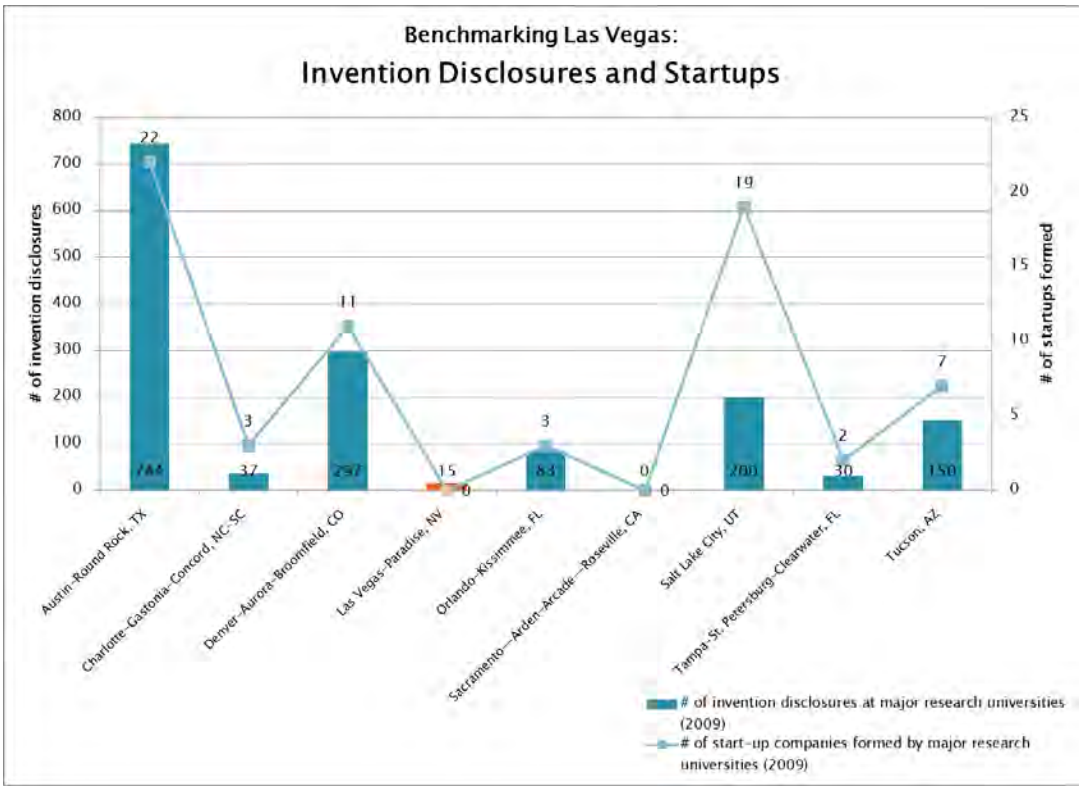


B) Collaboration and Innovation:

1) University Commercialization Activity

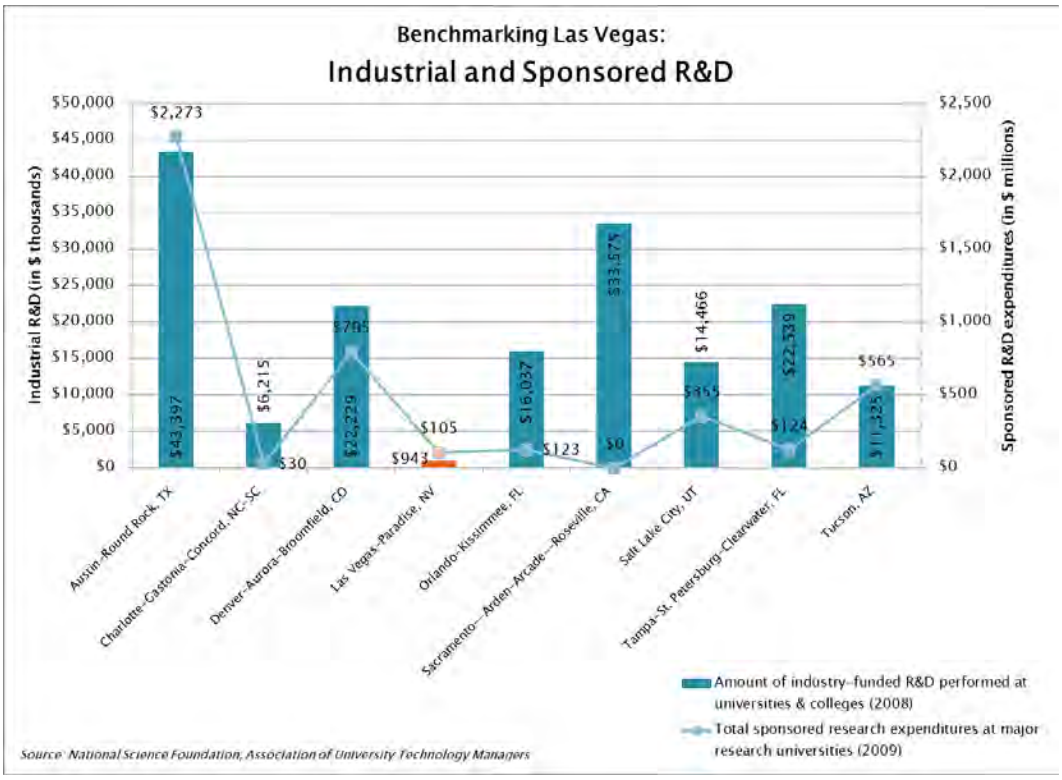





Benchmarking Las Vegas:
Invention Disclosures and Startups
# of invention disclosures
# of startups formed
800
700
600
500
400
300
200
100
0
25
20
15
10
5
0
22
3
11
15
0
3
0
0
19
2
7
744
37
297
83
200
30
150
Austin-Round Rock, TX
Charlotte-Gastonia-Concord, NC-SC
Denver-Aurora-Broomfield, CO
Las Vegas-Paradise, NV
Orlando-Kissimmee, FL
Sacramento--Arden-Arcade--Roseville, CA
Salt Lake City, UT
Tampa-St. Petersburg-Clearwater, FL
Tucson, AZ
# of invention disclosures at major research universities (2009)
# of start-up companies formed by major research universities (2009)

B) Collaboration and Innovation:

2) University-Industry Collaboration



GLOBALIZATION AND VITALITY IN LAS VEGAS

WHERE DOES LAS VEGAS STAND?

Las Vegas' presence in the global economy rates as average in some areas and poorly in others. While Las Vegas ranked as one of the top MSAs in terms of the total value of metropolitan exports, its value of exports as a share of the gross metropolitan product (8%) exceeded only three other peer MSAs. In addition, Las Vegas is home to three Fortune 500 companies, a number that trails only Charlotte and Denver in the peer rankings. All of Las Vegas's Fortune 500 companies, however, are based in the gaming, hospitality, and entertainment industries.

Las Vegas
Globalization & Vitality

Globalization

\+ High total value of metropolitan exports
O Average levels of metropolitan exports as a share of gross metropolitan product

Business Vitality

O Average gross metropolitan product, GMP per capita, and GMP growth rate
O Presence of only one Tech Fast 500 company
O Moderate private sector workforce growth over the last decade
— Poor rate of private sector employment growth over 5 years
— High unemployment
— Lack of Inc. 500 companies

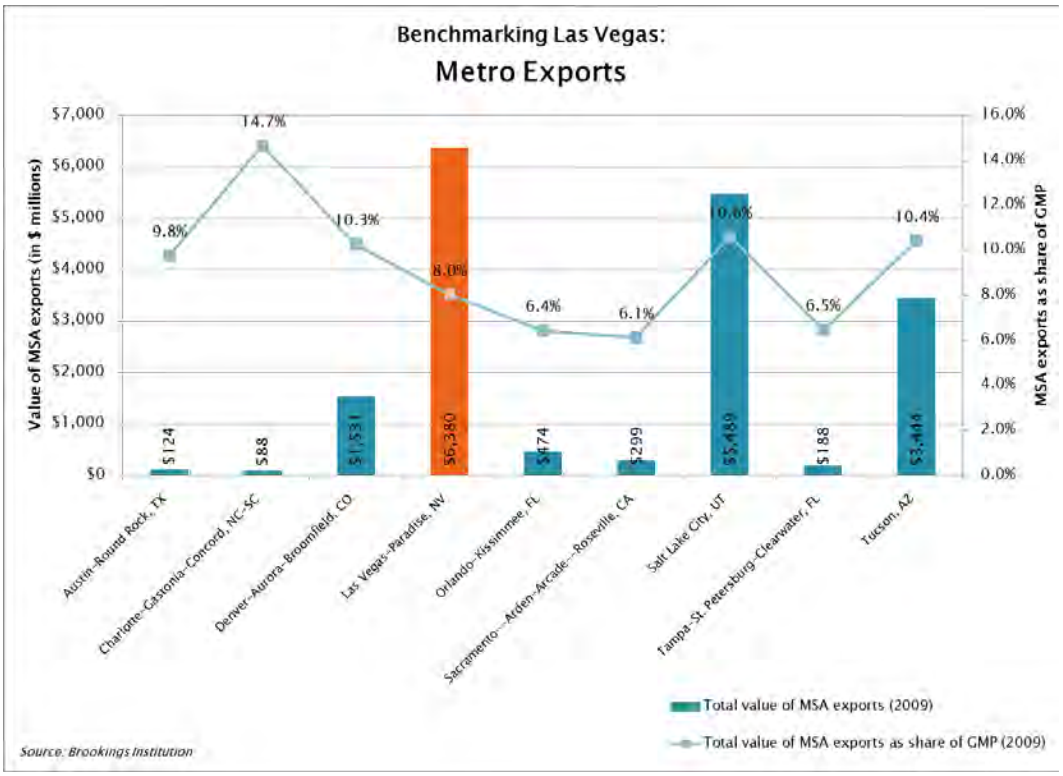
Growth in Las Vegas' metropolitan economy, meanwhile, was mixed. Though the gross metropolitan product of Las Vegas ranked slightly below average, the city posted a solid GMP per capita ($39,565) and GMP growth rate (4.4% CAGR, 2004-09), which were average when benchmarked against its peers. Across the past decade, Las Vegas rated highly (3rd) in the peer rankings for private sector employment growth (0.8% CAGR, 2001-11), but as one of the hardest hit regions during the economic recession, Las Vegas' private sector employment contracted significantly over the past five years (-3.0% CAGR, 2006-11), leading to the worst unemployment figure among the peer MSAs (12.1% as of April 2011). Reflecting the stagnant private sector, Las Vegas rated poorly in the number of fast-growing companies (in terms of revenue). Las Vegas had 27 companies in the Inc. 500 rankings and only one in the Technology Fast 500 rankings, placing it near the bottom of the peer rankings.

Las Vegas: Globalization and Vitality
Summary of Benchmarking Indicators

	Indicator Value for Las Vegas	Las Vegas' Ranking Among 9 Peer Metros
A) Globalization		
1) Exports		
Total value of MSA exports ($ millions) (2009)	$6,380	1
Total value of MSA exports as share of GMP (2009)	8.0%	6
B) Business Vitality		
1) Economic Prosperity and Growth		
Gross domestic product by metro area ($ millions) (2009)	$91,742	6
Gross domestic product per capita by metro area (2009)	$39,565	5
Average annual GMP growth rate over 5 years (CAGR) (2004-09)	4.4%	5
Average annual private sector employment growth rate over 5 years (CAGR) (2006-11)	-3.0%	8
Average annual private sector employment growth rate over 10 years (CAGR) (2001-11)	0.8%	3
% of labor force unemployed (April 2011)	12.1%	9
2) Top Performing Companies		
# of Fortune 500 Companies (2010)	3	3
# of Fortune 500 Companies per 10,000 businesses (2010)	0.6	3
# of Inc 500 Companies (2009)	27	7
# of Inc 500 Companies per 10,000 businesses (2009)	5.5	7
# of Tech Fast 500 Companies (2010)	1	5

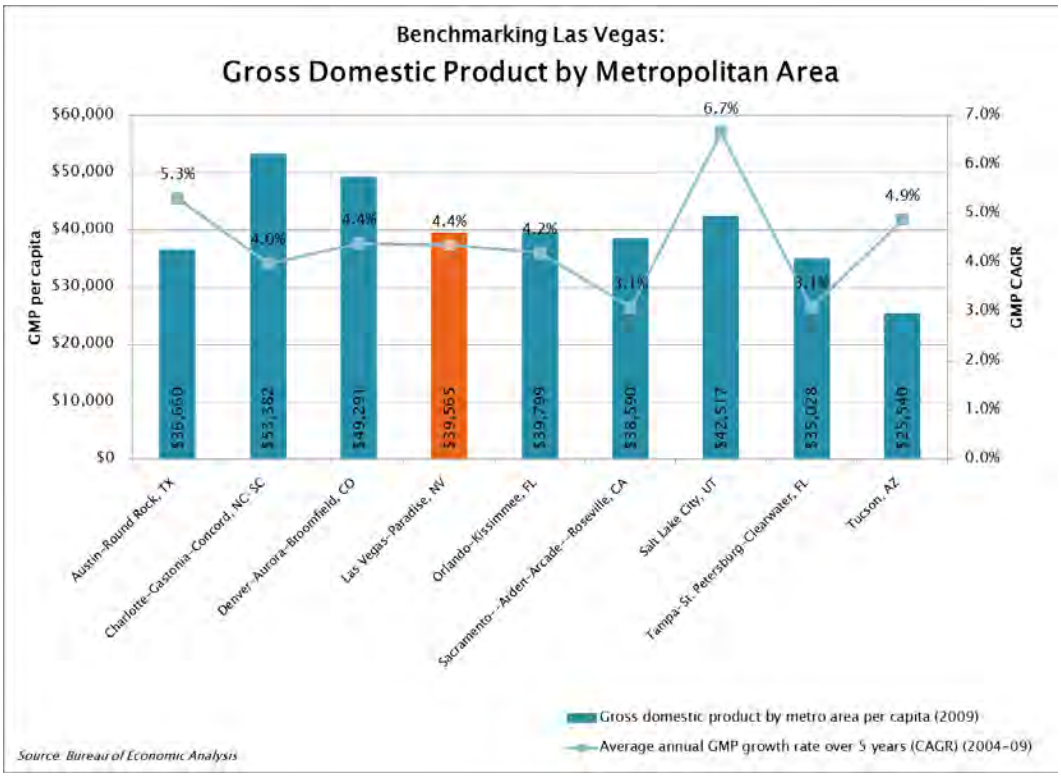
A) Globalization:

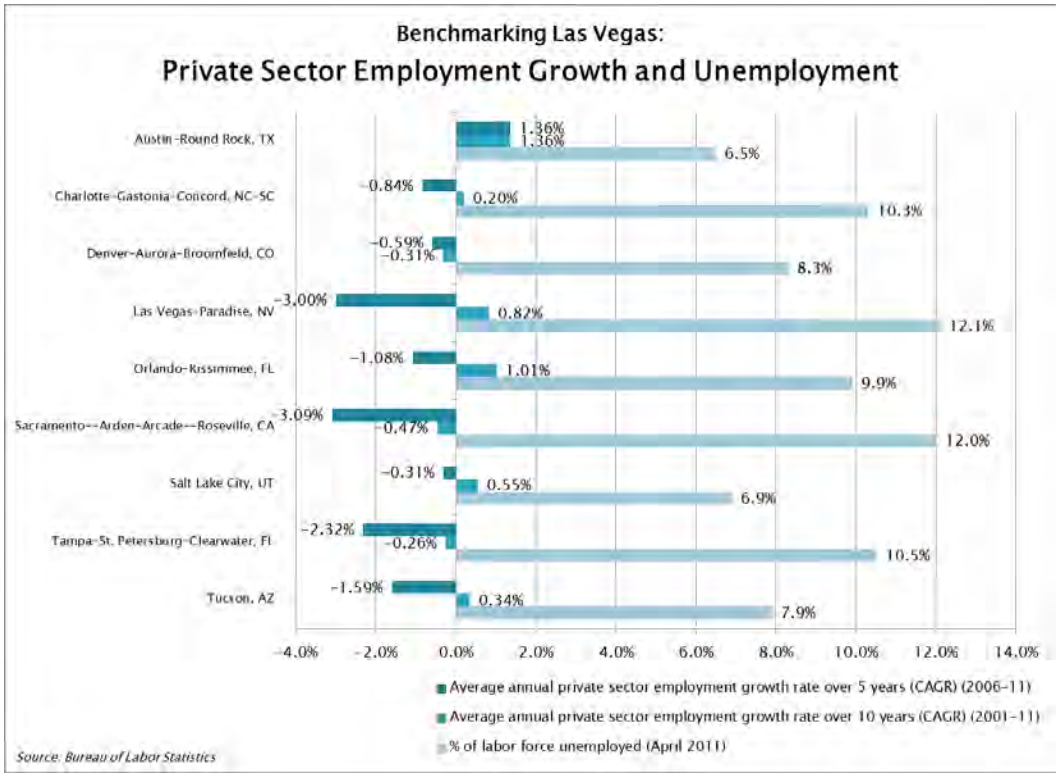
1) Exports



B) Business Vitality:

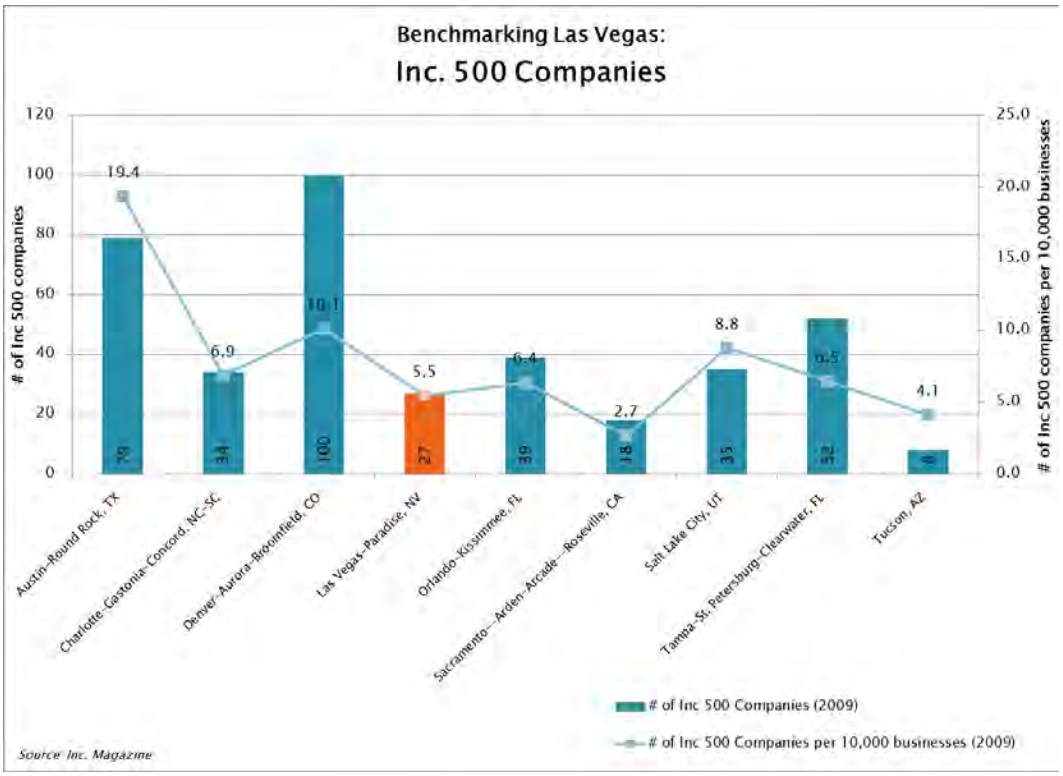
1) Economic Prosperity and Growth

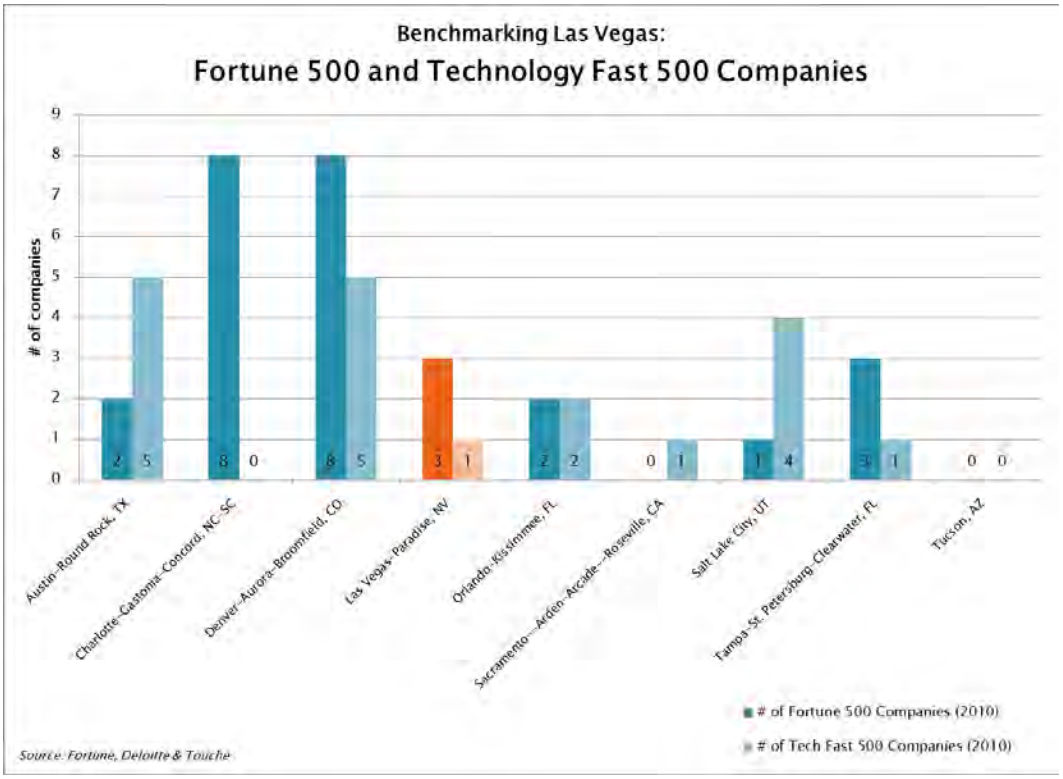




B) Business Vitality:

2) Top Performing Companies





INFRASTRUCTURE IN LAS VEGAS

WHERE DOES LAS VEGAS STAND?

Las Vegas has mixed results in the *Infrastructure* category of benchmarking indicators. Las Vegas is well-positioned in commercial air transportation, which is driven by the presence of McCarran International Airport. Over 19 million passengers boarded flights from Las Vegas to nearly 100 different metropolitan areas, placing Las Vegas near the top among its peers in terms of air traffic volume and connectivity (ranking 2nd and 3rd respectively). The region's flight performance was also above average, with over 80% of flights arriving on-time (ranking 4th). However, with airlines cutting back on flights outside their "core networks" over the last three years, Las Vegas was among the cities that experienced decreased air service as a result of regional job losses and decreased tourist activity. According to the MIT Airline Data Project, the number of passengers departing from Las Vegas dropped by 13.7 percent from 2007 to 2011.[71] Even during the recent uptick in passenger volumes across a majority of the world's largest airports, McCarran International Airport was among the few that instead experienced a decline from 2009 to 2010.[72]

Las Vegas Infrastructure	
Technology and Physical Infrastructure	
+	Very high number of total and per capita passenger boardings
+	Large number of flight connections to other metropolitan areas
+	Good access to public transit and jobs
o	Solid share of on-time arriving flights
o	Average download/upload Internet speeds (*although anecdotal evidence indicates that speeds are better than what can be measured here*)
–	Low number of broadband/high-speed service providers and providers per capita (*although anecdotal evidence indicates that service availability is better than what can be measured here*)

Las Vegas also rates well in the land transportation indicators. Most of Las Vegas residents have easy access to public transit stops and their jobs using the monorail and local bus network, placing Las Vegas in the top half of the peer rankings for both indicators.

Compared to its peer MSAs, Las Vegas seems to perform poorly in the two indictors of technology infrastructure used in this study. It ranked low for the number of broadband and high-speed service providers, with only 4.5 providers for every 10,000 people. Las Vegas' internet connectivity speed rated as average and also has some room for improvement. However, according to anecdotal information from local stakeholders, Las Vegas's internet connectivity is significantly better than what is measured through these quantitative indicators. One advantage for Las Vegas is that much

[71] "Air service cutbacks hit hardest where recession did," *The New York Times* July 8, 2011, http://www.nytimes.com/2011/07/09/business/flight-cutbacks-hit-midsize-airports-hardest.html?_r=1&nl=todaysheadlines&emc=tha25.
[72] "Last year's rising global passenger trend missed McCarran," *Las Vegas Sun* April 1, 2011, http://www.lasvegassun.com/news/2011/apr/01/last-years-global-passenger-trend-missed-mccarran/.

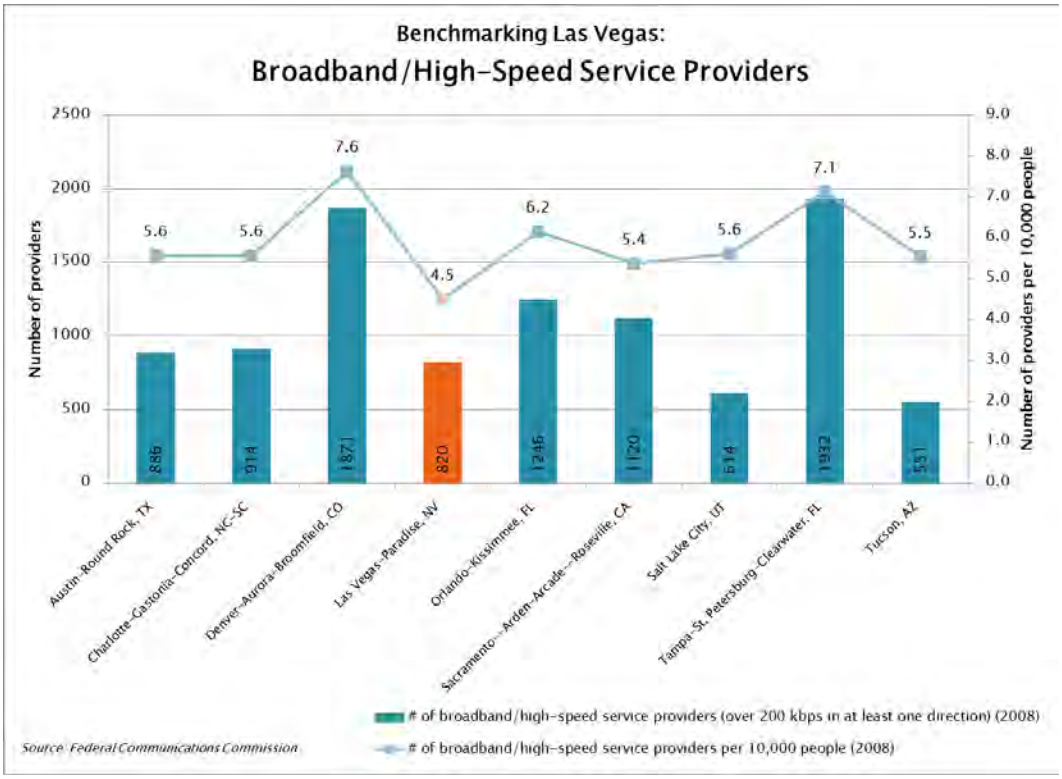
of the infrastructure in the region is relatively new due to the construction/housing boom of the last decade, so fiber optic cable is more prevalent and there are often multiple service providers available. In particular, Las Vegas's Switch SuperNAP data center boasts Internet connectivity, speed, and reliability that, it claims, is second to no other data center in the world, with 20 Internet service providers on-site. This service also allows Switch to offer an aggregated telecom purchasing/pricing approach for its customers that is highly competitive against any other region in the country. What is not clear, however, is the extent to which this speed and connectivity extends in a practical sense to other business and resident users throughout the greater Las Vegas metropolitan area.

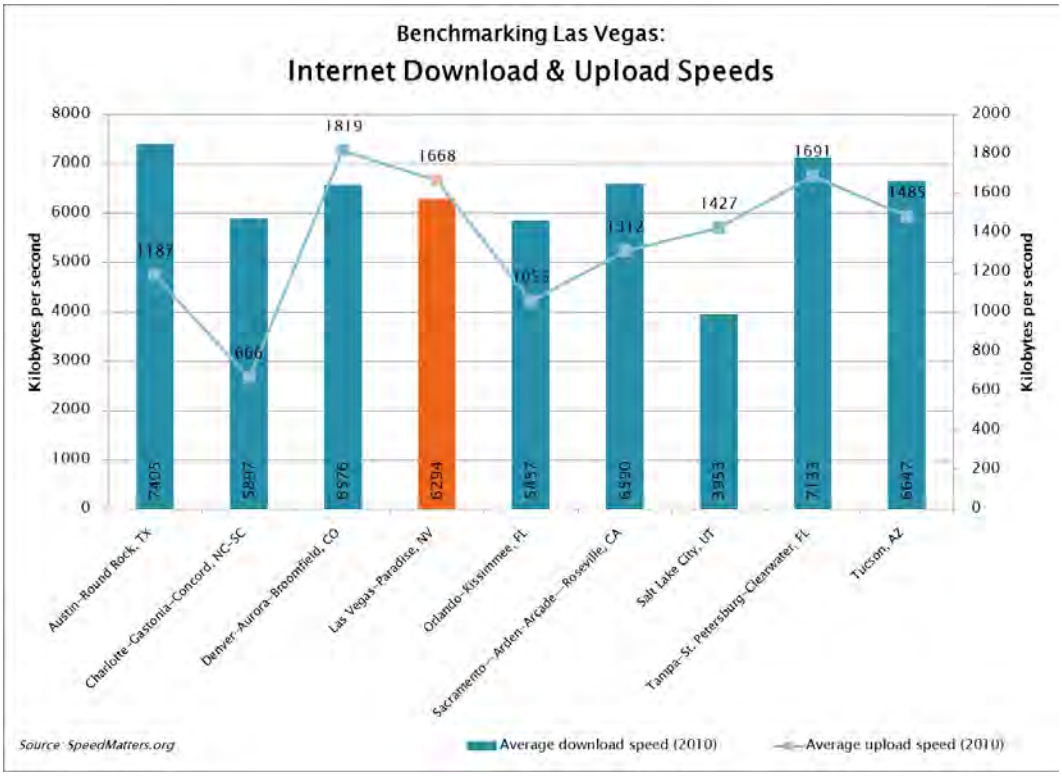
Las Vegas: Infrastructure
Summary of Benchmarking Indicators

	Indicator Value for Las Vegas	Las Vegas' Ranking Among 9 Peer Metros
A) Technology Infrastructure		
1) Broadband / High-Speed Telecom Connections		
# of broadband/high-speed service providers (over 200 kbps in at least one direction) (2008)	820	7
# of broadband/high-speed service providers (over 200 kbps in at least one direction) per 10,000 people (2008)	4.5	9
Average internet download speed (2010)	6,294 kbps	6
Average internet upload speed (2010)	1,668 kbps	3
B) Physical Infrastructure		
1) Access to Transit		
% of working-age residents living in block groups with access to at least one transit stop within ¾ mile (2011)	85.5%	2
% of metropolitan jobs reachable via transit within 90 minutes (2011)	44.0%	4
2) Air Transportation Services		
Number of passenger boardings (2009)	19,691,474	2
Number of passenger boardings per 1,000 people (2009)	10,510	1
Number of metropolitan/micropolitan connections (2009)	97	3
% of on-time arriving flights (2009)	81.4%	4

A) Technology Infrastructure:

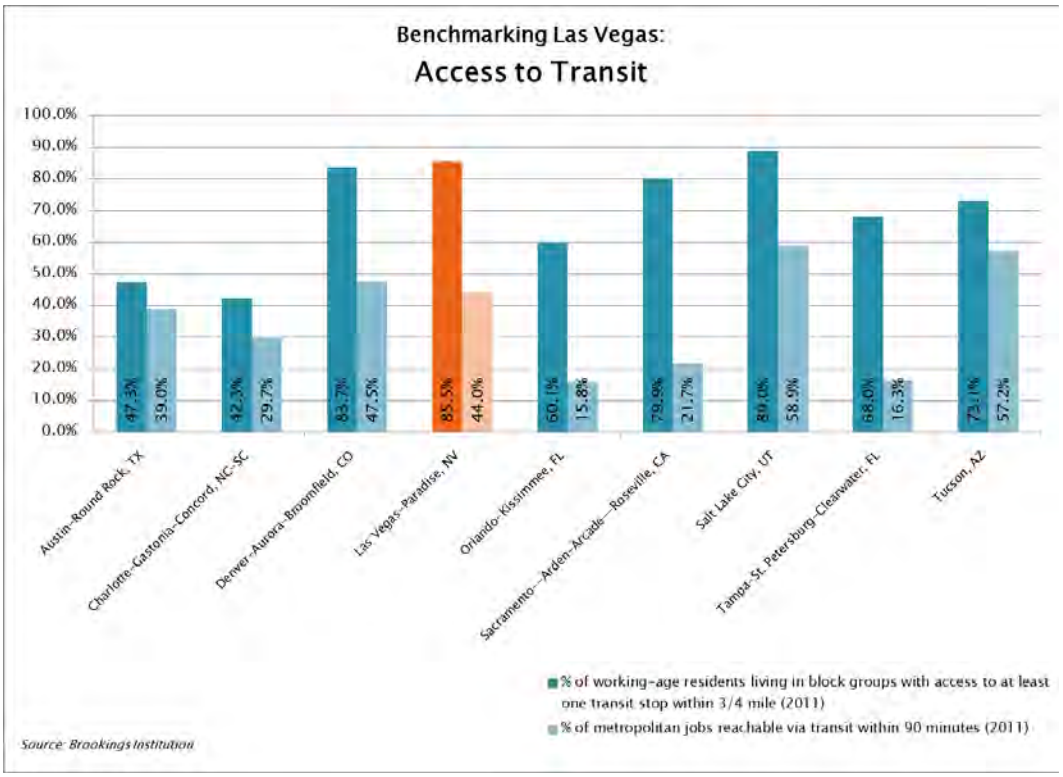
1) Broadband/High-speed Telecommunications Connections





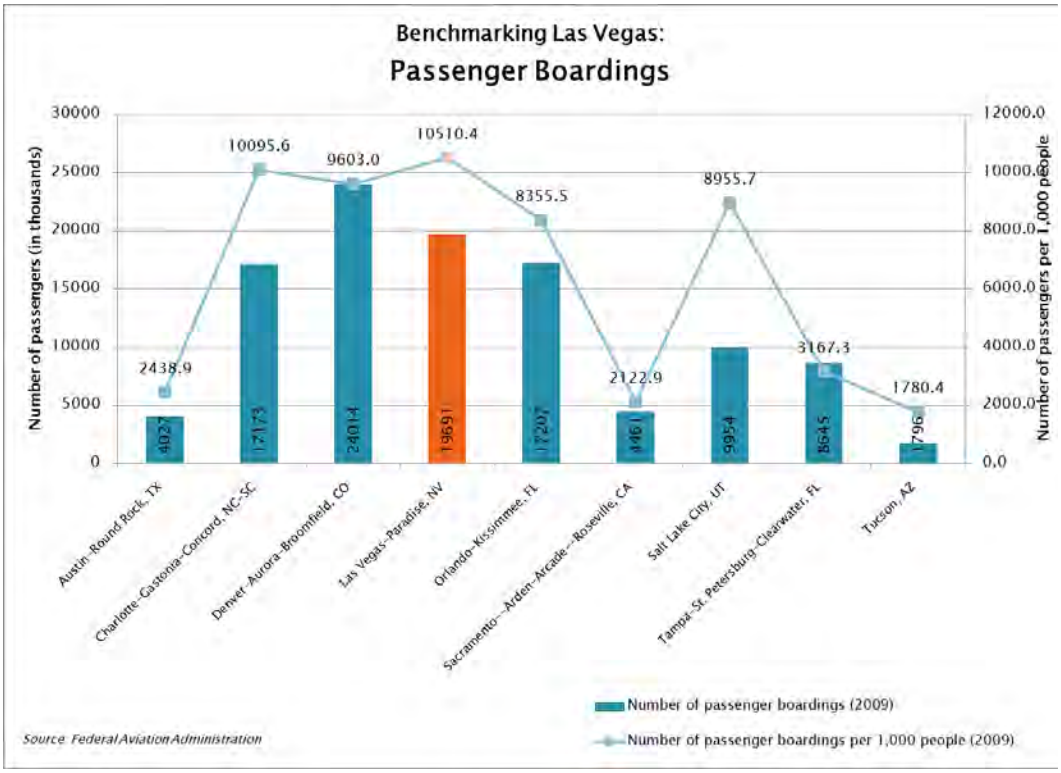
B) Physical Infrastructure:

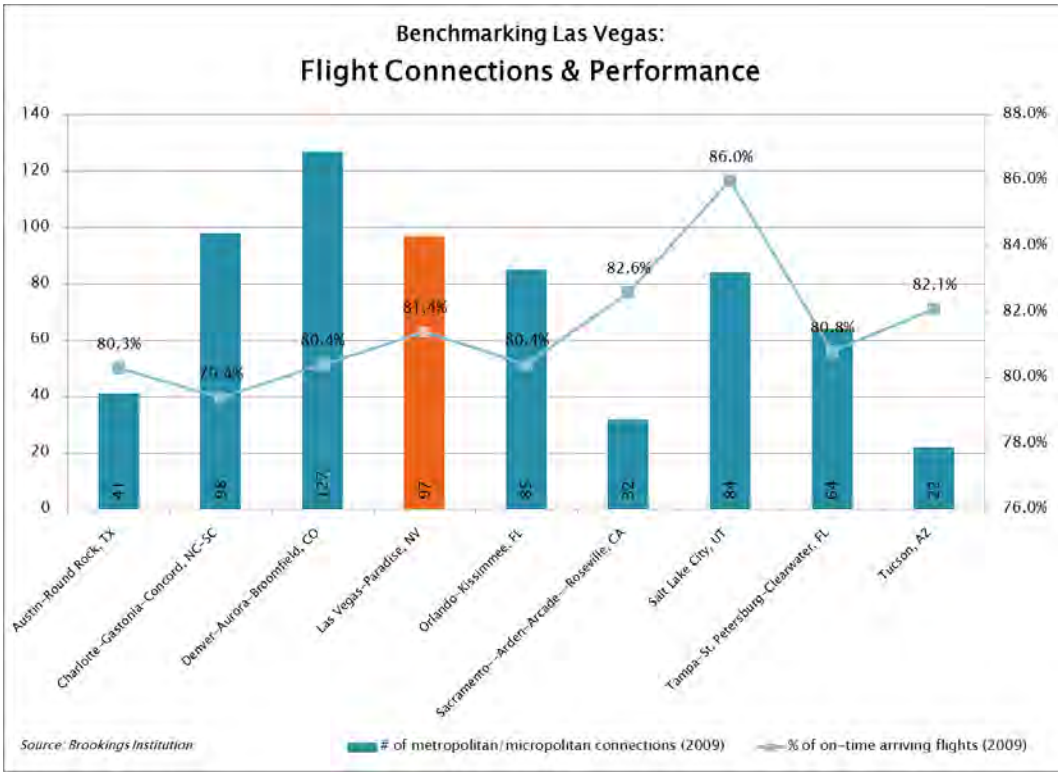
1) Access to Transit



B) Physical Infrastructure:

2) Air Transportation Services





APPENDIX A: INDUSTRY CLUSTER ANALYSIS METHODOLOGY

INDUSTRY CLUSTER DEFINITIONS

The first step in measuring and assessing Nevada's industry clusters was to delineate cluster boundaries and groupings. The SRI team undertook a careful review of the North American Industry Classification System (NAICS) to define the twenty-five cluster groupings that make up the regional economy and to compile the list of NAICS codes that comprise each individual cluster. In establishing the cluster groupings, the SRI team took into consideration the existing target industries and industry strengths in Reno/Carson City, Las Vegas, and the State of Nevada, as well as national and global trends that are shaping the future direction of many high-tech, knowledge-based, and strategic industries. A total of 1,121 NAICS codes, at the 6-digit level, were selected by SRI for inclusion in the cluster study, as well aggregated data for crop and animal production, short- and long-haul railroads, and government employment (divided into Federal military, Federal civilian excluding postal service, State Government, and Local Government). A detailed breakdown of the NAICS codes included in each cluster is provided at the end of this Appendix.

Determining the proper industry cluster boundaries is essentially an art form, requiring both local knowledge and judgment about industry linkages and synergies. For example, in many regions of the country, high-tech life sciences companies (such as pharmaceuticals and medical equipment) are grouped with the overall health and medical services cluster, while in other regions (e.g., Maryland, Minneapolis, Boston), pharmaceuticals and medical equipment might be large enough to be stand-alone clusters. In still other regions (e.g., Iowa, Kansas), life sciences research and biotechnology-related activities might be more closely aligned with the agribusiness industry.

High-tech industries (IT, microelectronics, biotechnology, medical devices, optics/photonics, digital media, marine electronics, and so on) are especially difficult to characterize and quantify using standardized NAICS-based data. Most high-tech activities are "hidden" within the NAICS codes for other more generalized activities, such as medical equipment manufacturing, pharmaceuticals, electronics manufacturing, colleges and universities, and many others, and it is impossible to identify the specific high-tech activities within these NAICS codes. A few clusters, such as *Information Technology Services* and *Research an Engineering Services* do specifically capture high-tech activities; however, these clusters are particularly fluid and can be difficult to characterize given their important roles in other industries. For example, depending on the other major industries in the region, these clusters may have close synergies and linkages with other clusters such as *Medicine & Life Services*, *Aerospace & Defense*, *Electronics*, and others; however, it is not possible from standardized, NAICS-based datasets to determine the extent to which these sectors are serving specific industries.

For this reason, NAICS-based cluster analysis is just a starting point for analyzing and understanding Nevada's clusters, and will be supplemented by the benchmarking and innovation analyses, as well

as focus groups and stakeholder consultation, to build a better sense of the potential that exists in clusters and sub-clusters that cannot be measured through NAICS.

INDUSTRY DATASET AND ANALYSIS METHODOLOGY

The data SRI used for the cluster analysis is drawn from an Economic Modeling Specialists Inc. (EMSI) industry dataset. The dataset covers both private and public sector employment, including proprietors and self employed workers. In order to create a detailed and accurate dataset, EMSI gathers and integrates data from a variety of state and federal sources, including the *Quarterly Census of Employment and Wages* (QCEW) produced by the Department of Labor, the *Regional Economic Information System* (REIS) published by the Bureau of Economic Analysis (BEA), and the *County/ZIP Business Patterns* (CBP) and *Nonemployer Statistics* (NES) published by the U.S. Census Bureau. By combining a variety of data sources, EMSI is able to fill gaps and suppressions in individual sources, yielding a composite, mathematically unsuppressed dataset.

Because EMSI aggregates data from multiple government datasets, the total state/regional employment figures shown in this report are likely to be higher than the figures shown in publicly-available government datasets. For example, commonly-used regional employment datasets such as Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW) typically exclude labor categories such as self-employed/sole proprietors, commission-based workers, military/armed forces, some state/local government workers, some agricultural workers, some domestic workers, and some railroad workers. The EMSI dataset includes those categories in the employment totals, so the aggregated figures may be higher than expected.

The dataset utilized in this report includes figures spanning from 2001 through Quarter 2 of 2011, as well as EMSI forecasts through the year 2016. EMSI projections are based on recent industry trends, national industry projections by the Bureau of Labor Statistics, and state and sub-state regional projections produced by individual states. While EMSI utilizes a rigorous methodology combining up-to-date data and state and federal industry expertise to develop annual projections going forward, there is significant uncertainty in these numbers, and they are not intended to be short-term forecasts, especially in times of high economic volatility.

Data drawn from the EMSI database were used to calculate a series of statistics for Nevada's twenty-five industry clusters. The following statistics were calculated for the State of Nevada, Reno/Carson City, and Las Vegas:

- ***Employment:*** Employment size was calculated for each of the twenty-five clusters, as well as for several sub-clusters within each cluster. Average annual employment growth rates were also calculated over the time periods 2006 to 2011 and 2011 to 2016 (based on EMSI projections). In addition, average annual employment growth rates were calculated for

different segments of the recent business cycle: Economic Expansion (2002-2007), Recession (2007-2009), and Initial Recovery (2009-2011).

- ***Establishments:*** The number of establishments – defined as a physical location for economic activity (a business) – was calculated for all clusters and sub-clusters. Note that a single company may have more than one establishment.

- ***Average Annual Pay:*** Average annual pay is calculated as the total annual earnings of a regional industry (wages, profits, benefits, and other compensation) divided by the number of employees. Note that because of this methodology, figures will vary slightly from actual average salaries for workers.

- ***Employment Concentration Ratio (Location Quotient):*** This statistic represents the degree to which a cluster is concentrated in a region relative to the national average. The employment concentration ratio is measured as follows: the percentage of industry cluster employment to total employment in the region, divided by the percentage of industry cluster employment to total employment for the United States. A ratio greater than 1.0 means the cluster is more highly concentrated in the region than the national average.

Nevada Industry Cluster Definitions (2007 NAICS Codes)		
Cluster	**NAICS**[73]	**NAICS Description**
Aerospace & Defense		
Aerospace	334511	Search, detection, and navigation instruments
	3364	Aerospace product and parts manufacturing
Airport & Aviation Services	481	Air transportation
	4881	Support activities for air transportation
	611512	Flight training
Defense & National Security	32592	Explosives manufacturing
	332992	Small arms ammunition manufacturing
	332993	Ammunition, except small arms, manufacturing
	332994	Small arms manufacturing
	332995	Other ordnance and accessories manufacturing
	336992	Military armored vehicles and tank parts mfg.
	912	Federal Government, military
Agriculture & Agribusiness		
Primary Agriculture	11A000	Crop and animal production
	114	Fishing, hunting and trapping
Food Processing	3111	Animal food manufacturing
	3112	Grain and oilseed milling
	3113	Sugar and confectionery product manufacturing
	3114	Fruit and vegetable preserving and specialty
	3115	Dairy product manufacturing
	3116	Animal slaughtering and processing
	3117	Seafood product preparation and packaging
	3118	Bakeries and tortilla manufacturing
	3119	Other food manufacturing
	31211	Soft drink and ice manufacturing
	31212	Breweries
	31214	Distilleries
Agriculture Support	1151	Support activities for crop production
	1152	Support activities for animal production
	54194	Veterinary services
Agriculture-Related Equipment	33311	Agricultural implement manufacturing
	333294	Food product machinery manufacturing
	3122	Tobacco manufacturing

[73] Although industry cluster data analysis was conducted using 6-digit NAICS codes, the codes presented in this table have been aggregated to the 3-, 4-, and 5-digit NAICS level wherever possible, to conserve space.

Automotive & Transportation Equipment Manufacturing		
Transportation Equipment	3361	Motor vehicle manufacturing
	3362	Motor vehicle body and trailer manufacturing
	3365	Railroad rolling stock manufacturing
	3366	Ship and boat building
	336991	Motorcycle, bicycle, and parts manufacturing
	336999	All other transportation equipment mfg.
Engine & Automotive Parts	332912	Fluid power valve and hose fitting manufacturing
	333995	Fluid power cylinder and actuator manufacturing
	333996	Fluid power pump and motor manufacturing
	335312	Motor and generator manufacturing
	335313	Switchgear and switchboard apparatus manufacturing
	3363	Motor vehicle parts manufacturing
Business Services		
Legal & Accounting Services	533	Lessors of nonfinancial intangible assets
	54111	Offices of lawyers
	541199	All other legal services
	541211	Offices of certified public accountants
	541213	Tax preparation services
	541219	Other accounting services
Management of Companies & Enterprises	551	Management of companies and enterprises
BPO & Employment Services	541214	Payroll services
	5611	Office administrative services
	5612	Facilities support services
	5613	Employment services
	56141	Document preparation services
	561439	Other business service centers
	561499	All other business support services
Printing Services	3231	Printing and related support activities
Other Business Support & Security Services	54193	Translation and interpretation services
	54199	All other professional and technical services
	561431	Private mail centers
	56144	Collection agencies
	56145	Credit bureaus
	561491	Repossession services
	561492	Court reporting and stenotype services
	5616	Investigation and security services
	56191	Packaging and labeling services
	56199	All other support services
Call Centers & Electronic Sales	4541	Electronic shopping and mail-order houses
	56142	Telephone call centers

Construction & Real Estate		
Construction Services	236	Construction of buildings
	23711	Water and sewer system construction
	23713	Power and communication system construction
	2372	Land subdivision
	2373	Highway, street, and bridge construction
	2379	Other heavy construction
	238	Specialty trade contractors
	532412	Other heavy machinery rental and leasing
Real Estate & Building Services	531	Real estate
	54135	Building inspection services
	5617	Services to buildings and dwellings
Construction-Related Equip.	33312	Construction machinery manufacturing
Education & Government		
Education	51912	Libraries and archives
	6111	Elementary and secondary schools
	6112	Junior colleges
	6113	Colleges and universities
	6114	Business, computer and management training
	611511	Cosmetology and barber schools
	611513	Apprenticeship training
	611519	Other technical and trade schools
	6116	Other schools and instruction
	6117	Educational support services
	6244	Child day care services
Government	4911	Postal service
	911000	Federal government, civilian, except postal service
	920000	State government
	930000	Local government
Electronics		
IT Hardware	3341	Computer and peripheral equipment manufacturing
	3344	Semiconductor and electronic component manufacturing
	811212	Computer and office machine repair
Measuring & Controlling Device Manufacturing	334512	Automatic environmental control manufacturing
	334513	Industrial process variable instruments
	334514	Totalizing fluid meters and counting devices
	334515	Electricity and signal testing instruments
	334516	Analytical laboratory instrument manufacturing
	334517	Irradiation apparatus manufacturing
	334518	Watch, clock, and part manufacturing
	334519	Other measuring and controlling device manufacturing
	335314	Relay and industrial control manufacturing
	811219	Other electronic equipment repair

Other Electronics	333295	Semiconductor machinery manufacturing
	333314	Optical instrument and lens manufacturing
	333315	Photographic and photocopying equipment manufacturing
	3343	Audio and video equipment manufacturing
	3346	Magnetic media manufacturing and reproducing
	811211	Consumer electronics repair and maintenance
Energy & Environment		
Fuel Production, Distribution, & Supply Chain Activities	211111	Crude petroleum and natural gas extraction
	211112	Natural gas liquid extraction
	2121	Coal mining
	213111	Drilling oil and gas wells
	213112	Support activities for oil and gas operations
	213113	Support activities for coal mining
	2212	Natural gas distribution
	23712	Oil and gas pipeline construction
	32411	Petroleum refineries
	33313	Mining and oil and gas field machinery manufacturing
	4247	Petroleum merchant wholesalers
	45431	Fuel dealers
	486	Pipeline transportation
Power Generation & Technology	2211	Power generation and supply
	33241	Power boiler and heat exchanger manufacturing
	3336	Turbine and power transmission equipment manufacturing
	335311	Electric power and specialty transformer manufacturing
Recycling & Waste Remediation	42393	Recyclable material merchant wholesalers
	56291	Remediation services
	56292	Materials recovery facilities
Environmental Research & Management	1153	Support activities for forestry
	54136	Geophysical surveying and mapping services
	54162	Environmental consulting services
	813312	Environment and conservation organizations
Clean & Renewable Energy	221111	Hydroelectric power generation
	221113	Nuclear electric power generation
	221119	Other electric power generation
	22133	Steam and air-conditioning supply
	325193	Ethyl alcohol manufacturing
	335911	Storage battery manufacturing
Financial Services		
Financial Institutions	521	Monetary authorities - central bank
	522	Credit intermediation and related activities
Securities	523	Securities, commodity contracts, investments
	525	Funds, trusts, and other financial vehicles
Insurance	524	Insurance carriers and related activities

General Services		
Social Assistance	6241	Individual and family services
	6242	Emergency and other relief services
	6243	Vocational rehabilitation services
Repair & Maintenance	8111	Automotive repair and maintenance
	8113	Commercial machinery repair and maintenance
	8114	Household goods repair and maintenance
Personal Services	812	Personal and laundry services
	814	Private households
Organizations & Associations	8131	Religious organizations
	8132	Grantmaking and giving services
	813311	Human rights organizations
	813319	Other social advocacy organizations
	8134	Civic and social organizations
	8139	Professional and similar organizations
Industrial & Commercial Equipment Manufacturing		
Industrial Machinery & Product Manufacturing	3327	Machine shops and threaded product manufacturing
	332911	Industrial valve manufacturing
	333293	Printing machinery and equipment manufacturing
	333298	All other industrial machinery manufacturing
	33392	Material handling equipment manufacturing
	333992	Welding and soldering equipment manufacturing
	333993	Packaging machinery manufacturing
	333994	Industrial process furnace and oven manufacturing
	333999	Miscellaneous general purpose machinery manufacturing
Commercial Machinery & Product Manufacturing	3322	Cutlery and handtool manufacturing
	333311	Automatic vending machine manufacturing
	333312	Commercial laundry and drycleaning machinery
	333313	Office machinery manufacturing
	333319	Other commercial and service machinery manufacturing
	3334	HVAC and commercial refrigeration equipment
	333991	Power-driven handtool manufacturing
	333997	Scale and balance, except laboratory, manufacturing
	3351	Electric lighting equipment manufacturing
	3352	Household appliance manufacturing
	335912	Primary battery manufacturing
	3399	Other miscellaneous manufacturing

Industrial Component Manufacturing	33242	Metal tank, heavy gauge, manufacturing
	33243	Metal can, box, and other container manufacturing
	3325	Hardware manufacturing
	3326	Spring and wire product manufacturing
	332913	Plumbing fixture fitting and trim manufacturing
	332919	Other metal valve and pipe fitting manufacturing
	332991	Ball and roller bearing manufacturing
	332996	Fabricated pipe and pipe fitting manufacturing
	332997	Industrial pattern manufacturing
	332998	Enameled iron and metal sanitary ware manufacturing
	332999	Miscellaneous fabricated metal product manufacturing
	33391	Pump and compressor manufacturing
	33593	Wiring device manufacturing
	33599	Other electrical equipment and component manufacturing
Information Technology Services		
Data Services, Programming, & Systems Design	5182	Data processing and related services
	5415	Computer systems design and related services
Internet Services	42511	Business to business electronic markets
	51913	Internet publishing and broadcasting and web search portals
Software Development	5112	Software publishers
Medicine & Life Sciences		
Pharmaceuticals	3254	Pharmaceutical and medicine manufacturing
	541711	Research and development in biotechnology
Medical Equipment	334510	Electromedical apparatus manufacturing
	3391	Medical equipment and supplies manufacturing
	42345	Medical equipment merchant wholesalers
	42346	Ophthalmic goods merchant wholesalers
Health & Medical Services	532291	Home health equipment rental
	621	Ambulatory health care services
	622	Hospitals
	623	Nursing and residential care facilities
Materials & Chemicals		
Chemicals	32511	Petrochemical manufacturing
	32512	Industrial gas manufacturing
	32513	Synthetic dye and pigment manufacturing
	32518	Other basic inorganic chemical manufacturing
	325191	Gum and wood chemical manufacturing
	325192	Cyclic crude and intermediate manufacturing
	325199	All other basic organic chemical manufacturing
	3253	Agricultural chemical manufacturing
	3255	Paint, coating, and adhesive manufacturing
	3256	Soap, cleaning compound, and toiletry manufacturing
	32591	Printing ink manufacturing
	32599	All other chemical preparation manufacturing

Metals	331	Primary metal manufacturing
	3321	Forging and stamping
	3323	Architectural and structural metals manufacturing
	3328	Coating, engraving, and heat treating metals
	3335	Metalworking machinery manufacturing
Plastics, Resin, & Rubber	3252	Resin, rubber, and artificial fibers manufacturing
	326	Plastics and rubber products manufacturing
	33322	Plastics and rubber industry machinery
Construction, Industrial, & Other Materials	32412	Asphalt paving and roofing materials manufacturing
	32419	Other petroleum and coal products manufacturing
	327	Nonmetallic mineral product manufacturing
Packaging Materials	322221	Coated and laminated packaging materials manufacturing
	322222	Coated and laminated paper manufacturing
	322223	Plastics, foil, and coated paper bag manufacturing
	322225	Flexible packaging foil manufacturing
	322226	Surface-coated paperboard manufacturing
Mining	2122	Metal ore mining
	2123	Nonmetallic mineral mining and quarrying
	21311	Support Activities for Mining
Media & Design Services		
Media & Broadcasting	512	Motion picture and sound recording industries
	515	Broadcasting, except Internet
	51911	News syndicates
	51919	All other information services
Advertising	5418	Advertising and related services
Publishing	5111	Newspaper, book, and directory publishers
Design Services	54141	Interior design services
	54143	Graphic design services
	54149	Other specialized design services
	54192	Photographic services
Paper		
Pulp & Paper	3221	Pulp, paper, and paperboard mills
Paper Products	32221	Paperboard container manufacturing
	322224	Uncoated paper and multiwall bag manufacturing
	32223	Stationery product manufacturing
	32229	Other converted paper product manufacturing
Paper-Related Equipment	333291	Paper industry machinery manufacturing
Research & Engineering Services		
Engineering, Testing, & Architecture	54131	Architectural services
	54132	Landscape architectural services
	54133	Engineering services
	54134	Drafting services
	54137	Other surveying and mapping services
	54138	Testing laboratories
	54142	Industrial design services

Consulting & Research	54161	Management consulting services
	54169	Other technical consulting services
	541712	Other physical and biological research
	54172	Social science and humanities research
	54191	Marketing research and public opinion polling
Retail Trade		
General Retail	441	Motor vehicle and parts dealers
	442	Furniture and home furnishings stores
	443	Electronics and appliance stores
	444	Building material and garden supply stores
	445	Food and beverage stores
	446	Health and personal care stores
	447	Gasoline stations
	448	Clothing and clothing accessories stores
	451	Sporting goods, hobby, book and music stores
	452	General merchandise stores
	453	Miscellaneous store retailers
	4542	Vending machine operators
	45439	Other direct selling establishments
Rentals & Leasing	532112	Passenger car leasing
	53221	Consumer electronics and appliances rental
	53222	Formal wear and costume rental
	53223	Video tape and disc rental
	532299	All other consumer goods rental
	5323	General rental centers
	53242	Office equipment rental and leasing
	53249	Other machinery rental and leasing
Textiles & Apparel		
Textiles	313	Textile mills
Textile Products	314	Textile product mills
Apparel	315	Apparel manufacturing
Leather Products & Footwear	316	Leather and allied product manufacturing
Textiles-Related Equipment	333292	Textile machinery manufacturing
Telecommunications		
Telecom. Equipment	3342	Communications equipment manufacturing
	33592	Communication and energy wire and cable manufacturing
	811213	Communication equipment repair
Telecom. Services	517	Telecommunications
Transportation & Distribution Services		
Water Transportation	483	Water transportation
	4883	Support activities for water transportation
Rail Transportation	482	Rail transportation
	4882	Support activities for rail transportation

Ground Freight Transportation	484	Truck transportation
	4884	Support activities for road transportation
	492	Couriers and messengers
Warehousing, Distribution, & Logistics	4885	Freight transportation arrangement
	4889	Other support activities for transportation
	493	Warehousing and storage
	532411	Transportation equipment rental and leasing
Ground Passenger Transit	485	Transit and ground passenger transportation
Tourism & Gaming		
Travel Arrangements	532111	Passenger car rental
	53212	Truck, trailer, and RV rental and leasing
	5615	Travel arrangement and reservation services
	56192	Convention and trade show organizers
Accommodations	72111	Hotels and motels, except casino hotels
	72119	Other Travel Accommodation
	7213	Rooming and Boarding Houses
Food & Beverage	722	Food services and drinking places
Arts & Culture	31213	Wineries
	7111	Performing arts companies
	7114	Agents and managers for public figures
	7115	Independent artists, writers, and performers
	71211	Museums
	71212	Historical sites
	71213	Zoos and botanical gardens
Sports & Recreation (except gaming)	487	Scenic and sightseeing transportation
	532292	Recreational goods rental
	711211	Sports teams and clubs
	711219	Other spectator sports
	7113	Promoters of performing arts and sports
	71219	Nature parks and other similar institutions
	7131	Amusement Parks and Arcades
	7139	Other Amusement and Recreation Industries
	7212	RV parks and recreational camps
Gaming	711212	Racetracks
	7132	Gambling Industries
	72112	Casino Hotels
Utilities & Waste Management		
Utilities & Waste Management	22131	Water supply and irrigation systems
	22132	Sewage treatment facilities
	5621	Waste collection
	5622	Waste treatment and disposal
	56299	All other waste management services

Wholesale Trade		
Durable Goods	4231	Motor vehicle and parts merchant wholesalers
	4232	Furniture and furnishing merchant wholesalers
	4233	Lumber and const. supply merchant wholesalers
	42341	Photographic equip. merchant wholesalers
	42342	Office equipment merchant wholesalers
	42343	Computer and software merchant wholesalers
	42344	Other commercial equip. merchant wholesalers
	42349	Other professional equip. merchant wholesalers
	4235	Metal and mineral merchant wholesalers
	4236	Electric goods merchant wholesalers
	4237	Hardware and plumbing merchant wholesalers
	4238	Machinery and supply merchant wholesalers
	42391	Sporting goods merchant wholesalers
	42392	Toy and hobby goods merchant wholesalers
	42394	Jewelry merchant wholesalers
	42399	All other durable goods merchant wholesalers
Nondurable Goods	4241	Paper and paper product merchant wholesalers
	4242	Druggists' goods merchant wholesalers
	4243	Apparel and piece goods merchant wholesalers
	4244	Grocery and related product wholesalers
	4245	Farm product raw material merchant wholesalers
	4246	Chemical merchant wholesalers
	4248	Alcoholic beverage merchant wholesalers
	4249	Misc. nondurable goods merchant wholesalers
Trade Agents & Brokers	42512	Wholesale trade agents and brokers
Wood & Furniture		
Logging & Forestry	113	Forestry and logging
Wood Products	3211	Sawmills and wood preservation
	3212	Plywood and engineered wood product manufacturing
	3219	Other wood product manufacturing
Furniture	3371	Household and institutional furniture manufacturing
	3372	Office furniture and fixtures manufacturing
	3379	Other furniture related product manufacturing
Wood-Related Equipment	33321	Sawmill and woodworking machinery

APPENDIX B: DETAILED INDUSTRY CLUSTER DATA TABLES

THE STATE OF NEVADA

The State of Nevada's Industry Clusters in Q2 2011								
	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Nevada	U.S.	Nevada	U.S.			
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	25,947	1.72%	-0.22%	0.72%	0.29%	0.907	287	$75,145
Energy & Environment	13,101	3.90%	4.60%	3.32%	2.26%	0.539	559	$69,196
Electronics	4,133	-0.32%	-3.22%	2.29%	-1.89%	0.472	273	$63,626
Financial Services	86,371	2.86%	2.04%	3.71%	2.16%	1.096	4,926	$58,023
IT Services	11,798	3.56%	2.03%	3.56%	2.49%	0.515	2,037	$69,955
Medicine & Life Sciences	89,148	2.64%	2.03%	2.35%	2.22%	0.634	5,853	$67,734
Media & Design Services	17,912	-2.11%	-1.30%	0.90%	0.74%	0.791	1,574	$44,394
Research & Engineering Services	26,491	-2.80%	1.31%	2.07%	2.70%	0.765	3,096	$71,645
Telecommunications	6,740	-2.87%	-3.14%	0.47%	-0.31%	0.655	323	$66,521
Service-Based Clusters								
Business Services	113,441	-1.22%	-0.96%	1.75%	1.24%	1.018	8,485	$53,975
Construction & Real Estate	186,019	-8.24%	-2.33%	2.11%	1.84%	1.141	12,445	$40,908
Education & Government	172,933	0.60%	0.54%	0.75%	1.16%	0.721	2,443	$65,422
Retail Trade	145,884	-1.99%	-1.44%	1.44%	0.28%	0.988	8,206	$31,980
General Services	75,097	2.38%	0.95%	1.79%	1.55%	0.812	5,136	$28,935
Transportation & Logistics Services	41,036	-0.63%	-1.01%	1.42%	0.94%	1.028	1,627	$41,661
Tourism & Gaming	351,808	-1.34%	0.37%	0.69%	1.53%	2.524	8,330	$34,554
Utilities & Waste Management	2,815	-1.92%	0.56%	1.61%	1.74%	0.936	125	$61,887
Wholesale Trade	34,325	-3.63%	-1.33%	1.97%	0.73%	0.721	4,952	$71,485

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011) Nevada	U.S.	*Predicted* (2011-2016) Nevada	U.S.	2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
Traditional & Manufacturing Clusters								
Agriculture & Agribusiness	13,593	0.31%	0.10%	1.03%	-0.29%	0.304	662	$39,045
Automotive & Transportation Mfg.	1,115	-6.40%	-6.77%	0.27%	-1.78%	0.137	53	$57,218
Industrial & Commercial Equipment Mfg.	11,109	-3.36%	-3.51%	2.34%	-1.24%	0.819	407	$83,072
Materials & Chemicals	23,914	-3.85%	-4.00%	1.65%	-0.89%	1.023	746	$79,794
Paper	589	1.94%	-3.50%	2.64%	-2.83%	0.238	11	$66,337
Textiles & Apparel	847	-7.27%	-7.06%	2.04%	-4.61%	0.231	71	$35,989
Wood & Furniture	2,583	-15.80%	-7.49%	2.21%	-1.07%	0.342	208	$45,580
Total Economy	**1,459,214**	**1.72%**	**0.28%**	**1.55%**	**1.24%**	**NA**	**73,080**	**$48,077**

Figures do not include industries or NAICS codes with <1 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

The State of Nevada's Industry Clusters and Sub-Clusters in Q 2011								
	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Nevada	U.S.	Nevada	U.S.			
Knowledge- & Technology-Based Clusters								
Aerospace	731	1.97%	0.22%	4.98%	0.23%	0.139	15	$78,072
Airport & Aviation Services	10,292	2.66%	-0.85%	1.15%	0.72%	1.820	266	$69,640
National Security & Defense	14,924	1.08%	-0.14%	0.19%	0.16%	0.844	6	$78,798
Aerospace & Defense	**25,947**	**1.72%**	**0.22%**	**0.72%**	**0.29%**	**0.907**	**287**	**$75,145**
Fuel Production, Distribution, & Other Supply Chain Activities	6,453	7.70%	6.84%	4.22%	2.95%	0.408	168	$50,013
Power Generation & Technology	2,834	-5.19%	1.09%	0.08%	-0.09%	0.697	61	$128,940
Recycling & Waste Remediation	1,774	8.87%	1.37%	4.18%	1.49%	0.967	100	$46,976
Environmental Research & Management	1,691	3.82%	2.84%	3.77%	2.85%	0.789	212	$56,071
Clean & Renewable Energy	349	27.40%	-6.65%	4.31%	-2.11%	0.794	18	$115,278
Energy & Environment	**13,101**	**3.90%**	**4.60%**	**3.32%**	**2.26%**	**0.539**	**559**	**$69,196**
IT Hardware	1,711	-1.31%	-3.39%	1.96%	-2.52%	0.328	127	$52,302
Measuring & Controlling Device Manufacturing	2,188	1.45%	-1.62%	2.69%	-0.58%	0.861	116	$75,793
Other Electronics	234	-6.92%	-5.95%	1.01%	-2.10%	0.236	30	$32,651
Electronics	**4,133**	**0.32%**	**3.22%**	**2.29%**	**1.89%**	**0.472**	**273**	**$63,626**
Financial Institutions	25,423	-3.51%	-1.65%	2.03%	1.10%	1.031	1,883	$67,035
Securities	46,210	9.77%	8.95%	5.21%	4.12%	1.509	1,280	$52,973
Insurance	14,738	-1.14%	-0.81%	1.58%	0.56%	0.626	1,763	$58,310
Financial Services	**86,371**	**2.86%**	**2.04%**	**3.71%**	**2.16%**	**1.096**	**4,926**	**$58,023**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Nevada	U.S.	Nevada	U.S.			
Data Services, Programming, & Systems Design	9,923	3.88%	2.05%	3.49%	2.61%	0.521	1,832	$67,138
Internet Services	891	2.46%	2.91%	5.16%	0.59%	0.690	138	$77,736
Software Development	984	1.51%	1.45%	2.79%	2.46%	0.383	67	$91,318
IT Services	**11,798**	**3.56%**	**2.03%**	**3.56%**	**2.49%**	**0.515**	**2,037**	**$69,955**
Pharmaceuticals	571	-5.21%	0.06%	1.00%	1.38%	0.152	28	$57,376
Medical Equipment	1,867	-0.82%	0.89%	2.28%	1.29%	0.364	180	$59,987
Health & Medical Services	86,710	2.79%	2.13%	2.36%	2.28%	0.658	5,645	$67,969
Medicine & Life Sciences	**89,148**	**2.64%**	**2.03%**	**2.35%**	**2.22%**	**0.634**	**5,853**	**$67,734**
Media & Broadcasting	5,830	-1.71%	-0.83%	0.75%	0.77%	0.833	345	$43,718
Advertising	5,067	-0.77%	-0.87%	0.91%	0.84%	0.955	598	$55,990
Publishing	2,717	-6.01%	-4.56%	-1.32%	-1.23%	0.530	188	$47,909
Design Services	4,298	-1.37%	1.38%	2.40%	2.40%	0.822	443	$29,420
Media & Design Services	**17,912**	**2.11%**	**1.30%**	**0.90%**	**0.74%**	**0.791**	**1,574**	**$44,394**
Engineering, Testing, & Architecture	11,650	-5.20%	-1.27%	0.56%	1.37%	0.872	1,123	$76,548
Consulting & Research	14,841	-0.63%	3.16%	3.20%	3.51%	0.698	1,973	$67,796
Research & Engineering Services	**26,491**	**2.80%**	**1.31%**	**2.07%**	**2.70%**	**0.765**	**3,096**	**$71,645**
Telecommunications Equipment	413	5.30%	-2.62%	2.79%	-0.89%	0.295	44	$58,444
Telecommunications Services	6,327	-3.29%	-3.22%	0.31%	-0.22%	0.711	279	$67,048
Telecommunications	**6,740**	**2.87%**	**3.14%**	**0.47%**	**0.31%**	**0.655**	**323**	**$66,521**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Nevada	U.S.	Nevada	U.S.			
Service-Based Clusters								
Legal & Accounting Services	20,316	0.35%	-0.01%	2.17%	1.41%	0.903	3,001	$64,268
Management of Companies & Enterprises	20,209	4.51%	0.79%	1.34%	0.81%	1.205	1,858	$111,246
Business Process Outsourcing & Employment Services	27,581	-7.94%	-3.16%	1.29%	1.33%	0.749	1,389	$29,295
Printing Services	3,313	-3.43%	-4.76%	0.45%	-2.02%	0.725	194	$47,787
Other Business Support & Security Services	29,804	1.47%	0.96%	2.11%	1.78%	1.253	1,612	$38,577
Call Centers & Electronic Sales	12,218	1.93%	1.32%	2.20%	1.39%	1.758	431	$37,086
Business Services	**113,441**	**1.22%**	**0.96%**	**1.75%**	**1.24%**	**1.018**	**8,485**	**$53,975**
Construction Services	77,354	-14.12%	-4.88%	0.85%	1.04%	1.017	6,910	$66,599
Real Estate & Building Services	108,665	-2.02%	0.30%	2.97%	2.54%	1.256	5,535	$22,620
Construction-Related Equipment	0	-100.00%	-3.39%	NA	-0.31%	0.000	0	NA
Construction & Real Estate	**186,019**	**8.24%**	**2.33%**	**2.11%**	**1.84%**	**1.141**	**12,445**	**$40,908**
Education	22,965	2.87%	1.54%	3.07%	2.05%	0.462	1,136	$27,284
Government	149,968	0.28%	0.29%	0.37%	0.93%	0.789	1,307	$71,262
Education & Government	**172,933**	**0.60%**	**0.54%**	**0.75%**	**1.16%**	**0.721**	**2,443**	**$65,422**
General Retail	142,391	-1.88%	-1.37%	1.43%	0.28%	0.984	7,841	$31,403
Rentals & Leasing	3,493	-5.99%	-4.38%	1.71%	0.29%	1.180	365	$55,503
Retail Trade	**145,884**	**1.99%**	**1.44%**	**1.44%**	**0.28%**	**0.988**	**8,206**	**$31,980**
Social Assistance	14,532	6.46%	3.42%	2.70%	3.05%	0.837	833	$23,300
Repair & Maintenance	14,354	-2.93%	-2.68%	0.52%	0.19%	0.920	1,575	$41,444
Personal Services	34,369	3.53%	2.18%	2.10%	2.02%	1.044	1,974	$25,170
Organizations & Associations	11,842	2.26%	0.36%	1.24%	0.73%	0.446	754	$31,612
General Services	**75,097**	**2.38%**	**0.95%**	**1.79%**	**1.55%**	**0.812**	**5,136**	**$28,935**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Nevada	U.S.	Nevada	U.S.			
Water Transportation	80	9.86%	0.23%	0.25%	0.60%	0.076	4	$75,645
Rail Transportation	733	-4.75%	-1.66%	-0.41%	0.20%	0.358	0	$91,048
Ground Freight Transportation	15,963	-2.97%	-2.27%	1.27%	0.47%	0.699	974	$46,542
Logistics & Warehousing	10,330	2.49%	1.05%	2.13%	2.20%	1.230	486	$42,486
Ground Passenger Transit	13,930	0.38%	1.73%	1.17%	1.22%	2.503	163	$32,662
Transportation & Logistics Services	**41,036**	**0.63%**	**1.01%**	**1.42%**	**0.94%**	**1.028**	**1,627**	**$41,661**
Travel Arrangements	11,357	-3.39%	-2.41%	-0.64%	0.85%	2.539	660	$45,466
Accommodations	15,963	3.73%	-0.63%	2.75%	0.86%	1.186	472	$39,879
Food & Beverage	100,553	0.97%	0.39%	1.54%	1.42%	1.172	5,303	$22,690
Arts & Culture	17,893	1.37%	0.79%	2.37%	1.89%	1.383	602	$30,264
Sports & Recreation (except gaming)	18,875	0.40%	1.77%	1.87%	2.41%	1.012	698	$27,171
Gaming	187,167	-3.05%	-0.94%	-0.18%	1.65%	45.468	595	$40,967
Tourism & Gaming	**351,808**	**1.34%**	**0.37%**	**0.69%**	**1.53%**	**2.524**	**8,330**	**$34,554**
Utilities & Waste Management	2,815	-1.92%	0.56%	1.61%	1.74%	0.936	125	$61,887
Utilities & Waste Management	**2,815**	**1.92%**	**0.56%**	**1.61%**	**1.74%**	**0.936**	**125**	**$61,887**
Durable Goods	16,821	-5.25%	-2.48%	1.23%	0.17%	0.734	1,441	$66,514
Nondurable Goods	11,489	-2.80%	-0.89%	1.55%	0.67%	0.654	651	$62,614
Trade Agents & Brokers	6,015	-0.04%	1.65%	4.68%	2.57%	0.843	2,860	$102,328
Wholesale Trade	**34,325**	**3.63%**	**1.33%**	**1.97%**	**0.73%**	**0.721**	**4,952**	**$71,485**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Nevada	U.S.	Nevada	U.S.			
Traditional & Manufacturing Clusters								
Primary Agriculture	4,961	-0.80%	0.01%	-0.07%	-1.08%	0.217	234	$31,109
Food Processing	4,792	0.61%	-0.45%	1.32%	-0.10%	0.357	178	$48,917
Agriculture Support	3,823	1.59%	1.68%	2.06%	1.71%	0.503	248	$36,969
Agriculture-Related Equipment	17	-8.84%	-0.89%	-5.22%	-0.70%	0.026	2	$38,668
Tobacco & Cigarettes	0	-100.00%	-8.34%	NA	-2.98%	0.000	0	NA
Agriculture & Agribusiness	**13,593**	**0.31%**	**0.10%**	**1.03%**	**0.29%**	**0.304**	**662**	**$39,045**
Transportation Equipment	496	-0.63%	-6.75%	2.96%	-1.21%	0.129	18	$46,754
Engine & Automotive Parts	619	-9.86%	-6.79%	-2.12%	-2.31%	0.145	35	$65,602
Automotive & Transportation Mfg.	**1,115**	**6.40%**	**6.77%**	**0.27%**	**1.78%**	**0.137**	**53**	**$57,218**
Industrial Machinery & Product Mfg.	1,881	0.02%	-2.55%	1.70%	-1.05%	0.406	116	$53,167
Commercial Machinery & Product Mfg.	8,107	-4.11%	-4.13%	2.55%	-1.05%	1.451	238	$91,426
Industrial Component Manufacturing	1,121	-2.89%	-3.75%	1.94%	-1.82%	0.335	53	$72,837
Industrial & Commercial Equipment Mfg.	**11,109**	**3.36%**	**3.51%**	**2.34%**	**1.24%**	**0.819**	**407**	**$83,072**
Chemicals	872	-0.30%	-2.36%	2.40%	-0.76%	0.284	35	$90,060
Metals	3,440	-7.58%	-3.97%	0.60%	-0.80%	0.384	197	$60,647
Plastics, Resin, & Rubber	2,997	-7.30%	-4.42%	2.23%	-1.33%	0.490	87	$48,380
Construction, Industrial, & Other Materials	2,805	-14.80%	-6.10%	0.58%	-0.84%	0.811	174	$62,846
Packaging Materials	122	1.01%	-1.98%	-1.35%	-1.01%	0.277	5	$51,303
Mining	13,678	2.04%	-0.33%	1.96%	0.01%	10.205	248	$94,568
Materials & Chemicals	**23,914**	**3.85%**	**4.00%**	**1.65%**	**0.89%**	**1.023**	**746**	**$79,794**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Nevada	U.S.	Nevada	U.S.			
Paper	0	NA	-4.64%	NA	-5.19%	0.000	0	#DIV/0!
Paper Products	589	1.94%	-3.00%	2.64%	-1.84%	0.331	11	$66,337
Paper-Related Equipment	0	NA	-5.25%	NA	-8.79%	0.000	0	#DIV/0!
Paper	**589**	**1.94%**	**3.50%**	**2.64%**	**2.83%**	**0.238**	**11**	**$66,337**
Textiles	177	-0.88%	-8.98%	1.75%	-5.14%	0.193	3	$45,588
Textile Products	441	-6.53%	-7.06%	0.98%	-3.31%	0.430	58	$39,851
Apparel	168	-12.42%	-6.39%	3.55%	-5.94%	0.123	6	$19,841
Leather Products & Footwear	61	-7.89%	-3.06%	5.84%	-1.43%	0.194	4	$24,683
Textiles-Related Equipment	0	-100.00%	-9.61%	NA	-10.80%	0.000	0	NA
Textiles & Apparel	**847**	**7.27%**	**7.06%**	**2.04%**	**4.61%**	**0.231**	**71**	**$35,989**
Logging & Forestry	229	7.98%	-1.45%	9.47%	0.41%	0.206	0	$16,797
Wood Products	956	-16.37%	-8.91%	0.29%	-1.77%	0.316	54	$43,955
Furniture	1,398	-17.28%	-7.74%	2.11%	-0.88%	0.413	154	$51,406
Wood-Related Equipment	0	NA	-12.15%	NA	-9.35%	0.000	0	NA
Wood & Furniture	**2,583**	**15.80%**	**7.49%**	**2.21%**	**1.07%**	**0.342**	**208**	**$45,580**
Total Economy	**1,459,214**	**1.72%**	**0.28%**	**1.55%**	**1.24%**	**NA**	**73,080**	**$48,077**

Figures do not include industries or NAICS codes with <10 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

RENO/CARSON CITY

Reno/Carson City Industry Clusters i Q 2011								
	2011* Total Employment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establishments	2011 Average Annual Pay
		Reno/ Carson City	U.S.	Reno/ Carson City	U.S.			
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	2,832	-1.80%	-0.22%	1.24%	0.29%	0.435	74	$53,781
Energy & Environment	4,068	3.12%	4.60%	3.83%	2.26%	0.736	188	$63,063
Electronics	2,690	-0.39%	-3.22%	1.91%	-1.89%	1.350	102	$74,483
Financial Services	22,402	4.67%	2.04%	3.78%	2.16%	1.249	1,130	$70,126
IT Services	2,941	2.89%	2.03%	2.89%	2.49%	0.564	544	$70,927
Medicine & Life Sciences	24,174	1.52%	2.03%	2.00%	2.22%	0.756	1,394	$67,303
Media & Design Services	4,072	-2.00%	-1.30%	0.67%	0.74%	0.790	337	$42,793
Research & Engineering Services	7,230	-1.14%	1.31%	2.00%	2.70%	0.918	914	$61,127
Telecommunications	1,668	-2.03%	-3.14%	0.95%	-0.31%	0.712	95	$61,625
Service-Based Clusters								
Business Services	27,600	-1.96%	-0.96%	1.42%	1.24%	1.089	2,183	$52,546
Construction & Real Estate	41,946	-8.02%	-2.33%	2.15%	1.84%	1.130	3,534	$34,654
Education & Government	47,975	0.18%	0.54%	0.60%	1.16%	0.879	823	$64,993
Retail Trade	31,921	-3.14%	-1.44%	0.85%	0.28%	0.950	1,890	$31,590
General Services	18,674	1.71%	0.95%	1.42%	1.55%	0.888	1,529	$27,112
Transportation & Logistics Services	12,872	0.43%	-1.01%	1.38%	0.94%	1.417	597	$47,861
Tourism & Gaming	51,127	-3.03%	0.37%	0.50%	1.53%	1.612	1,857	$26,427
Utilities & Waste Management	654	-2.15%	0.56%	1.60%	1.74%	0.956	52	$52,698
Wholesale Trade	10,130	-4.70%	-1.33%	1.29%	0.73%	0.935	1,226	$68,178

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011) Reno/ Carson City	(2006-2011) U.S.	*Predicted* (2011-2016) Reno/ Carson City	*Predicted* (2011-2016) U.S.	2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
Traditional & Manufacturing Clusters								
Agriculture & Agribusiness	4,303	1.13%	0.10%	1.26%	-0.29%	0.423	185	$42,606
Automotive & Transportation Mfg.	626	-10.27%	-6.77%	-1.38%	-1.78%	0.339	26	$62,246
Industrial & Commercial Equipment Mfg.	4,905	-4.85%	-3.51%	0.98%	-1.24%	1.588	164	$78,429
Materials & Chemicals	4,986	-7.05%	-4.00%	0.83%	-0.89%	0.937	233	$65,141
Paper	272	1.78%	-3.50%	4.25%	-2.83%	0.482	5	$50,674
Textiles & Apparel	217	-7.93%	-7.06%	1.26%	-4.61%	0.261	15	$40,471
Wood & Furniture	1,108	-10.58%	-7.49%	4.14%	-1.07%	0.645	79	$45,195
Total Economy	**332,029**	**2.14%**	**0.28%**	**1.45%**	**1.24%**	**NA**	**19,434**	**$48,204**

Figures do not include industries or NAICS codes with <1 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

Reno/Carson City Industry Clusters an Sub-Clusters in Q 2011								
	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011) Reno/ Carson City	U.S.	*Predicted* (2011-2016) Reno/ Carson City	U.S.	2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
Knowledge- & Technology-Based Clusters								
Aerospace	579	-1.52%	0.22%	4.89%	0.23%	0.484	7	$74,148
Airport & Aviation Services	911	-6.22%	-0.85%	-0.07%	0.72%	0.708	66	$50,865
National Security & Defense	1,342	1.92%	-0.14%	0.40%	0.16%	0.333	1	$46,973
Aerospace & Defense	**2,832**	**1.80%**	**0.22%**	**1.24%**	**0.29%**	**0.435**	**74**	**$53,781**
Fuel Production, Distribution, & Other Supply Chain Activities	2,246	9.21%	6.84%	4.71%	2.95%	0.624	57	$50,304
Power Generation & Technology	517	-13.38%	1.09%	-0.43%	-0.09%	0.559	5	$133,035
Recycling & Waste Remediation	378	9.79%	1.37%	3.78%	1.49%	0.906	31	$51,934
Environmental Research & Management	794	2.52%	2.84%	3.37%	2.85%	1.628	93	$50,090
Clean & Renewable Energy	133	24.20%	-6.65%	6.59%	-2.11%	1.330	2	$115,617
Energy & Environment	**4,068**	**3.12%**	**4.60%**	**3.83%**	**2.26%**	**0.736**	**188**	**$63,063**
IT Hardware	877	-2.73%	-3.39%	0.70%	-2.52%	0.738	40	$63,526
Measuring & Controlling Device Manufacturing	1,749	1.38%	-1.62%	2.47%	-0.58%	3.025	54	$81,101
Other Electronics	64	-9.08%	-5.95%	2.67%	-2.10%	0.284	8	$43,770
Electronics	**2,690**	**0.39%**	**3.22%**	**1.91%**	**1.89%**	**1.350**	**102**	**$74,483**
Financial Institutions	4,641	-2.56%	-1.65%	1.31%	1.10%	0.827	420	$69,498
Securities	14,394	10.22%	8.95%	5.09%	4.12%	2.066	282	$72,369
Insurance	3,367	-1.87%	-0.81%	1.17%	0.56%	0.629	428	$61,406
Financial Services	**22,402**	**4.67%**	**2.04%**	**3.78%**	**2.16%**	**1.249**	**1,130**	**$70,126**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011) Reno/ Carson City	(2006-2011) U.S.	*Predicted* (2011-2016) Reno/ Carson City	*Predicted* (2011-2016) U.S.	2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
Data Services, Programming, & Systems Design	2,489	2.34%	2.05%	2.93%	2.61%	0.574	490	$67,278
Internet Services	132	9.46%	2.91%	3.00%	0.59%	0.449	26	$90,316
Software Development	320	5.06%	1.45%	2.50%	2.46%	0.547	28	$91,309
IT Services	**2,941**	**2.89%**	**2.03%**	**2.89%**	**2.49%**	**0.564**	**544**	**$70,927**
Pharmaceuticals	150	4.74%	0.06%	0.92%	1.38%	0.176	11	$54,492
Medical Equipment	979	-2.48%	0.89%	2.17%	1.29%	0.840	47	$54,181
Health & Medical Services	23,045	1.70%	2.13%	2.00%	2.28%	0.769	1,336	$67,944
Medicine & Life Sciences	**24,174**	**1.52%**	**2.03%**	**2.00%**	**2.22%**	**0.756**	**1,394**	**$67,303**
Media & Broadcasting	1,232	-0.59%	-0.83%	0.88%	0.77%	0.774	53	$45,601
Advertising	1,078	0.00%	-0.87%	1.23%	0.84%	0.893	142	$53,507
Publishing	780	-6.98%	-4.56%	-1.37%	-1.23%	0.669	51	$43,134
Design Services	982	-1.10%	1.38%	1.33%	2.40%	0.825	91	$27,239
Media & Design Services	**4,072**	**2.00%**	**1.30%**	**0.67%**	**0.74%**	**0.790**	**337**	**$42,793**
Engineering, Testing, & Architecture	3,282	-4.17%	-1.27%	0.12%	1.37%	1.080	374	$63,079
Consulting & Research	3,948	1.89%	3.16%	3.46%	3.51%	0.816	540	$59,505
Research & Engineering Services	**7,230**	**1.14%**	**1.31%**	**2.00%**	**2.70%**	**0.918**	**914**	**$61,127**
Telecommunications Equipment	204	-1.23%	-2.62%	3.22%	-0.89%	0.640	23	$59,896
Telecommunications Services	1,464	-2.14%	-3.22%	0.62%	-0.22%	0.723	72	$61,866
Telecommunications	**1,668**	**2.03%**	**3.14%**	**0.95%**	**0.31%**	**0.712**	**95**	**$61,625**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011) Reno/ Carson City	(2006-2011) U.S.	*Predicted* (2011-2016) Reno/ Carson City	*Predicted* (2011-2016) U.S.	2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
Service-Based Clusters								
Legal & Accounting Services	5,158	-0.25%	-0.01%	1.99%	1.41%	1.007	791	$61,384
Management of Companies & Enterprises	4,287	4.85%	0.79%	1.11%	0.81%	1.123	488	$107,660
Business Process Outsourcing & Employment Services	7,779	-7.52%	-3.16%	1.30%	1.33%	0.928	356	$32,302
Printing Services	1,169	-5.70%	-4.76%	-0.98%	-2.02%	1.124	66	$50,465
Other Business Support & Security Services	5,767	0.42%	0.96%	1.73%	1.78%	1.065	363	$41,101
Call Centers & Electronic Sales	3,440	1.73%	1.32%	1.49%	1.39%	2.176	119	$36,281
Business Services	**27,600**	**1.96%**	**0.96%**	**1.42%**	**1.24%**	**1.089**	**2,183**	**$52,546**
Construction Services	15,693	-15.05%	-4.88%	1.13%	1.04%	0.907	2,110	$56,479
Real Estate & Building Services	26,253	-1.45%	0.30%	2.73%	2.54%	1.334	1,424	$21,609
Construction-Related Equipment	0	NA	-3.39%	NA	-0.31%	0.000	0	0
Construction & Real Estate	**41,946**	**8.02%**	**2.33%**	**2.15%**	**1.84%**	**1.130**	**3,534**	**$34,654**
Education	5,649	2.84%	1.54%	2.65%	2.05%	0.499	323	$22,886
Government	42,326	-0.15%	0.29%	0.31%	0.93%	0.979	500	$70,612
Education & Government	**47,975**	**0.18%**	**0.54%**	**0.60%**	**1.16%**	**0.879**	**823**	**$64,993**
General Retail	31,285	-2.99%	-1.37%	0.87%	0.28%	0.950	1,837	$31,273
Rentals & Leasing	636	-9.33%	-4.38%	0.00%	0.29%	0.945	53	$47,203
Retail Trade	**31,921**	**3.14%**	**1.44%**	**0.85%**	**0.28%**	**0.950**	**1,890**	**$31,590**
Social Assistance	4,204	6.58%	3.42%	2.73%	3.05%	1.065	287	$24,065
Repair & Maintenance	3,436	-4.01%	-2.68%	-0.21%	0.19%	0.968	469	$43,758
Personal Services	8,017	2.83%	2.18%	1.84%	2.02%	1.070	526	$20,604
Organizations & Associations	3,017	0.74%	0.36%	0.21%	0.73%	0.499	247	$29,691
General Services	**18,674**	**1.71%**	**0.95%**	**1.42%**	**1.55%**	**0.888**	**1,529**	**$27,112**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011) Reno/ Carson City	(2006-2011) U.S.	*Predicted* (2011-2016) Reno/ Carson City	*Predicted* (2011-2016) U.S.	2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
Water Transportation	22	11.10%	0.23%	-3.93%	0.60%	0.092	0	$70,163
Rail Transportation	259	-4.26%	-1.66%	0.53%	0.20%	0.556	0	$90,996
Ground Freight Transportation	6,237	-0.79%	-2.27%	1.22%	0.47%	1.200	341	$47,614
Logistics & Warehousing	5,514	2.86%	1.05%	1.66%	2.20%	2.885	228	$46,851
Ground Passenger Transit	840	-3.13%	1.73%	1.09%	1.22%	0.663	28	$42,443
Transportation & Logistics Services	**12,872**	**0.43%**	**1.01%**	**1.38%**	**0.94%**	**1.417**	**597**	**$47,861**
Travel Arrangements	998	-1.38%	-2.41%	1.04%	0.85%	0.981	90	$39,990
Accommodations	1,940	-0.70%	-0.63%	4.86%	0.86%	0.634	134	$34,128
Food & Beverage	17,597	-0.13%	0.39%	1.66%	1.42%	0.902	1,204	$18,256
Arts & Culture	2,720	0.80%	0.79%	1.65%	1.89%	0.924	90	$23,826
Sports & Recreation (except gaming)	4,901	0.07%	1.77%	1.74%	2.41%	1.154	193	$21,834
Gaming	22,971	-6.02%	-0.94%	-1.30%	1.65%	24.524	146	$32,735
Tourism & Gaming	**51,127**	**3.03%**	**0.37%**	**0.50%**	**1.53%**	**1.612**	**1,857**	**$26,427**
Utilities & Waste Management	654	-2.15%	0.56%	1.60%	1.74%	0.956	52	$52,698
Utilities & Waste Management	**654**	**2.15%**	**0.56%**	**1.60%**	**1.74%**	**0.956**	**52**	**$52,698**
Durable Goods	5,643	-5.39%	-2.48%	0.63%	0.17%	1.082	401	$66,648
Nondurable Goods	3,253	-4.53%	-0.89%	1.13%	0.67%	0.814	171	$55,994
Trade Agents & Brokers	1,234	-1.71%	1.65%	4.50%	2.57%	0.760	654	$107,293
Wholesale Trade	**10,130**	**4.70%**	**1.33%**	**1.29%**	**0.73%**	**0.935**	**1,226**	**$68,178**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011) Reno/ Carson City	(2006-2011) U.S.	*Predicted* (2011-2016) Reno/ Carson City	*Predicted* (2011-2016) U.S.	2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
Traditional & Manufacturing Clusters								
Primary Agriculture	1,493	-0.66%	0.01%	-0.19%	-1.08%	0.287	68	$37,221
Food Processing	1,740	3.42%	-0.45%	2.07%	-0.10%	0.569	41	$51,087
Agriculture Support	1,070	0.73%	1.68%	1.89%	1.71%	0.619	76	$36,326
Agriculture-Related Equipment	0	-100.00%	-0.89%	NA	-0.70%	0.000	0	0
Tobacco & Cigarettes	0	NA	-8.34%	NA	-2.98%	0.000	0	0
Agriculture & Agribusiness	**4,303**	**1.13%**	**0.10%**	**1.26%**	**0.29%**	**0.423**	**185**	**$42,606**
Transportation Equipment	123	-11.46%	-6.75%	3.20%	-1.21%	0.141	4	$43,705
Engine & Automotive Parts	503	-9.96%	-6.79%	-2.64%	-2.31%	0.518	22	$66,780
Automotive & Transportation Mfg.	**626**	**10.27%**	**6.77%**	**1.38%**	**1.78%**	**0.339**	**26**	**$62,246**
Industrial Machinery & Product Mfg.	1,134	-1.11%	-2.55%	1.51%	-1.05%	1.075	67	$55,254
Commercial Machinery & Product Mfg.	3,088	-5.94%	-4.13%	1.00%	-1.05%	2.429	72	$90,361
Industrial Component Manufacturing	683	-5.28%	-3.75%	-0.06%	-1.82%	0.896	25	$62,958
Industrial & Commercial Equipment Mfg.	**4,905**	**4.85%**	**3.51%**	**0.98%**	**1.24%**	**1.588**	**164**	**$78,429**
Chemicals	350	0.70%	-2.36%	4.44%	-0.76%	0.501	20	$82,696
Metals	1,628	-8.94%	-3.97%	0.52%	-0.80%	0.799	66	$59,960
Plastics, Resin, & Rubber	1,098	-10.04%	-4.42%	-0.50%	-1.33%	0.789	39	$51,191
Construction, Industrial, & Other Materials	697	-11.17%	-6.10%	0.74%	-0.84%	0.885	37	$69,568
Packaging Materials	62	4.40%	-1.98%	-0.99%	-1.01%	0.618	2	$49,234
Mining	1,151	1.38%	-0.33%	1.45%	0.01%	3.774	69	$78,615
Materials & Chemicals	**4,986**	**7.05%**	**4.00%**	**0.83%**	**0.89%**	**0.937**	**233**	**$65,141**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011) Reno/ Carson City	(2006-2011) U.S.	*Predicted* (2011-2016) Reno/ Carson City	*Predicted* (2011-2016) U.S.	2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
Paper	NA	NA	-4.64%	NA	-5.19%	NA	NA	NA
Paper Products	272	1.78%	-3.00%	4.25%	-1.84%	0.672	5	$50,674
Paper-Related Equipment	NA	NA	-5.25%	NA	-8.79%	NA	NA	NA
Paper	**272**	**1.78%**	**3.50%**	**4.25%**	**2.83%**	**0.482**	**5**	**$50,674**
Textiles	0	-100.00%	-8.98%	NA	-5.14%	0.000	0	0
Textile Products	181	-6.03%	-7.06%	0.87%	-3.31%	0.776	15	$45,063
Apparel	24	-17.55%	-6.39%	3.13%	-5.94%	0.077	0	$11,062
Leather Products & Footwear	12	NA	-3.06%	3.13%	-1.43%	0.168	0	$30,033
Textiles-Related Equipment	0	NA	-9.61%	NA	-10.80%	0.000	0	0
Textiles & Apparel	**217**	**7.93%**	**7.06%**	**1.26%**	**4.61%**	**0.261**	**15**	**$40,471**
Logging & Forestry	81	8.05%	-1.45%	9.41%	0.41%	0.320	0	$14,047
Wood Products	531	-10.47%	-8.91%	2.41%	-1.77%	0.772	27	$47,730
Furniture	496	-12.37%	-7.74%	4.97%	-0.88%	0.645	52	$47,568
Wood-Related Equipment	0	NA	-12.15%	NA	-9.35%	0.000	0	0
Wood & Furniture	**1,108**	**10.58%**	**7.49%**	**4.14%**	**1.07%**	**0.645**	**79**	**$45,195**
Total Economy	**332,029**	**2.14%**	**0.28%**	**1.45%**	**1.24%**	**NA**	**19,434**	**$48,204**

Figures do not include industries or NAICS codes with <10 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

LAS VEGAS

La Vegas Industry Clusters in Q 2011								
	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Knowledge- & Technology-Based Clusters								
Aerospace & Defense	21,014	2.06%	-0.22%	0.60%	0.29%	1.038	188	$76,984
Energy & Environment	5,809	0.75%	4.60%	2.04%	2.26%	0.338	231	$84,320
Electronics	1,285	-0.26%	-3.22%	3.06%	-1.89%	0.207	156	$45,122
Financial Services	60,819	2.06%	2.04%	3.65%	2.16%	1.090	3,626	$54,786
IT Services	8,471	3.85%	2.03%	3.75%	2.49%	0.523	1,450	$70,823
Medicine & Life Sciences	61,057	2.93%	2.03%	2.48%	2.22%	0.614	4,199	$69,002
Media & Design Serv.	13,093	-2.31%	-1.30%	0.95%	0.74%	0.816	1,179	$46,166
Research & Engineering Services	17,126	-3.14%	1.31%	2.01%	2.70%	0.699	2,070	$74,675
Telecommunications	4,835	-3.10%	-3.14%	0.26%	-0.31%	0.663	194	$68,792
Service-Based Clusters								
Business Services	81,034	-1.10%	-0.96%	1.82%	1.24%	1.028	5,989	$54,673
Construction & Real Estate	134,323	-8.60%	-2.33%	2.01%	1.84%	1.164	8,183	$43,573
Education & Government	110,252	0.87%	0.54%	0.84%	1.16%	0.650	1,157	$66,848
Retail Trade	104,850	-1.58%	-1.44%	1.62%	0.28%	1.003	5,767	$32,524
General Services	51,125	2.65%	0.95%	1.92%	1.55%	0.781	3,287	$29,844
Transportation & Logistics Services	25,995	-1.21%	-1.01%	1.41%	0.94%	0.920	906	$38,370
Tourism & Gaming	287,233	-1.08%	0.37%	0.71%	1.53%	2.911	5,918	$36,523
Utilities & Waste Management	1,826	-2.56%	0.56%	1.26%	1.74%	0.858	40	$67,916
Wholesale Trade	22,690	-3.31%	-1.33%	2.21%	0.73%	0.673	3,506	$73,522

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Traditional & Manufacturing Clusters								
Agriculture & Agribusiness	5,069	-0.08%	0.10%	1.53%	-0.29%	0.160	265	$44,471
Automotive & Transportation Mfg.	316	-5.44%	-6.77%	3.59%	-1.78%	0.055	8	$53,415
Industrial & Commercial Equipment Mfg.	5,846	-2.18%	-3.51%	3.24%	-1.24%	0.609	189	$89,547
Materials & Chemicals	6,067	-9.76%	-4.00%	1.36%	-0.89%	0.367	293	$59,770
Paper	317	2.81%	-3.50%	0.56%	-2.83%	0.181	6	$79,779
Textiles & Apparel	532	-7.72%	-7.06%	2.06%	-4.61%	0.205	44	$36,899
Wood & Furniture	1,279	-19.73%	-7.49%	0.00%	-1.07%	0.239	106	$48,179
Total Economy	**1,032,847**	**1.76%**	**0.28%**	**1.55%**	**1.24%**	**NA**	**49,208**	**$48,085**

Figures do not include industries or NAICS codes with <1 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

La Vegas Industry Clusters an Sub-Clusters in Q 2011								
	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Knowledge- & Technology-Based Clusters								
Aerospace	109	NA	0.22%	6.88%	0.23%	0.029	3	$102,960
Airport & Aviation Services	8,616	3.33%	-0.85%	1.13%	0.72%	2.152	185	$71,167
National Security & Defense	12,289	1.06%	-0.14%	0.16%	0.16%	0.982	0	$80,831
Aerospace & Defense	**21,014**	**2.06%**	**0.22%**	**0.60%**	**0.29%**	**1.038**	**188**	**$76,984**
Fuel Production, Distribution, & Other Supply Chain Activities	1,849	-0.66%	6.84%	1.29%	2.95%	0.165	49	$74,604
Power Generation & Technology	1,874	-3.63%	1.09%	0.09%	-0.09%	0.651	26	$128,860
Recycling & Waste Remediation	1,199	7.50%	1.37%	4.46%	1.49%	0.924	55	$40,412
Environmental Research & Management	775	5.39%	2.84%	4.13%	2.85%	0.511	99	$66,658
Clean & Renewable Energy	112	#DIV/0!	-6.65%	3.50%	-2.11%	0.360	2	$91,735
Energy & Environment	**5,809**	**0.75%**	**4.60%**	**2.04%**	**2.26%**	**0.338**	**231**	**$84,320**
IT Hardware	761	-0.03%	-3.39%	2.97%	-2.52%	0.206	84	$42,105
Measuring & Controlling Device Manufacturing	393	2.94%	-1.62%	3.64%	-0.58%	0.219	50	$56,855
Other Electronics	131	-8.11%	-5.95%	1.77%	-2.10%	0.187	22	$27,445
Electronics	**1,285**	**0.26%**	**3.22%**	**3.06%**	**1.89%**	**0.207**	**156**	**$45,122**
Financial Institutions	19,792	-3.96%	-1.65%	2.15%	1.10%	1.134	1,370	$67,373
Securities	30,263	9.32%	8.95%	5.25%	4.12%	1.396	985	$45,062
Insurance	10,764	-0.98%	-0.81%	1.63%	0.56%	0.646	1,271	$58,979
Financial Services	**60,819**	**2.06%**	**2.04%**	**3.65%**	**2.16%**	**1.090**	**3,626**	**$54,786**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Data Services, Programming, & Systems Design	7,093	4.57%	2.05%	3.64%	2.61%	0.526	1,301	$68,167
Internet Services	741	1.20%	2.91%	5.51%	0.59%	0.811	111	$76,650
Software Development	637	-0.09%	1.45%	2.85%	2.46%	0.350	38	$93,619
IT Services	**8,471**	**3.85%**	**2.03%**	**3.75%**	**2.49%**	**0.523**	**1,450**	**$70,823**
Pharmaceuticals	407	-8.04%	0.06%	0.96%	1.38%	0.153	16	$55,956
Medical Equipment	856	0.84%	0.89%	2.55%	1.29%	0.236	117	$66,754
Health & Medical Services	59,794	3.07%	2.13%	2.49%	2.28%	0.641	4,066	$69,123
Medicine & Life Sciences	**61,057**	**2.93%**	**2.03%**	**2.48%**	**2.22%**	**0.614**	**4,199**	**$69,002**
Media & Broadcasting	4,393	-2.04%	-0.83%	0.74%	0.77%	0.887	261	$43,896
Advertising	3,926	-0.94%	-0.87%	0.77%	0.84%	1.046	453	$57,274
Publishing	1,710	-5.97%	-4.56%	-1.27%	-1.23%	0.472	123	$52,649
Design Services	3,064	-2.11%	1.38%	2.60%	2.40%	0.828	342	$31,571
Media & Design Services	**13,093**	**2.31%**	**1.30%**	**0.95%**	**0.74%**	**0.816**	**1,179**	**$46,166**
Engineering, Testing, & Architecture	7,877	-5.12%	-1.27%	0.74%	1.37%	0.833	693	$82,227
Consulting & Research	9,249	-1.24%	3.16%	3.05%	3.51%	0.614	1,377	$68,244
Research & Engineering Services	**17,126**	**3.14%**	**1.31%**	**2.01%**	**2.70%**	**0.699**	**2,070**	**$74,675**
Telecommunications Equipment	190	16.91%	-2.62%	2.22%	-0.89%	0.192	22	$59,541
Telecommunications Services	4,645	-3.57%	-3.22%	0.18%	-0.22%	0.738	172	$69,170
Telecommunications	**4,835**	**3.10%**	**3.14%**	**0.26%**	**0.31%**	**0.663**	**194**	**$68,792**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Service-Based Clusters								
Legal & Accounting Services	14,348	0.48%	-0.01%	2.23%	1.41%	0.901	2,104	$67,318
Management of Companies & Enterprises	15,549	4.11%	0.79%	1.41%	0.81%	1.310	1,332	$111,336
Business Process Outsourcing & Employment Services	17,914	-8.62%	-3.16%	1.22%	1.33%	0.687	968	$27,076
Printing Services	2,059	-2.29%	-4.76%	0.98%	-2.02%	0.636	115	$47,237
Other Business Support & Security Services	22,606	1.75%	0.96%	2.16%	1.78%	1.342	1,174	$36,512
Call Centers & Electronic Sales	8,558	1.98%	1.32%	2.44%	1.39%	1.740	296	$38,050
Business Services	**81,034**	**1.10%**	**0.96%**	**1.82%**	**1.24%**	**1.028**	**5,989**	**$54,673**
Construction Services	56,965	-14.32%	-4.88%	0.56%	1.04%	1.059	4,300	$70,723
Real Estate & Building Services	77,358	-2.37%	0.30%	3.03%	2.54%	1.264	3,883	$23,581
Construction-Related Equipment	0	NA	-3.39%	NA	-0.31%	0.000	0	0
Construction & Real Estate	**134,323**	**8.60%**	**2.33%**	**2.01%**	**1.84%**	**1.164**	**8,183**	**$43,573**
Education	15,885	3.04%	1.54%	3.31%	2.05%	0.451	765	$30,225
Government	94,367	0.53%	0.29%	0.40%	0.93%	0.702	392	$73,013
Education & Government	**110,252**	**0.87%**	**0.54%**	**0.84%**	**1.16%**	**0.650**	**1,157**	**$66,848**
General Retail	102,211	-1.47%	-1.37%	1.61%	0.28%	0.998	5,474	$31,822
Rentals & Leasing	2,639	-5.34%	-4.38%	1.78%	0.29%	1.260	293	$59,731
Retail Trade	**104,850**	**1.58%**	**1.44%**	**1.62%**	**0.28%**	**1.003**	**5,767**	**$32,524**
Social Assistance	9,653	6.86%	3.42%	2.75%	3.05%	0.786	482	$23,237
Repair & Maintenance	8,974	-2.79%	-2.68%	0.72%	0.19%	0.813	960	$41,645
Personal Services	24,419	3.53%	2.18%	2.13%	2.02%	1.048	1,377	$26,811
Organizations & Associations	8,079	2.76%	0.36%	1.55%	0.73%	0.430	468	$33,798
General Services	**51,125**	**2.65%**	**0.95%**	**1.92%**	**1.55%**	**0.781**	**3,287**	**$29,844**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Water Transportation	45	9.95%	0.23%	1.72%	0.60%	0.061	2	$82,059
Rail Transportation	251	-8.06%	-1.66%	-2.96%	0.20%	0.173	3	$88,952
Ground Freight Transportation	8,366	-4.52%	-2.27%	1.44%	0.47%	0.517	527	$46,127
Logistics & Warehousing	4,528	1.40%	1.05%	2.27%	2.20%	0.762	250	$39,129
Ground Passenger Transit	12,805	0.56%	1.73%	1.16%	1.22%	3.251	124	$31,888
Transportation & Logistics Services	**25,995**	**1.21%**	**1.01%**	**1.41%**	**0.94%**	**0.920**	**906**	**$38,370**
Travel Arrangements	10,215	-3.64%	-2.41%	-0.90%	0.85%	3.227	554	$46,361
Accommodations	12,895	4.74%	-0.63%	2.46%	0.86%	1.354	235	$42,058
Food & Beverage	79,078	1.21%	0.39%	1.50%	1.42%	1.303	3,813	$24,033
Arts & Culture	14,533	1.30%	0.79%	2.50%	1.89%	1.587	501	$32,153
Sports & Recreation (except gaming)	12,740	0.13%	1.77%	1.78%	2.41%	0.965	445	$30,082
Gaming	157,772	-2.59%	-0.94%	-0.01%	1.65%	54.149	370	$42,616
Tourism & Gaming	**287,233**	**1.08%**	**0.37%**	**0.71%**	**1.53%**	**2.911**	**5,918**	**$36,523**
Utilities & Waste Management	1,826	-2.56%	0.56%	1.26%	1.74%	0.858	40	$67,916
Utilities & Waste Management	**1,826**	**2.56%**	**0.56%**	**1.26%**	**1.74%**	**0.858**	**40**	**$67,916**
Durable Goods	10,210	-5.65%	-2.48%	1.37%	0.17%	0.629	922	$66,093
Nondurable Goods	7,789	-1.94%	-0.89%	1.68%	0.67%	0.626	432	$66,440
Trade Agents & Brokers	4,691	0.40%	1.65%	4.73%	2.57%	0.928	2,152	$101,449
Wholesale Trade	**22,690**	**3.31%**	**1.33%**	**2.21%**	**0.73%**	**0.673**	**3,506**	**$73,522**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Traditional & Manufacturing Clusters								
Primary Agriculture	255	-4.20%	0.01%	-4.65%	-1.08%	0.016	16	$24,707
Food Processing	2,883	-0.18%	-0.45%	1.37%	-0.10%	0.303	109	$47,912
Agriculture Support	1,931	0.85%	1.68%	2.48%	1.71%	0.359	140	$41,943
Agriculture-Related Equipment	0	NA	-0.89%	NA	-0.70%	0.000	0	0
Tobacco & Cigarettes	0	-100.00%	-8.34%	NA	-2.98%	0.000	0	0
Agriculture & Agribusiness	**5,069**	**0.08%**	**0.10%**	**1.53%**	**0.29%**	**0.160**	**265**	**$44,471**
Transportation Equipment	226	-2.46%	-6.75%	4.00%	-1.21%	0.083	4	$51,617
Engine & Automotive Parts	90	-11.09%	-6.79%	2.53%	-2.31%	0.030	4	$57,928
Automotive & Transportation Mfg.	**316**	**5.44%**	**6.77%**	**3.59%**	**1.78%**	**0.055**	**8**	**$53,415**
Industrial Machinery & Product Mfg.	621	2.09%	-2.55%	1.77%	-1.05%	0.189	32	$51,370
Commercial Machinery & Product Mfg.	4,827	-3.06%	-4.13%	3.39%	-1.05%	1.220	145	$94,209
Industrial Component Manufacturing	398	4.01%	-3.75%	3.64%	-1.82%	0.168	12	$92,574
Industrial & Commercial Equipment Mfg.	**5,846**	**2.18%**	**3.51%**	**3.24%**	**1.24%**	**0.609**	**189**	**$89,547**
Chemicals	396	-2.13%	-2.36%	0.10%	-0.76%	0.182	12	$98,992
Metals	1,584	-5.20%	-3.97%	0.71%	-0.80%	0.250	102	$62,777
Plastics, Resin, & Rubber	1,807	-5.67%	-4.42%	3.88%	-1.33%	0.417	41	$46,848
Construction, Industrial, & Other Materials	1,857	-16.86%	-6.10%	0.25%	-0.84%	0.758	109	$61,065
Packaging Materials	60	-0.97%	-1.98%	-1.37%	-1.01%	0.192	3	$53,419
Mining	363	-5.04%	-0.33%	-1.83%	0.01%	0.383	26	$62,606
Materials & Chemicals	**6,067**	**9.76%**	**4.00%**	**1.36%**	**0.89%**	**0.367**	**293**	**$59,770**

	2011* Total Employ-ment	Average Annual % Employment Growth (2006-2011)		*Predicted* (2011-2016)		2011 *National* Location Quotient	2010 of Establish-ments	2011 Average Annual Pay
		Las Vegas	U.S.	Las Vegas	U.S.			
Paper	0	NA	-4.64%	NA	-5.19%	0.000	0	0
Paper Products	317	2.81%	-3.00%	0.56%	-1.84%	0.252	6	$79,779
Paper-Related Equipment	0	NA	-5.25%	NA	-8.79%	0.000	0	0
Paper	**317**	**2.81%**	**3.50%**	**0.56%**	**2.83%**	**0.181**	**6**	**$79,779**
Textiles	170	0.84%	-8.98%	1.71%	-5.14%	0.262	2	$45,995
Textile Products	239	-6.86%	-7.06%	1.06%	-3.31%	0.329	37	$36,598
Apparel	102	-16.01%	-6.39%	5.77%	-5.94%	0.106	4	423,548
Leather Products & Footwear	21	-14.88%	-3.06%	-4.14%	-1.43%	0.094	1	$31,541
Textiles-Related Equipment	0	NA	-9.61%	NA	-10.80%	0.000	0	0
Textiles & Apparel	**532**	**7.72%**	**7.06%**	**2.06%**	**4.61%**	**0.205**	**44**	**$36,899**
Logging & Forestry	84	17.19%	-1.45%	9.95%	0.41%	0.107	0	$22,950
Wood Products	354	-21.77%	-8.91%	-4.18%	-1.77%	0.165	18	$41,596
Furniture	841	-20.16%	-7.74%	0.40%	-0.88%	0.351	88	$53,469
Wood-Related Equipment	0	NA	-12.15%	NA	-9.35%	0.000	0	0
Wood & Furniture	**1,279**	**19.73%**	**7.49%**	**0.00%**	**1.07%**	**0.239**	**106**	**$48,179**
Total Economy	**1,032,847**	**1.76%**	**0.28%**	**1.55%**	**1.24%**	**NA**	**49,208**	**$48,085**

Figures do not include industries or NAICS codes with <1 employees, so actual employment is slightly higher than the figures shown.
Source: Economic Modeling Specialists Inc. (EMSI), calculations by SRI

APPENDIX C: INDUSTRY CLUSTER SKILL LEVEL RATINGS METHODOLOGY

Various methodologies exist to measure skill levels for different occupations and industries. For the purposes of this assignment, the SRI team utilized the U.S. Department of Labor's *Occupational Information Network* (O*NET) Job Zone Skill Level rating. SRI selected this indicator because it provides occupation-based skill ratings that encompass many different dimensions, including: abilities, basic skills, cross-functional skills, knowledge, tools and technology, license/certification/registration requirements, work activities, training, and education. In particular, the inclusion of education levels in the overall rating of occupational skills was an important metric for this assignment.

Although skill level measures exist for individual occupations, they do not exist at the industry sector level. Therefore, SRI developed its own methodology, described below, to assign a skill level rating to each industry cluster, based on the composition of individual occupations within the cluster (according to national-level data from the Bureau of Labor Statistics).

SOURCE 1: OCCUPATIONAL COMPOSITION OF EACH INDUSTRY CLUSTER

In order to establish the occupational composition for each of the 25 industry clusters covered in the study, SRI utilized data from the Bureau of Labor Statistics' *Occupational Employment Statistics (OES)* The OES dataset provides industry-specific breakdowns of occupational employment, by 2-, 3-, and 5-digit NAICS codes at the national level. Utilizing this dataset, SRI calculated the total number of workers employed at the national level, broken down by detailed Standard Occupational Classification (SOC) code, for each of the 25 industry clusters. Because this dataset is not available at the state or county level, SRI used the national data as a representative proxy for the occupational employment patterns that exist in Clay County.

SOURCE 2: SKILL-LEVEL RATING FOR EACH OCCUPATION

In order to establish a skill-level rating for each occupational category, SRI utilized the Job Zone Skill Level Ratings developed by the U.S. Department of Labor's *Occupational Information Network* (O*NET). The O*NET Job Zone Skill Levels range from 1 to 5, with a "1" assigned to occupations that need little or no preparation and a "5" assigned to those that need extensive preparation. Definitions for each numerical skill level are provided in the following table. Job Zone Skill Level ratings are available for each of the 820 detailed SOC codes.

Summary o O*NET Job Zones Skill Levels				
Job Zone Number and Description	**Experience**	**Training**	**Examples**	**Education**
Job Zone 1: Little or No Preparation Needed	No experience needed	A few days to a few months by an experienced co-worker	Taxi driver, cashier, wait-staff	May require a high school diploma/GED or a license.
Job Zone 2: Some Preparation Needed	Experience may be helpful but is not needed	A few months to one year working with experienced co-workers	Sheet metal workers, teller, retail salesperson	Usually require a high school diploma/GED; may require vocational training.
Job Zone 3: Medium Preparation Needed	Previous work-related skill, knowledge or experience	One to two years of training, both on-the-job and informally by experienced co-workers	Electrician, legal secretary, insurance sales agent	Usually require vocational training or an associate's degree; may require a bachelor's degree.
Job Zone 4: Considerable Preparation Needed	Two to four years of work-related skill, knowledge or experience	Several years of experience, on-the-job training and/or vocational training	Accountant, computer programmer, teacher, chemist	Most require a four-year bachelor's degree.
Job Zone 5: Extensive Preparation Needed	Five or more years of work-related skill, knowledge or experience	Though some on-the-job training may be needed, assumption is necessary skills were already acquired.	Librarian, lawyer, aerospace engineer, physicist, surgeon	Minimum of a bachelor's degree; often requires a graduate degree.

Source: http://online.onetcenter.org/help/online/zones; summarized by SRI.

DEVELOPING AN INDUSTRY-BASED SKILL-LEVEL RATING

To develop a skill-level rating for each of the 25 industry clusters, SRI applied the SOC-based Job Zone Skill Level ratings provided by O*NET to the industry-based occupational data that was provided by BLS OES.

Skill Level Categories and Ratings	
SRI Skill-Level Rating	**Weighted Average Job Zone Skill-Level Rating for Each Industry**
Very High	Above 3.0
High	2.5 to 3.0
Medium	2.0 to 2.5
Low	1.5 to 2.0
Very Low	Below 1.5

For each industry category, SRI applied the O*NET Job Zone score to each occupation that comprises the industry (as defined by the national-level OES dataset). SRI then calculated a weighted average of the Job Zone scores for each of the 25 industry clusters, weighted by the number of employees in each occupation within that industry cluster at the national level. This calculation provided an overall Job Zone Skill-Level rating for each industry cluster. SRI then developed a classification of industry skills ranging from "very low" to "very high," based on the weighted

average Job Zone Skill-Level rating for each industry cluster. Details about this classification are provided in the table above.

The table below summarized the skill-level ratings calculated by SRI for each of the 25 industry clusters.

SRI Industry Cluster Skill-Level Ratings

	Weighted Average of Job Zone Skill Level Score	SRI Industry Skill Level Rating
Research & Engineering Services	3.46	Very High
Information Technology Services	3.41	Very High
Financial Services	3.05	Very High
Aerospace & Defense	3.01	Very High
Medicine & Life Sciences	2.97	High
Media & Design Services	2.97	High
Education & Government	2.84	High
Business Services	2.70	High
Wholesale Trade	2.66	High
Telecommunications	2.66	High
Electronics	2.63	High
General Services	2.62	High
Automotive & Transportation Manufacturing	2.56	High
Paper & Paper Products	2.45	Medium
Materials & Chemicals	2.43	Medium
Construction & Real Estate	2.43	Medium
Utilities & Waste Management	2.38	Medium
Energy & Environment	2.29	Medium
Wood & Furniture	2.26	Medium
Agriculture & Agribusiness	2.25	Medium
Transportation & Distribution Services	2.20	Medium
Textiles & Apparel	2.12	Medium
Industrial & Commercial Equipment Manufacturing	2.03	Medium
Retail Trade	1.93	Low
Tourism & Gaming	1.91	Low

Source: Calculations by SRI International, using data from the U.S. Department of Labor.

APPENDIX D: BENCHMARKING DATA SOURCES

Human Investment	
Indicator	**Source**
A) Quality Of Education	
1) Secondary Education Performance	
Secondary education attainment (2005 and 2009)	Census Bureau, *American Community Survey*
Expenditure per pupil in public elementary and secondary schools (2007-08)	National Center for Education Statistics, *CCD Public School District Data*
2) Higher Education Performance	
Higher education attainment (2005 and 2009)	Census Bureau, *American Community Survey*
B) Workforce Characteristics	
1) Workforce Growth & Migration	
Growth rate of civilian labor force (2006-11 and 2001-11)	Bureau of Labor Statistics, *Local Area Unemployment Statistics*
Net domestic migration of population (2009)	Census Bureau, *Population Estimates*
Net international migration of population (2009)	Census Bureau, *Population Estimates*
2) Next Generation Workforce	
Growth rate of young adult population (ages 25-34) (2005-09)	Census Bureau, *American Community Survey*
Number of science & engineering graduate students (2008)	National Science Foundation, *Survey of Graduate Students and Postdoctorates in Science and Engineering*
Number of science & engineering degrees granted (at the bachelor's, master's, and doctorate levels) (2008)	National Center for Education Statistics, *Integrated Postsecondary Education Data System*, calculations by SRI
3) Knowledge & Innovation Economy Workforce	
Total employment in S&E occupations (2010)	Bureau of Labor Statistics, *Occupational Employment Statistics*, calculations by SRI
Total employment in managerial, professional, & technical occupations (2010)	Bureau of Labor Statistics, *Occupational Employment Statistics*, calculations by SRI

Innovation Resources	
Indicator	**Source**
A) Research & Development Support	
1) R&D Activity	
Total R&D expenditures at universities and colleges (2008)	National Science Foundation, *Survey of Research and Development Expenditures at Universities and Colleges*
Total value of federal R&D obligations (2008)	National Science Foundation, *Federal S&E Support to Universities, Colleges, and NPOs*
2) Funding from Competitive R&D Awards	
Total number of SBIR awards and funding amount (2007-10)	Small Business Administration, *SBA Tech-Net*
Total number of STTR awards and funding amount (2007-10)	Small Business Administration, *SBA Tech-Net*
Total # of competitive NSF proposals submitted and awards (2010)	National Science Foundation, *Budget Internet System*
B) Collaboration and Innovation	
1) University Commercialization Activity	
# of licenses & options executed by major research universities (2009)	Association of University Technology Managers, *AUTM Licensing Survey*
Number of full-time equivalent staff in major research university technology transfer offices (including licensing and other FTEs) (2009)	Association of University Technology Managers, *AUTM Licensing Survey*
Total licensing income received by major research universities (2009)	Association of University Technology Managers, *AUTM Licensing Survey*
# of invention disclosures and U.S. patents issued at major research universities (2009)	Association of University Technology Managers, *AUTM Licensing Survey*
# of start-up companies formed by major research universities (dependent on the licensing of the university's technology for initiation) (2009)	Association of University Technology Managers, *AUTM Licensing Survey*
# of start-ups operating in home state (2009)	Association of University Technology Managers, *AUTM Licensing Survey*
2) University-Industry Collaboration	
Amount of industry-funded R&D performed at universities & colleges (2008)	National Science Foundation, *Survey of Research and Development Expenditures at Universities and Colleges*
Total sponsored research expenditures at major research universities (2009)	Association of University Technology Managers, *AUTM Licensing Survey*

Globalization and Vitality	
Indicator	**Source**
A) Globalization	
1) Exports	
Total value of MSA exports (2009)	Brookings Institution
B) Business Vitality	
1) Economic Prosperity & Growth	
Gross domestic product by metro area (2004 and 2009)	Bureau of Economic Analysis, *Regional Accounts Data*
Average annual private sector employment growth rate (2006-11 and 2001-11)	Bureau of Labor Statistics, *Current Employment Statistics*
% of labor force unemployed (April 2011)	Bureau of Labor Statistics, *Local Area Unemployment Statistics*
2) Top Performing Companies	
# of Fortune 500 Companies (2010)	*Fortune* Magazine, *Fortune 500 List*
# of Inc 500 Companies (2009)	*Inc.* Magazine, *Inc. 500 List*
# of Tech Fast 500 Companies (2010)	Deloitte & Touche, *Technology Fast 500 List*

Infrastructure	
Indicator	**Source**
A) Technology Infrastructure	
Broadband / High-Speed Telecom Connections	
# of broadband/high-speed service providers (over 200 kbps in at least one direction) (2008)	Federal Communications Commission, *ZIP Codes by Number of High-Speed Service Providers*
Average internet download speed (2010)	SpeedMatters.org
Average internet upload speed (2010)	SpeedMatters.org
B) Physical Infrastructure	
2) Air Transportation Services	
Number of passenger boardings (2009)	Federal Aviation Administration, *Passenger Boarding (Enplanement) and All-Cargo Data for U.S. Airports*