Photo Courtesy of Sydney Martinez/TravelNevada

A New Economic Agenda for Nevada:

Final Report

December 21, 2018

Prepared for:
Nevada Governor's Office of Economic Development

Prepared by:
Roland Stephen, Director
Center for Innovation Strategy and Policy
SRI International

SRI International®

Center for Innovation Strategy and Policy

SRI International · 333 Ravenswood Avenue · Menlo Park, CA 94025-3493 · 650.859.2000 · www.sri.com

Authors

This report was researched and written by Ashley Begley, Steve Deitz, Nikhil Kalathil, Daniel Querejazu, JR Sullivan, and Roland Stephen, at the Center for Innovation Strategy and Policy, SRI International. The authors would like to acknowledge significant support and review provided by Paul Anderson, Derek Armstrong, Matthew Moore, and Bob Potts at the Nevada Governor's Office of Economic Development.

Note

This report was developed by SRI International, based on research funded by the Nevada Governor's Office of Economic Development. The findings, conclusions, and any errors in the report are the sole responsibility of the authors.

SRI International®

Contents

Executive Summary

Nevada's economic output and level of unemployment have recovered completely from the Great Recession.

Nevada added **285,000** jobs since 2010.

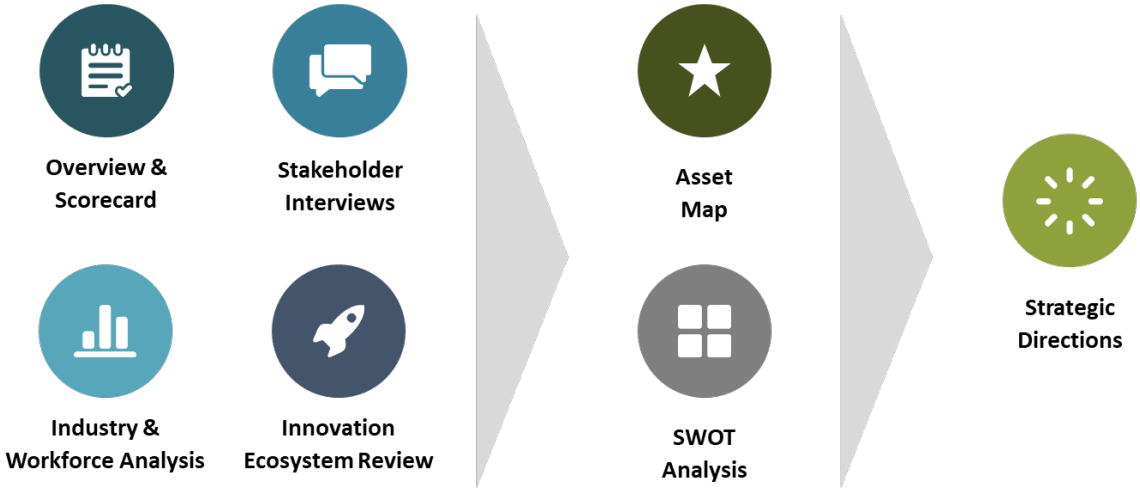
Nevada's economy has become more diverse since 2011, but high-wage jobs in new sectors still need to be effectively targeted.

Project Background

The Great Recession hit Nevada harder than almost any other state. To meet this challenge, the Governor of Nevada asked SRI International (SRI) and the Brookings Institution (Brookings) to conduct a rigorous, objective analysis of Nevada's challenges and to identify key opportunities for economic development and job creation. The SRI/Brookings team concluded that Nevada needed to diversify its economy, upgrade the economic development system, pursue smart strategies adapted to each region, and emphasize innovation and new enterprise.

Seven years later, the Governor's Office of Economic Development (GOED) asked SRI's Center for Innovation Strategy and Policy to revisit Nevada's economic development agenda. This report represents SRI's findings and recommendations. It includes a scorecard on progress, an analysis of Nevada's current assets (including industry base, workforce mix, innovation ecosystem, and economic development policies and programs), and a new set of strategic directions for the future.

Report Methodology



Overview

The SRI team's analysis and findings began with a comprehensive overview and scorecard for the development of Nevada's economy from 2010 to 2018, including Nevada's three metropolitan areas and six micropolitan areas (smaller towns with 10,000 to 50,000 people). SRI then reviewed Nevada's industry base and talent and workforce mix using a comprehensive dataset that integrates economic and workforce data. SRI also conducted an analysis of the state's innovation and entrepreneurship ecosystem.

These analyses, combined with stakeholder interviews, formed the basis for an asset map for the state and its regions. Based on this map, the research team analyzed the strengths, weaknesses, opportunities, and threats (SWOT) for the state, and formulated strategies and actions for the state based on what the analysis revealed.

Overview & Scorecard

Nevada's economic output and level of unemployment have recovered completely from the Great Recession. Nevada ranks in the middle of its peers in terms of overall recovery from the Great Recession, but with signs of characteristic economic dynamism associated with increased population and job growth.

Peer State Rankings

State	Percent Change in GDP 2011-2017	Percent Change in Population 2011-2017	Decline in Unemployment Rate 2011-2017	Workforce Participation Rate 2017
Arizona	3	4	4	5
Colorado	1	3	2	2
Nevada	**4**	**2**	**1**	**4**
New Mexico	6	6	6	6
Oregon	5	5	3	3
Utah	2	1	5	1

Nevada's two largest metropolitan regions (Reno-Sparks and Las Vegas) grew at an average annual rate of 2.56% and 2.15%, respectively, between 2011 and 2017. Boise, Phoenix, Sacramento, and Salt Lake City grew at a very similar rate to Las Vegas and Reno-Sparks, with only Denver growing significantly faster. At an aggregate level, the recovery among large metropolitan areas in the Mountain West and Southwest looks quite similar.

Peer Metropolitan Area Rankings

Metropolitan Area	Percent Change in GDP 2011-2017	Percent Change in Population 2011-2017	Decline in Unemployment Rate 2011-2017	Workforce Participation Rate 2017
Boise City, ID	4	1	6	6
Carson City, NV	**10**	**11**	**3**	**10**
Colorado Springs, CO	9	5	7	9
Denver Aurora Lakewood, CO	1	2	8	1
Las Vegas Paradise, NV	**7**	**3**	**2**	**7**
Phoenix Mesa Scottsdale, AZ	5	4	9	8
Portland Vancouver Hillsboro, OR-WA	8	7	5	3
Reno-Sparks, NV	**3**	**8**	**1**	**4**
Sacramento Roseville Arden Arcade, CA	6	9	4	11
Salt Lake City, UT	2	6	10	2
Santa Fe, NM	11	10	11	5

In the years following the Great Recession, most of Nevada's micropolitan regions have experienced a complete recovery with approximately the same level of unemployment that they had in 2007. Relative to other micropolitan regions in the area, Nevada's micropolitan areas were hit harder by the Great Recession but also recovered better than other regions.

Stakeholder Interviews

SRI conducted over 140 interviews with key stakeholders in community and economic development, business and industry, academic research, and workforce development across the state to enrich the team's understanding of Nevada's assets. All interviews were conducted in person (either individually or as part of a stakeholder engagement session) or over the phone. Support for these interviews was provided by GOED and each of the regional development authorities (RDAs) throughout the state.

SRI conducted

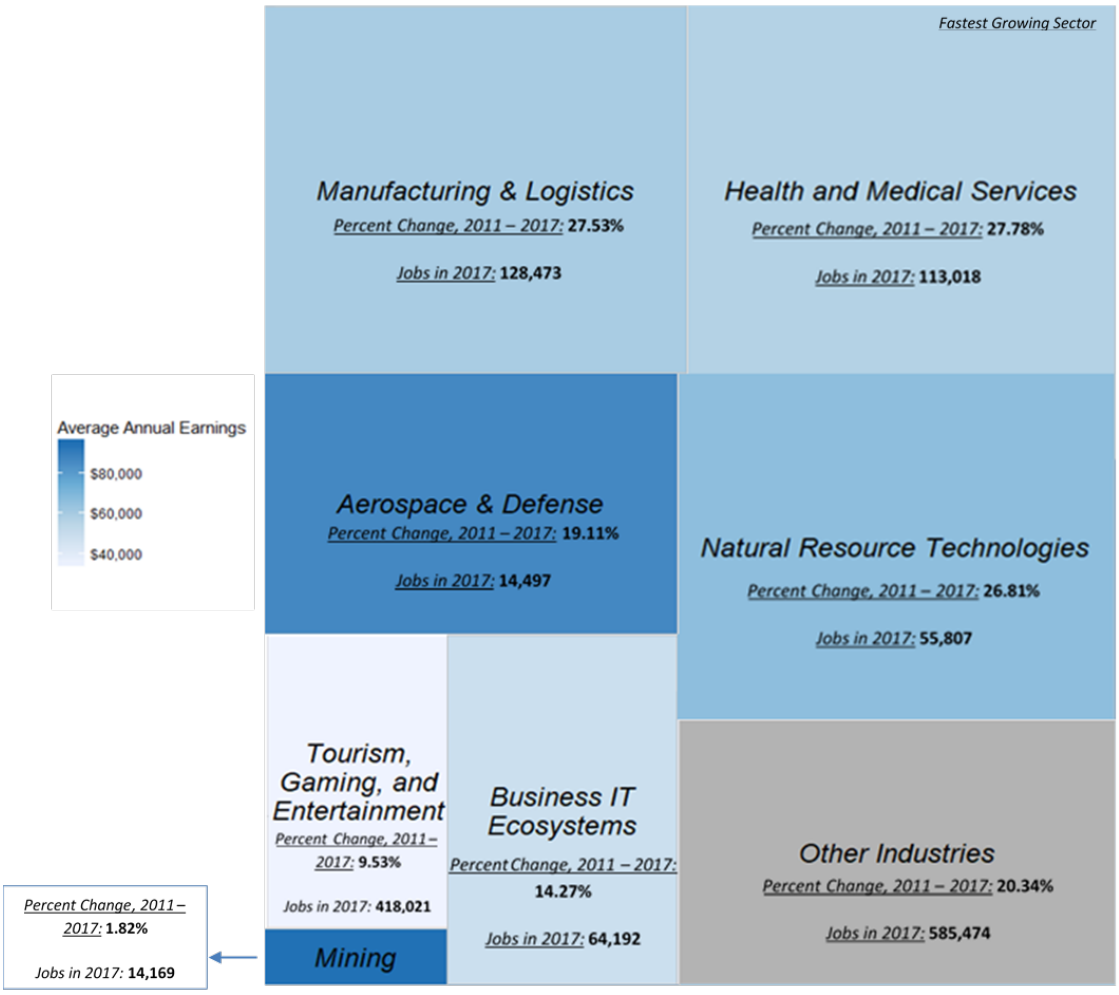
140

stakeholder interviews for this report.

Targeting Specific Industries, Occupations, and Skills

Nevada has begun the transition away from its dependence on hospitality, gaming, and entertainment. While these activities will continue to remain important, the figure below shows how employment in other sectors has grown much more quickly in other, targeted sectors over the course of the recovery from the recession.

Percent Change in Number of Jobs for Select Sectors in Nevada's Economy Between 2011 and 2017. Source: EMSI



However, while Nevada's economy has been successful in diversifying broadly (away from concentration in tourism, gaming, and entertainment, for example), diversification may still be concentrated in lower-wage sub-sectors.

Nevada must provide opportunities for skill development and workforce training for workers with lower levels of formal educational credentials or education. This is important to ensure that these often enterprising and hardworking workers are not discouraged from participating in the labor force and have opportunities for growth.

Nevada's Innovation Ecosystem

Nevada's enterprising spirit, the fruit of its historically high level of in-migration, remains strong. However, the state's innovation system is characterized by a general lack of coordination and alignment among the various actors and programs that support entrepreneurship statewide.

Talent

+ Strong entrepreneurial culture
– Shortage of technically skilled workers

Risk Capital

+ Sufficient levels of venture capital (VC) funding for later stage investments
– Gap in early-stage (pre-seed and seed) investments

Access to Markets

+ Strong clusters in energy storage, hospitality, and gaming
– Few testing and demonstration facilities available

Idea Generation

+ Very high levels of new business formation and churn
– Low levels of academic and business R&D expenditures and outputs

Business Environment

+ Access to western markets
+ Very business-friendly environment

Networks

+ Some strong connections between industry and academia
– Immature mentor and investor networks

University R&D Outputs, 2017 (ordered by total research expenditures).
Source: Association of University Technology Managers (AUTM)

	Under-graduates	Post-graduates	Total Research Expenditures	Total Licenses Executed	Gross Licensing Income	Invention Disclosures	Patent Applications	Startups Initiated
Univ. of Arizona	35,123	9,708	$622,200,000	105	$2,703,261	261	139	15
Univ. of Colorado-Boulder	27,665	5,581	$471,909,649	48	$2,117,204	120	215	9
Univ. of Utah	23,789	8,071	$380,295,000	42	$8,260,475	196	94	10
Colorado State	25,688	7,370	$338,202,049	37	$3,189,811	101	41	5
Univ. of New Mexico	19,147	7,031	$246,595,239	58	$1,335,335	114	68	12
Univ. of Oregon	19,351	3,629	$76,142,752	55	$8,853,587	28	2	4
University of Nevada, Reno (UNR)	21,657	3,025	$75,663,944	6	$320,209	21	7	1
University of Nevada, Las Vegas (UNLV)	25,282	5,345	$66,285,000	9	$292,526	57	20	4

Asset Map: Nevada

Physical Infrastructure

Energy

+ Significant renewable energy integration into the electrical grid
– Dependent on imports for fuel to meet energy needs

Housing

+ New home builds increasing throughout the state
– New homebuyers increasingly priced out in metropolitan areas

Transportation

+ Strong air and road connectivity in major metropolitan areas
– Lack of consistent funding for roads that require significant repairs

Broadband

+ Strong connectivity and high speeds in metropolitan areas
– Weak connectivity and lack of redundancy in rural communities

Quality of Life

Health

+ Positioned for significant growth in healthcare
– Continuing shortage of medical professionals

Safety

+ Significant progress in reducing property and violent crime
– Crime still a pervasive issue in many communities

Education

+ K-12 education system contains nationally-ranked high performers
– Underperformance a result of underfunding and overcrowding

Recreation

+ Open land for exploration and outdoor recreation
– Ability to attract families harmed by an incomplete image of the state ("Sin City")

Economy

Diversification of Economic Base

+ Shift from tourism and gaming towards high-skill industries
– Many jobs added in lower-skill elements of high-skill industries

Skilled Workforce Attraction/Retention

+ Attraction of many historically underrepresented occupations
– Highly educated spouses unable to find jobs in some areas

Governance

Business-Friendly Environment

+ Easy access to decisionmakers
– Tax abatements not meeting the needs of technology companies

Institutional Assets

+ Responsive state and local offices for economic development
– Collaboration lacking among economic development organizations

Taxation

+ Low-tax environment attractive to business
– Low-tax environment limiting to investments that could attract businesses

Natural Resources

Land

+ Majority of the state's land open to the public for recreation
– Extensive federal land ownership problematic for expanding cities and land usage

Minerals

+ Lithium a new opportunity for the state's mining industry
– Mining industry and its technology not well-understood

Water

+ Experienced in conservation efforts to save water
– Current water resources threatened by rapid growth

Innovation Ecosystem

+ Entrepreneurial and risk-taking population
– Coordination lacking among the state's innovation system

Nevada's Regions

Nevada's regions are each unique and have different assets. Las Vegas is internationally known for its high-quality tourism, gaming, and entertainment industry. Reno-Sparks has a broad array of outdoor recreation opportunities and has become home to a number of advanced manufacturing companies in recent years. Though small in terms of population, the micropolitan areas that are found throughout the state of Nevada play important roles in the state's economy. Smaller towns like Elko and Winnemucca have benefited from long-standing, well-established industries such as mining. The full report provides a detailed account of assets for the metropolitan and micropolitan regions in Nevada.

SWOT Analysis

A SWOT analysis enables organizations to assess their current capabilities and understand how to work with them in order to navigate future uncertainty. This powerful analysis serves as the basis for strategy by highlighting sources of strength and weakness that may be addressed, opportunities to be realized, and dangers and difficulties to be avoided. The SWOT analysis summarized below provides the basis upon which the SRI team formulated strategies for the future.

Strength

Culture and Quality of Life
- Enterprising migrants
- Frontier spirit
- Artists, musicians, and performers
- Outdoor enthusiasts

Governance
- Low taxes and regulation
- "Small state" advantage

Industry
- Increasing diversification
- Value-chain opportunities

Infrastructure
- Inexpensive energy
- Increasing use of renewable energy
- Advanced water management
- Urban connectivity
- Stable environment

Innovation
- Connections to the West Coast
- Low barriers for new businesses
- Pervasive small business ethic

Workforce and Education
- Established models of success
- Workforce Innovations for a New Nevada (WINN) and other career and technical education (CTE) booster programs

Weakness

Innovation
- Immature mentor networks
- Lack of early-stage funding
- Underutilized tools and programs
- Weak connections to research institutions

Infrastructure
- Energy market uncertainty
- Water rights
- Rural broadband connectivity
- Congestion in suburban and urban areas
- Federal land ownership

Governance
- Incomplete tax abatements
- Property tax limitations
- Impact of the Knowledge Fund
- Economic development collaboration

Culture and Quality of Life
- Housing affordability
- Low trust in government institutions
- Lack of collaboration
- Poor health indicators
- Harsh desert climate

Workforce and Education
- Weak institutional performance
- Lack of K-12 and higher education funding
- Low educational attainment
- Poor career guidance for mid-skill workers
- Shortages in building and other skilled trades

Industry
- Persistently low wages

Opportunity

- Access to West Coast networks
- Access to Mountain West markets
- Las Vegas world brand
- Opportunities for mining diversification
- Testbed for new technologies
- Mobile Millennials and Generation Z
- West Coast costs and congestion

Threat

- Impact of climate change
- Exposure to economic cycles
- Uncertain federal policies
- Competition from Mountain West states
- Costs and congestion

Strategic Directions

The SRI team has identified three broad strategic directions—collaborate, innovate, and refine—that address the challenges identified in this report. In addition, SRI has identified a set of recommendations for the renewal of the Nevada System of Higher Education (NSHE). More details on resources required (cost and timeline), potential collaborators, and sample milestones and metrics can be found in the Strategic Directions section of the full report.

Collaborate: **Work together to build on existing programs, avoid duplication of effort, and address known gaps in services and resources.**

Build formal mentorship and angel investor networks, in part by drawing on Nevada's access to West Coast ecosystems.

Action: Hold mentoring and networking events for high net-worth individuals.

Action: Seed rural area investor networks.

Action: Support the Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) application process and provide a match for successful SBIR/STTR grants.

Reformulate and increase investment in the Knowledge Fund to be an external partnership between universities, entrepreneurs, and industry.

Action: Fund joint enterprise/university partnerships directly through private partners.

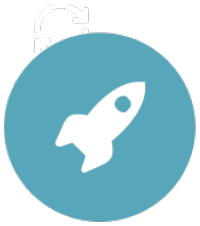
Action: Support virtual accelerators in Northwest and South Nevada to provide wraparound services to entrepreneurs, startups, and small businesses.

Integrate economic development activities.

Action: Pool leads among economic development entities, and celebrate economic development wins as a state.

Action: Collaborate across state lines by working with economic development entities in other locations (Boise, Sacramento) to build regional value chains and production networks.

Action: Create and increase support for information hubs that integrate workforce development, entrepreneurship, and business retention programs across different state agencies and RDAs to eliminate duplication of effort and provide a one-stop shop for key information, including the Governor's Office of Workforce Innovation (OWINN).



Innovate: Complete the development of statewide and regional innovation ecosystems through new initiatives, effective marketing, and implementation of existing programs. Emphasize Nevada's potential to be a testbed for new technology, drawing on a culture of individualism, adventure, and risk-taking.

Redefine Nevada as the state for ambitious entrepreneurs who take calculated risks on big ideas.

Action: Define Nevada's image as the next frontier for experimentation and innovation, focusing on an overall attitude of "move fast and break things."

Action: Create unique programs for lifestyle entrepreneurs at regional colleges in both urban and rural areas that integrate business skills and technology into outdoor recreation, tourism, art, history, and culture.

Action: Support high-profile outdoor events around extreme sports, endurance competitions, and adventure tourism in order to encourage younger visitors and promote healthier lifestyles.

Provide meaningful support for targeted advanced research and applied research activities.

Action: Build a capability for research and testing for drone delivery, autonomous last-mile delivery, autonomous trucks, warehouse robotics, and associated support systems.

Action: Expand capabilities for research and testing renewable energy technologies suitable for Nevada's unique environment.

Refine: Adjust current programs and policies to better align with the needs of Nevadans and Nevada's growing industries.

Refine workforce programs and policies to better align them with present and future needs.

Action: Accelerate mid-skill careers by training high school counselors and educating parents on the many career pathways offered by technical education, emphasizing those aligned with the value-chain opportunities in Nevada's diversifying economic sectors.

Action: Scale successful programs, such as ScienceAlive, LifeWorks, Jump Start, and Learn and Earn Advanced-career Pathways (LEAP), to expand access to rigorous science, technology, engineering, and mathematics (STEM) learning opportunities.

Action: Increase overall funding for career and technical placement programs and pioneer creative and innovative initiatives to transition unskilled workers to higher-wage occupations, taking the lead from Truckee Meadows Community College's (TMCC) successful partnerships with industry.

Align state and local tax and finance around economic development priorities.

Action: Retool tax abatement packages to focus on growth in high-wage sectors (including advanced manufacturing and mining supply chain companies) and internal growth by technology-based startups.

Action: Review and amend the revenue mix for regional and local governments (including property taxes) to ensure an appropriately sized tax base that can meet the needs of future growth.

Action: Incorporate Opportunity Zone designations into business recruitment strategies.

Fill infrastructure gaps in connectivity and energy.

Action: Invest in broadband improvements, including redundancy measures and creative non-wired solutions, in rural and remote areas to improve education, health (telemedicine), and public safety.

Action: Promote a balanced energy market that keeps rates low while encouraging distributed generation to accommodate energy needs in rural areas of the state and that allows for additional renewable energy generation assets.

Renew: Pursue comprehensive reform of NSHE through root and branch improvements to governance, institutional design, and innovation investments.

Reform NSHE governance through fundamental changes to its governing board and the delegation of authority.

Action: Change or end the present system of government by an elected board and place NSHE under the direction of the governor and legislature.

Action: Alter the community college funding formula to include local sources of funding and recognize different kinds of success beyond graduation rates.

Action: Delegate the government of all NSHE institutions to boards of trustees.

Action: Invest in nationwide recruitment for senior leadership committed to radical innovation in higher education.

Redesign NSHE institutions around challenges faced by the region, the nation, and the world.

Action: Organize disciplines and departments into colleges focused on interdisciplinary challenges.

Action: Rework ranks, pathways, and hiring contracts for all categories of professional staff to allow and reward a complex mix of responsibilities and career choices (teaching, research, engagement).

Invest in new ways into innovation institutions.

Action: Establish semi-independent entities at UNR, UNLV, and the Desert Research Institute (DRI) for entering into agile partnerships with business that allow flexibility in employment, contracting, and intellectual (IP) management.

Action: Grow evergreen venture funds at UNR, UNLV, and DRI targeting IP at each institution, to work in collaboration with Battle Born Venture.

Project Background

Project Background

In 2011, the State of Nevada stood at a critical juncture. Nevada's reliance on service sector and natural resource industries meant that the Great Recession hit Nevada harder than almost any other state. To meet this challenge, the Governor of Nevada tasked SRI International (SRI) and the Brookings Institution (Brookings) to conduct a rigorous, objective analysis of Nevada's challenges and opportunities and to identify a series of key opportunities for meaningful near-term and medium- to long-term economic development and job creation.

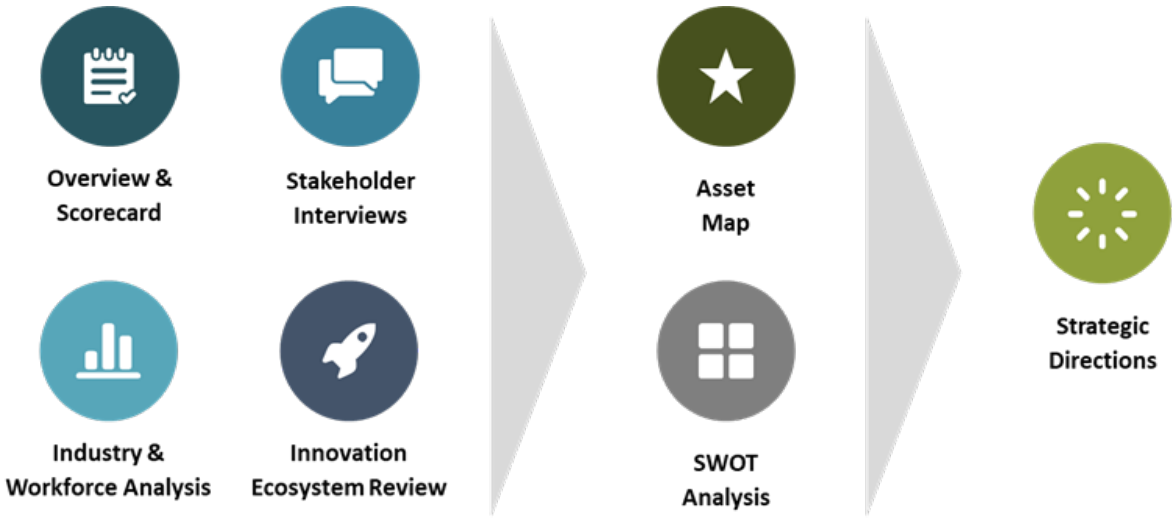
The SRI/Brookings team identified four overarching challenges and goals for the State of Nevada and its metropolitan and rural regions.[1] It concluded that the State of Nevada urgently needs to diversify its economy by targeting seven major industries (and 30 narrower targets), upgrade the economic development system, pursue smart strategies adapted to particular regions, and emphasize practices that foster innovation and new enterprise.

Seven years later, it is time to revisit and update the 2011 Economic Development Plan. The Governor's Office of Economic Development (GOED) has collaborated with SRI's Center for Innovation Strategy and Policy to revisit Nevada's economic development agenda. This review includes a scorecard on progress over the last seven years, an analysis of Nevada's current assets (including industry base, talent and workforce mix, innovation ecosystem, and economic development policies and programs), and strategic possibilities for the future.

Report Methodology

An overview of the SRI's team methodology for this report can be found in Figure 1. SRI used several inputs to understand the state's strengths and development opportunities, which form the foundation for the strategic possibilities listed in the final section of the report.

Figure 1. Report Methodology Overview



The SRI team conducted an objective and rigorous data analysis to produce a comprehensive overview and scorecard for the development of Nevada's economy from 2010 to 2018, including Nevada's three metropolitan areas and six micropolitan areas (smaller towns with 10,000 to 50,000 people).

To provide an overview of Nevada's assets, SRI reviewed Nevada's industry base and talent and workforce mix using a comprehensive dataset from EMSI, a commercial data service that integrates economic and workforce data. SRI also conducted over 140 interviews with key stakeholders in community and economic development, business and industry, academic research, and workforce development across the state to enrich the team's understanding of Nevada's assets. All interviews were conducted in person (either individually or as part of a stakeholder engagement session) or over the phone. A full listing of participants is included in Appendix B. SRI's interview protocols differed slightly by type of stakeholder and are available in Appendix C. Support for these interviews was provided by GOED and each of the regional development authorities (RDAs) throughout the state.

SRI also conducted an analysis of activity across the state associated with innovation and entrepreneurship to formulate an inventory and assessment of regional innovation ecosystems. The data analysis, stakeholder interviews, and innovation review provide unique perspectives of Nevada's story over the past seven years, and this information was used to compile an asset map and conduct an analysis of strengths, weaknesses, opportunities, and threats (SWOT) for the state. The results of this analysis directly informed the development of high-level strategic possibilities for the state of Nevada.

Roadmap for the Future

As a result of changes following the Great Recession, Nevada's economy is now characterized by a more diverse economic base. It is also home to rapid growth in innovation and entrepreneurship. The high-level strategic directions, initiatives, and actions identified at the end of this report are intended as a guide to effective policies to help Nevada's leaders build on this success. These ideas are based on data analysis and interviews with 140 key stakeholders across state government, industry, and academia. The recommendations include broad estimates of the required levels of investment (both time and resources), identification of partnerships to be developed, and sample milestones and metrics for tracking success. These strategic possibilities are intended to give Nevada's decisionmakers a sense of where to prioritize efforts over the next few years based on the analysis conducted by the SRI team.

Over 140 interviews were conducted with stakeholders across the state of Nevada, including representatives from government, industry, and academia.

Overview and Scorecard for Nevada's Economy

Comparative Overview and Scorecard

This overview is designed to place Nevada's growth following the Great Recession in comparative perspective with peer states and metropolitan areas, in particular across the Mountain West. In summary, the record shows that the state's economy has performed well, in particular exhibiting strong employment growth, although weakness in earnings has persisted.

The next section of the report will build on this overview with a detailed analysis of Nevada's industry sectors and workforce. It will focus on key components of the economy (e.g., earnings and skills) that are important indicators of the economic well-being of the state. The findings from this deeper analysis, in combination with a wider analysis of Nevada's economic development assets, inform the recommendations outlined in the conclusion to the report.

Nevada's economic output and level of unemployment have recovered completely from the Great Recession.

Nevada's economic output and level of unemployment have recovered completely from the Great Recession. In addition, the structure of Nevada's economy is becoming more diverse, with increased employment in sectors such as health services, transportation and logistics, and advanced manufacturing. This represents a record of recovery that some other areas of the country have not enjoyed.

This recovery reflects the broader positive experiences of a select number of peer states in the western United States (U.S.), with some important differences summarized in Table 1.

Colorado and Utah have experienced rapid economic and population growth and continue to enjoy high workforce participation rates. Utah's drop in the unemployment rate was comparatively modest because of significant in-migration.

Nevada and Arizona have also recovered in terms of economic growth after being more seriously hurt by the recession. Nevada has made a dramatic improvement in its unemployment rate, while at the same time drawing many new residents. This strong performance is tempered by a decline in the workforce participation rate. On balance, both states have recovered, with population growth an added dynamic element for Nevada.

New Mexico and Oregon have both grown slowly in terms of the economy and population, even though they are very different in terms of location and structure of the economy. However, an important difference is Oregon's stronger improvement in the unemployment rate and high workforce participation rate.

In summary, as seen in Table 1, Nevada ranks in the middle of its peers, but with signs of characteristic economic dynamism. The analysis of the performance of comparable metropolitan areas in this section

show how the northern part of the state is performing like the Mountain West states of Utah and Colorado, while Southern Nevada plays a role as a leader in the southwestern United States.

Table 1. Peer State Rankings

State	Percent Change in GDP 2011-2017	Percent Change in Population 2011-2017	Decline in Unemployment Rate 2011-2017	Workforce Participation Rate 2017
Arizona	3	4	4	5
Colorado	1	3	2	2
Nevada	**4**	**2**	**1**	**4**
New Mexico	6	6	6	6
Oregon	5	5	3	3
Utah	2	1	5	1

The mixed picture outlined at the state level is reproduced when Nevada's principal metropolitan areas are compared to other metropolitan areas in the western United States. Quickly growing metropolitan areas include Denver, Salt Lake City, Boise, and Reno-Sparks. Strong recoveries in regional economies and levels of unemployment have been achieved alongside significant population growth and relatively high workforce participation rates. Reno's economy has performed well even when compared to Salt Lake and Denver, given that the recession hit it much harder. The unemployment rate declined dramatically from a high starting point, as seen in Table 2.

Table 2. Peer Metropolitan Area Rankings

Metropolitan Area	Percent Change in GDP 2011-2017	Percent Change in Population 2011-2017	Decline in Unemployment Rate 2011-2017	Workforce Participation Rate 2017
Boise City, ID	4	1	6	6
Carson City, NV	**10**	**11**	**3**	**10**
Colorado Springs, CO	9	5	7	9
Denver Aurora Lakewood, CO	1	2	8	1
Las Vegas Paradise, NV	**7**	**3**	**2**	**7**
Phoenix Mesa Scottsdale, AZ	5	4	9	8
Portland Vancouver Hillsboro, OR-WA	8	7	5	3
Reno-Sparks, NV	**3**	**8**	**1**	**4**
Sacramento Roseville Arden Arcade, CA	6	9	4	11
Salt Lake City, UT	2	6	10	2
Santa Fe, NM	11	10	11	5

Las Vegas, Phoenix, Portland, and Sacramento recovered more slowly. Las Vegas also exhibited a dramatic decline in the unemployment rate alongside significant population growth, which compares favorably to the situation in Phoenix. Portland and Sacramento also created jobs, while growing more slowly in terms of population.

Carson City, Colorado Springs, and Santa Fe recovered more slowly than other western metropolitan areas from the recession, with Carson City and Santa Fe sharing slow population growth, while Carson City and Colorado Springs made significant comparative improvement in their unemployment rates. This lower level of dynamism may be associated with an increasing population of retirees who, living on fixed incomes, will tend to limit consumption-based growth.

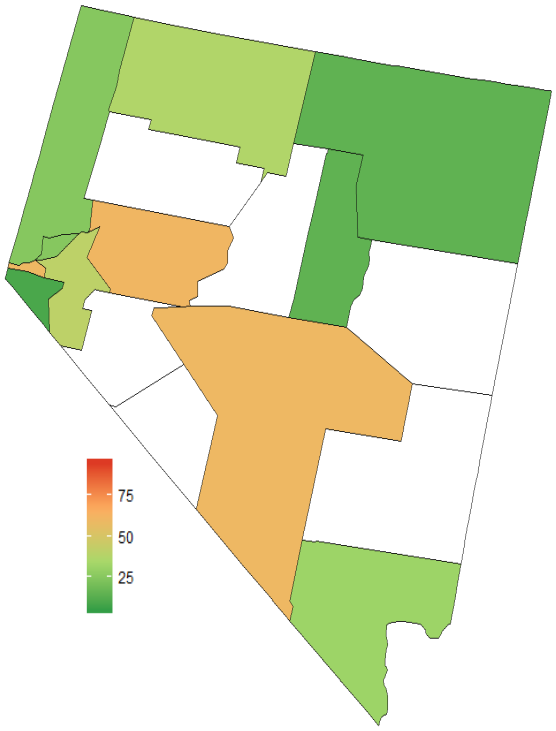
In summary, the Las Vegas metropolitan area is one of the most dynamic labor markets in the regional economies of the southwestern United States, while Reno-Sparks serves as a bridge between Northern California and the fast-growing metropolitan areas of the Mountain West, Salt Lake City, and Denver. These regional connections are powerful, and they position Nevada's principal metropolitan areas favorably for the future. This regional distinction is reproduced in a different mix of businesses, which is reviewed in the Industry Analysis section. The experience of Nevada's smaller regions (reviewed in this section) is more diverse.

To assess the specific ways that Nevada's economy has, or has not recovered, from the recession, this section of the report provides a detailed overview of Nevada's economy and demographics. Specifically, this section covers GDP, unemployment and labor force participation, and wages. Nevada is a geographically diverse state, and each region has recovered from the recession differently. As such, the overview seeks to analyze economic and demographic measures for the state as a whole as well as for individual metropolitan and micropolitan regions. This detailed, regional analysis will ensure that our understanding of the state of Nevada's economy is robust, and that future economic development initiatives can be specifically tailored to meet the individual needs of Nevada's regions.

General Economy Measures

Recent work by the Economic Innovation Group (EIG) combines seven complementary metrics to create an assessment of community well-being in the United States. Based on data between 2011 and 2015 from the Census Bureau, EIG has created a "Distressed Communities Index" (DCI) that places regions into five tiers or categories: prosperous, comfortable, mid-tier, at risk, and distressed.[2] The index captures indicators that include education, housing vacancy, and poverty. Of Nevada's three metropolitan regions and six micropolitan areas, two are ranked as prosperous, three ranked as comfortable, three ranked as mid-tier, and only one ranked as at risk.

Figure 2. DCI Grouping for Nevada's Regions



The full breakdown is shown in Table 3 and Figure 2, where green areas represent prosperous communities, while red areas represent at-risk communities. Figure 2 visualizes how distress in Nevada is geographically located in more isolated parts of the state. The following sections break down select components of the DCI and place Nevada and its metropolitan and micropolitan regions within the context of similar states and regions.

Table 3. DCI Grouping for Nevada's Regions

Region	DCI Group
Fallon, NV	At Risk
Pahrump, NV	Mid-Tier
Fernley, NV	Mid-Tier
Carson City, NV	Mid-Tier
Winnemucca, NV	Comfortable
Reno-Sparks, NV	Comfortable
Las Vegas, NV	Comfortable
Gardnerville Ranchos, NV	Prosperous
Elko, NV	Prosperous

GDP Growth in Nevada

Between 2007 and 2010, Nevada ranked 51st in overall GDP growth among the 50 states and the District of Columbia. The economic development initiatives that Nevada has undertaken since the recession have helped accelerate a complete recovery from what was a critical moment in the state's history, as evidenced by its increasing economic diversification (discussed in detail in the next section of the report). Between 2011 and 2017, Nevada ranked 20th in GDP growth among the 50 states and the District of Columbia. In terms of relative improvement between these two time periods (2007 to 2010 and 2011 to 2017), Nevada ranked 7th overall—in other words, Nevada had the 7th best recovery from the Great Recession among all U.S. states. However, Nevada still has room for growth when compared to peer states. Benchmarking against peer states allows us to create a coarse understanding of how Nevada's specific initiatives contributed to the state's recovery, separately from the nation-wide economic trends that boosted GDP, employment, and wages following the Great Recession.

Among five other similar states (Arizona, Colorado, New Mexico, Oregon, and Utah), Nevada ranks 5th in terms of average annual GDP growth between 2011 and 2017. Annual average GDP growth reflects the average annual rate of growth over a specific time period. Nevada's two largest metropolitan regions (Reno-Sparks and Las Vegas) grew at an average annual rate of 2.56% and 2.15%, respectively, between 2011 and 2017. In other words, each year, Reno-Sparks's GDP grew, on average, 2.56% compared to the

previous year. Among 11 similar metropolitan regions[a], the Reno-Sparks and Las Vegas metropolitan areas ranked 4th and 8th, respectively. When including the San Francisco-Oakland-Hayward and San Jose-Sunnyvale-Santa Clara metropolitan areas, Reno and Las Vegas rank 6th and 10th, respectively (see Table 4).

Table 4. Regional Economic Growth. Source: Bureau of Economic Analysis (BEA)

Metropolitan Region	Average Annual GDP Growth, 2011-2017	GDP Growth Rank
Dallas-Fort Worth-Arlington, TX	4.23%	1
Denver-Aurora-Lakewood, CO	3.01%	2
Salt Lake City, UT	2.63%	3
Reno, NV	2.56%	4
Boise City, ID	2.50%	5
Phoenix-Mesa-Scottsdale, AZ	2.41%	6
Sacramento--Roseville--Arden-Arcade, CA	2.24%	7
Las Vegas-Henderson-Paradise, NV	2.15%	8
Portland-Vancouver-Hillsboro, OR-WA	1.52%	9
Colorado Springs, CO	1.24%	10
Carson City, NV	-0.68%	11
Santa Fe, NM	-0.85%	12

While a major metropolitan area like Dallas (provided for comparative purposes) grew much more quickly between 2011 and 2017 (as did the major metropolitan areas in the Bay Area), the data on annual average growth rates show how the rankings reported in the first section obscure the degree to which Boise, Phoenix, Sacramento, and Salt Lake City grew at a very similar rate to Las Vegas and Reno-Sparks, with only Denver growing significantly faster. At an aggregate level, the recovery among large metropolitan areas in the Mountain West and Southwest looks quite similar. However, Carson City and Santa Fe are exceptions, and performed relatively poorly during the recovery. This may reflect their role as small cities home to state government and a retirement population, but it may also reflect a more general problem in the United States in which smaller metropolitan areas struggle to keep up with growth that favors larger urban areas.

[a] Nevada's metropolitan regions were benchmarked against: Boise City, ID; Colorado Springs, CO; Denver-Aurora, CO; Dallas-Fort Worth-Arlington, TX; Phoenix-Mesa-Scottsdale, AZ; Portland-Vancouver-Hillsboro, OR-WA; Sacramento-Roseville-Arden-Arcade, CA; Salt Lake City, UT; and Santa Fe, NM.

Population and Labor Force

The ability to draw new workers, rain or shine, is an enduring feature of, and contributor to, a dynamic economy poised for growth. An understanding of the population demographic trends in Nevada and the state of the overall workforce allows us to assess the specific skills challenges that Nevada is facing and the forces contributing to its labor force participation rate.

Despite its economic hardships during the recession, Nevada saw its population increase substantially, as seen in Table 5. In terms of percent change, Nevada's population grew roughly 6% between 2007 and 2010 and 12% between 2011 and 2017. During both time periods, Nevada's population growth in percentage terms ranked 3rd in the nation, beating out the national average by wide margins. It should be noted that this population growth is a feature shared by other peer states in the region (with the exception of New Mexico), and is a distinguishing characteristic of their economies. If Nevada can succeed in building a skilled workforce based on these population flows, it will succeed in the long-term diversification of its economy.

If Nevada can succeed in building a skilled workforce based on these population flows, it will succeed in the long-term diversification of its economy.

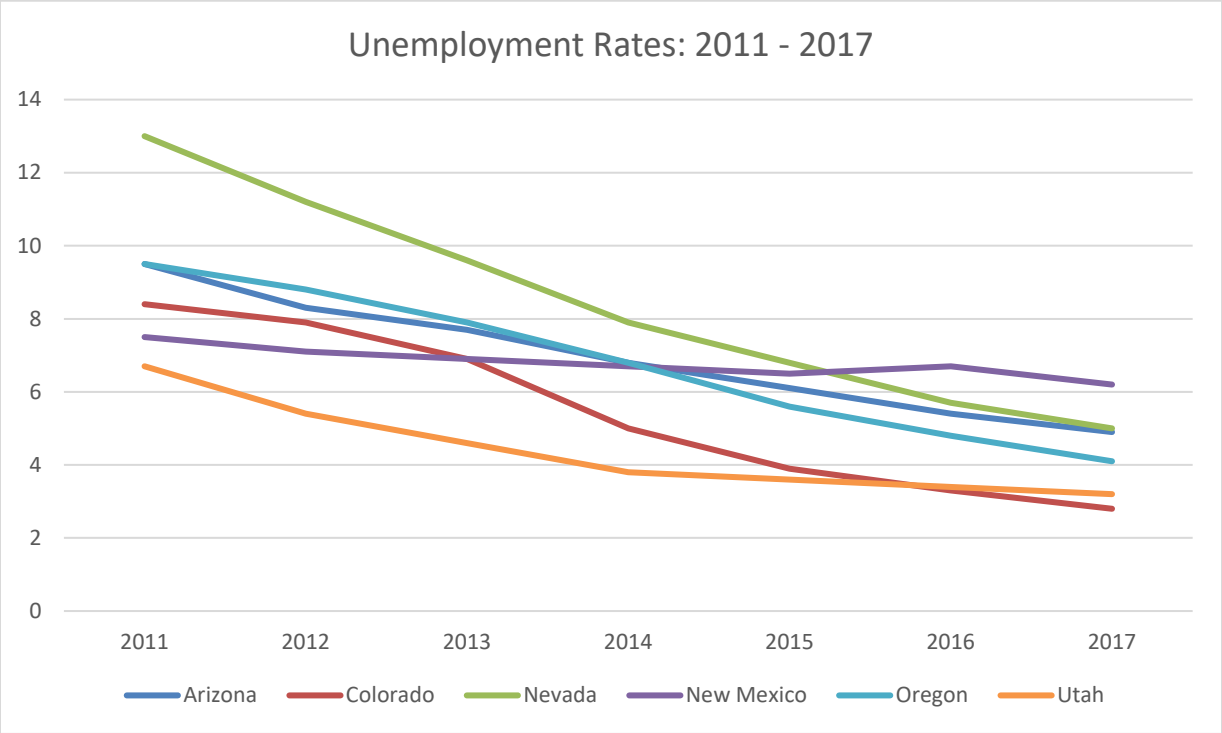
Table 5. State Population Change

State	Population Percent Change 2007-2010	Population Percent Change Rank: 2007-2010	Population Percent Change 2011-2017	Population Percent Change Rank: 2011-2017
Arizona	2.8%	30	11.0%	6
Colorado	4.8%	12	12.0%	4
Nevada	6.4%	3	12.1%	3
New Mexico	5.2%	8	2.4%	42
Oregon	3.7%	23	8.7%	12
Utah	4.3%	18	12.9%	1

While population growth is a promising indicator of a dynamic economy poised for growth, there must also be ample employment opportunities for these new individuals to contribute to the state's growth. While Nevada's population grew during the recession, the unemployment rate skyrocketed. Between 2007 and 2010, Nevada's unemployment rate grew from 4.5% to 13.5%. In 2010, Nevada had the worst unemployment rate in the nation. Nevada's economic development initiatives since that time have helped dramatically reduce unemployment in the state. Nevada's unemployment rate fell by from 14% to 5%, representing the biggest reduction in unemployment rates in the nation. However, Nevada's unemployment rate still ranks as the 7th highest unemployment rate overall.

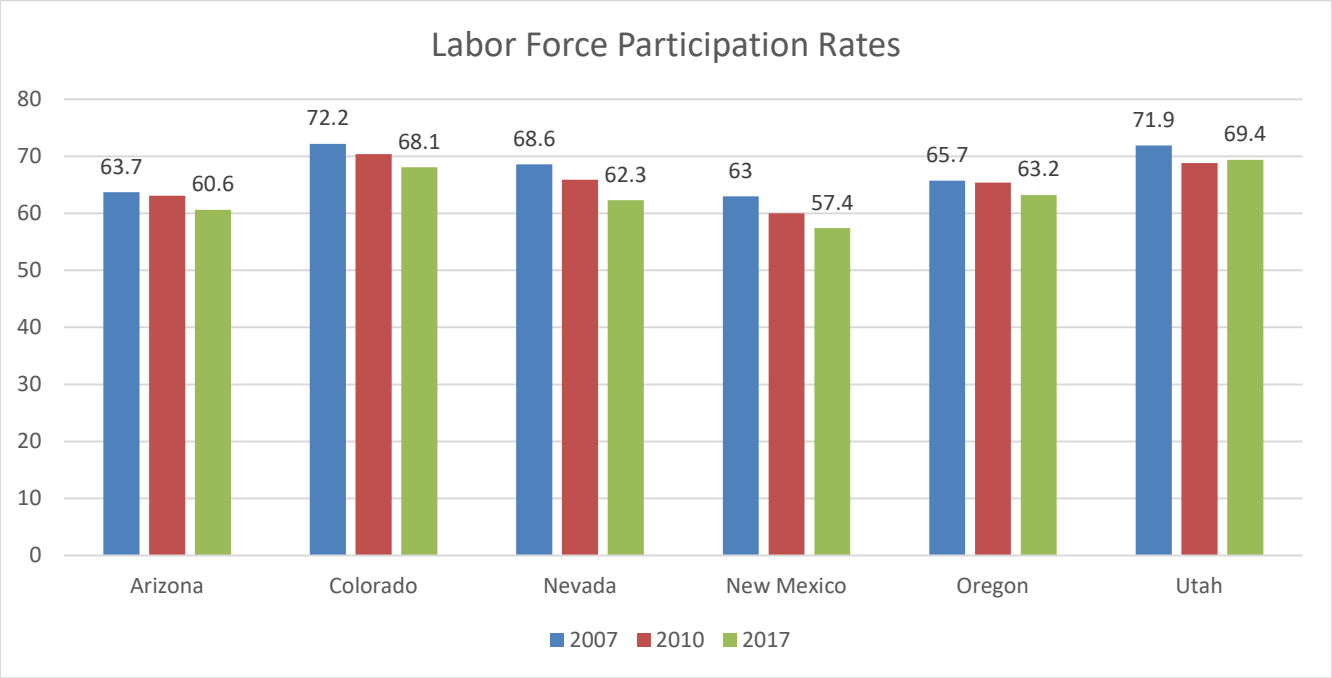
Although Nevada's unemployment rate fell more quickly and more dramatically than its peers (Arizona, Colorado, Nevada, New Mexico, Oregon, and Utah), it still has the 4th highest unemployment rate among these states, as seen in Figure 3.

Figure 3. Unemployment Rate for Nevada and Similar Regions, Between 2011 and 2017. Source: Local Area Unemployment Statistics, U.S. Bureau of Economic Analysis (BLS LAUS)



During this period, Nevada's labor force participation rates also fell. In 2007, Nevada had the 13th highest labor force participation rate in the nation at 68.6%. In 2017, Nevada's labor force participation rate was only 34th in the nation at 62.3%. Relative to its peer states, Nevada's labor force participation rate ranks 4th. Only Utah has seen an increase in labor force participation rates between 2010 and 2017, as seen in Figure 4. While this change is consistent with a national decline in participation rates, Nevada's decline has exceeded that of its peers.

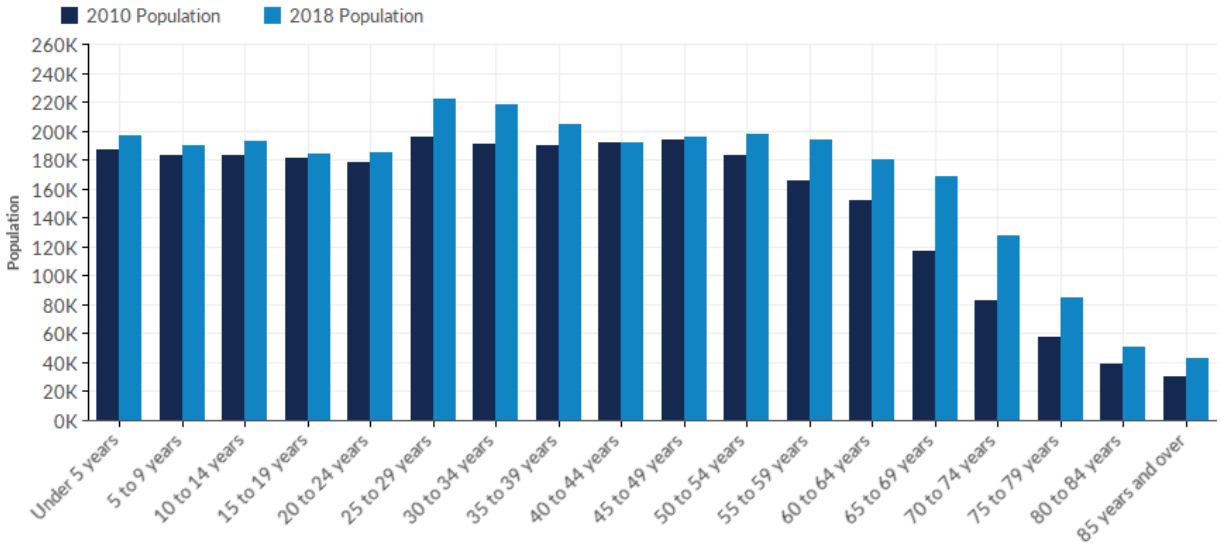
Figure 4. Labor Force Participation Rates for Nevada and Similar Regions for 2007, 2010, and 2017. Source: BLS LAUS



Nevada's population has grown considerably since 2010, and employment opportunities have followed. Part of the decline in labor force participation can be attributed to the fact that Nevada's population has seen substantial growth in ages 55 and above, as seen in Figure 5. In 2011, the median age in Nevada was 36.1, while in 2017, the median age was 37.7. These statistics indicate that Nevada is attracting an aging population. While this shift alters the composition of the workforce and changes consumption patterns, the continuing strong growth for 25- to 34-year-olds suggests that Nevada remains a popular destination for young millennials who are eager to work. This bimodal pattern of in-migration will need to be recognized in future economic development initiatives. The increase in ages 55 and above as a share of the state's population (noted in the Overview section) may be a contributing factor, but it is also possible that the state's economy is still home to a pool of discouraged workers, even after seven years of recovery.

The increase in ages 55 and above as a share of the state's population may be a contributing factor, but it is also possible that the state's economy is still home to a pool of discouraged workers, even after seven years of recovery.

Figure 5. Population Demographics Breakdown for Nevada. Source: EMSI



Metropolitan and Micropolitan Population and Labor Force Dynamics

Each region in Nevada has recovered differently from the Great Recession. A detailed, regional analysis allows us to understand which regions are overperforming, and which are underperforming. Similar to the state as a whole, Nevada's metropolitan regions saw large declines in the unemployment rate between 2011 and 2017. Nevada's main metropolitan regions saw a total drop in the unemployment rate, on average, of over 8%, as seen in Table 6.

Table 6. Metropolitan Population and Employment Change. Source: BLS LAUS

Metropolitan Region	Population Growth, 2011-2017	Total Percentage Point Change in Unemployment Rate, 2011-2017
Carson City, NV	0.01%	-8.17
Las Vegas-Henderson-Paradise, NV	12.09%	-7.99
Reno, NV	8.34%	-8.42

This is a remarkable achievement, especially when viewed from the comparative perspective of the southwestern United States as a whole. Figure 6 shows unemployment rate changes by county from 2007 to 2011 and highlights the high levels of unemployment experienced across Nevada during the Great Recession.

Figure 6. Unemployment Rate Changes (Metropolitan Regions) 2007–2011. Source: BLS LAUS

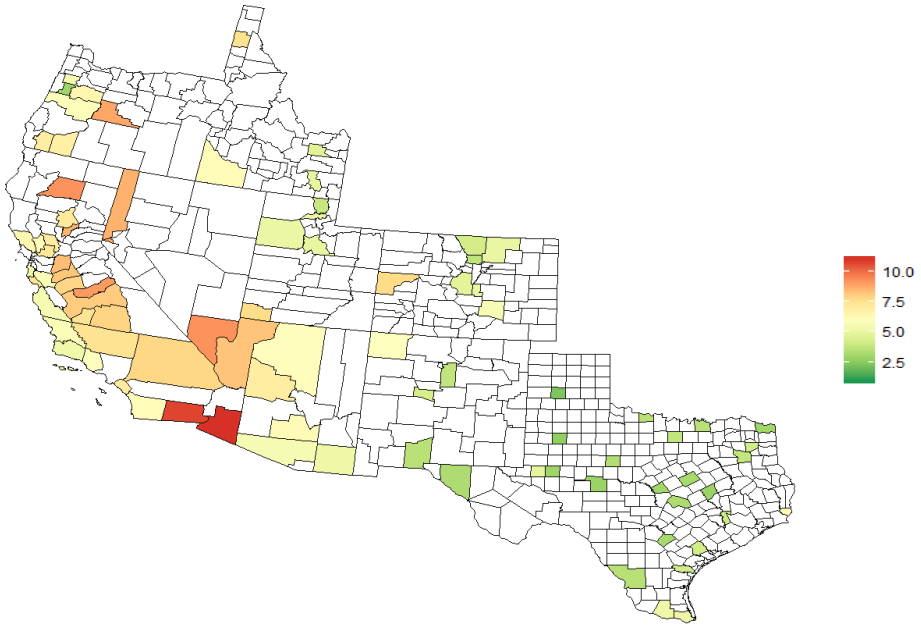
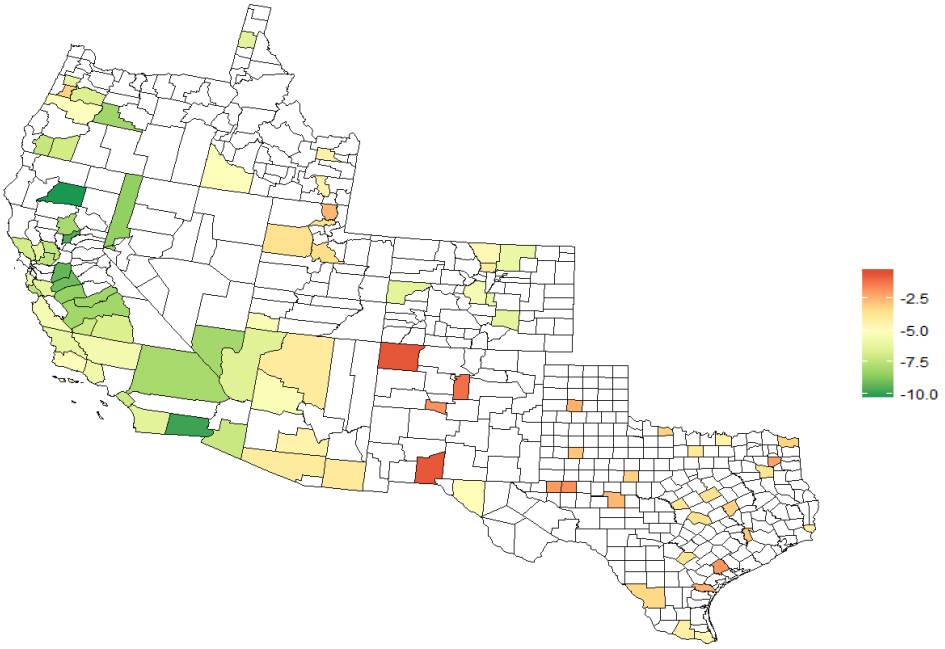


Figure 7. Unemployment Rate Changes (Metropolitan Regions) 2011–2017. Source: BLS LAUS



As seen in Figure 7, while Nevada's metropolitan regions were among the hardest hit regions during the Great Recession, in the recovery years following (2011 to 2017), Nevada's metropolitan regions performed better than almost any other metropolitan region. The transformation of the two maps over the two time periods is notable, and a measure of the resilience of Nevada's regions. However, as was the case with the state as a whole, while the metropolitan unemployment rate has declined substantially, labor force participation rates have also fallen precipitously. The Carson City and Las Vegas metropolitan regions had among the highest declines in labor force participation rate between 2011 and 2017, ranking 10th and 12th among peer regions, respectively.

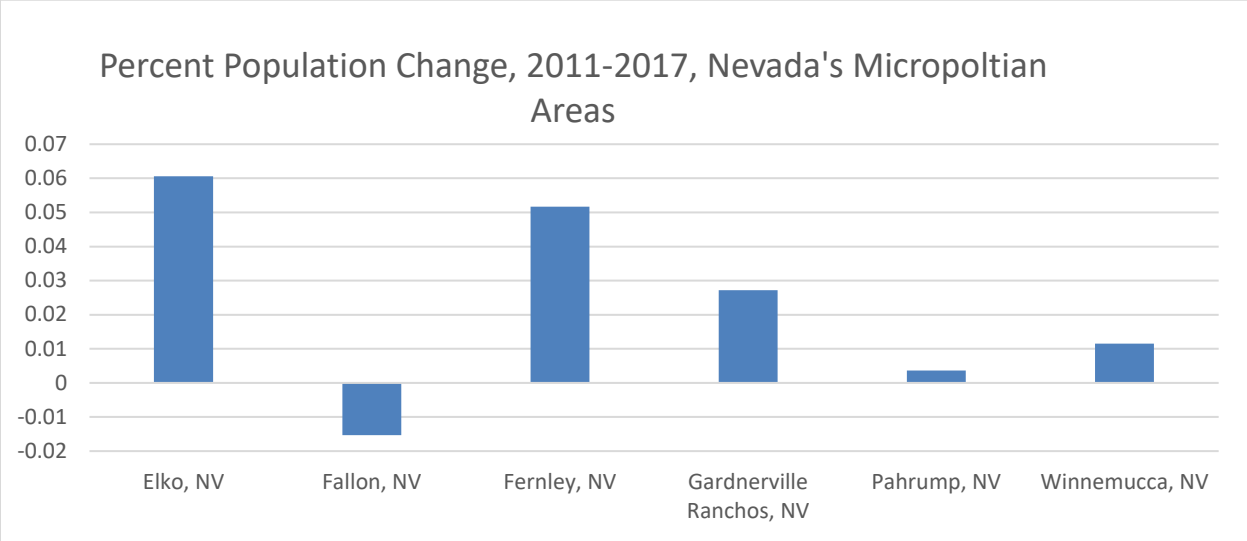
While this trend may be cause for concern, it should be remembered that this decline among the metros has occurred within the context of a national decline in labor force participation and a decline in labor force participation in other Western metropolitan regions. However, Nevada's metropolitan regions have seen a sharper decline in this rate than seen in peer regions. Any economic development strategy for the next decade must address local and regional labor force participation rates by targeting discouraged members of the workforce.

Micropolitan Population and Labor Force Dynamics

Across the United States, large metropolitan areas have captured most of the growth following the Great Recession. Separate attention must be paid to micropolitan regions that have a smaller population and tend to be less dynamic. Although relatively small, micropolitan regions make an important, specialized contribution to Nevada's economy, in particular through mining. Each of these regions tend to have unique, defining assets that separate them from other micropolitan areas, making it hard to identify a universe of peer micropolitan regions. As such, Nevada's six micropolitan regions are examined within the context of all micropolitan regions in California, Oregon, Nevada, Arizona, Utah, Idaho, Colorado, New Mexico, and Texas.

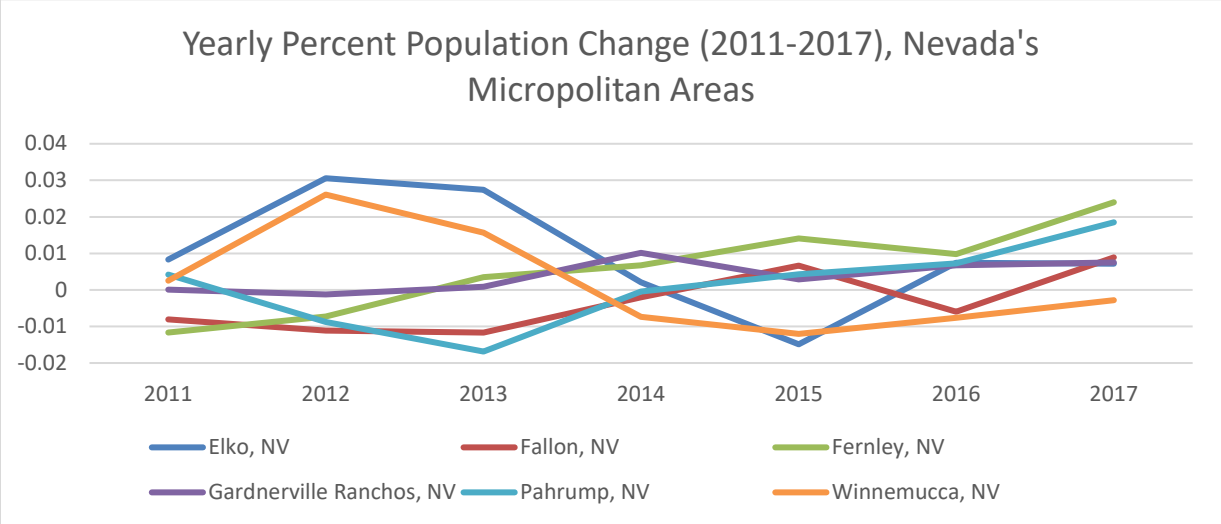
Nevada's six micropolitan regions have experienced differing levels of population change between 2011 and 2017. Elko and Fernley have seen the greatest percent increases in population, while Fallon has seen a decline in population, as seen in Figure 8.

Figure 8. Total Percent Population Change, 2011–2017 for Nevada's Micropolitan Regions. Source: BLS LAUS



On a year-to-year basis, population changes in Nevada's micropolitan communities have been irregular, as seen in Figure 9. The Fernley micropolitan region has seen a steady increase in population year over year, while Elko and Winnemucca saw high growth years in 2011, 2012, and 2013, which petered out in 2014. Elko has seen high growth in 2015, 2016, and 2017 while Winnemucca's population has continued to decline year over year since 2014. Conversely, while Pahrump saw an initial decline in population, starting in 2014 it has experienced consistent year-over-year growth in population.

Figure 9. Yearly Percent Population Change, 2011–2017, Nevada's Micropolitan Areas. Source: BLS LAUS



An investigation of the factors behind year-to-year population changes in Nevada's micropolitan regions must also account for the factors behind total percent population change in unemployment between 2011 and 2017. Among Nevada's micropolitan regions, Fernley and Pahrump were hit hardest by the

Great Recession, experiencing an increase in the unemployment rate of 11.09 and 10.82 percentage points, respectively.

As seen in Table 7, in the years following the Great Recession most of Nevada's micropolitan regions experienced a complete recovery. Except for Elko and Winnemucca, Nevada's micropolitan regions now have approximately the same level of unemployment that they had in 2007, before the beginning of the Great Recession. Winnemucca and Elko weathered the Great Recession relatively well, experiencing growth in the unemployment rate of 4.40 and 5.11 percentage points, respectively. However, the unemployment rate remains approximately 1 percentage point higher than it was in 2007.

Table 7. Unemployment and Labor Force Participation Rate Changes for Nevada's Micropolitan Regions. Source: BLS LAUS

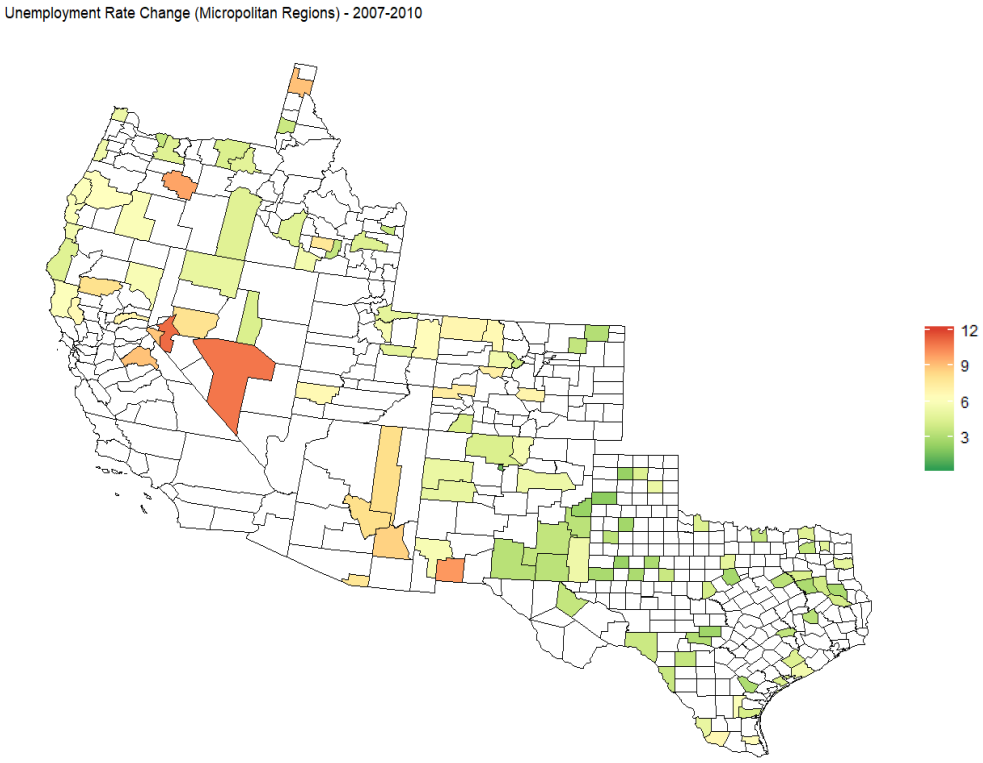
Micropolitan Region	Unemployment Rate Change (2007–2010)	Unemployment Rate Change (2011–2017)	Unemployment Rate (2017)	Labor Force Participation Rate Change (2011–2017)
Elko, NV	4.40	-3.55	7.70	-4.88
Fallon, NV	8.06	-7.99	4.42	-1.50
Fernley, NV	11.09	-10.76	5.96	-3.90
Gardnerville Ranchos, NV	8.91	-8.44	4.80	-2.15
Pahrump, NV	10.82	-10.43	6.38	-1.09
Winnemucca, NV	5.11	-3.65	4.18	-3.18

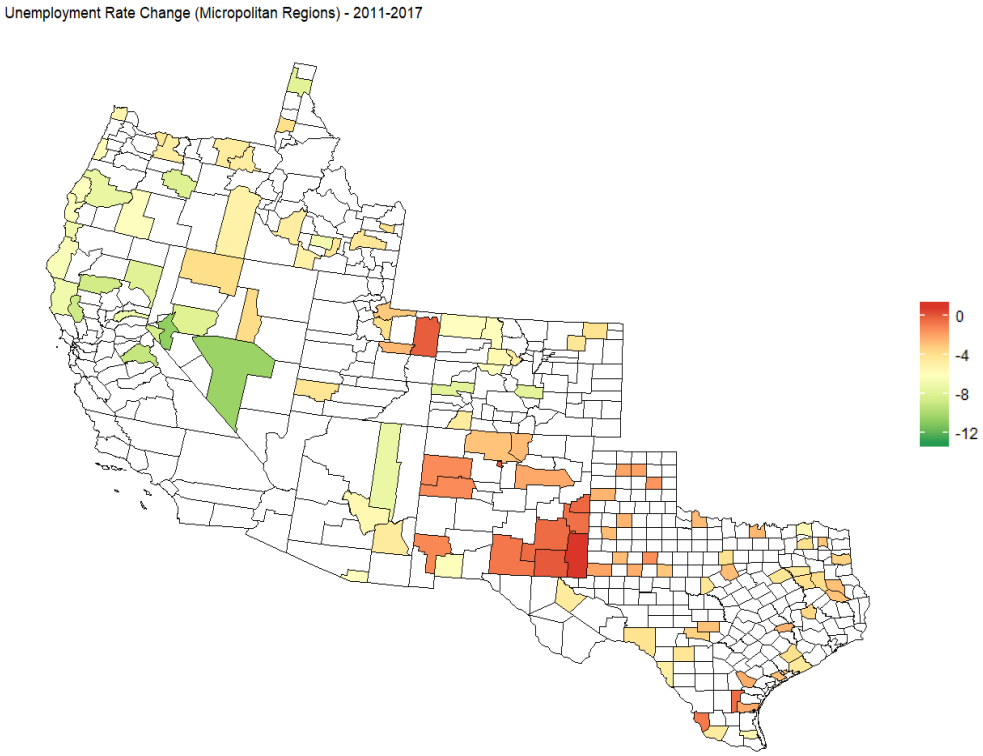
Relative to other micropolitan regions in the area, Nevada's micropolitan areas were hit harder by the Great Recession but also recovered better than other regions, as seen in Figure 10. Regions that were hit harder by the Great Recession also recovered better than regions that weathered it relatively well.

The fact that labor force participation rates have also declined across the board for micropolitan regions suggests that the recovery from the Great Recession may have left some share of the workforce discouraged and out of the workforce. While Elko saw the largest percentage increase in population between 2011 and 2017, it also had the largest decrease in the labor force participation rate, and the smallest decrease in the unemployment rate between 2011 and 2017 (see Table 7). Relative to other western micropolitan regions, Nevada only saw a modest decline in labor force participation.

Nevada's micropolitan regions each have their own unique characteristics and have generally grown considerably between 2011 and 2017. An in-depth examination of the unique aspects of each region and how those aspects correlate to population and employment growth is necessary to properly understand these population and workforce characteristics to ensure that new economic development initiatives adequately address the specific needs and challenges of individual regions.

Figure 10. Unemployment Rate Changes (in Percentage Points) for 2007-2010 and 2011-2017 in Western Micropolitan Regions. Source: BLS LAUS





Wages

Growth in population and employment opportunities are still only pieces of a larger economic development puzzle. High-wage jobs will help ensure the future prosperity of Nevada's economy. Between 2007 and 2010, the year-to-year average percent change in wages remained positive for most Western states and for the United States as a whole. However, as seen in Figure 11, Nevada experienced an average annual decline in wages of 4.43% per year between 2007 and 2011. Among peer regions, only Arizona saw a similar, prolonged average decline in wages.

However, in the period following the Great Recession between 2011 and 2017, Nevada has seen a consistent, and impressive, average annual percent increase in wages of 4.25%. This wage growth outpaced the U.S. average but is still behind Utah (+5.62%), Oregon (+5.38%), Colorado (+4.93%), and California (+5.40%). Because these other states did not experience the same annual average percent decline during the Great Recession, Nevada's growth in wage is still lagging behind peer states.

The number of establishments in Nevada also fell during the great recession. Among Nevada's peer states, only Washington (+2.1%), California (+1.1%), New Mexico (+0.70%), and Texas (+0.23%) saw average annual percent increases in the number of establishments. In contrast, Nevada saw the third highest annual average percent decline in the number of establishments (-1.30%), below only Colorado (-1.33%) and Arizona (-3.30%).

Figure 11. Annual Average Percent Change in Wages, 2007–2010. Source: Quarterly Census of Employment and Wages (QCEW)

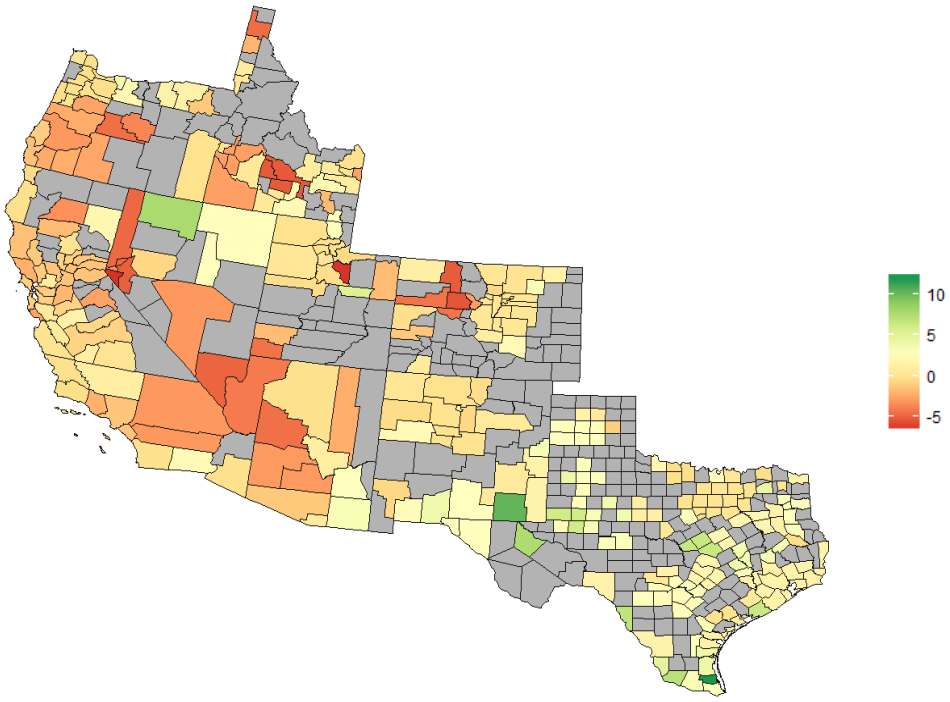
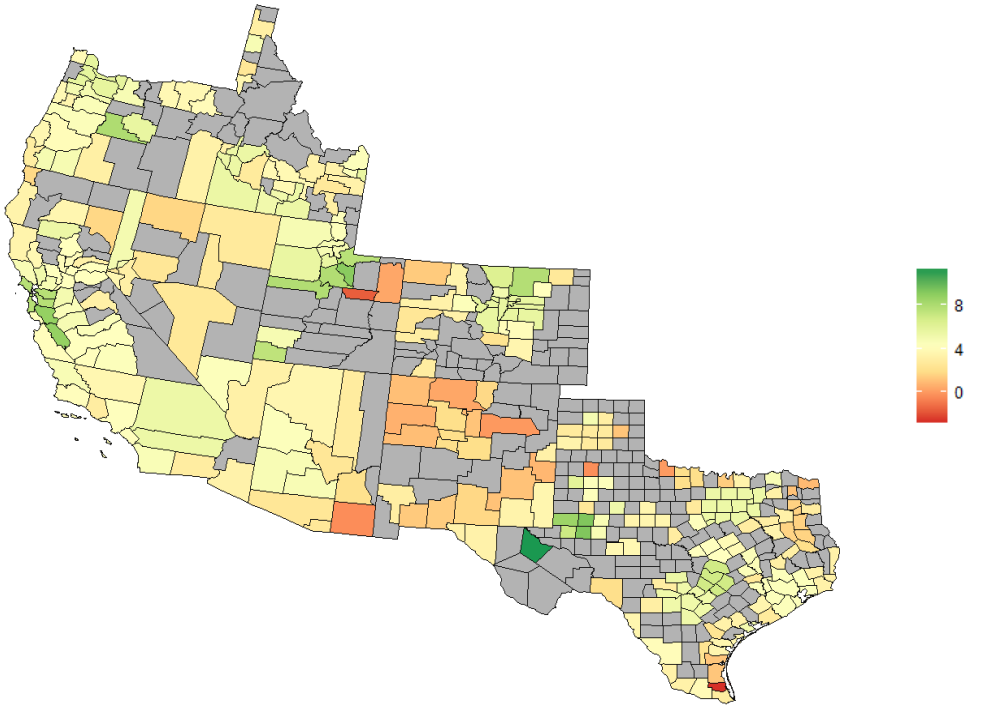


Figure 12. Annual Average Percent Change in Wages, 2011–2017. Source: QCEW



Between 2011 and 2017, as seen in Figure 12, Nevada's metropolitan and micropolitan regions saw a slightly above average increase in wages relative to other western regions. However, Nevada has no "superstar" metropolitan or micropolitan regions with respect to wage growth between 2011 and 2017. Reno-Sparks saw the greatest average annual percent increase in wages (+5.01%), followed closely by Las Vegas (+4.2%). Winnemucca had the lowest average annual percent increase in wages (+1.77%) over this period. Figures 8 and 9 show the intensity of the decline in wages in the Mountain West during the recession, and their subsequent recovery. However, it should be noted that outside Denver, the only "superstar" metropolitan area in the Mountain West, wages have recovered more slowly than on the West Coast.

Conclusion

Nevada's strong recovery from the Great Recession is impressive. To ensure that Nevada's growth following the recession is not simply a "return to the norm" but rather represents a solid foundation for increased diversification, a detailed analysis of Nevada's industry sectors, workforce, strengths, assets, opportunities, and threats is needed. The next section of this report dives deeper into the details of Nevada's economy to understand why, in spite of diversification, wages have not grown as fast as they have in peer states, what the impact of an influx of elderly and retired individuals means for the state, and how the declining labor force participation rate may influence Nevada's future growth.

Nevada's Diversifying Economy: Targeting Specific Industries, Occupations, and Skills

Targeting Specific Industries, Occupations, and Skills

This section of the report dives deeper into Nevada's economy. In spite of the rise of new sectors, wages have not grown as fast as they have in peer states. The analysis parses each target sector and discovers important variation among sub-sectors. This section also assesses the impact of an influx of elderly and retired individuals and its contribution to the declining labor force participation rate. At the same time, this section flags discouraged workers with limited skills as an opportunity for innovative workforce initiatives.

The analysis that follows builds on the preceding scorecard by providing a detailed report on the state of Nevada's seven targeted industry sectors. The analysis helps state leaders and stakeholders to understand how these sectors have performed between 2011 and 2017, identify opportunities for continued growth, and highlight any warning signals. These industry sectors are used as focal points to investigate regional and geographic variations in Nevada's economy, provide an overview of key occupational trends in each sector, and examine the key skills and skill gaps in each of the sectors.

The task of identifying and growing strategic industry opportunities for Nevada is an iterative process that requires incorporating both data-based inputs as well as stakeholder interviews. In the years 2011 to 2017, following the Great Recession, Nevada's economy created more than 220,000 jobs. While raw job creation is a promising indicator of a dynamic growth, understanding the distribution and nature of these jobs across industry sectors provides a more informative measure of the health and potential of Nevada's economy. GOED focused on fostering growth in the following key industries:

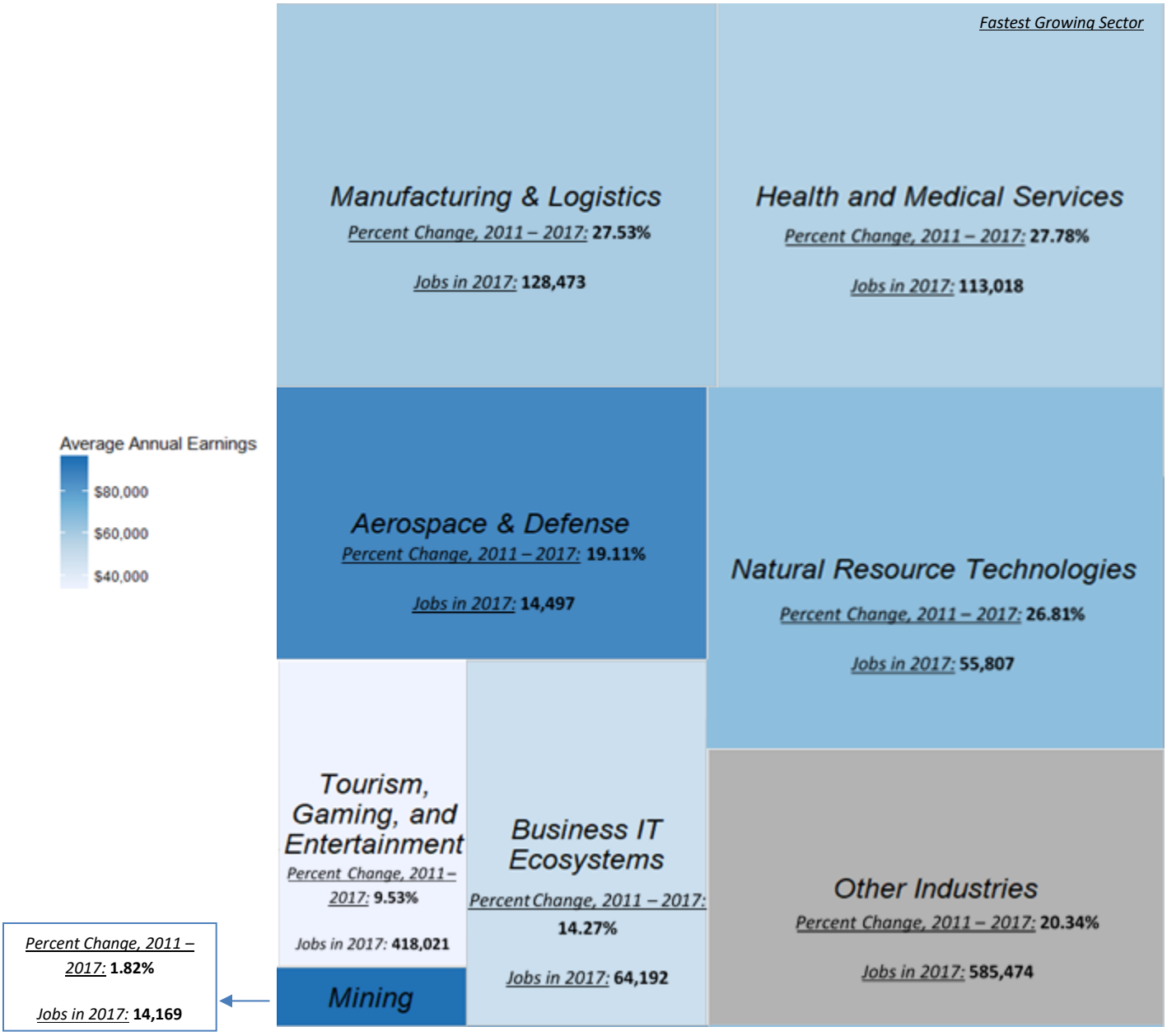
- Aerospace and Defense
- Business IT Ecosystems
- Health and Medical Services
- Manufacturing and Logistics
- Mining
- Natural Resource Technologies
- Tourism, Gaming, and Entertainment (TGE)

Figure 13 illustrates the percent change in the number of jobs by sector between 2011 and 2017. The size of each cell represents the growth of that sector, while the shading of each cell captures average annual earnings for each industry. As a whole, Nevada's economy has seen the greatest percent growth in the health and medical services, manufacturing and logistics, and natural resource technology sectors. Although tourism, gaming, and entertainment remains a very large part of the economy, its percentage increase in employment following the recession was modest. These fast-growing sectors, with the inclusion of the aerospace and defense sector, are all high-wage sectors. However, to ensure that Nevada's economic development agenda is proceeding appropriately, it is important to understand where the growth within these sectors comes from. Each of the seven main industry sectors is made up of many different sub-industries—some of which pay higher wages than others. In the past eight years, Nevada has had initial success in diversifying its economy. However, as seen in Table 8, these sectors also have relatively high variation in wages.

Table 8. Average Annual Wages and Standard Deviation in Wages for Target Sectors. Source: EMSI

Sector	Average Annual Wages	Standard Deviation in Wages
Aerospace and Defense	$84,882	$26,762
Business IT Ecosystems	$78,983	$32,151
Health and Medical Services	$60,575	$21,325
Manufacturing and Logistics	$68,084	$27,218
Mining	$91,540	$18,645
Natural Resource Technologies	$73,868	$35,406
Tourism, Gaming, and Entertainment	$53,315	$61,556

Figure 13. Percent Change in Number of Jobs for Select Sectors in Nevada's Economy Between 2011 and 2017. Source: EMSI



In other words, wages across the sub-sectors that make up these industries vary substantially. If growth has been concentrated in lower wage sub-industries then this may partially explain why wages in Nevada as a whole have not kept up with wages in neighboring peer states. Table 9 illustrates how, for aerospace and defense, manufacturing and logistics, and natural resource technologies, the average annual wage is higher among the sub-industries that shrank in employment from 2011 to 2017 than it is among sub-industries that grew in employment during that time period. For health and medical services, the opposite is true.

Table 9. Average Percent Change in Jobs between 2011 and 2017 and Annual Average Wages for Growing and Shrinking Sub-Industries within Select GOED Target Sectors. Source: EMSI

	Mean Percent Change in Jobs Within Growing Sub-Industries, 2011–2017	Average Annual Wage
Aerospace and Defense	68%	$92,600
Health and Medical Services	77%	$62,430
Manufacturing and Logistics	75%	$64,047
Natural Resource Technologies	72%	$70,084
	Mean Percent Change in Jobs Within Shrinking Sub-Industries, 2011–2017	**Average Annual Wage**
Aerospace and Defense	-7%	$113,710
Health and Medical Services	-33%	$57,807
Manufacturing and Logistics	-18%	$82,213
Natural Resource Technologies	-21%	$97,148

While Nevada's economy has been successful in diversifying broadly (away from concentration in tourism, gaming, and entertainment, for example), at a narrower level, diversification may still be concentrated in lower-wage sub-sectors.

A full list of all the sub-industries within each GOED target sector is presented in Appendix D. Table 9 implies that growth in some of the high-wage sectors of the economy may have been concentrated in some of the lower-wage sub-industries within a specific, targeted sector. Thus, while Nevada's economy has been successful in diversifying broadly (away from concentration in tourism, gaming, and entertainment, for example), at a narrower level, diversification may still be concentrated in lower-wage sub-sectors. A crucial question to consider when formulating economic development objectives is the type of industries in which policy makers seek to foster growth. The character of each individual industry correlates to how innovative and high-paying that industry may be.

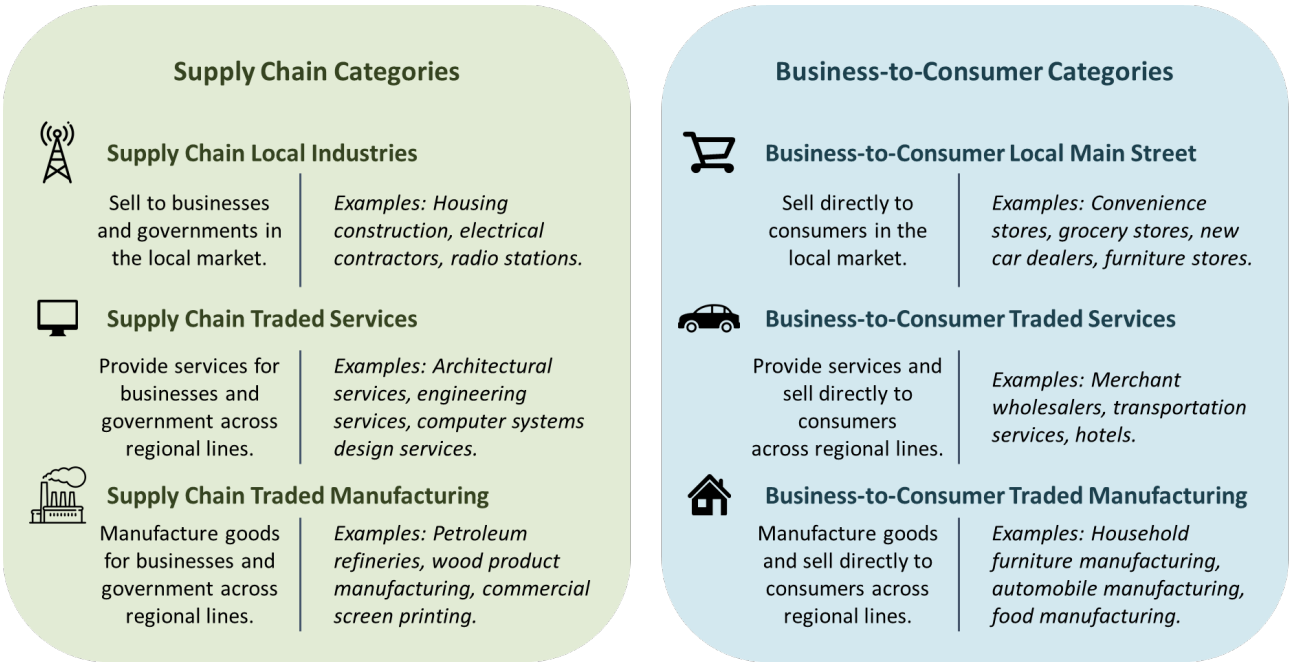
This report takes an innovative approach to understanding an industry's key characteristics. Rather than divide the economy between just

manufacturing and service sector industries, the economy can be separated into "supply chain" industries that sell to other businesses, and "business-to-consumer" industries that sell to consumers. Industries that are part of the supply chain economy contribute to other industries and have ripple effects across the economy. Generally, these industries are more innovative, pay higher wages, and grow faster. Conversely, business-to-consumer industries are dependent on other industries, tend to be more cyclical, and generally have lower wages.[3]

Supply chain industries also produce specialized inputs and are desirable because they are associated with positive externalities to learning and regional innovation capacity. These industries have both downstream and upstream linkages with multiple industries, allowing for diffusion, and often benefit from co-location with geographically concentrated consumers.

To categorize Nevada's economy, the supply chain or business consumer category can be added to two other classifications, local and traded industries and manufacturing and service industries. These distinctions leave six total categories, as summarized in Figure 14.

Figure 14. Supply Chain and Business-to-Consumer Categories Summary



Note that the business-to-consumer trading manufacturing category is not included in the regional analysis of Nevada because only Las Vegas has industries in this category, and it accounts for less than 1% of total job growth in the region. Similarly, the supply chain traded manufacturing category is not included in the regional analysis of Nevada because these industries are only present in Reno and Las Vegas, and they account for less than 5% of total job growth in the region.

In general, the analysis shows that Nevada's diversification efforts are proceeding in a positive direction. The manufacturing and logistics, aerospace and defense, and natural resource technologies sectors are all thriving and adding jobs in high-wage, highly innovative sub-industries. These sectors are also

diversifying into new areas, such as drone manufacturing, clean energy, and semiconductor manufacturing.

The business IT ecosystems sector has seen massive growth in the data processing and storage industry but remains strongly connected to the call center and telemarketing industry. In mining, new opportunities for lithium mining are driving potential new growth opportunities, while the state's historical gold and silver mining industries are continuing to flourish. In health and medical services, there has been some growth in general hospitals, but there is still a shortage of doctors, especially in rural regions. The tourism, gaming, and entertainment sector has perhaps seen the most prominent within-sector diversification, as jobs have shifted away from casinos and casino hotels to restaurants, conventions and trade shows, breweries, and distilleries.

Nevada must provide opportunities for skill development and workforce training for workers with lower levels of formal educational credentials or education to ensure that workers, who are often enterprising and hardworking, are not discouraged from participating in the labor force and have opportunities for growth.

As the composition and focus of Nevada's economy shifts, Nevada should ensure that it provides adequate support for the burgeoning new industries by providing opportunities for R&D and fostering innovation. Currently, R&D industries make up only a small portion of jobs in Nevada's economy. Investment in R&D could help foster growth in these highly innovative industries, especially through startups and inward investment. The Innovation Ecosystem portion of this report provides an in-depth view of Nevada's innovation systems. From a workforce perspective, Nevada's economy is dominated by a large pool of workers with either no formal educational credentials, or little to no higher education beyond high school. This group of workers continues to fuel the state economy and supports Nevada's most dynamic and innovative sectors. Wages in occupations requiring higher educational attainment are high, indicating that demand for these workers is high and is potentially not being met. Continuing to develop, activate, and provide opportunities for this large pool of workers will be critical in addressing the declining labor force participation rates in the state.

To continue to grow, Nevada must pursue a two-part strategy. First, Nevada must provide opportunities for skill development and workforce training for workers with lower levels of formal educational credentials or education to ensure that workers, who are often enterprising and hardworking, are not discouraged from participating in the labor force and have opportunities for growth. Simultaneously, Nevada should also invest in R&D and encourage higher-skilled workers to come to Nevada to drive the high-end of Nevada's economy. Nevada should view its pool of workers with few formal educational

credentials or only a high school education as an asset, and the state has a tremendous opportunity to lead the nation in developing its "unskilled" workforce.

In summary, Nevada's diversification efforts are proceeding well with a few areas of concern. By identifying and addressing workforce needs in particular, Nevada can continue to diversify and expand its economy. To build on successful diversification efforts, a detailed examination of the specific industries, occupations, and skills that define Nevada's economy is necessary to ensure that economic develop initiatives can be properly tailored to capitalize on any opportunities and course-correct when necessary.

> Nevada should also invest in R&D and encourage higher-skilled workers to come to Nevada to drive the high-end of Nevada's economy.

Aerospace and Defense

The aerospace and defense sector in Nevada is defined by twelve sub-industries. Between 2011 and 2017, the aerospace and defense sector grew by 2,035 jobs, or 19%. Eight sub-industries grew, while only three industries[b] shrank. More than half of the statewide growth in the aerospace and defense industry was in the "other support activities for air transportation" industry, specifically in the Las Vegas metropolitan area, adding 1,103 jobs between 2011 and 2017.

Regionally, jobs in the aerospace and defense sector increased in Las Vegas (+1,848), Reno-Sparks (+424), and Gardnerville (+48), while falling in the other metropolitan and micropolitan regions. Carson City saw a decline of 226 jobs between 2011 and 2017. Regional wages are slightly higher in Las Vegas ($103,558 annual average earnings per job) than in Reno-Sparks ($100,180 annual average earnings per job).

In Reno-Sparks, the most dominant sub-industry is engineering services, which added 541 jobs between 2011 and 2017. The dominance of engineering services in the Reno-Sparks metropolitan area could be, in part, due to the strong engineering program at University of Nevada, Reno. However, stakeholder interviews identified the graduation rate for this program to be relatively low, but that is true of many engineering programs in the United States.

Gardnerville saw a sharp increase in the engineering services industry, adding 46 jobs to grow by more than 50% from 2011 to 2017. Gardnerville also added almost 30 jobs in the small arms, ordnance, and ordnance accessories manufacturing industry, an industry that did not exist in 2011. While this growth may seem small or trivial, growth in the aerospace and defense sector in Gardnerville can continue to be cultivated, especially through developing partnerships with the Reno-Sparks metropolitan area and existing university system.

[b] Bolt, nut, screw, rivet, and washer manufacturing; aircraft engine and engine parts manufacturing; guided missile and space vehicle manufacturing; and research and development in the physical, engineering, and life sciences.

Growth in the aerospace and defense sector was concentrated in the supply chain traded manufacturing and services categories. Aerospace and defense lost jobs in research and development in the physical, engineering, and life-sciences industry but saw growth in flight training, aircraft manufacturing, engineering services, and other support activities for air transportation. Investment in R&D and workforce training may boost growth in this sector. Appendix Figure 1 illustrates the breakdown of growth between 2011 and 2017 in absolute terms, and average annual wages in 2017 for each of the sub-industries that make up the aerospace and defense sector. Each data point is sized relative to the number of jobs in that sub-industry in 2017.

Aerospace and defense added one new industry between 2011 and 2017: aircraft manufacturing. Over 100 jobs in 2017 were part of this industry, with average annual earnings of $73,860. This industry includes drone-related manufacturing activities, and the increase of drone manufacturing may be one of the factors that explains why there was growth in the aircraft manufacturing industry while the aircraft engine and engine parts manufacturing shrank. Interviewees reported that local community college drone programs are currently doing an excellent job of training workers to join drone companies and succeed in this industry, although more tailoring of programs could still be helpful for companies hiring locally.

This sector is very closely related to the manufacturing and logistics sector, sharing some of the same sub-industries. Nevada's diversification into this sector can be paired with targeted investment and economic development agendas designed to promote growth in the manufacturing and logistics sector. In terms of natural assets, Nevada boasts long airport landing strips that make it an attractive testing ground for aviation activities, and a small military base in Hawthorne. However, Nevada's airspace is not always easily accessible due to federal land/air ownership, and the need for security surrounding many of the military and defense related initiatives in Nevada means that the state cannot always advertise some of its most promising and innovative programs.

Occupations and Skills

The occupations that make up the largest share of industry jobs in the aerospace and defense sector are civil engineers (7.6%); aircraft mechanics and service technicians (4.3%); and laborers and freight, stock, and material movers (2.5%). Data and reports from EMSI show that among the top 10 occupations in the aerospace and defense sector, jobs increased by 17,833 over the last five years, and are projected to increase by 9,368 over the next five years. Regional job concentration is 1.03 times the national job concentration, but regional median earnings (at $18.55 an hour), are only $0.26 per hour above the national median earnings of $18.29 per hour.

The regional supply for workers in these top 10 occupations come from the University of Nevada, Reno (725 degrees and 0 certificates); University of Nevada, Las Vegas (521 degrees and 23 certificates); College of Southern Nevada (416 degrees and 13 certificates); and Truckee Meadows Community College (133 degrees and 17 certificates).

As seen in Table 10, the majority of employment in the aerospace and defense sector is comprised of occupations with bachelor's or associate's degrees, with high school diplomas and below less important.

Table 10. Share of Jobs in Aerospace and Defense Sector Sub-Industries, by Occupational Entry-Level Education Levels. Source: EMSI

Education	Share of Industry Jobs (2018)
Doctoral or professional degree	1.9%
Master's degree	0.6%
Postsecondary nondegree award	5.5%
Associate's degree	12.4%
Bachelor's degree	43.6%
Some college, no degree	1.3%
High school diploma or equivalent	29.8%
No formal educational credential	4.7%

Because Nevada's economy as a whole has such a high population of workers without traditional or formal schooling, activating and training skilled workers remains a challenging hurdle. Companies operating within this sector would benefit from developing partnerships and programs with local colleges and universities. Truckee Meadows Community College has invested in special drone and advanced manufacturing programs, and the fact that it is producing a relatively high number of completions is promising. Similarly, University of Nevada, Reno, has a reputation for its strong engineering program, providing a supply of local workers to the aerospace and defense sector.

Across aircraft manufacturing, engineering services, and other support activities for air transportation, the top companies hiring for positions are Aecom, Western Mine Engineering, Affinity, Jacobs Engineering Group, and Arcata Associates. The top posted job titles are maintenance mechanics, civil engineers, project managers, design engineers, and system engineers. The top hard or technical skills are civil engineering, occupational safety and health, and Sensitive Compartmented Information (SCI Clearance). These trends indicate that the aerospace and defense sector may be competing for talent with other, more civil engineering-oriented industries.

Business IT Ecosystems

The business IT ecosystems sector in Nevada is defined by 44 sub-industries, 26 of which grew and 18 of which shrank. Between 2011 and 2017, the business IT ecosystems sector grew by 15,792 jobs, or 14.27%. A little less than half of the growth in this sector came from the telemarketing bureaus and other contact centers industry in Las Vegas, with the temporary help services industry in both Las Vegas and Reno-Sparks contributing to a little less than 20% of the growth in this sector. In Las Vegas, data processing, hosting, and related services, along with computer systems design services, combined contributed to about 11% of the growth in the business IT ecosystems sector.

These trends indicate that call centers are still a dominant industry in Nevada. However, the rapid growth in data processing, hosting, and related services is promising, as it indicates that more and more companies (such as Switch, located outside of Las Vegas) may be recognizing the value of Nevada's stable natural environment.

Regional development of supporting infrastructure, especially in the micropolitan regions, as well as improving connectivity in the state could help dramatically boost the business IT ecosystem sector in Nevada.

Regionally, Las Vegas (+12,878), Reno-Sparks (+3,507), Pahrump (+159), and Gardnerville (+53) all saw growth in sub-industries in the business IT ecosystems sector, while the other regions saw a decline, with Elko (-162) losing the most jobs in this sector. Pahrump saw the most growth in facilities support services (+79) but also saw the arrival of three new industries: data processing, hosting, and related services (+24); internet publishing and broadcasting and web search portals (+49); and computer systems design services (+11). Gardnerville, on the other hand, actually saw a decline in these software-related industries (with the exception of internet publishing and broadcasting and web search portals), and towards the call center-related industries. Regional development of supporting infrastructure, especially in the micropolitan regions, as well as improving connectivity in the state could help dramatically boost the business IT ecosystem sector in Nevada.

As seen in Appendix Figure 2, in the business IT ecosystems sector, wages and growth were strongest in the supply chain traded services category, including industries, such as software publishers; computer systems design services; and data processing, hosting, and related services. The rapid growth of these industries may represent a structural shift in Nevada towards these higher paying, more innovative areas of the economy. In Appendix Figure 2**.**, to capture variation among other data points, two outliers are excluded: the temporary help services industry (+3,089) and the telemarketing bureaus and other contact centers (+8,730) industry.

The problems facing the business IT ecosystem sector mirror the problems facing Nevada as a whole: despite ongoing diversification, and a strong potential for growth and innovation across may highly dynamic sub-industries, the state (and, in this case, the sector) remain deeply rooted in low-wage, highly cyclical areas of the economy.

Wages in industries in the supply chain local category are still low, but the data indicate that the sector is adding jobs in high-wage, innovative industries. The rise of this sector speaks to Nevada's strong local entrepreneurial culture and potential for innovation. As discussed in the Innovation Ecosystem section, there is still substantial work to be done in developing the business IT ecosystem sector.

Occupations and Skills

The occupations that make up the largest share of industry jobs in the business IT ecosystem sector are customer service representatives (12.4%); laborers and freight, stock, and material movers (7.8%); and sales representatives, services (3.4%). The software developers for applications occupation only makes up 2.8% of industry jobs, and the computer programmer occupation makes up 1.2% of jobs. Data and

reports from EMSI show that among the top 10 occupations in the business IT ecosystem sector, jobs increased by 29,431 over the last five years, and are projected to increase by 15,922 over the next five years. While regional job concentration is 0.95 times the national job concentration, regional median earnings are $0.71 per hour below the national median earnings of $17.62 per hour, making the cost of labor for this sector relatively cheap in Nevada.

As seen in Table 11, the business IT ecosystem sector employs workers with high school diplomas, bachelor's degrees, or no formal educational credentials. Most of the top occupations in the business IT ecosystem sector are low-skill and entry-level occupations, supporting the idea that this sector is still a nascent one in the region, largely comprised of call centers, for example.

Table 11. Share of Jobs in Business IT Ecosystem Sector Sub-Industries, by Occupational Entry-Level Education Levels. Source: EMSI

Education	Share of Industry Jobs (2018)
Doctoral or professional degree	0.4%
Master's degree	0.2%
Associate's degree	2.8%
Postsecondary nondegree award	3.8%
Bachelor's degree	24.6%
Some college, no degree	3.2%
High school diploma or equivalent	46.2%
No formal educational credential	18.7%

The regional supply for workers in these top 10 occupations come from the University of Nevada, Reno (714 degrees and 0 certificates); University of Nevada, Las Vegas (612 degrees and 23 certificates); College of Southern Nevada (479 degrees and 168 certificates); and Truckee Meadows Community College (154 degrees and 18 certificates).

Across data processing, hosting, and related services; custom computer programming services; and computer systems design services, the top companies hiring for positions are Computer Task Group Incorporated, Fiserv, Sirius Computer Solutions, Sykes Enterprises, and WIPRO LIMITED. Postings are predominantly in Las Vegas; however, Fallon ranks above Reno-Sparks in terms of postings. Companies are seeking software engineers, customer service representatives, project managers, java developers, and business analysts. In terms of hard skills, companies are looking for proficiencies with SQL, Agile Software Development, Java, JavaScript, and information systems.

The College of Southern Nevada recently launched an Apple app coding course and has several other certificate programs designed to train and develop a local workforce, which is reflected in the high number of students with certificates coming out of the College of Southern Nevada. These certificate programs are one way Nevada can continue to grow the higher wage, more innovative sub-industries within the business IT ecosystem sector.

Health and Medical Services

The health and medical services sector in Nevada is defined by 42 sub-industries. Between 2011 and 2017, the aerospace and defense sector grew by 24,274 jobs, or 27.78%. During this same time period, 38 sub-industries grew, while only four industries[c] shrank. Statewide growth in the health and medical services sector was not overtly concentrated in one region or one industry. Most of the growth in this sector occurred in the Las Vegas metropolitan region—in the general medical and surgical hospitals, services for the elderly and persons with disabilities, and offices of physicians industries. Growth in the services for the elderly and persons with disabilities sector is in accordance with the demographic trends within Nevada, which is attracting many elderly and retired individuals.

Among micropolitan regions, services for the elderly and persons with disabilities contributed the most to growth in the health and medical services sector. Only Gardnerville and Elko saw growth in general medical and surgical hospitals, and in the other micropolitan regions the number of private offices for different types of doctors increased. These trends match the narrative shared in stakeholder interviews concerning a rural and tribal medicine shortage. Programs that rotate doctors out from metropolitan centers to rural communities may help partially address this problem.

Regionally, jobs in the health and medical services sector increased across the board, with Las Vegas (+19,770) and Reno-Sparks (+3,604) leading the way, with the exception of Pahrump (-95) which saw a marginal decline in jobs in this sector.

The health and medical services sector is the only sector in the business-to-consumer local healthcare category. This sector added 19,350 jobs between 2011 and 2017, with an average wage of $74,562. The rise in business-to-consumer local healthcare services is promising, given the state's historically poor healthcare sector. However, as seen in Appendix Figure 3, less than half of the sub-industries within this sector pay above the state annual average wage of $57,943. Wages in high-skill industries (such as offices of physicians) are high in Nevada, but there are a number of health support industries that offer very little compensation.

This sector saw an increase in businesses, such as kidney dialysis centers, physicians' offices, general medical and surgical hospitals, and nursing care facilities. This sector only saw modest growth in manufacturing-related categories. Nevada can continue to build on its investments in health and medical services to promote growth in this sector but should also pursue medical device manufacturing and related industries to take advantage of growing strengths in advanced manufacturing workforce development.

Because the medical industry is not particularly well-entrenched in the state, Nevada may be a promising location for testing medical innovations, especially innovations related to delivering medical services. Innovative models that cut across sectors, such as an initiative to provide self-driving

[c] Surgical and medical instrument manufacturing; research and development in nanotechnology; ophthalmic goods manufacturing; and all other miscellaneous ambulatory health care services.

transportation to bus people to and from hospitals for non-urgent visits, could be particularly helpful for Nevada's development in the health and medical services sector.

Occupations and Skills

The occupations that make up the largest share of industry jobs in the health and medical services sector are registered nurses (14%), personal care aids (10%), and medical assistants (5%). The physician and surgeons occupation makes up 2% of jobs. As seen in Table 12, the majority of employment in the health and medical service sector is made up of occupations with bachelor's and associate's degrees and postsecondary nondegree awards. Wages for occupations in this sector with doctoral or professional degrees are the highest in the state, indicating that there is high demand for skilled health and medical service sector employees, without an adequate supply to meet that demand.

Table 12. Share of Jobs in Health and Medical Services Sector Sub-Industries, by Occupational Entry-Level Education Levels. Source: EMSI

Education	Share of Industry Jobs (2018)
Doctoral or professional degree	7.6%
Master's degree	3.7%
Associate's degree	7.7%
Postsecondary nondegree award	20.2%
Bachelor's degree	21.7%
Some college, no degree	0.7%
High school diploma or equivalent	33.7%
No formal educational credential	4.7%

Data and reports from EMSI show that among the top 10 occupations in the health and medical services sector, jobs increased by 18,782 over the last five years and are projected to increase by 15,071 over the next five years. Regional job concentration is 0.80 times the national job concentration, and regional median earnings are $1.12 per hour above the national median earnings of $17.58 per hour.

The regional supply for workers in these top 10 occupations come from the College of Southern Nevada (221 degrees, 594 certificates), Milan Institute—Las Vegas (0 degrees, 403 certificates), Brightwood College—Las Vegas (0 degrees, 342 certificates), and Truckee Meadows Community College (95 degrees, 339 certificates). The top educational completions for workers in this sector are in nursing or medical assistance. The new medical school in Las Vegas is a promising addition to the region, but interviewees often shared concerns that Nevada needs to offer more residencies in their hospitals, as physicians often stay where they complete their residencies. Nevada could benefit from educating and training more doctors to meet the state's needs as the population continues to grow.

Manufacturing and Logistics

Between 2011 and 2017, the manufacturing and logistics sector grew by 20,540 jobs, or 28%. This sector in Nevada is defined by 346 sub-industries, making it the most comprehensive sector. A total of 229 sub-industries grew, while 117 sub-industries shrank. More than 40% of statewide growth in the

manufacturing and logistics sector was in the general warehousing and storage industry in the Las Vegas (+5,218 jobs) and Reno-Sparks (+3,178 jobs) metropolitan areas. Nevada's close proximity to many other states makes it an attractive destination for warehousing and storage activities.

Almost 15% of statewide growth in the manufacturing and logistics sector was in the storage and battery manufacturing industry in Reno, which was not present in 2011. As of 2017, this industry employed 2,998 workers, with an average annual pay of $85,549. Growth in this industry can be attributed to the Tesla Gigafactory as well as activity by Panasonic.

Regionally, jobs in the manufacturing and logistics sector increased in every metropolitan and micropolitan region except for the Gardnerville micropolitan area, which lost 25 jobs. The Las Vegas (+14,798) and Reno-Sparks (+13,701) metropolitan areas led the metropolitan growth. Elko (+155) and Fernley (+155) led the micropolitan regions in growth, outpacing the Carson City metropolitan area, which only added 9 jobs. In Elko, petroleum and petroleum products merchant wholesalers (+111), as well as construction and mining machinery and equipment manufacturing (+48), added the most jobs in the manufacturing and logistics sector. In Fernley, fabricated structural metal manufacturing (+127) and sign manufacturing (+51) added the most jobs in this sector.

The manufacturing and logistics sector added 32 new industries between 2011 and 2017, primarily in the supply chain and business-to-business traded manufacturing categories. As seen in Appendix Figure 4, much of the growth was concentrated in B2C traded services sub-industries—industries that tended to pay more than the state average wage. Growth in supply chain industries was modest, and wages in the supply chain traded services category remain low. The high-wage nature of the business-to-consumer traded services sub-industries, especially when paired with the low-wage nature of the supply chain traded services sub-industries, warrants further investigation, as this relationship is normally reversed.

There is room for improvement in continuing to develop manufacturing and logistics sub-industries that are part of the supply chain economy, especially in the construction- or battery-related areas.

Many of the fast growing, high-wage industries or sub-sectors in the manufacturing and logistics sector also belong to the natural resource technologies or aerospace and defense sectors, confirming the synergies between these sectors. These trends suggest that Nevada's diversification into industries in the manufacturing sector is successfully attracting new, high-wage industries. However, many sub-industries that fall into the supply chain traded manufacturing category shrank. As such, there is room for improvement in continuing to develop manufacturing and logistics sub-industries that are part of the supply chain economy, especially in the construction- or battery-related areas. Policies to foster growth in sub-industries, such as storage battery manufacturing; power, distribution, and specialty transformer manufacturing; and fabricated structural metal manufacturing, would build on existing strengths in

Nevada and allow the state to develop specializations and differentiate itself from neighboring peer states.

Occupations and Skills

The occupations that make up the largest share of industry jobs in the manufacturing and logistics sector are laborers and freight, stock, and material movers (11.7%); heavy and tractor-trailer truck drivers (6.6%); and sales representatives, wholesale and manufacturing (5.5%). As seen in Table 13, the manufacturing and logistics sector predominantly employs occupations with no postsecondary credentials. Wages for occupations in the sector with bachelor's degrees are substantially higher than the state average, and these occupations are growing, suggesting that demand for skilled labor in this sector may be rising given the previously discussed rise of semiconductor and other advanced manufacturing industries.

Table 13. Share of Jobs in Manufacturing and Logistics Sector Sub-Industries, by Occupational Entry-Level Education Levels. Source: EMSI

Education	Share of Industry Jobs (2018)
Doctoral or professional degree	0.1%
Master's degree	0.0%
Associate's degree	1.4%
Postsecondary nondegree award	8.0%
Bachelor's degree	13.4%
Some college, no degree	1.5%
High school diploma or equivalent	55.6%
No formal educational credential	19.9%

Data and reports from EMSI show that among the top 10 occupations in the manufacturing and logistics sector, jobs increased by 32,444 over the last five years, and are projected to increase by 18,195 over the next five years. Regional job concentration is 0.95 times the national job concentration, and regional median earnings are $0.08 per hour below the national median earnings of $16.51 per hour.

The regional supply for workers in these top 10 occupations come from the College of Southern Nevada (385 degrees, 6 certificates); University of Nevada, Las Vegas (371 degrees, 23 certificates); University of Nevada, Reno (335 degrees, 0 certificates); and Truckee Meadows Community College (130 degrees and 1 certificate).

The manufacturing and logistics sector is still dominated by relatively low-skill industries and occupations, such as warehousing/storage and trucking. Because of Nevada's proximity to other states, these sub-industries will always be an important aspect of Nevada's economy, and should not be ignored. However, Nevada also can build on its advanced manufacturing sub-industries, especially in the power battery manufacturing area. Programs similar to the ones offered at UNR and Truckee Meadows Community College, such as the advanced manufacturing technician certifications (MT1 offered by

Western Nevada College, and the Siemens Megatrons I/II, represent a positive step in continuing to foster growth in advanced manufacturing-related sub-industries.

Across semiconductor and related device manufacturing, storage battery manufacturing, power distribution and specialty transformer manufacturing, and fabricated structural metal manufacturing, the top companies hiring for positions are Sunrun, Inc.; Panasonic Energy Corporation of America; Micron Technology; and Sony Corporation. The top job titles are sales representatives, solar photovoltaic (PV) installers, operations coordinators, and design engineers. The top hard skills are warehousing, electric vehicle, customer relationship management, and regional sales. These trends suggest that there is a strong demand for support activities around semiconductor and battery manufacturing.

Mining

The mining sector in Nevada is defined by 20 sub-industries. Between 2011 and 2017, the mining sector grew by 364 jobs, or 1.82%. Ten sub-industries grew, and ten sub-industries shrank. All other nonmetallic mineral mining in Las Vegas accounted for more than 50% of statewide growth in the mining sector, adding almost 207 jobs (and accounting for no jobs in 2011). This was followed by clay and ceramic and refectory minerals mining in Pahrump, adding 84 jobs, and gold ore mining in Elko, adding 80 jobs. The largest decline was in the support activities for metal mining sub-industry in Elko, which lost 464 jobs between 2011 and 2017. Regionally, jobs in the mining sector decreased everywhere, except for Las Vegas (+241) and Reno (+3). The largest decline came from Elko, which lost 351 jobs.

As seen in Appendix Figure 5, the mining sector saw growth in the supply chain traded services category in sub-industries such as gold ore mining, silver ore mining, and all other nonmetallic mineral mining. Precious metal mining (including gold mining, silver mining, etc.) is a counter-cyclical industry that has historically bolstered Nevada's economy in down years, and many precious metal mining companies invest heavily in local schools and workforce development. The decline in support activities for metal mining may partially be attributed to the stringent export requirement and complicated water rights issues in the state of Nevada that deter companies in this sub-industry from locating within Nevada. Furthermore, mining is Nevada is complicated by the high percentage of land that belongs to the federal government. The strong growth in all other nonmetallic mineral mining is likely due to lithium mining in the region as well as other minerals mined throughout the state. In general, Nevada's mining industry is bogged down by a misconception of modern mining as a low-tech and low skill sector, dissuading workers from joining. Continued outreach and the implementation of additional educational programs that advertise the high-tech nature of mining in Nevada could help to partially offset this issue.

Occupations and Skills

The occupations that make up the largest share of industry jobs in the mining sector are continuous mining machine operators (12.6%), heavy and tractor-trailer truck drivers (6.7%), and mine cutting and channeling machine operators (5.3%). As seen in Table 14, the mining sector predominately employs workers with no postsecondary credentials and workers with bachelor's degrees.

Table 14. Share of Jobs in Mining Sector Sub-Industries, by Occupational Entry-Level Education Levels. Source: EMSI

Education	Share of Industry Jobs (2018)
Doctoral or professional degree	0.0%
Master's degree	0.0%
Associate's degree	4.0%
Postsecondary nondegree award	7.2%
Bachelor's degree	12.3%
Some college, no degree	0.5%
High school diploma or equivalent	57.9%
No formal educational credential	18.1%

Data and reports from EMSI show that among the top 10 occupations in mining sector, jobs increased by 7,101 over the last five years and are projected to increase by 4,280 over the next five years. Regional job concentration is 0.98 times the national job concentration, and regional median earnings are $3.42 per hour above the national median earnings of $24.05 per hour, indicating that the cost of labor in the mining sector is relatively high for Nevada.

Synergies between advanced manufacturing and high-tech mining should be exploited.

The regional supply for workers in these top 10 occupations come from Great Basin College (0 degrees, 104 certificates), the Advanced Training Institute (0 degrees, 92 certificates), and Truckee Meadows Community College (4 degrees and 49 certificates). The mining sector relies heavily on workers without advanced degrees, and these workers tend to come from local, community colleges. When looking at the supply of skilled workers (geoscientists; mining and geological engineers), UNLV (42 degrees, 0 completions) and UNR (38 degrees, 0 completions) provide most of the supply. These programs are degree-based programs. The Mackay School of Mines is a main source of advanced mining talent in the region; however, according to stakeholder interviews, these programs do not provide enough graduates to meet the needs of the state's mining industry, forcing companies to look out of state to meet their talent needs. Furthermore, interview respondents shared that the Mackay School of Mines is not as well-funded as it once was, exacerbating the talent shortage in Nevada. The development and expansion of mining programs in these universities could boost employment and wages in mining. Furthermore, synergies between advanced manufacturing and high-tech mining should be exploited.

Across gold ore mining and all other nonmetallic mineral mining, the top companies hiring are Newmont Mining Corporation; Couer Mining, Inc.; McEwen Mining, Inc.; and Eldorado Gold Corporation. Barrick Gold Corporation, albeit a top employer in the region in mining was, at the time of this report, not a top hiring company for gold ore and other nonmetallic mineral mining, with Barrick Goldstrike Mines having

only four unique postings between September 2016 and August 2018, compared to 682 unique postings by Newmont Mining Corporation. The top job titles are maintenance mechanics, mining engineers, and process operators. The top in-demand hard skills are sustainability, continuous improvement process, mechanics, and operational excellence. Although sustainability and operational excellence appear very frequently in job postings, they rarely appear in workforce profiles. These trends indicate that there may be a slight mismatch in skills—a gap that could easily be addressed by specifically designed and targeted education programs.

Natural Resource Technologies

The natural resource technologies sector in Nevada is defined by 112 sub-industries, 69 of which grew and 43 of which shrank. Between 2011 and 2017, the natural resource technologies sector grew by 13,011 jobs, or 26.81%. Storage battery manufacturing in Reno accounted for more than 20% of statewide growth in this sector, while plumbing, heating, and air-conditioning contractors between the Las Vegas (+2,896) and Reno-Sparks (+1,526) metropolitan areas accounted for more than 30% of statewide growth in this sector.

Regionally, the only regions that saw a decline in this sector were Elko (-430) and Winnemucca (-439). Las Vegas (+6,230) and Reno-Sparks (+6,643) led Nevada in growth in the natural resource technologies sector. Pahrump (+230) and Fernley (+150) had the most growth in natural resource technologies among micropolitan regions. In Pahrump, the sub-industries with the most absolute growth were plumbing, heating, and air-conditioning contractors (+92), and electric power distribution (+60). In Fernley, the sub-industries with the most absolute growth were animal production (+62) and site preparation contractors (+51). The high number of jobs in the plumbing, heating, and air-conditioning contractors sub-industry may be at least fueled by heating, ventilation, and air conditioning (HVAC) programs at local community colleges.

Food processing and manufacturing is an energy-intensive part of the natural resource technology sector and is also a target industry for Southern Nevada. However, there are a limited number of facilities for processing meat, meaning that Nevada's economy is only participating in a portion of the supply chain for the meat industry. In terms of agriculture, there is ample existing infrastructure, along with a history of partnerships between local universities. The University of Nevada Cooperative Extension program works to assist farmers in transitioning to new technologies and practices. However, Nevada's agricultural industry suffers from a lack of availability of seasonal workers for harvesting produce.

Water rights and water management have historically been complex issues in Nevada. However, the Water Smart program has provided the idea-sharing infrastructure to allow communities to share water resource management technologies and tactics across the state. Nevada seems to be diversifying away from fossil fuel energy generation sources and towards clean energy generation, as jobs in the fossil fuel electric power generation industry fell while jobs in solar electric power generation increased. The renewable portfolio standard (RPS) in Nevada likely contributed to this shift. While Nevada is a big user of geothermal energy, there are many untapped geothermal energy resources located on federal land in

Nevada, which limits the expansion opportunities for this sub-industry. While solar energy is popular and highly used in Nevada, it is not a large employer.

As seen in Appendix Figure 6, the natural resource technologies sector saw substantial growth in the supply chain local category. The natural resource technologies sector added 15 new industries, primarily in the business-to-consumer traded manufacturing and supply chain traded manufacturing categories. The highest wage new industry was the power, distribution, and specialty transformer manufacturing industry. Other new industries include electric bulk power transmission and control, storage battery manufacturing, and primary battery manufacturing. These new industries can likely be attributed to the Tesla Gigafactory and Panasonic.

The natural resource technologies sector also saw substantial growth in engineering services and site preparation contractors. This growth corresponds with information gathered from stakeholder interviews about an increase in demand for local infrastructure construction projects. Nevada is in a prime position to capitalize on the successful diversification into the natural resource technologies sector by focusing on growth and investment in industries in the supply chain traded manufacturing and services categories.

Occupations and Skills

The occupations that make up the largest share of industry jobs in the natural resource technologies sector are plumbers, pipefitters, and steamfitters (7.0%); construction laborers (4.0%); and farmworkers and laborers and crop, nursery, and greenhouse workers (3.7%). As seen in Table 15, the natural resource technologies sector employs workers with no postsecondary credentials and workers with bachelor's degrees. Despite the previously discussed rise in clean energy industries in this sector, engineers (especially electrical and energy engineers) make up a small portion of jobs in this sector. To continue growth in the clean energy sector, Nevada must ensure that demand for workers can be met by providing relevant workforce development and training programs.

Table 15. Share of Jobs in Natural Resource Technologies Sector Sub-Industries, by Occupational Entry-Level Education Levels. Source: EMSI

Education	Share of Industry Jobs (2018)
Doctoral or professional degree	0.3%
Master's degree	0.2%
Associate's degree	5.4%
Postsecondary nondegree award	4.3%
Bachelor's degree	22.1%
Some college, no degree	1.4%
High school diploma or equivalent	48.7%
No formal educational credential	17.5%

Data and reports from EMSI show that among the top 10 occupations in the natural resource technologies sector, jobs increased by 24,402 over the last 5 years and is projected to increase by 12,123

over the next 5 years. Regional job concentration is 0.94, and regional median earnings are $0.95 per hour above the national median earnings of $17.21 per hour.

The regional supply for workers in these top 10 occupations come from the University of Nevada, Reno (726 degrees, 0 certificates); University of Nevada, Las Vegas (521 degrees, 23 certificates); College of Southern Nevada (417 degrees, 17 certificates); and Truckee Meadows Community College (136 degrees, 62 certificates).

Many of the main sub-industries in the natural resource technologies sector are shared by the manufacturing and logistics sector or the aerospace and defense sector. Across plumbing, heating, and air conditioning contractors, the top companies hiring are Source Refrigeration & HVAC, Inc.; American Residential Services, L.L.C.; Southland Industries; and Freedom Enterprise, Inc. The top job titles are HVAC Refrigeration Technicians, HVAC Service Technicians, and Plumbers. The most in-demand skills are HVAC, plumbing, ventilation, and customer satisfaction.

Tourism, Gaming, and Entertainment

The tourism, gaming, and entertainment (TGE) sector is defined by 86 sub-industries. Between 2011 and 2017, the TGE sector grew by 37,806 jobs, or 9.53%. Together, the full-service restaurant (+10,782) and limited-service restaurant (+10,420) sub-industries in Las Vegas account for more than half of the statewide growth in the TGE sector. The casino hotel industry lost 3,093 jobs between 2011 and 2017.

Regionally, jobs in the TGE sector only decreased in Elko (-261) and Winnemucca (-12). Las Vegas led the region in growth, adding 33,897 jobs in the TGE sector. Among micropolitan regions, both Gardnerville (+150) and Pahrump (+153) saw substantial increases as well. Gardnerville saw an increase of 234 jobs in golf courses and country clubs and 118 jobs in limited-service restaurants. Pahrump added 75 jobs in full-service restaurants and 63 jobs in hotels (excluding casino hotels).

As seen in Appendix Figure 7, Nevada's tourism, gaming, and entertainment sector saw the most growth in business-to-consumer categories. Growth in the TGE sector occurred predominately in sub-industries that pay below the state average annual wage. Excluding convention and trade show organizers (adding 2,383 jobs with an average annual wage per job of $59,721), growth in sub-industries paying more than the state annual average wage was modest, adding only 1,570 jobs and accounting for just over 4% of statewide growth in the TGE sector. This trend suggests that the TGE sector is growing in a number of relatively low-wage sub-industries. However, this is not necessarily a cause for concern: Nevada can take advantage of the strong creative and performance businesses in the state to remain an attractive destination for ambitious, curious, and creative individuals.

The decrease in activity among casinos and casino hotels towards restaurants, conventions, and trade shows is in line with rebranding efforts towards food and entertainment. This represents a within-sector diversification, as new jobs in Nevada are increasingly appearing in new areas of the TGE sector. Nevada can continue to build on this success by leveraging its new sports teams and investing in Esports as an emerging industry. Nevada has the Vegas Golden Knights, is home to a minor league baseball team, is an affiliate of the Oakland Athletics, and hosts about half a dozen Ultimate Fighting Championships a year.

The Las Vegas Aces, a member of the Women's National Basketball Association, made Las Vegas its home during 2018, and the same year also saw the debut of the Las Vegas Lights FC in the United Soccer League. The Oakland Raiders have committed to moving to Southern Nevada by the 2020 National Football League season, and Las Vegas frequently hosts multiple special events, such as NASCAR races. These entertainment events attract corporate partners, tourists, and play a role in boosting Nevada's economy through the development of critical venues and infrastructure.[4] Sports and entertainment infrastructure development in the region could be used to attract construction workers and capital that can then be used in other projects. Furthermore, the growth of breweries and distilleries in northern Nevada is a promising trend. Finally, suburbs—such as Summerlin, located just outside of Las Vegas—have exploded in population in recent years, driving growth in the food and entertainment sub-industries.

Occupations and Skills

The occupations that make up the largest share of industry jobs in the TGE sector are waiters and waitresses (9.6%), combined food preparation and serving workers (6.9%), and restaurant cooks (5.3%). As seen in Table 16, the TGE sector primarily employs occupations with no postsecondary credentials.

Table 16. Share of Jobs in TGE Sector Sub-Industries, by Occupational Entry-Level Education Levels. Source: EMSI

Education	Share of Industry Jobs (2018)
Doctoral or professional degree	0.0%
Master's degree	0.0%
Associate's degree	0.1%
Postsecondary nondegree award	1.1%
Bachelor's degree	5.0%
Some college, no degree	0.6%
High school diploma or equivalent	32.2%
No formal educational credential	60.9%

Data and reports from EMSI show that among the top 10 occupations in the TGE sector, jobs increased by 16,610 over the last five years and are projected to increase by 21,311 over the next five years. Regional job concentration is 1.69 times the national job concentration, and regional median earnings are $0.52 per hour above the national median earnings of $11.19 per hour.

The state's rich history in the tourism, gaming, and entertainment sector has left it with a strong creative class that can not only contribute to the economy, but also play a critical role in shaping regional culture and making Nevada an attractive tourist destination.

The regional supply for workers in these top 10 occupations come from Le Cordon Bleu College of Culinary Arts in Las Vegas (131 degrees, 6 certificates), the College of Southern Nevada (67 degrees, 14 certificates), the Art Institute of Las Vegas (25 degrees, 1 certificate), and Truckee Meadows Community College (13 degrees, 10 certificates). Nevada has invested in developing STEM programs and initiatives in many of its local colleges and universities. These efforts have certainly yielded fruit, contributing to the diversification of the state's economy. However, Nevada should not exclusively focus on STEM programs. The state's rich history in the TGE sector has left it with a strong creative class that can not only contribute to the economy, but also play a critical role in shaping regional culture and making Nevada an attractive tourist destination.

Across full-service restaurants; and convention and trade show organizers, the top companies hiring are Chipotle Mexican Grill; The Cheesecake Factory; Brinker International; Wynn, Inc.; and Red Robin Gourmet Burgers. The top job titles are restaurant crew team members, restaurant managers, line cooks, cooks, and hosts/hostesses. The top skills are restaurant operation, grilling, cooking, and outline of food preparation. These trends suggest that the restaurant industry in Nevada is dominated by large, fast casual restaurants.

Other Industries

There are 276 industries in Nevada that do not fall into any of the targeted GOED sectors, growing by 106,657 jobs, or 20.34%. The sub-industry that grew the most in absolute terms was corporate, subsidiary, and regional managing offices (+6,866 jobs) in Las Vegas, followed by elementary and secondary schools (+3,747 jobs). Nevada, Reno, and Las Vegas have made a concentrated push to attract corporate headquarters that, based on the data, seems to be paying off. However, these efforts are still hampered by the trailing spouse burden: the difficulty in finding exciting opportunities for the spouses of corporate executives and other professionals.

As seen in Appendix Figure 8, the majority of other, non-targeted industries fall into the supply chain local or business-to-consumer local main street categories. Industries that grew predominately paid lower than the state average annual wage. However, industries in the supply chain traded services category grew and generally paid more than the state annual average wage. Industries that did not fall into any of the sectors that GOED specifically targeted were spread across various aspects of the economy, from marketing to credit card issuing to outdoor advertising. Based on the data, it appears as though GOED's seven targeted sectors cover the most dynamic and promising areas of Nevada's

economy. As such, GOED would be well served by continuing to invest in those sectors and pursuing policies and initiatives that are specifically tailored to suit the needs of those sectors.

Industry and Occupation Conclusions

The sector-level analysis of Nevada's economy provides a breakdown of the different economic activities and sectors present in the region. Analyzing which occupations have grown and how occupations vary between industry sectors, provides another layer of detail to inform future economic development in Nevada.

Nevada's diversification into the natural resource technologies, manufacturing and logistics, and the aerospace and defense sectors has attracted new, high-wage, high-innovation businesses in sub-sectors that are part of the supply chain economy in the state. Nevada can continue to build on these efforts to strengthen and develop the economy but has work to do in the health and medical services and business IT ecosystems sectors. Nevada's successful diversification efforts have reoriented the state towards less cyclical, higher-wage sectors. Nevada now has an opportunity to build on this success by fine-tuning its approach so that each sector, and each region, continues to diversify towards high-wage, innovative sub-sectors. To ensure continued success, Nevada can build on synergies between the manufacturing and logistics, aerospace and defense, and natural resource technologies sectors.

The three fastest growing occupational groups between 2011 and 2017 were computer and mathematical occupations; construction and extraction occupations; and farming, fishing, and forestry occupations (although farming, fishing, and forestry occupations remains a very small portion of Nevada's economy). Nevada's economy also saw substantial growth in high-wage occupations, such as management occupations, healthcare practitioners and technical occupations, and computer and mathematical occupations. Growth in construction and extraction occupations is especially promising, given the region's high demand for these types of jobs.

Table 17 presents a breakdown of median hourly earnings and the share of statewide growth for each major occupational group, with particularly high-wage occupations highlighted in dark green. As Table 17 illustrates, with some highlighted exceptions, the higher-wage occupations played a relatively small part in job creation between 2011 and 2017.

Table 17. Breakdown of Average Hourly Earnings and the Share of Statewide Growth by Major Occupational Group

Occupational Group	Share of Total Statewide Growth	Jobs in 2017	Median Hourly Earnings ($)
All Occupations	NA	1,310,220	16.79
Office and Administrative Support Occupations	11.7%	211,505	16.49
Construction and Extraction Occupations	10.7%	79,276	21.09
Transportation and Material Moving Occupations	9.8%	103,154	14.97
Sales and Related Occupations	8.3%	155,322	13.37
Personal Care and Service Occupations	8.2%	90,296	10.69

Occupational Group	Share of Total Statewide Growth	Jobs in 2017	Median Hourly Earnings ($)
Management Occupations	7.6%	72,261	41.56
Food Preparation and Serving Related Occupations	7.4%	189,932	11.45
Healthcare Practitioners and Technical Occupations	5.5%	62,166	37.90
Business and Financial Operations Occupations	5.3%	53,826	29.10
Installation, Maintenance, and Repair Occupations	4.1%	56,522	22.79
Production Occupations	3.6%	49,207	15.62
Education, Training, and Library Occupations	2.9%	56,116	22.57
Protective Service Occupations	2.7%	43,627	17.43
Computer and Mathematical Occupations	2.5%	22,227	34.02
Building and Grounds Cleaning and Maintenance Occupations	2.5%	80,906	14.22
Arts, Design, Entertainment, Sports, and Media Occupations	2.2%	28,768	19.25
Healthcare Support Occupations	1.8%	27,489	15.72
Community and Social Service Occupations	1.0%	14,930	23.67
Architecture and Engineering Occupations	0.8%	14,680	35.40
Farming, Fishing, and Forestry Occupations	0.5%	3,688	13.37
Life, Physical, and Social Science Occupations	0.4%	9,068	29.58
Military-Only Occupations	0.2%	8,141	18.51
Legal Occupations	0.2%	10,037	39.44

There were 306 occupations that grew between 2011 and 2017 and had higher wages than the state average, compared to 236 occupations that grew between 2011 and 2017 but had lower wages than the state average. This indicates that efforts to diversify Nevada's economy have been making progress, as Nevada continues to add relatively high-wage jobs. If these trends continue, then the state average wage in Nevada should increase as well.

Efforts to diversify Nevada's economy have been making progress, as Nevada continues to add relatively high-wage jobs.

The construction and extraction occupation group saw growth in 23 industries with average earnings above the state average and growth in 21 industries with average earnings below the state average. The computer and mathematical group as well as the engineering and architecture group saw growth only in occupations with higher wages than the state average, indicating that demand for these occupations is strong. The healthcare practitioner and technical group had 38 occupations that grew between 2011 and 2017 with higher wages than the state average. However, among healthcare practitioner and

technical group occupations with average occupational earnings per hour that are more than $60 higher than the state average, seven occupations shrank compared to six occupations that grew. The fastest growing healthcare practitioner and technical group occupations were health technologists and technicians, veterinarians, and nurse practitioners.

> Without workforce training and development initiatives, wages for unskilled workers will remain low, dragging down average wages for the state.

Growth in extremely high-wage occupations has been moderate, with most of the growth occurring in occupations with average earnings per hour between $0 and $20 higher than the state average. Occupations with workers that have no formal educational credentials or with only high school diplomas make up the majority of occupations that grew between 2011 and 2017, with average wages *less* than the state average. This trend is in line with Nevada's history of plentiful employment opportunities for workers with no postsecondary credentials. Without workforce training and development initiatives, wages for these workers will remain low, dragging down average wages for the state.

In 2017, about 72% of jobs in Nevada offered some form of training, as shown in Table 18. More than half of Nevada's 1,434,844 jobs in 2017 offered short-term on-the job training; however, this figure was down 1.11 percentage points from 2011, while the share of jobs that offered no training increased by 0.49 percentage points. The share of jobs that offered apprenticeships increased by 0.46 percentage points, an indicator of Nevada's ongoing efforts to encourage apprenticeship program. The share of jobs offering moderate-term on-the-job-training increased by 0.16 percentage points since 2011. These data indicate that Nevada's programs to incentivize on-the-job-training may not be marketed sufficiently, and the emphasis on apprenticeships may be at the expense of more intensive, longer term training.

Table 18. Jobs with Differing Levels of Training, as a Share of All Jobs (2017). Source: EMSI

Level of Training	Share of 2017 Jobs
None	28.14%
Internship/residency	0.81%
Apprenticeship	2.18%
Short-term on-the-job training	50.05%
Moderate-term on-the-job training	16.13%
Long-term on-the-job training	2.69%

Nevada's economy saw growth in high-wage occupations dominated by workers with bachelor's and master's degrees. Nevada also added jobs in occupations with a typical entry-level education of postsecondary nondegree awards. Wages in these occupations, the so-called mid-skill occupations, tended to be above the state average, but only moderately so. Growth in occupations with doctoral or professional degrees was modest, and these occupations make up a small share of Nevada's economy.

The workforce education dilemma in Nevada is unique because of the high number of growing occupations that pay below state average wages and typically require no postsecondary credentials. Nevada has an opportunity to pioneer creative and innovative initiatives to transition these workers into higher-wage occupations and could be a model for the rest of the country to follow in activating and developing this group of "unskilled" workers. Workers in these occupations tend to be concentrated in service sector occupational groups, but many of these workers are also in construction and extraction occupations.

Nevada has an opportunity to pioneer creative and innovative initiatives to transition these workers into higher-wage occupations and could be a model for the rest of the country to follow in activating and developing this group of "unskilled" workers.

Nevada has an intense demand for construction and extraction workers, and wages in these occupations tend to be above the state average. Nevada must ensure that it is adequately developing and using this workforce, especially to meet its construction needs. Workforce development and entrepreneurial training initiatives specifically targeting workers in construction and extraction occupations could be very effective in Nevada. This high-level analysis of occupational growth in Nevada illustrates that Nevada's economy continues to expand and diversify in the right direction.

Nevada's Innovation Ecosystem: Assets and Gaps

Nevada's Innovation Ecosystem: Assets and Gaps

This section provides an analysis and overview of the innovation system in Nevada. The purpose of this analysis is to create a picture of the overall landscape of the state-level innovation system and to identify strengths and weaknesses in the system and its metropolitan areas, all of which speak to the extremely high potential of Nevada's innovation economy.

Nevada's enterprising spirit, the fruit of its historically high level of in-migration, remains strong. However, the state's innovation system is characterized by a general lack of coordination and alignment among the various actors and programs that support entrepreneurship statewide. This lack of coordination results in information gaps, leaving entrepreneurs and businesses unaware of various support programs and incentives, and gaps in coverage, where early-stage companies are systematically under supported. However, Nevada benefits from a strong entrepreneurial culture, dynamic economy, low cost of living, and easy access to western markets, all of which speak to the extremely high potential of Nevada's innovation system. An overview of Nevada's innovation system is presented in Table 19.

Nevada's enterprising spirit, the fruit of its historically high level of in-migration, remains strong. However, the state's innovation system is characterized by a general lack of coordination and alignment among the various actors and programs that support entrepreneurship statewide.

Table 19. Nevada Innovation System Overview

Innovation Element	Key Findings
Talent	• Shortage of technically skilled workers, particularly in the 25- to 44-year-old age group • Strong entrepreneurial culture
Risk Capital	• Sufficient levels of VC funding for later stage investments • Gap in early-stage (pre-seed and seed) investments
Access to Markets	• Few testing and demonstration facilities available, with the exception of the UAS sector • Strong clusters in energy storage, hospitality, and gaming that could form early customer base and support supply chain integration for startups
Idea Generation	• Low levels of academic and business R&D expenditures and outputs • Very high levels of new business formation and churn
Business Environment	• Access to western markets • Very business-friendly environment
Networks	• Some strong connections between industry and academia • Weak mentor and investor networks

This analysis utilizes SRI's Regional Innovation System Framework, which was created after years of working with cities and regions to develop self-sustaining innovation systems. Through this work, SRI has identified six key elements of regional innovation systems:

- **Talent:** The mix of business, entrepreneurship, and technical skills, experience, and attitudes found among a region's workforce and students
- **Risk Capital:** The quantity and quality of equity capital and other financing for new ventures available in the region and the sector-specific expertise level of area investors
- **Access to Markets:** The types and number of customers that are accessible in a region to provide test beds, co-development opportunities, early revenue, supply chain partners, and a long-term customer base
- **Idea Generation:** The volume, quality, and focus of business-relevant ideas generated within a region
- **Business Environment:** The unique characteristics of infrastructure, expertise, geography, market demographics, and other regional characteristics that provide competitive advantages and differentiated innovation opportunities
- **Networks:** The connections and hubs in a region that help connect area ideas, talent, investors, and mentorship to markets and each other

Talent

An innovation system's talent refers to the mix of business, entrepreneurship, and technical skills; experience; and attitudes found among a region's workforce and students. It represents the pool of potential entrepreneurs, managers, and skilled workers that a region's businesses and research institutions draw upon to fill their workforce needs. Overall, Nevada suffers from a shortage of skilled technical workers in the fields of science, technology, engineering, and mathematics (STEM). While the state has a strong entrepreneurial culture, there is an additional lack of experienced entrepreneurs with the skills needed to attract venture investors and scale companies.

Technical Workforce

Nevada ranks at or near the bottom among the United States in several important indicators related to the technical workforce: In 2017, Nevada was last among states in the percentage of a state's labor force that has earned at least a bachelor's degree; last in percentage of 25- to 44-year-olds that have earned at least a bachelor's degree; and third lowest in high school completion percentage among 25- to 44-year-olds.[5] Low rates of high school and bachelor's degree attainment among 25- to 44-year-olds is a particular concern because this age group is of prime working age and represents the bulk of the workforce in the state. Interviewees noted that historically there has not been a strong culture of postsecondary attainment in the state. This is because for many decades the state has had jobs that pay enough to afford a middle-class lifestyle without any educational requirements beyond a high school degree, largely due to the state's low cost of living.

This historic bias toward low-skilled jobs is reflected in the current makeup of Nevada's workforce: the state is the third lowest in the country in the percentage of workers employed in science and engineering occupations.[6] However, demand for technically skilled workers in STEM fields is growing

rapidly, and many organizations across the state now have a difficult time finding local engineers, programmers, and researchers to fill open positions. To counter this, some startups and businesses have developed relationships with local universities and community colleges to establish recruitment pipelines. Some companies go so far as to teach courses at these institutions to ensure recruited students will have the skills they desire upon graduation.

While stakeholders across the state mentioned shortages in STEM and high-tech manufacturing skills, both at the four-year degree level and associate's degree and certification level, the shortage of skilled STEM workers is more acute in the Las Vegas metropolitan area than in the Reno-Sparks metropolitan area. When compared to the Reno-Sparks area, organizations based in Las Vegas have a harder time attracting STEM workers and professionals because of quality-of-life concerns and fewer jobs at the same level for spouses.

Nevada's universities and community colleges face several challenges in increasing the supply of technically skilled workers. Academic stakeholders reported that many in-state universities have difficulties retaining graduates with four-year degrees in state after they leave school, though the University of Nevada, Reno (UNR), has had some success in improving graduate retention rates, with 73% of all graduates staying in state.[7] The increase in retention may be due in part to the quality-of-life and employment opportunities found in the Reno-Sparks region.

The state's community colleges supplement the universities' output with a broad range of career and technical education (CTE) programs, but their capacity to produce trained workers is limited due to a lack of funding and available students. Community colleges receive funding based on college graduation and program completion rates, but many current students are finding jobs before they complete their program or degree due to increased demand for their technical skills. Given the high demand for skilled workers, even a partially completed technical program can result in a job offer for many community college students.

While this is a great outcome for students, community colleges do not receive additional funding for successful job placements, as the Nevada System of Higher Education (NSHE) funding formula is based on program completion and graduation rates. Community colleges have also had a difficult time filling spots in some programs due to a lack of marketing funds and available students. It can be particularly difficult to draw a potential student into a program if they are working multiple jobs, living paycheck to paycheck, and/or feel they cannot take the time to enroll in a program. Many students also require remedial courses upon entry to a college-level program and are deterred by the prospect of the additional funds and time required to take these classes.

> The capacity of Nevada's community colleges to produce trained workers is limited due to a lack of funding and available students.

Nevada's K-12 system also presents problems for the skilled workforce pipeline, as many interviewees stated that Nevada students were not leaving high school with the education base needed to undertake STEM degrees. The state ranked 46th in public school expenditures per pupil in 2015; 41st in eighth grade math proficiency in 2017; and 39th in eighth grade science proficiency in 2015.[8]

Entrepreneurial Skills and Culture

Nevada enjoys a strong entrepreneurial and risk-taking culture. Many people throughout the state aspire to start their own businesses, a cultural feature shared by the populations of many of the states in the mountain west. However, at present, this entrepreneurial spirit is mostly focused on establishing smaller, locally oriented service businesses, rather than scalable startups.

Stakeholders across the state noted that Nevada's universities and community colleges have many enthusiastic students interested in starting new businesses. The state is home to a number of entrepreneurship degrees and training programs, including the UNR Ozmen Center for Entrepreneurship, which offers an undergraduate minor and Master of Business Administration degree; the Truckee Meadows Community College (TMCC) Entrepreneurship Program, which offers an associate's degree; the University of Nevada, Las Vegas (UNLV), Troesh Center for Entrepreneurship and Innovation; as well as other support programs and business competitions across state.

However, the state has very few entrepreneurs with the knowledge and experience needed to attract investment and to scale a company beyond the initial startup team or to serve as mentors to others. This is a problem shared with most regional innovation systems in the country, with exceptions of the Bay Area and a few other cities. These skills are largely learned on the job, and the pool of experienced, trained entrepreneurs in the state will likely grow naturally over time in tandem with the increase of startup activity throughout the state.

Risk Capital

Risk capital refers to the quantity and quality of equity capital and other financing for high-risk ventures available in the region and to the sector-specific expertise level of area investors. In recent years, Nevada has attracted moderate levels of venture capital investments, which likely provide sufficient risk capital relative to the level of startup activity in the state. However, there are gaps in early-stage (pre-seed and seed) investment and support.

In 2017, Nevada ranked 29th in venture capital (VC) investments (as well as 29th in VC investments per capita) and 28th in number of venture capital deals.[9] Some interviewees stated that there were likely sufficient amounts of risk capital funding available for later stage deals (series A, B, and C), but gaps exist in early-stage funding (pre-see, seed, and angel) for local startups.

There are very few local sources of risk capital in the state. These include a handful of private VC funds, located in Reno-Sparks and Las Vegas, as well as Battle Born Venture, an evergreen venture capital program overseen by GOED. Battle Born Venture makes seed-stage investments in Nevadan enterprises in specific sectors but, to date, has invested in fewer than 10 companies.

There have been efforts to form angel networks in both Reno-Sparks and Las Vegas, but there has been little angel activity in terms of investments thus far. Interviewees felt that local angel networks have suffered from both a lack of organization and a lack of connections and integration into the rest of the innovation system. Notably, Nevada is home to an increasing number of high-wealth individuals, particularly in the Lake Tahoe region, who could serve as angel investors within the state. If sufficiently organized and connected to the local startup community, this concentration of wealthy individuals could form a major asset to the state's innovation system, particularly in the Reno-Sparks region.

Access to Markets

Access to markets describes the customers and partners that are accessible in the state to provide test beds, co-development opportunities, early revenue, supply chain partners, and a long-term customer base. Nevada is home to several notable industry clusters in the Las Vegas and Reno-Sparks metropolitan areas, which could provide opportunities for startups to find early customers and suppliers if those clusters were sufficiently integrated into the innovation ecosystem. However, there are very few sites available for testing, demonstration, and certification within the state.

Test Beds and Demonstration Sites

Outside of the unmanned autonomous systems (UAS) industry, Nevada does not have many facilities where businesses can test, calibrate, and demonstrate new technologies and products. The Nevada Institute for Autonomous Systems (NIAS) is the exception, providing drone testing facilities for businesses engaged in developing autonomous technologies and supporting systems.

Beyond NIAS, there are very few facilities that offer any equipment or services for technology development and demonstration. The Innevation Centers in Las Vegas and Reno have been very successful in attracting and supporting startups, but that support comes primarily in the form of low-cost rental space. The Nevada Center for Applied Research (NCAR) offers shared research facilities, where outside businesses can pay for access to university facilities and equipment, but many interviewees felt the private sector was largely unaware of these services.

Early Customers and Supply Chain Partners

Nevada is home to several notable industry clusters that could help startups develop early customer relationships and supply chain partnerships. The first of these is located around the Tahoe-Reno Industrial Center (TRIC), home to the Tesla Gigafactory, Panasonic, Walmart, and many of their suppliers and service providers as well as a host of other companies. The second major cluster is the Las Vegas hospitality and gaming sector. These concentrations of companies could provide a huge resource for startups in a host of industries, including electric vehicles, energy storage, logistics, and others. Clusters can also provide opportunities to establish early customer relationships and revenue streams and plug in to major supply chain networks.

Idea Generation

Idea generation refers to the volume, quality, and focus of business-relevant ideas generated within a region. These ideas are then turned into new products and services and often form the basis for new

companies. These ideas could come from many sources, including academia, research institutions, and the private sector. Idea generation appears to be a bottleneck in the Nevada innovation system, indicated by low levels of research expenditures, university intellectual property (IP) outputs, and business R&D expenditures. However, Nevada does enjoy very high levels of new business formation, which is both a feature of its strong entrepreneurial culture and a positive indicator for idea generation.

University-based research is an important source of ideas for regional innovation systems. Looking at money spent on academic research and development, Nevada ranked 45th in academic R&D expenditures (39th per capita) in 2016.[10] State universities also rank fairly low in various research outputs, including invention disclosures, technology licenses, and startups. As seen in Table 20, R&D outputs from UNR and UNLV were lower than many public universities from neighboring states. The very low levels of research expenditures at UNR and UNLV relative to peer universities are a particular concern for idea generation in the state.

The very low levels of research expenditures at UNR and UNLV relative to peer universities are a particular concern for idea generation in the state.

Table 20. University R&D Outputs, 2017 (ordered by total research expenditures).
Source: Association of University Technology Managers (AUTM)[11]

	Under-graduates	Post-graduates	Total Research Expenditures	Total Licenses Executed	Gross Licensing Income	Invention Disclosures	Patent Applications	Startups Initiated
Univ. of Arizona	35,123	9,708	$622,200,000	105	$2,703,261	261	139	15
Univ. of Colorado-Boulder	27,665	5,581	$471,909,649	48	$2,117,204	120	215	9
Univ. of Utah	23,789	8,071	$380,295,000	42	$8,260,475	196	94	10
Colorado State	25,688	7,370	$338,202,049	37	$3,189,811	101	41	5
Univ. of New Mexico	19,147	7,031	$246,595,239	58	$1,335,335	114	68	12
Univ. of Oregon	19,351	3,629	$76,142,752	55	$8,853,587	28	2	4
UNR	21,657	3,025	$75,663,944	6	$320,209	21	7	1
UNLV	25,282	5,345	$66,285,000	9	$292,526	57	20	4

The Desert Research Institute (DRI) conducts applied research in a range of environmental disciplines. DRI has a large IP portfolio, but its efforts to commercialize its intellectual property are limited by a small administrative staff capacity to identify, develop, and commercialize DRI's innovations. The state is

also home to several applied research institutes created through the state's Knowledge Fund, such as NCAR and UNLV International Gaming Institute Center, which aim to supplement the flow of ideas out of the state's universities.

Governance contributes to the challenge of aligning and growing research outputs. NSHE is governed by a central board, whereas governance delegated more completely to local boards could facilitate collaboration between universities and colleges and their ecosystem partners. The fact that community colleges are integrated into a single system is also a challenge for responding in an agile way to local needs.

Nevada ranked 39th in R&D expenditures (45th per capita) by the private sector in 2015.[12] Local companies' abilities to attract federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards are also strong indicators of idea generation. These competitive programs are open to small businesses to help them explore their technological potential and provide an incentive to profit from commercialization. Nevada ranked 35th in dollars awarded through the SBIR-STTR programs in 2016.[13]

Another potential indicator of idea generation is new business formation—the rate at which new businesses are created in a state or region. Nevada had the second highest establishment entry rate in the nation in 2016 and was tied for the second highest establishment exit rate. While some of these establishment births may be the result of firms incorporating in the state for tax reasons, Nevada had an average of 5.3 jobs created per establishment birth in 2016, the sixth highest rate in the country, which indicates that a large portion of these new openings are real establishments generating employment for the state.[14] These high levels of new business formation and churn (business creation and destruction) reflect a strong entrepreneurial culture and dynamic state economy. The high level of new business creation is a positive indicator for idea generation, but if this activity is focused on local service sector opportunities, the results will tend to be small, low-technology businesses with few opportunities to scale.

The high level of new business creation is a positive indicator for idea generation, but if this activity is focused on local service sector opportunities the results will tend to be small, low-technology businesses with few opportunities to scale.

Business Environment

Business environment describes the unique characteristics of infrastructure, expertise, geography, market demographics, and other regional characteristics that provide competitive advantages and differentiated innovation opportunities in a region. Nevada has several strong assets in its business environment, including attractive physical geography, good connections to western markets, low cost of living, and a business-friendly regulatory and tax environment.

Nevada's close proximity to California allows the state to reap many of the benefits of being a western state without the costs of living associated with the West Coast.

Location

Nevada's close proximity to California allows the state to reap many of the benefits of being a western state without the costs of living associated with the West Coast. Businesses located in Reno-Sparks and Las Vegas can take advantage of the state's low cost of living and low taxes while still having excellent transportation connections to the markets in the Bay Area and Southern California. The physical geography of northwestern Nevada and ready access to numerous outdoor recreation areas is also a strong attractor for workers and businesses to that part of the state.

Demographics

Nevada's population is growing extremely rapidly; from 2011 to 2017, the state's population grew by 10.2%—well above the national average of 4.5% and only below the District of Columbia, Texas, and North Dakota in terms of growth rate.[15] This population growth has had both positive and negative effects on the state. It has brought an influx of young, often skilled, workers attracted to the state's low cost of living and unique geography. However, the majority of that growth has gone to the Las Vegas and Reno-Sparks metropolitan areas, and infrastructure in those areas has struggled to keep up.

Startup Support Organizations

Nevada has several accelerators and incubators, but the capacity of these organizations is low and often focused on providing space. StartUpNV does offer a number of supplemental resources for entrepreneurs, but this statewide program can only mentor up to 50 companies at a time.[16] FundNV, administered by StartUpNV, offers some funding for early-stage companies; this funding, however, is capped at $50,000 per company and, to date, only six companies have been funded by the program, which started in 2017.[17] Other programs are scattered throughout the state, such as The Mill (Las Vegas), Elevate Blue (Lake Tahoe), and the Ozmen Center for Entrepreneurship (Reno-Sparks), but these programs lack formal connections and have not yet formed a solid base for an innovation ecosystem in Nevada.[18]

There are several other facilities that offer quality office space to startups at low cost, including the Las Vegas Innevation Center, Reno Innevation Center, Reno's Startup Row, and other incubators throughout the state.

Infrastructure

The Reno-Sparks and Las Vegas metropolitan areas have grown so rapidly that much of the physical infrastructure in those areas have not been able to keep pace. This had led to traffic problems in both areas, and the Reno-Sparks metropolitan area has also experienced housing shortages. Several interviewees said that some Reno-based companies have had to place new employees in hotels for

extended periods due to the lack of suitable housing. The state also suffers from limited north-south transportation options, restricting connections between the state's two major metropolitan areas.

The presence of Nevada's large data storage facilities provides access to very high-speed internet connectivity, but only in the major metropolitan areas. Much of the state's rural areas still suffer from very poor broadband access. This is an issue for people in STEM fields based in rural areas, as it can be difficult to work remotely for a technology-based company without reliable internet.

Ease of Doing Business

Overall, Nevada enjoys a very business-friendly regulatory and tax environment. Many private sector stakeholders shared that state government leaders are easily accessible and willing to work with companies to get things done, and the state has invested in streamlining permitting and approval processes.

The state also has low business and corporate taxes, though tax concessions are structured in ways that do not help startups or fast-growing small and medium enterprises. Tax abatements typically come with a stipulation that requires firms to export at least 51% of their product out of state, which is hard for smaller, newer firms to accomplish. State tax incentives also do not target businesses with low headcounts, which includes early-stage startups, and do not reward businesses for hiring at higher wage levels or for training employees.

Interviewees also noted that there is a general lack of knowledge about the state's business incentives among Nevada-based companies. Most existing business owners have no idea that there are incentives for which they are eligible; the general perception is that the tax programs are exclusively for companies coming from outside of the state.

Networks

Networks and hubs in a region help connect area ideas, talent, investors, and mentorship to markets and each other. Networks are the connective tissue of an innovation system, allowing ideas, capital, skills, and experience to flow across all of the innovation system elements detailed earlier. Nevada suffers from generally poor network formation, though it does have a few strong linkages between the private sector and academic institutions.

University-Industry Linkages

University-industry linkages allow for the transition of ideas and skilled graduates to flow from academia into the private sector, and these linkages can take many forms, such as industry advisory boards; industry-sponsored research; internships, co-ops, and other training programs; researcher consulting agreements; and other, less formal, connections.

In Nevada, as in most places, the strength of these linkages varies widely by region and by academic institution. Interviewees noted that, in general, university-industry linkages were quite weak, with a few notable exceptions. Stakeholders from the private sector felt that four-year universities are not responsive to the needs of local companies, particularly in the area of curriculum development. Some

interviewees did say they have had success working with UNR, but they had to reach out to the university to do so. Both UNR and UNLV have implemented various internship programs, co-ops, and other industry collaborations, but these tend to be one-off arrangements, rather than part of a coordinated industry engagement effort.

As noted, there are several exceptions to this. One example identified by numerous stakeholders was the pipeline program for post-education employment developed by TMCC with Panasonic and Tesla. Other examples include Great Basin College's diesel mechanics program, funded by Workforce Innovations for a New Nevada (WINN) and the College of Southern Nevada home health aide program.

DRI is also starting to make headway in connecting research innovations to industry through the Desert Research Corporation. For instance, DRI has been very successful with its WaterStart program, which has partnered industry with innovative water technologies for use across the state.

Mentor Networks

Mentor networks connect new entrepreneurs and companies to experienced serial entrepreneurs, providing new entrepreneurs with advice, connections, and other support they might need to develop new products and services, create business models, build high-performing teams, and attract investors. The consensus among interviewees was that entrepreneurship networks and mentoring are very limited in the state. One reason for this is a lack of experienced entrepreneurs throughout the state, as discussed in the Talent section of this analysis. There are a few informal or small local mentoring groups in Las Vegas and the Reno-Sparks area, but these entrepreneurial communities are, as yet, not large enough to sustain large, cohesive mentorship networks and events.

Investor Networks

Investor networks are connections between investors and the local startup community, allowing for high-potential local startups to get exposure to and investments from risk capital investors located inside and outside the state. The investor community in Nevada is small, with weak connections to each other and to the innovation system as a whole. This lack of connection is particularly acute among the state's small angel investor community, which suffers from a lack of organization, experience, and cohesion; this greatly limits its integration into Nevada's innovation system.

However, the state does benefit from linkages that have been formed with Bay Area investors. Interviewees said that many VC investments made in the state are made by California investment funds. Some Bay Area VCs are also moving startups into Nevada to take advantage of the state's low cost of living, thus driving down operational costs for startups in their portfolio.

Asset Map: Nevada

Asset Map: Overview

Despite its vast size, the state of Nevada's population remains highly centralized between two main metropolitan areas: Las Vegas in the south and Reno-Sparks in the north. Scattered throughout the area between these cities are numerous small rural and frontier communities[d] that face significant differences compared to their urban counterparts. The presence of regionally concentrated population centers has enabled the evolution of distinct characteristics for these areas, resulting in different approaches to the economic development dilemmas faced in each community. Each community faces a variety of strengths and weaknesses, requiring a tailored approach.

The following section uses stakeholder perspectives to gain an understanding of the realities of Nevada's regions and communities. These perspectives provide direction for the following discussions and assisted in the formulation of six key assets and their corresponding sub-assets:

- **Physical Infrastructure**: energy, transportation, housing, and broadband
- **Natural Resources**: land, minerals, and water
- **Quality of Life**: health, K-12 education, higher education, safety, and recreation
- **Governance**: a business-friendly environment, institutional assets, and taxation
- **Economy**: diversification of the economic base and attraction/retention of a skilled workforce
- **Innovation Ecosystem**: talent, risk capital, access to markets, idea generation, business markets, and networks

At the state level, these assets are discussed according to their statewide strengths and weaknesses. At the metropolitan level, however, it becomes apparent that some regions are stronger performers in certain smaller components (e.g., K-12 education, safety, energy). Performance at this level is based on information gathered from stakeholder interviews, combined with data and other secondary sources to identify potential trends that were not observed in the interviews. At the micropolitan level, stakeholder interviews revealed realities unique to Nevada's rural and frontier communities. The limited availability of data requires an approach focused on the state's rural communities as a collective region rather than on an individual basis.

[d] According to the National Center for Frontier Communities, "frontier areas are the most remote and geographically isolated areas in the United States. These areas are usually sparsely populated and face extreme distances and travel time to services of any kind." More information is available at http://frontierus.org/defining-frontier/.

Asset Map: Nevada

Nevada has a number of important assets, including outdoor recreation opportunities, a friendly business environment, and a high quality of life. This section summarizes Nevada's assets along six dimensions: physical infrastructure, natural resources, quality of life, governance, economy, and innovation ecosystem. Table 21 provides an overview of Nevada's assets at a state level. While some regional variations are noted in the state-level asset map, the next section provides a more in-depth overview of Nevada's unique regional assets.

Table 21. Nevada Asset Summary

Category		Assets
Physical Infrastructure	**Energy**	• Nevada has achieved impressive levels of renewable energy integration into the state's electrical grid. • Nevada remains largely dependent on other states to import much of the fuel to meet its energy needs.
	Transportation (e.g., road, air)	• Through the state's two largest metropolitan areas, Nevada maintains strong air and road connectivity, though rural areas are less connected. • Roadways in Nevada are generally in need of significant repairs, and funding is not consistently allocated.
	Housing	• Nevada's housing market has recovered nicely from the Great Recession, with new home builds increasing throughout the state. • In the state's two major metropolitan areas, prices are reaching a level that prices out homebuyers for new builds.
	Broadband	• Residents in the state's two major metropolitan areas enjoy strong connectivity and high speeds. • Connectivity throughout Nevada's rural communities remains weak and in need of expansion.
Natural Resources	**Land**	• Due to the large amount of government ownership of state lands, much of Nevada is open to the public for recreation. • Federal ownership of land has resulted in many cities being developmentally "land-locked" and unable to expand further.
	Minerals	• In addition to Nevada's historical strengths in gold and silver, recent discoveries of lithium in the state promise a new frontier for the state's mining industry. • The mining industry is generally not well-understood by many in the state, both in terms of the role in the economy as well as the advancements that have been made in mining technologies.
	Water	• As a state dominated by the desert landscape, Nevadans have become well-accustomed to conservation efforts to save water. • Nevada's current water resources are threatened by the state's rapid expansion, the effects of climate change, and outdated agreements with neighboring states.

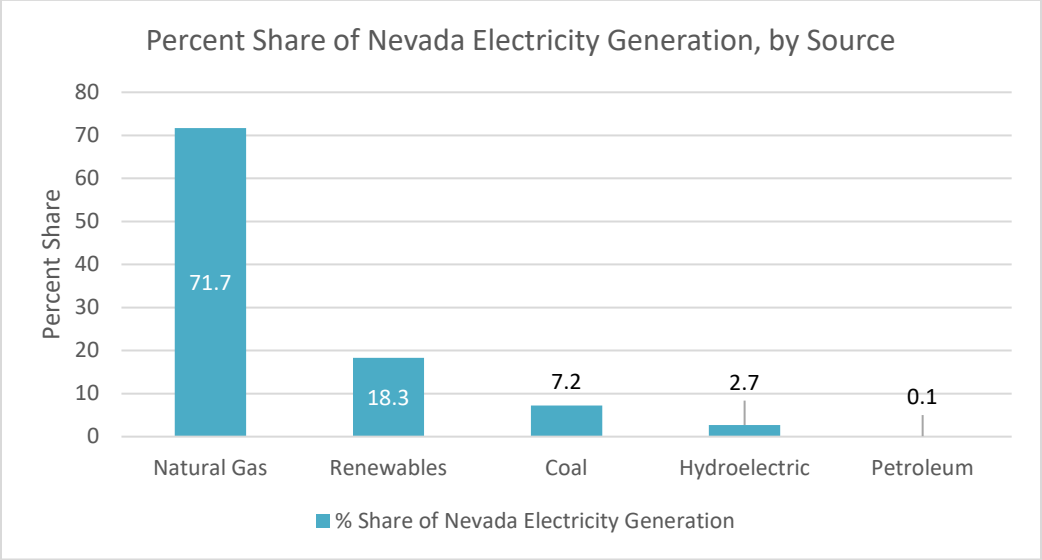
Category		Assets
Quality of Life	**Health**	• With the addition of new medical education facilities and medical firms, Nevada has positioned itself for significant growth in this industry. • Nevada continues to face a shortage of medical professionals to care for the state's growing population.
	Education	• The Nevada public K-12 education system contains some nationally ranked high performers that indicate the potential of the state. • Underfunding and overcrowding have led to much of the system's underperformance.
	Safety	• Trend data indicates that Nevada has achieved significant progress in reducing the state's property and violent crime rates. • Crime remains a pervasive issue in many of the state's communities, though it is being addressed through the hiring of more officers.
	Recreation	• Much of Nevada remains as it did hundreds of years ago and is open to the public for exploration and recreation. • The reputation of Las Vegas as "Sin City" has hurt the state's reputation when trying to attract workers with families.
Governance	**Business-Friendly Environment**	• The accessibility of decisionmakers in the state puts many companies at ease when deciding to expand or relocate to the state. • Many of the abatements the state currently offers should be refined to target technology-intensive companies.
	Institutional Assets	• State and local offices for economic development have been responsive to changes in their respective economies, providing new opportunities to the state's residents. • Collaboration between RDAs and other economic development organizations has been lacking, which could lead to the state missing out on important economic development opportunities.
	Taxation	• Nevada's low-tax environment has made it easy for businesses to conduct business in the state and motivate others to relocate to the state. • The low-tax environment has limited Nevada's ability to mitigate additional costs to attract businesses to the state.
Economy	**Diversification of Economic Base**	• Nevada has shown a dedicated effort to moving the state's economy away from an overreliance on tourism and gaming and more towards high-skill industries, such as advanced manufacturing. • Though the economy is showing signs of diversification, the jobs added to the economy tend to be on the lower-skill end of high-skill industries.
	Attraction/Retention of Skilled Workforce	• The diversification of the economic base has been accompanied by the attraction of many occupations that have historically been underrepresented in the state's economy. • In addition to the "Sin City" reputation, Nevada faces the "trailing spouse" issue, where highly educated spouses are unable to find jobs in some parts of the state.
Innovation Ecosystem	**Innovation Ecosystem**	• Nevada's population is highly entrepreneurial and enjoys a strong risk-taking spirit. • Coordination, collaboration, and formal ties are lacking among many of the actors in the state's innovation system.

Physical Infrastructure: Energy

Strengths

NV Energy, the state's investor-owned public utility provider, provides 83% of the state's electricity, and the remainder is provided by retail power marketers, electric cooperatives, municipal utilities, and others.[19] Natural gas accounts for the greatest amount of generation in the state (71.7%), with renewable (18.3%), coal (7.2%), and hydroelectric (2.7%) sources accounting for notable portions as well. Petroleum accounts for less than 0.1% of electricity generation in the state.[20] Figure 15 shows the split in share of electricity generation sources within Nevada.

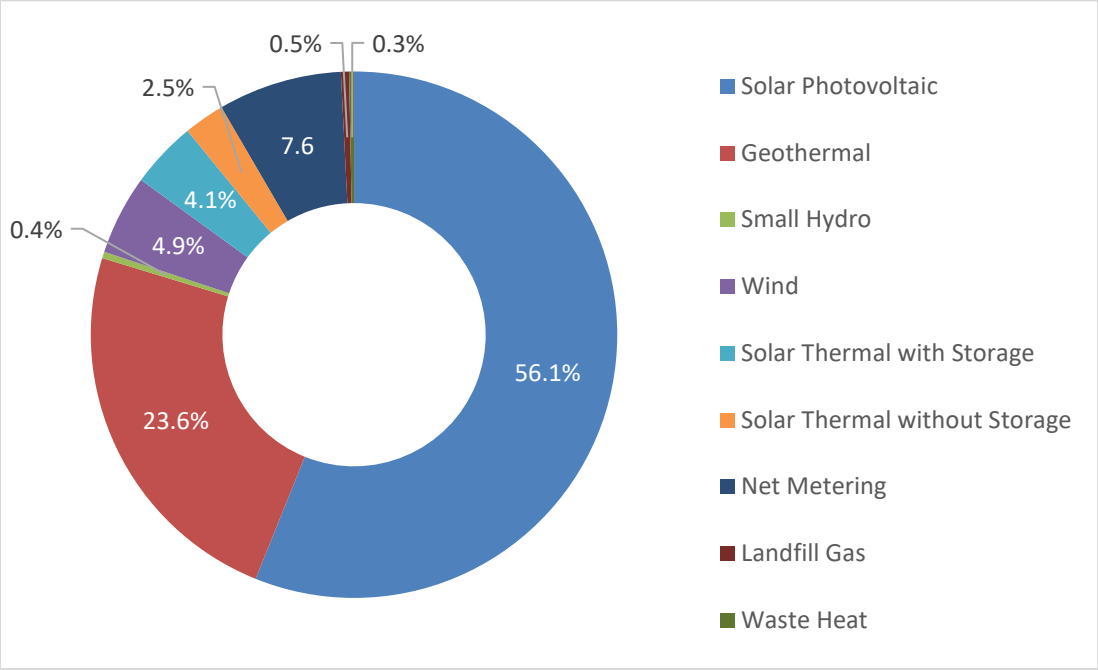
Figure 15. Percent Share of Electricity Generation in Nevada, by Source. Source: Nevada Governor's Office of Energy



Nevada has a varied mix of renewable resources, both in terms of capacity as well as generation.[e] Figure 16 visualizes the split in renewable energy capacity in the Nevadan energy grid. Solar photovoltaic is the dominant source for renewable capacity, accounting for 56.1% of the state's renewable capacity. Geothermal (23.6%) is also a significant source for renewable capacity, with smaller amounts coming from net metering (7.6%), wind (4.9%), and the remainder from other resources (7.8%).[21]

[e] The U.S. Energy Information Administration defines electricity generation as the amount of electricity that a source generator (e.g. solar panels, coal-fired power plants, wind turbines) produces over a period of time. Electricity capacity, however, refers to the maximum electric output a source generator can produce under specific conditions. As an example, a generator may have the capacity to produce 1 megawatt (MW) of electricity per hour, but one day it may generate 0.5 MW in one hour due to environmental conditions. More information can be found here: https://www.eia.gov/tools/faqs/faq.php?id=101&t=3.

Figure 16. Renewable Capacity, by Source (2016). Source: Nevada Governor's Office of Energy



The state's renewable generation is regulated by a renewable portfolio standard (RPS), which sets a floor for the percentage of electricity generated in the state that must come from renewable sources. Adopted statewide in 1997, the RPS aims for 25% of electricity generation to come from renewable sources by 2025. An original goal of the RPS was for solar to account for at least 6% of Nevada's total renewable energy generation, and Nevada has surpassed this goal with 36.4% of total renewable energy generation coming from solar photovoltaic.[22] Solar accounts for more than half of Nevada's renewable capacity, although it is only responsible for less than 40% of the state's total renewable generation. This indicates that Nevada has installed more solar capacity than the state uses. Additionally, though geothermal accounts for less than a quarter of Nevada's renewable capacity, it accounts for over half of the state's renewable generation. Figure 17 provides data on renewable generation in Nevada.

Figure 17. Renewable Generation, by Source (2016). Source: Nevada Governor's Office of Energy

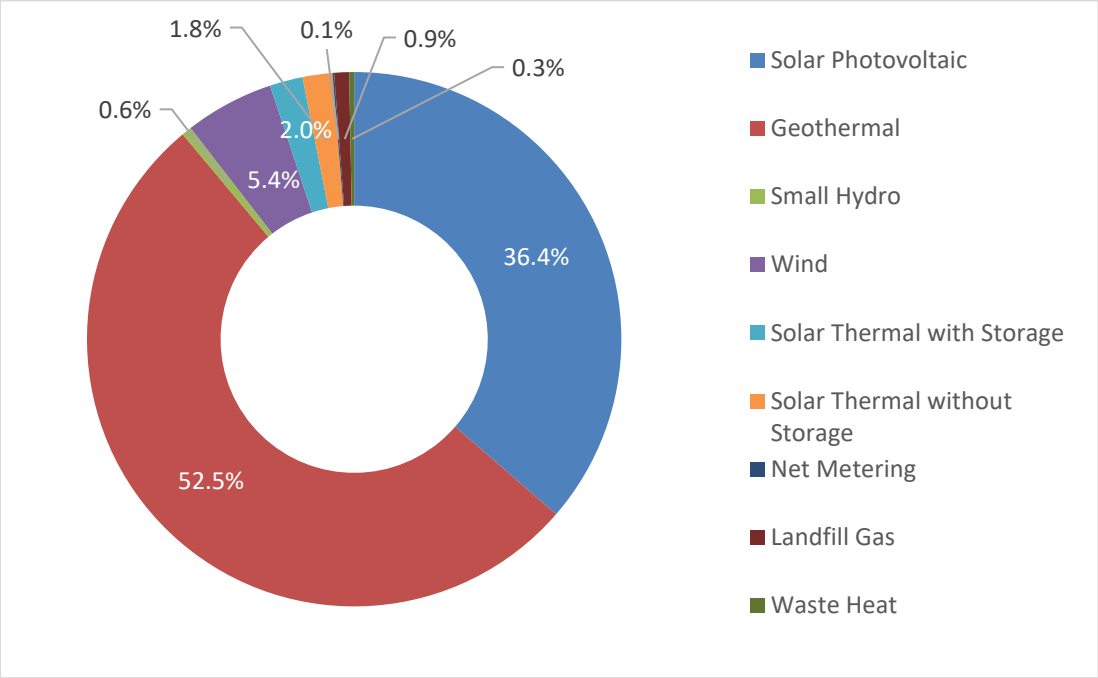


Table 22 provides information on Nevada's energy prices[23], compared with those of Nevada's peer states. The average cents per kilowatt hour (kWh) is the average price over the residential, commercial, and industrial sectors (excluding transportation energy prices). Nevada's energy pricing remains competitive at national and regional levels. This means that Nevada has been able to maintain affordable energy while increasing statewide adoption of renewable technologies.

Table 22. Price per kWh for Nevada and Peer States, August 2018.
Source: U.S. Energy Information Administration

State	Residential (cents/kWh)	Commercial (cents/kWh)	Industrial (cents/kWh)	Average (cents/kWh)
Utah	11.04	8.55	6.80	8.80
Oregon	11.09	9.49	5.92	8.83
Nevada	11.42	8.16	8.09	9.22
New Mexico	13.62	10.81	5.68	10.04
Colorado	12.50	10.53	7.30	10.11
United States	13.30	11.01	7.24	10.52
Arizona	12.91	11.24	7.74	10.63

Weaknesses

Nevada has a significant dependence upon its neighboring states for many natural resources, especially natural gas, to provide electricity. According to the U.S. Energy Information Administration, this dependence has pushed Nevada to import 88% of its energy from neighboring states.[24] The growing role of renewables in the state energy mix is a step in the right direction in achieving energy independence, but it will be many years until that is achieved.

Additionally, the persistence of the urban-rural divide in Nevada has resulted in very different conditions for urban areas compared to rural areas. For instance, rural communities have very limited access to high transmission lines, making it more difficult for these communities to plug into the state's grid. This can have significant impacts on their economic competitiveness and self-sufficiency.

Physical Infrastructure: Transportation

Strengths

At the state level, Nevada is well-connected throughout the region, the country, and the world. McCarran International Airport in Las Vegas has non-stop international service to many countries, as well as to all major economic and population centers throughout the United States. As a logistics hub, Reno-Sparks maintains strong roadway connections to major cities along the West Coast as well as the Southwest. Short driving times to other cities throughout the West was a common highlight in many interviews, particularly in the Reno-Sparks area. With a majority of the western population within a day's drive, northwestern Nevada has serious potential as a logistics gateway for the region.

Weaknesses

Though connectivity is quite strong for Nevada, the state of Nevada's infrastructure is a cause for concern. The relatively poor condition of Nevada's roads and highways costs Nevadans a total of $3.2B annually in the form of additional vehicle operating costs, congestion-related delays, and traffic crashes. As the state's population continues to grow at a rapid rate, the state of the infrastructure can be expected to decrease further. Statewide, 24% of Nevada's major locally and state-maintained roads are in poor condition, 41% are in mediocre or fair condition, and the remaining 35% are in good condition.[25]

Similar to many other states, Nevada funds roadway improvements through a fuel tax. However, the statewide fuel tax has not been increased since 1992. While Clark and Washoe counties have been able to index their fuel taxes locally to increase funding for improvements, this is not the case at the state level or in Nevada's rural communities. At the state level, an estimated $285M is needed between 2014 and 2024 to catch up on highway maintenance throughout the state.[26]

Additionally, while Nevada's incentives for greener and more fuel-efficient vehicles helps the state to lower its overall carbon footprint, the incentives have also reduced the number of times drivers visit the gas station. The purchase of both electric and hybrid vehicles more than tripled between 2014 and 2017 in Nevada, with nearly 35,000 hybrid and 2,500 electric vehicles now registered in the state.[27] Between 2015 and 2016, Las Vegas had the fastest growing sales rate of hybrid and electric vehicles in the nation. There is legitimate concern this growth will impact the revenues generated from the state's fuel tax.

A 2009 report by the National Surface Transportation Infrastructure Financing Commission found that direct user charge systems, such as tolling and mileage-based user fees, raise substantially more revenues and maintain long-term sustainability better than indirect user fees, such as fuel taxes and registration fees.[28] However, registration fees have by far been the most commonly used state-level mechanism for revenue generation from hybrid and electric vehicles. Across the nation, 20 states have successfully enacted a fee structure to address growing rates of hybrid and electric vehicle registrations,

and charge from as little as $50 to as much as $200. At least four of these states structured their fees to grow over time, either by tying the fee to the consumer price index or another inflation-related metric, in order to account for declining revenues from fuel taxes.[29] While these types of registration fees would only apply to hybrid and electric vehicles registered in Nevada, a mileage-based user fee is another option that could charge any driver using Nevada's highways, substantially increasing the amount of individuals paying into the state's roadway improvement funds.

The deteriorating state of Nevada's roads and highways should be viewed as a legitimate impediment to future growth in the state especially since public transportation is not widely available outside of the urban cores of its cities. As much as $144 billion in goods pass through Nevada every year, with a majority travelling by truck.[30] If Nevada's infrastructure continues to degrade, there will likely be serious repercussions for the logistics industry, which has been identified as a target industry for growth.

While the commercial airports in Las Vegas and Reno are strong performers and able to fund necessary maintenance and upgrades, the state's general aviation airports (which predominantly serve rural communities) are a different story. These airports require $56 million in pavement maintenance and repair alone over the next five years; though the state has established the Nevada Aviation Trust Fund to help secure federal funding for improvements at these airports, the Fund has not received a budget since 2005.[31]

Physical Infrastructure: Housing

Strengths

When compared to its peer states, Nevada's housing market remains among the most affordable in the region. Table 23 provides dollar figures for average home value and sale price as well as the Housing Affordability Index (HAI), for the most recent period available.

Table 23. Housing Data for Nevada and Peer States. Source: Zillow[32]

State	House Value ($) (September 2018)	House Sale Price ($) (June 2018)	Housing Affordability Index
Colorado	378,900	357,500	183.7342
Oregon	341,600	327,500	175.6702
Utah	326,400	298,700	220.8804
Nevada	295,200	274,700	200.8736
Arizona	254,500	243,300	220.1315
United States	242,502	238,181	241.9042
New Mexico	190,600	N/A	N/A
**Note: Sale price data are not available for New Mexico.*			

The cost of living is a significant factor for many relocating individuals and corporations, so maintaining a competitive edge over neighboring states better allows Nevada to compete for business and talent within the region.

Nevada maintains a competitive advantage among peer states for housing affordability. The cost of living is a significant factor for many relocating individuals and corporations, so maintaining a competitive edge over neighboring states better allows Nevada to compete for business and talent within the region.

HAI assesses whether an area's median income is sufficient to purchase a single-family home at the median sale price for a property in a specified area. An HAI of 100 indicates that an area's median income is exactly able to purchase a home at the median sale price, assuming a 20% down payment and a qualifying ratio of 25% (meaning the monthly principle and interest payment cannot exceed 25% of the median family monthly income).[33] Nevada's score of 200.9 indicates that, overall, families earning the state's median income have 200% of the income necessary to purchase a median-priced home in the state. In other words, at the state level, Nevadan real estate remains quite affordable. However, it is important to note that the state-level HAI is a statistical average and does not necessarily capture the reality for all of Nevada's urban and rural communities, where home prices and incomes can vary drastically. This means that, while the state's median income may be able to afford a home in one of Nevada's many rural communities, this is not necessarily the case in the state's larger urban areas, where home prices can be significantly higher. The urban housing market dynamics will be discussed in greater detail in the Las Vegas and Reno-Sparks Asset Map sections.

Weaknesses

Nevada lost significant numbers of construction workers during the Great Recession, which was not unique due to a nationwide decline in new construction, especially for residential builds. However, while other states and regions of the United States have regained much of the construction labor that dissipated during the recession, Nevada has struggled to rebuild this workforce. As surrounding states began to quickly recover from the economic downturn, Nevada's growth remained lethargic for several more years. Subsequently, the construction workforce found employment in other states, such as California, Arizona, and Utah, with little incentive to return to Nevada once the state's economy began recovering. This labor shortage has made it much more difficult for Nevada to meet the rising construction demand with adequate supply.

Table 24 provides an overview of the number of building permits issued for new residential construction in each of Nevada's peer states. While Nevada is experiencing a slight increase (5%) in new home permits, it underperforms when compared to its regional counterparts.[34] Apprehension is understandable in the state's housing market, given the slow recovery following the Great Recession.

However, new housing will continue to be a necessity for the state so long as it experiences sustained population growth.

Table 24. Number of Building Permits Issued for New Residential Construction, July 2018.
Source: National Association of Home Builders

State	Number of Building Permits Issued for Residential Construction	Percent Increase over July 2017
Colorado	18,107	28%
New Mexico	2,942	21%
Arizona	18,745	14%
Utah	11,539	13%
United States	521,438	7%
Nevada	8,155	5%
Oregon	6,034	-2%

Further compounding the constraints on the construction workforce is the underwhelming interest in construction trades among many Nevadans. As new, higher-skill industries move to the state, greater emphasis has been placed on specialized training and education so that Nevada can supply these industries with the appropriate workforce. While training and education for these sectors is important, it is essential that residents also understand the opportunities available in the construction sector.

It is understandable that Nevada is currently facing a strained housing market: the Great Recession decimated markets throughout the state, with Nevada one of the hardest hit states in terms of property value loss. However, the pendulum has now swung back quite strongly, where the state is short of housing for many of its new residents.

Also constraining the state's housing market is the large amount of state territory that is owned by the federal government. Discussed in greater detail in the Land section, the extensive ownership of these lands by the federal Bureau of Land Management (BLM) limits the extent to which the state's communities can develop new housing projects to meet growing demand. Such limitations result in fewer new home builds and, eventually, increasing housing prices. As an additional 5,000 individuals move to Nevada every month, it is important for the state to establish an understanding with federal agencies to meet the state's growing demand for housing with its shrinking supply of available land.

Physical Infrastructure: Broadband

Strengths

In 2015 the Federal Communications Commission (FCC) increased the download standard for what qualifies as broadband internet. Previously baselined at 4 megabits per second (Mbps) for download speeds and 1 Mbps for upload speeds, broadband internet is now considered any connection over 25 Mbps for downloading and 3 Mbps for uploading (also known as 25/3 speeds).[35]

Nevada is well-connected for internet and online services, which helps to facilitate the emergence of medium- to high-tech industries as well as those industries that are dependent on broadband

connectivity. Using the FCC's baseline for broadband internet speeds, 100% of the state has access to 25/3 speeds through at least one provider, and nearly 93% has access through at least two providers. More than half of the state (53%) has access to these speeds from at least three providers.[36]

Weaknesses

However, Nevadans tend to have less choice in internet service providers (ISPs) than the nation overall. For instance, more than 70% of the nation has access to 25/3 internet speeds from at least three ISPs, compared to 53.3% of Nevadans[37]

When it comes to internet speeds greater than 100 Mbps for downloading and 10 Mbps for uploading, Nevada consistently scores below national statistics. Nearly 30% of the state has no access to 100/10 speeds, whereas less than 17% of the nationwide population is without access. While 72% of Nevadans have access to 100/10 speeds from at least one provider, less than 13% have any choice between ISPs at these speeds. Nationally, however, at least 30% of the population has access from at least two ISPs.[38]

Redundancy also remains a significant factor for broadband infrastructure in Nevada, particularly for the state's rural communities. In many rural areas, entire towns are serviced by a single cable that delivers broadband; when the cable has been accidentally severed, an entire community has been cut off from the internet. As internet connectivity becomes further engrained within industries and individuals' lives, simply providing a service is not enough. Rather, the service must be consistent and reliable, as well as competitively delivered, which is not necessarily the case for many of Nevada's rural communities.

Natural Resources: Land

Strengths

Nevada is the seventh largest state in the United States by total land size. Though the federal government maintains extensive ownership over most of these lands, Nevada has great potential when it comes to development opportunities. Land in rural areas remains affordable, especially when compared to some of Nevada's neighboring states. Likewise, BLM has shown a willingness to lease land to municipalities, especially when it comes to infrastructure, such as roadways and schools.

Nevada is also less prone to natural disasters than many of its neighbors. However, the state does still experience a variety of extreme weather events, such as high winds, drought and wildfires; flash flooding from snow melt also poses a hazard to the state's communities and infrastructures.[39] The climate is well-suited to many industries that require stability and predictability in the weather.

Weaknesses

Out of the slightly more than 70 million acres that make up the state of Nevada, roughly 56 million of these acres (79.6%) are owned by the federal government. This is by far the largest amount of federal ownership of state territory in the United States, with the next highest concentration in neighboring Utah (63.1%). BLM retains the most acreage (47 million), with the Forest Service and Fisheries and Wildlife agencies owning significant portions as well (5.8 million and 2.3 million, respectively). The National Parks Service and Department of Defense own smaller amounts.[40]

Significant federal land ownership can act as an impediment to rapid growth and development. The state's two major urban metropolitan areas, Las Vegas and Reno-Sparks, are essentially developmentally land-locked. Lands owned by BLM surround both cities—artificially inflating the cost of land, as developers cannot easily turn this land into profitable enterprises, either residential or industrial. There is also a sense of uncertainty about federal lands since usage is determined by the federal government and not at the state level.

Natural Resources: Minerals

Strengths

Nevada has a long history with the mining industry. Discovery of significant gold and silver deposits in the 19th century brought thousands of frontiersmen and women to the aptly named Silver State and propelled it to statehood in 1864, the only state to be admitted during the Civil War. Nevada has maintained a close relationship with the mining industry, which continues to be responsible for about 75% of the total gold production in the United States.[41] The mining industry has remained particularly important for the state's rural communities, where such companies provide many locals with high-wage jobs.

> Nevada produces about 75% of all gold mined in the United States.

In more recent history, Nevada has been discovered to be the home of one of the world's largest concentrations of lithium, a central component for batteries. Nevada has significant potential to further develop this mining subsector and translate it into tangential industries, with the only lithium-producing mine in the United States, the Silver Peak Mine. With worldwide lithium demand expected to increase from 220,000 tons in 2018 to 800,000 tons by 2025, lithium remains an important component of the Nevadan mining industry.[42]

Weaknesses

Though Nevada is well-endowed with precious materials like gold and silver, the state lacks any significant fossil fuel reserves, whether oil or natural gas.[43] Consequently, Nevada is highly dependent on neighboring states to provide resources for much of its power generation, as discussed earlier in the Energy section.

Natural Resources: Water

Strengths

As a state dominated by the desert landscape, Nevada has learned how to manage its limited water resources. The culture of conservation has become engrained within Nevadans throughout the state, making it easier for government to enact sustainability measures. Much of the new construction throughout the state is required to abide by stringent restrictions on water usage and waste. Larger metropolitan areas and regions have implemented their own conservation strategies, with Southern Nevada cutting water usage by nearly 100 gallons per person per day.[44]

Weaknesses

While Nevada can promote conservation at the policy level, it has little control over how much water the state receives. Nevada receives the lowest average annual precipitation in the nation, greatly restricting the amount of water the state can work with when considering population expansion.[45] As the population continues to grow, the state can expect water scarcity to be a bigger concern and more threatening to the sustainability of its urban areas, particularly Las Vegas.

In 2014, the American Society of Civil Engineers estimated that Nevada would require roughly $5.6 billion over the next 20 years just to maintain the system's current status and resources, which received an overall score of a C minus. While infrastructure remains adequate for Clark and Washoe counties, the state's rural communities are facing aging water infrastructure and little funding to address any arising concerns.[46]

Quality of Life: Health

Strengths

It is evident that Nevada scores better than national averages in many categories. Table 25 provides data on five metrics in which Nevada performs well, including the following.

- Adult obesity rate
- Percentage of adults reporting poor mental health status
- Percentage of adults reporting serious mental illness in past year
- Opioid overdose death rate per 100,000
- Infant mortality rate

Adult obesity rate data are taken from County Health Rankings, and all other data come from the Henry J. Kaiser Family Foundation. While the mental health metrics indicate that Nevada performs well compared to peer states and against the national average, some interviewees mentioned that adequate mental health support services are lacking in Nevada.

Table 25. Nevada's Positive Key Health Indicators. Source: Henry J. Kaiser Family Foundation; County Health Rankings[47]

State	Adult Obesity Rate, Percent (2016)	Percent of Adults Reporting Poor Mental Health Status (2017)	Percent of Adults Reporting Serious Mental Illness in Past Year (2015-16)	Opioid Overdose Death Rate Per 100,000 (2016)	Infant Mortality Rate (2015)
Arizona	27	35	4	11.4	5.47
Colorado	21	39	5	9.5	4.66
Nevada	27	31	4	13.3	5.18
New Mexico	24	37	4	17.5	5.07
Oregon	27	41	5	7.6	5.15
Utah	25	40	5	16.4	5.02
United States	29.6	36	4	14.7	6.17

Weaknesses

Table 26 provides data on health metrics in which Nevada underperforms, including the following.

- Life expectancy at birth
- Drug overdose rate per 100,000
- Percentage of adults who smoke

Table 26. Nevada's Negative Key Health Indicators. Source: Henry J. Kaiser Family Foundation

State	Life Expectancy at Birth (2009)	Drug Overdose Rate Per 100,000 (2016)	Percent of Adults Who Smoke (2017)
Arizona	79.6	20.3	16
Colorado	80.0	16.6	15
Nevada	78.1	21.7	18
New Mexico	78.4	25.2	18
Oregon	79.5	11.9	16
Utah	80.2	22.4	9
U.S.	79.6	21.3	17

Quality of Life: K-12 Education

Strengths

K-12 education in Nevada has pockets of excellence scattered throughout the state, particularly in suburban communities. These schools are often high performers on a national level and help to provide an anchor for their communities. Some high schools also offer strong career and technical education programs, with the opportunity to earn college credit, an associate's degree, or certificate upon completion of the program. Distance learning is becoming a more viable option for some specialized courses in rural Nevada, although reliable broadband access and a lack of corresponding technical labs and practice facilities continue to be barriers for many students in these communities.

Weaknesses

Nevada has taken great steps to fortify its workforce base to better serve its changing industry mix, particularly through its higher education system. However, less attention has been focused at the K-12 level. In many discussions, the Nevadan K-12 education system has been described as spotty. The underperforming areas have a strong impact on the overall performance of the state, which ranks 41st out of 50 in terms of percent of population with a high school diploma or equivalency (86.8%).[48]

The Nevada public K-12 education system is a minority-majority system, with nearly 70% of the school-going population identifying as non-white or mixed race. Of the total school-going population, Hispanics alone account for over 40% of enrolled students. It is important for Nevada to consider the implications of a minority-majority educational system when addressing state-level education policy.

Interviewees throughout the state also identified a shortage of qualified teachers as a significant hurdle for the Nevadan public education system. For the 2018-19 school year, the average K-12 teacher in Nevada is responsible for 20 students, a notable degree higher than the national average of 16:1.

Likewise, Nevada's student-teacher ratio remains above two of its peer states, Colorado (17:1) and New Mexico (15:1); other peer states are available in Table 27. This means that teachers are unable to provide students with the individual attention they may require to be successful.[49]

Table 27. Student-Teacher Ratios Among Peer States. Source: Public School Review

State	Student-Teacher Ratio
Utah	23:1
Oregon	20:1
Arizona	20:1
Nevada	20:1
Colorado	17:1
United States	16:1
New Mexico	15:1

Using adjusted cohort graduation rate (ACGR) data from the National Center for Education Statistics for the 2015–16 school year, Nevada's underperformance quickly becomes evident: Nevada (74%) ranks 48th out of 50 for ACGR, only scoring better than New Mexico (71%) and Washington, D.C. (69%). For the same year, the United States averaged an ACGR of 84%.[50]

For standardized testing, Nevada scores below national averages. Table 28 provides the average ACT composite score for Nevada and its peer states as well as the national average. Of its five peer states, Nevada scores the lowest, nearly 2 points below the next lowest scorers and about 3 points below the national average.[51]

Table 28. Average ACT Scores of Peer States' Graduating Class, 2017. Source: ACT.org

State	Average ACT Composite Score
Oregon	21.8
United States	21.0
Colorado	20.8
Utah	20.3
Arizona	19.7
New Mexico	19.7
Nevada	17.8

Quality of Life: Higher Education

Strengths

NSHE is an engine for local economic development in certain sectors. Similar to the state's public K-12 education system, NSHE is a minority-majority system; though white students make up the single greatest number of students, over 56% of the system's population is from a minority background. Currently, the system is aiming to reach 60% college attainment or credential of value (60% college attainment or state/national/industry certification) by 2020, requiring an increase of 790 awards

conferred each year from 2014 to 2020. For the school years 2013 to 2015, NSHE met this goal; however, for the 2015–16 school year, NSHE fell short by 29 awards.[52]

Table 29 provides data for the four most commonly awarded degree focus areas in the NSHE system for the 2016–17 school year.

Table 29. Top Four Focus Areas for NSHE Students, 2016-17. Source: Nevada System of Higher Education

Focus Area	Number of Awards Conferred	Percent of Total (Top Four Focus Areas Only)
Business, Management, Marketing and Related Support Services	2,978	17.92%
Health Professions and Related Programs	1,996	12.01%
Liberal Arts and Sciences, General Studies and Humanities	1,938	11.66%
Education	1,251	7.53%
Total	16,614	100.00%

Among its peer states, Nevada scores highly for funding per full-time enrollment, though the state remains below the national average.

NSHE produces a significant number of students in the social and soft sciences as well as notable amounts of students in health and hard sciences. The dedication to health professions may be an outcome of the state's push to develop the healthcare industry within Nevada, which has historically been underserved by the state's institutions. However, an increase in STEM graduates is necessary for NSHE to supply new and emerging industries in Nevada with the necessary workforce.

Among its peer states, Nevada scores highly for funding per full-time enrollment (FTE), though the state remains below the national average. Table 30 provides data for per-pupil spending among peer states. Spending has not yet recovered to pre-recession values at both the state and national levels.

Table 30. State-Level Higher Educational Appropriations per Full-Time Enrollment. Source: State Higher Education Executive Officers Association[53]

State	Appropriations FY 2008 ($)	Appropriations FY 2017 ($)	Percent Change Since Recession (FY 2008)
New Mexico	11,233	9,348	-16.8
United States	8,641	7,642	-11.6
Nevada	10,903	7,496	-31.2
Utah	8,612	6,543	-24
Oregon	6,075	5,959	-1.9
Arizona	8,399	4,920	-41.4
Colorado	4,697	4,194	-10.7

Nationally, funding was nearly 12% lower in 2017 than it was in 2008. Nevada's funding remains 31% less than in 2008; the only peer state whose funding decreased more is Arizona at 41%. Nevertheless, Nevada's per-FTE spending remains competitive among its peer states.

UNR serves as the state's flagship university. Many interviewees noted the university's ability to forge connections with community businesses as an indication of the university's growing importance to not only northwestern Nevada, but also to the state as a whole. In the south, UNLV is particularly well-known for its college of hospitality, which is ranked as one of the best hospitality management programs internationally. Both of these universities have shown an interest in growing their connections with community businesses to provide opportunities for their students, although many of these connections are still nascent. As of 2018, UNLV is classified by the Carnegie Foundation as an R1 university (very high research activity), and UNR is classified as an R2 university (high research activity).[54]

In addition to the state's four-year institutions, Nevada is served by a number of community colleges. These colleges remain important workforce development institutions for the communities they serve. Oftentimes, interviewees stated that the state's two-year institutions were more successful at forging industry partnerships than their four-year counterparts. The most notable success story for university-industry partnerships was the pipeline established between TMCC, Tesla, and Panasonic. As a result of this program, TMCC was able to build and ultimately directly supply Tesla and Panasonic with a workforce tailored to the specific needs of each company. Community colleges throughout the state have enjoyed similar success in engaging with industry and nimbly reacting to changing market needs.

At the research level, DRI is a non-degree granting, nonprofit research institute within the NSHE system. With two campuses in Nevada, one in Reno-Sparks and the other in Las Vegas, DRI has a strong tradition of producing high-quality environmental research. The WaterStart program is one example of a successful collaboration between DRI, UNR, UNLV, and several economic development and industry partners that connects water innovations across the state. DRI also administers the ScienceAlive program that provides STEM curriculum supplements, trainings, and other professional development opportunities to preK-12 educators across the state.

Weaknesses

As a supplier of local workforce needs, NSHE is generally able to meet the needs of the market. However, as the driver of workforce development for the new industries Nevada aims to attract, NSHE underperforms in many regards. Overall, graduation rates remain low throughout the state: for the 2015–16 school year, the average graduation rate for the state's four-year institutions was 46%. Though this figure has increased overall since 2006, gains have been minimal (increasing from 43% in 2006 to 46% in 2016). At the state's two-year institutions, graduation rates hover around 15%. Even when adjusting graduation rates for 150% normal time (i.e., six years for a bachelor's degree and three years for an associate's degree), graduation rates remain low. At the

Graduation rate gains have been minimal, increasing from 43% in 2006 to 46% in 2016.

state's four-year institution level, graduation rates for students at 150% normal time falls to 37%; at the two-year level, rates increase to 21%.[55]

Low graduation rates among Nevada's two- and four-year institutions have led to lower educational attainment across the state. While 85% of Nevadans have at least a high school diploma or equivalency, only 23% have obtained a bachelor's degree or higher. Table 31 provides an overview of Nevada's educational attainment rates compared to its peer states.

Table 31. Educational Attainment for Nevada and its Peer States, 2016. Source: U.S. Census Bureau[56]

State	Percent of Population with High School Diploma (or Equivalent) or Higher	Percent of Population with Bachelor's Degree or Higher
Utah	91.5	31.7
Colorado	91	38.7
Oregon	90	31.4
United States	87	30.3
Arizona	86.2	28
Nevada	85.4	23.2
New Mexico	84.6	26.7

With only 23% of the population holding a bachelor's degree or higher, Nevada ranks below all of its peers and is below the national average in educational attainment.

A "chicken or egg" dilemma": should NSHE institutions focus on building a workforce skillset for the yet-to-come and emerging industries, or should they continue to focus efforts on existing industries, such as hospitality or entertainment, until new industries are firmly established?

Many stakeholders shared a "chicken or egg" dilemma: should NSHE institutions focus on building a workforce skillset for the yet-to-come and emerging industries, or should they continue to focus efforts on existing industries, such as hospitality or entertainment, until new industries are firmly established? Regardless of whichever comes first, many stakeholders believe that graduates are not entering the workforce with the needed skills for many of Nevada's industries, whether new or traditional. In addition to specialty skills (e.g., coding), many interviewees mentioned a noticeable lack of soft skills (e.g., communication and workplace professionalism) in recent graduates. The lack of these soft skills in NSHE graduates can incentivize firms to either import their labor at the expense of local job seekers or conduct business in other states.

While some NSHE institutions have proved to be adept at collaborating with industries to build dedicated workforce pipelines, others remain less interested in forging these relationships. Here, again,

the "chicken and egg" analogy was shared by stakeholders: does academia approach industry to initiate the collaboration or vice versa? In discussions with stakeholders from both academia and industry, it was apparent that each thought the other was responsible for initiating the relationship. However, in some cases where industry had reached out to an institution, the institution was either not interested or not motivated to establish a pipeline program.

Quality of Life: Safety

Strengths

Overall, Nevada maintains a well-sized police force, far above the national average (see Table 32). Likewise, Nevada's police officers are the best paid compared to those in peer states; on average, they earn nearly $74,000 per year, about 13% higher than the national average ($64,490). A well-paid police force allows the state to recruit those individuals who are best qualified for law enforcement positions.[57]

Table 32. Police and Sheriff's Patrol Officers per 100,000 Population, 2017. Source: Bureau of Labor Statistics

State	Police and Sheriff's Patrol Officers per 100,000 Population (May 2017)	Annual Mean Wage ($)
New Mexico	567.1	52,320
Arizona	424.6	65,810
Colorado	369.5	71,270
Nevada	361.9	73,930
Utah	312.7	52,410
United States	204.0	64,490
Oregon	N/A	68,530

A strong police force better enables the state to intervene in crimes and mitigate future occurrences. In Nevada, this can be seen in the state's comparatively low property crime rate, shown in Table 33. Nevada's property crime rate remains below all of its peer states, though it remains above the national average. However, aside from Arizona, Nevada has seen the largest decrease in property crime since 2008 when compared to its peer states.

Table 33. Property Crime Rate per 100,000 Population. Source: Federal Bureau of Investigation

State	Property Crime Rate per 100,000 Population, 2008	Property Crime Rate per 100,000 Population, 2017	Percent Change, 2008-2017 (%)
New Mexico	3,909.2	3,941.7	+0.8
Oregon	3,282.2	2,986.5	-9.0
Arizona	4,291.0	2,914.9	-32.1
Utah	3,357.4	2,780.2	-17.2
Colorado	2,849.0	2,701.6	-5.2
Nevada	3,447.5	2,612.4	-24.2
United States	3,212.5	2,362.2	-26.5

Weaknesses

Though Nevada maintains a well-sized and well-paid police force, as demonstrated by Table 34 , the violent crime rate throughout the state remains above the national average as well as many of its peer states' averages. However, it is important to understand the current violent crime rate within the trend for the state overall. Among its peer states, Nevada is the only state that experienced a reduction in violent crime, falling 23% between 2008 and 2017. This reduction in violent crime is nearly double that of the national reduction in violent crime for the same time period. Thus, while Nevada currently has an above-average violent crime rate, trends suggest that the state is experiencing success with a decrease the violent crime rate at a time when its peer states are seeing an increase in violent crime.[58]

Table 34. Violent Crime Rate per 100,000 Population. Source: Federal Bureau of Investigation

State	Violent Crime Rate per 100,000 Population, 2008	Violent Crime Rate per 100,000 Population, 2017	Percent Change 2008-2017 (%)
New Mexico	649.9	783.5	+20.6
Nevada	724.5	555.9	-23.3
Arizona	447.0	508.0	+13.6
United States	454.5	382.9	-16.5
Colorado	343.1	368.1	+7.3
Oregon	257.2	281.8	+9.6
Utah	221.8	239.0	+7.7

Quality of Life: Recreation

Strengths

The tourism, gaming, and entertainment industry remains a dominant player in the Nevadan economy, supplying the state with seemingly endless sources of recreation, particularly within the Las Vegas metropolitan area. Las Vegas remains world-famous for its large number of casinos, restaurants, and a wide range of live entertainment offerings (e.g., music, Broadway shows, circuses). Nevada has recently become home to several new professional sports teams, including National Football League, Women's National Basketball Association, and National Hockey League teams. Esports are also increasingly making a home in Nevada, and new entertainment venues like the Madison Square Garden Sphere promise to remake the Las Vegas skyline.

However, the state has much more to offer outside of the gaming industry. With nearly 80% of the state owned by the federal government, the state remains vastly undeveloped and is still a frontier in many ways.

Within this frontier lies an immense amount of open space, much of which is accessible to the public. Nevada boasts over 77,000 acres of national parks and 92,000 acres of state parks, and Lake Tahoe, Lake Mead, and Great Basin National Park are valuable recreational assets in the north, south, and east, respectively. Many of these popular recreation areas are within driving distance of Las Vegas and Reno-Sparks, providing residents as well as visitors with extensive possibilities for exploring the outdoors.

Nevada is also just a few hours' drive from a wealth of recreation opportunities in bordering states, including Yosemite National Park, Zion National Park, and the Grand Canyon.

Weaknesses

While extensive federal government land ownership is currently an asset of Nevada's outdoor recreation industry, there is the potential for this land to be converted for private or industrial use, especially as the state grows. This could result in the loss of many acres of Nevada's currently open land close to the major metropolitan areas.

Many interviewees in both metropolitan areas identified the reputation of Las Vegas as a party city as detrimental not just to the city, but to the state overall. This incomplete image can make Nevada, and especially Las Vegas, seem less suitable for young families.

Governance: Business-Friendly Environment

Strengths

There is little doubt that Nevada has created an environment in which firms feel relatively unobstructed to conduct business. Firms can generally enjoy a low tax environment with few state obligations.

> The availability of state government officials is a major benefit of doing business in Nevada.

Aside from taxes and abatements, many stakeholders identified the availability of state government officials as a major benefit of doing business in Nevada. The Tesla Gigafactory was a popular example, where the state legislature held a special session to pass the numerous laws that allowed for the Tesla deal to go through, all within nine days. The willingness of state government to engage with industry and find solutions to some of the problems facing firms relocating to Nevada is a significant factor for many of the firms who eventually moved to the state.

Weaknesses

Many stakeholders shared that the abatement programs in their current forms no longer serve the needs of many of the state's development goals. Notable insights regarding the abatement programs include the following:

- The abatements are not strong enough to attract firms to Nevada. They typically are awarded to firms that have already decided to relocate to the state and simply "sweeten the deal."
- The export requirements attached to many abatements (i.e., firms must export at least 51% of their product out of the state) are detrimental to service-related firms (e.g., tech firms) as they do not typically export a physical product. The export requirement also makes it difficult for rural areas to attract supply chain companies that would primarily serve in-state industries, such as mining and agriculture.

- Many startups and entrepreneurs are unable to benefit from any abatement programs for the above reasons. Additionally, because startups are at a different stage of enterprise development, they require a different package of incentives, benefits, and services to foster sustained growth, compared to larger, more established firms.

Governance: Institutional Assets

Strengths

The economic development institutions within Nevada are experienced and effective. At the state level, GOED was consistently noted for its ability to convene stakeholders and engage industry on ways in which they can help to shape Nevada's future. The Governor's Office of Workforce Innovation (OWINN) was frequently cited as one of the state's most valuable resources, especially for the state's education institutions. While the economic development agencies of Nevada have worked diligently to connect industry stakeholders with government offices and, to a lesser extent, academia, OWINN has been instrumental in facilitating dialogue between emerging industries and academia. Additionally, GOED administers the WINN Fund, which enables education institutions to develop new programs aimed at meeting an industry workforce skill gap.

At the regional and local level, RDAs were similarly well-regarded, with close ties to their local communities and the ability to cater to industry stakeholders. In conversations with interviewees, it became evident that the Las Vegas Global Economic Alliance (LVGEA) and the Economic Development Authority of Western Nevada (EDAWN), in particular, played significant roles in the development of their respective communities. Both RDAs have found ways to tailor the state's overall economic development agenda to the specific capabilities and needs of their local communities. Similar to GOED, these RDAs have shown an ability to bring different stakeholders to the table to discuss issues and solutions for their communities.

Weaknesses

While RDAs have been emboldened in recent years to drive economic development in their regions, the approach to economic development in the state has become increasingly fragmented. While there are significant differences between not only the state's two largest metropolitan areas, but also the urban and rural communities, there is a lack of collaboration between the state's RDAs. While GOED has maintained the power to convene these agencies, they remain autonomous entities with little incentive to collaborate to achieve statewide success.

A regional approach to economic development is not inherently counterproductive and was encouraged by the SRI-Brookings report in 2011.[59] However, Nevada faces many issues at the state level, so collaboration between these entities is also very important. For example, if an RDA is unable to accommodate a certain firm or industry the RDA should recommend the firm or industry to another region in Nevada instead of treating other counties like other states.

Governance: Taxation

Strengths

Nevada is well-known as a low-tax state. As one of the few states with no personal or corporate income taxes, individuals and firms can expect little in the way of direct taxation. This means the state relies on other forms of taxation to support public services like education and healthcare. These other forms of taxation include the following.

- Personal property taxes
- Sales and use taxes
- Real property taxes
- Modified business taxes
- Commerce tax
- Manufacturing equipment sales tax

Sales and use taxes can vary throughout the state depending on the county-levered sales tax rate, resulting in both Las Vegas and Reno-Sparks having the highest rates (8.25% and 8.265%, respectively).[60] Though comparatively high, these taxes do not seem prohibitive to either businesses or individuals.

Additionally, whereas most states would abate corporate income taxes to incentivize businesses to relocate to their state, Nevada has fewer options. However, abatements exist for most taxes that apply to Nevadan businesses, including the following.

- Sales and use taxes
- Modified business taxes
- Personal property taxes
- Real property taxes
- Taxes on aviation parts and data centers

Many of these taxes can be abated for several years, ranging from four years for modified business taxes to 20 years for aviation parts and data center taxes. In addition to the standard abatement timeline, most of these abatements can be extended into the future, provided firms meet a variety of conditions in order to qualify. These qualifications can include a minimum for capital investment, number of primary jobs created, and the minimum hourly wage level. In an effort to recognize the differences between the needs of urban and rural firms, the abatements for rural locations have lower thresholds for firms to qualify for abatements and extensions, requiring less capital investment and fewer primary jobs created.[61]

Weaknesses

There are two existing tax structures that may be detrimental to Nevada's future: the lack of an abatement for sales taxes on manufacturing equipment and the real property tax. Central to the state's economic recovery has been the growth of the advanced manufacturing sector, particularly in northwestern Nevada. However, working against this industry's growth is the lack of a sales tax exemption for manufacturing equipment purchases, which can significantly increase the cost of

upgrading or establishing manufacturing facilities in Nevada. While nearly 40 states now provide full exemptions from sales and use taxes on manufacturing equipment, with others providing a partial exemption, Nevada remains one of the few that provide no exemption for manufacturing equipment.[62]

Nevada's real property tax structure was also an issue shared by many stakeholders. While property tax caps were an understandable response to the economic instability of the late 2000s, they have severely limited the funding available to municipalities to improve public services. For instance, property taxes account for nearly 20% of funding for public K-12 education in Clark County, yet the amount of real property taxes that can be collected is essentially capped every year.[63] This arrangement, while it helps to maintain affordability in the state's housing market, also prevents municipalities from being able to adequately increase funding for services such as education. Several stakeholders emphasized that they would be willing to pay more in real property taxes if the funding was allocated to better public education in the state.

> Property tax caps have limited the funding available to municipalities to improve public services.

Economy: Diversification of Economic Base

Strengths

Nevada has clearly recovered from the depths of the Great Recession and is in a much stronger position than in 2011. Leading the charge in this economic recovery has been the state's push to further diversify its economy away from the traditionally dominant sectors, particularly tourism, gaming, and entertainment. At the state level, Nevada has seen the greatest growth in the health and medical services, manufacturing and logistics, and natural resources technology sectors. These new sectors and industries bring with them wages that are higher than what is typically seen in Nevada.

Weaknesses

Though Nevada has experienced success with its diversification agenda, the tourism, gaming, and entertainment sector still remains the dominant player in the Nevadan economy. However, as compared to growth in other sectors, the tourism, gaming, and entertainment sector has added comparatively fewer jobs, indicating the growing importance of other sectors.

Discussed in greater detail in the next section, the lack of the skilled workforce required to attract and sustain many new industries remains a significant hindrance for Nevada. Subsequently, workforce capabilities (or lack thereof) should be seen as an obstacle for the state's diversification strategy.

Economy: Attraction/Retention of Skilled Workforce

Strengths

The unique characteristics and offerings of Nevada, discussed throughout the following section, act as a primary factor in attracting workers to the state. Interviewees across the state identified the large number and variety of recreational activities that many other states are unable to replicate as one of the state's greatest assets for individuals interested in relocation.

> The large number and variety of recreational activities is one of Nevada's greatest assets for individuals interested in relocation.

Additionally, the emergence of new industries in the state's economy has begun to attract a cadre of higher-skilled, higher-paid individuals to the state. The state's existing residents also remain an important strength for Nevada and provide an excellent source of individuals for the state's existing industries as well as newer sectors, such as manufacturing and logistics.

Weaknesses

Retention of talent remains an issue for the state, especially for the college-educated population. Many individuals who have the option to leave the state for higher education do leave. While those who stay in the state are able to find employment, more competitive offers from out-of-state higher employers can make staying in Nevada a difficult decision.

Overall, however, Nevada's workforce remains dominated by individuals with no postsecondary credentials. While some sectors, such as tourism, gaming, and entertainment, often do not require postsecondary credentials, Nevada's target growth sectors expect workers to be trained and equipped with specific skills and qualifications. A lack of qualified individuals was consistently identified in stakeholder interviews, indicating a statewide trend in a shortage of qualified workers.

Innovation Ecosystem

Strengths

Nevada enjoys a strong entrepreneurial culture and risk-taking spirit. Many people in the state aspire to start their own businesses, which results in high levels of new business formation across the state. The state's low cost of living and attractive physical geography helps to bring many young, often skilled, workers into the state, boosting the Nevada's existing technical workforce. The regulatory environment and proximity to the West Coast also make Nevada an attractive location for starting a new business. Nevada is also home to several prominent industry clusters in energy storage, hospitality, and gaming, which could form the early customer base and support supply chain integration for startups and other innovative businesses.

Weaknesses

Statewide, the innovation system is characterized by a general lack of coordination and alignment among the various actors and programs that support entrepreneurs. This lack of coordination results in information gaps, leaving entrepreneurs and businesses unaware of various support programs and incentives as well as gaps in coverage, where early-stage companies are systematically under supported. Despite high levels of in-migration, there is a shortage of technically skilled workers, particularly in the 25- to 44-year-old age group. The state's universities, research institutes, and businesses have very low levels of R&D expenditures and outputs, which, in turn, results in fewer ideas for commercialization.

Asset Map: Nevada's Regions

Asset Map: Nevada's Regions

Nevada's regions are each unique and have different assets. This section maps those assets for Las Vegas, Reno-Sparks, and rural Nevada to four dimensions: physical infrastructure, natural resources, quality of life, and economy.

Asset Map: Las Vegas

Las Vegas is internationally known for its high-quality tourism, gaming, and entertainment industry. Table 35 provides an overview of Las Vegas's assets.

Table 35. Las Vegas Asset Summary

Category		Assets
Physical Infrastructure	**Transportation (e.g., road, air)**	• McCarran Airport is a great asset, with many non-stop domestic and international flights. • Roadways are in need of improvement and expansion.
	Housing	• Housing remains relatively affordable compared to Reno and Southern California.
	Broadband	• Broadband connectivity is strong throughout the metropolitan area, and most consumers have choice in selecting providers.
Natural Resources	**Land**	• Land is available, but BLM ownership inflates the value which can be a hindrance for developing.
	Water	• Lake Mead is at its lowest point in recent history. The area is good at managing its water, but growth puts additional strains on the system.
Quality of Life	**Health**	• Access to healthcare remains inadequate. • Lifestyles tend to be unhealthy.
	Education	• Underperforming K-12 education system with limited areas of success. This deters many people looking to relocate to the state. • UNLV is not considered a competitive or top-tier institution.
	Safety	• According to data, violent crime is an issue for the region, with more crime than Reno.
	Recreation	• Plenty of entertainment is available for people at any time of the day. Outdoor recreation is not as prevalent as in the north. There is a concern that the traditional recreational activities available in Las Vegas perpetuate a negative image for the city.
Economy	**Diversification of Economic Base**	• Las Vegas has experienced a slower rate of economic diversification than Reno.

Category		Assets
	Attraction/Retention of Skilled Workforce	• The "Sin City" reputation hurts the city's ability to attract individuals who are married and/or have children. • When trying to recruit from outside of the state, employers are confronted with the trailing spouse issue, as professional opportunities may be less available.

Physical Infrastructure

Strengths

Broadband. Using the FCC's definition of broadband internet, 100% of the Las Vegas-Henderson-Paradise metropolitan area has at least one provider for internet speeds of at least 25 Mbps for downloading and 3 Mbps for uploading. Nearly 96% of the population has access to at least two providers for the same 25/3 download/upload speeds, and more than 55% of the population is serviced by at least three providers. This is above state averages for the same speeds and number of providers, which stand at 100%, slightly less than 93%, and over 53%, respectively.[64]

There is widespread availability of download speeds of at least 100 Mbps and upload speeds of at least 10 Mbps in the Las Vegas metropolitan area. However, consumers have substantially less choice: slightly more than 5% of the population has no access to 100/10 speeds, and nearly 95% of the population only has access from one provider. Less than 20% of the population has access through at least two providers. As of June 2017, there were no more than two providers with 100/10 or greater speeds.[65]

Transportation. Las Vegas is serviced by McCarran International Airport as well as numerous major roads and highways (Beltway 215, I-15, I-515, I-95, Summerlin Parkway).[66] Over 30 airlines fly though the airport, with non-stop service to 145 domestic and international destinations.[67] After suffering a significant decline from over 44 million passengers in 2008 to 39.7 million passengers in 2010 (a 10% drop), in 2017, McCarran saw a total passenger count of more than 48.5 million passengers, a 2% increase over the previous year. Regarding cargo, it moved nearly 245 million pounds in 2017, a roughly 9% increase over 2016 levels. The airport is on track to increase its total cargo in 2018: by August 2018 more than 170 million pounds had passed through it, a 7% increase from the same time last year.[68]

Las Vegas is also well-connected through its roads and highways. I-15 and I-11 provide easy access to markets in Arizona, California, and Utah within a day's drive. The expansion of I-11 is also expected to increase activity between Phoenix and Las Vegas and includes the restoration of rail access to Boulder City.[69] Las Vegas has limited light rail services, mainly connecting the hotels on the Strip to the Las Vegas Convention Center. The Las Vegas Monorail extends 3.9 miles along the Strip and boasts a 10-minute-from-any-point commute on the railway to the convention center.[70]

Housing. The Las Vegas housing market was one of the hardest hit in the nation during the Great Recession. The median sale price for a single-family home in the Las Vegas-Henderson-Paradise metropolitan area fell from a high of $315,000 in June 2006 to $116,000 by September 2011. Though

sale prices are now at $273,000, more than double their 2011 low, the housing market has yet to recover to pre-recession values. When compared to other regional markets, particularly the high costs of southern California, Las Vegas home prices remain competitive for many buyers.[71]

New single-family homes continue to be built in Clark County. For 2018 overall, there has been an increase in new builds compared to 2017, though new builds for the third quarter of 2018 are down 9% from the same time period in 2017. There has been a significant increase (124%) for new attached builds as developers focus on more affordable housing products rather than higher-end detached homes. In 2016, the most recent year for which data are available, the housing affordability metric (HAI) for Las Vegas area residents stood at 145.8, indicating that the area's average income was sufficient to purchase a single-family home. However, it is important to note that HAI for Las Vegas has fallen 17% between 2013 and 2016, indicating that overall affordability is decreasing in the metropolitan area.[72]

Weaknesses

Transportation. As one of the fastest growing cities in the United States, with an increase of about 43,000 people from 2016 to 2017,[73] it is not surprising that Las Vegas' infrastructure is under duress. A 2016 study by TRIP Transportation Research Group found that 34% of the major roads and highways in the Las Vegas metropolitan area were in poor or mediocre condition.[74] Along with traffic congestion and accidents, the condition of the metropolitan area's transportation infrastructure is estimated to cost the average resident $1,744 annually.

As with many communities experiencing significant and rapid growth, Las Vegas residents have identified lengthening commute times as a concern. A multitude of infrastructure improvements and additions have temporarily resulted in increased congestion as the region aims to better prepare itself for forecasted population growth. However, according to the American Community Survey, there has not been a substantial increase in average commute times for the typical Clark County commuter: in 2016 the average commuter spent 25.4 minutes commuting to work each morning, a 0.2-minute increase over the 2009 figure.[75] Nevertheless, the average driver in the Las Vegas metropolitan area loses 46 hours annually due to congestion.[76]

Transportation infrastructure improvements aside from roads and highways, however, remain limited. An agreement was reached in 2006 to expand the city's existing monorail system to McCarran International Airport, but thus far, no funding has been allocated to the project.

Housing. Though homeowners have recovered much of the value lost during the Great Recession, similar to the rest of the state, Las Vegas suffers from a shortage of construction labor that delays projects and drives up construction costs. Likewise, the limited stock of available homes has increased the cost of homeownership in the Las Vegas metropolitan area. In October 2018, just 1.6 months of supply of existing homes was available for new residents, far below the six-month supply often found in a balanced market.[77]

In order to keep pace with the annual inflows of new residents to the area, there is little option other than to construct new housing. Though builders have shown an interest in more affordable attached

housing alternatives, the average price for new detached single-family homes is over $450,000, which is increasingly out of reach for many buyers. An increasing number of new homes built in Clark County are pushing the $350,000 range, with 55% of new detached builds in the third quarter of 2018 priced above $350,000; 82% are priced over $300,000. Adding to the cost of new single-family homes is the extensive federal land ownership throughout the Las Vegas Valley, discussed in greater detail in the next section.[78]

Natural Resources

Weaknesses

Land. Las Vegas is land-locked due to extensive federal land ownership surrounding the metropolitan area. BLM oversees 57% of the land surrounding Las Vegas and its suburbs, preventing further development within the Las Vegas Valley.[79] Extensive federal ownership of land in the Valley inflates land prices, increasing the costs for developers to expand area communities.

BLM has shown a willingness to cooperate with local governments to enable controlled development in the region. This cooperation includes numerous sales of public land to developers and municipalities as well as lease agreements. In October 2018, BLM released press statements related to the leasing of land in the northern Las Vegas Valley for the development of a solar park near Apex Industrial area as well as the leasing of land to Clark County School District for the construction of a new elementary school.[80] Nevertheless, BLM ownership of local lands slows the process for Las Vegas to develop and adds an element of uncertainty when firms are considering moving operations to the area.

Water. As a desert city, water scarcity is not an unusual occurrence for Las Vegas and its suburbs. A history of conservation as well as successful efforts to reduce the average citizen's water usage has increased the city's water security for decades to come. However, rapid and continuous growth within the Las Vegas Valley has called into question the sustainability of current water resources and practices in Las Vegas. This uncertainty threatens the ability of the city to expand in the future.

Las Vegas sources 90% of its water from Lake Mead. A series of agreements with neighboring states that were made long before the city was its present size regulate the city's claim to the lake's resources. Water levels at the lake are cyclical, typically falling during the summer months before replenishing during the spring. However, the rapid population growth, coupled with lower-than-average monthly rainfall, has resulted in low water levels at the lake. As of October 2018, Lake Mead was nearly 3.5 feet below 2017 levels and stood at only 38.31% of full pool.[81] Though current predictions do not see a significant impact on Las Vegas in the near future, sustained growth at current levels could cause supply issues for future generations.

Quality of Life

Strengths

Higher Education. UNLV serves as the region's premier four-year institution. Historically, UNLV has been well aligned with the region's traditional sectors, most notably hospitality. The William F. Harrah College of Hospitality, the university's hospitality school, was ranked as number one in the world for hospitality and leisure by QS World University Rankings.[82] The college is well-known for its engagement with

industry partners that help provide opportunities to the university's hospitality students and conducts significant recruiting on campus.

The College of Southern Nevada has proved itself nimble in the face of changing local industry. With campuses throughout Clark County, it offers numerous programs, including associate of arts and four-year degree programs. The College of Southern Nevada's Division of Workforce and Economic Development provides many workforce training programs, with a particular focus on healthcare, manufacturing, and coding/app development. Such programs provide career pathways to students who do not intend to matriculate into a four-year program.

Importantly, at the higher-education level, collaboration appears to be increasing. UNLV, the College of Southern Nevada, and Nevada State College have each shown a willingness in collaborating with industry and, to some extent, with local workforce development boards. Not only is collaboration increasing, but it is becoming increasingly efficient and desirable among the local institutions.

Recreation. Las Vegas is often regarded as one of the entertainment capitals of the United States. The possibilities for entertainment among the region's adult population are endless. Within Las Vegas, there are nearly 150,000 hotel rooms, with thousands more planned for construction each year.[83] Existing hotel rooms are typically located in one of the city's famous casinos, of which there are more than 100.[84] Often considered cities within themselves, these casinos provide ample opportunity to enjoy shows, dining, and other events. The scale of the hotel and conference facilities available also make Las Vegas one of the most attractive locations for major conferences and trade shows.

Outside of the gaming industry, Clark County offers many museums and outdoor activities. Lake Mead, Red Rock Canyon, and Mount Charleston are all located within Clark County and provide year-round outdoor recreation opportunities. Non-casino-affiliated museums include the National Atomic Testing Museum and the Nevada State Museum.

> The possibilities for entertainment in Las Vegas are endless.

Additionally, Las Vegas is quickly becoming home to many professional sports teams. This is a significant gain for the community and works to bolster a unified identity for Las Vegas residents, something that many interviewees considered to be lacking. Likewise, professional sports franchises primarily serve the interests of local residents rather than outside visitors, something that is not common for many of the city's entertainment attractions. Most anticipated are the Las Vegas Raiders, a professional football team that will start its first season in Las Vegas in 2020. Also of note are the Las Vegas Aces, a Women's National Basketball Association team established in Las Vegas in 2018, as well as the Vegas Golden Knights, a National Hockey League team formed in 2017. The Las Vegas Lights, a professional soccer team, was founded in 2017 and played its first season in the United Soccer League in 2018.

Weaknesses

Health. Similar to the rest of the state, Las Vegas has few healthcare options for many of its residents; a lack of healthcare professionals puts at stake the health of the local population and workforce. Statewide shortages in doctors, nurses, and healthcare-affiliated professions lead to overcrowding in hospitals and waitlists for primary care physicians. Some interviewees remarked that if one wants good healthcare in Nevada, go to McCarren airport (and find it out of state)—a longstanding jest that still rings true among many residents. There is approximately one primary care physician for every 1,809 residents of Clark County (2018) or about 55 per 100,000 population. This is significantly below the 2017 national average (149.7 per 100,000 population) and remains unsustainable for the city's expected growth.[85]

Clark County consistently ranks poorly within the state on many health metrics, with 19% of the population considered to be in fair/poor health, close to the average for the state as a whole (21%). Adult obesity is particularly prevalent throughout Clark County, with 28% of the population considered to be obese. 16% of the county's population smokes, and 15% are uninsured.[86]

K-12 Education. Las Vegas is serviced by the nation's fifth largest public-school district: Clark County School District (CCSD). CCSD is responsible for 75% of the state's school-going population, with more than 320,000 students enrolled in K-12 education and roughly 24 students for every teacher. CCSD is also the largest employer in the state, with 42,000 employees at the district's 358 schools and administrative offices. The district is a minority-majority district: 76.5% of the student population comes from a minority or multiracial background. The Hispanic/Latino population is the single largest student group, representing over 46% of the student population.[87]

High school graduation rates are a useful metric to assess the efficacy of a region's K-12 education system. For CCSD, the high school graduation rate remains below 85%.[88] It is worth noting that the district has made significant strides in improving its graduation rate, with the underperformance due in part to the frequency with which students move between schools or leave the CCSD system.

The average ACT composite score, which is used to assess students' readiness for university education, is a 17.43, slightly below the state average of 17.55 and significantly below the national average of 21. Moreover, less than half of elementary and middle school students are rated as proficient on the national English language arts standards; even fewer (41.6% of elementary and 30.1% of middle school students) are rated as proficient in mathematics. Underperformance of students can hinder their ability to move on to four-year institutions, whether in the state or elsewhere in the country.[89]

Higher Education. Las Vegas is the largest American metropolitan city without a top-ranked research university.[90] While there are plans to advance UNLV to this status, UNLV has been less nimble at adapting to meet the needs of the state's new and emerging industries. As the state and Las Vegas look to diversify the economy, it is important that UNLV maintains relevancy in the face of new emerging skillsets and industries. This includes research, where UNLV has typically underperformed: compared to peer institutions with comparable levels of student enrollment, UNLV reports vastly lower R&D activity

(Table 20). As the economy further diversifies, it is important that the university's course offering diversify as well.

Regarding higher educational attainment, Las Vegas scores poorly. While overall state overages are low, Las Vegas scores below these as well: 83.5% of the population has a high school degree or equivalency (Nevada: 85.4%) and 22.4% possess a bachelor's degree or higher (Nevada: 23.2%). Bachelor's degree attainment seems to be more highly concentrated within the metropolitan area's 45+ population, with 23% having obtained a bachelor's degree or higher. For Las Vegas's aged 25 to 44 population, 21% possess the qualification, though it is lower for those aged 25 to 34 (19.5%).[91]

Safety. Similar to prosperous metropolitan areas across the nation, such as Los Angeles and Dallas, the economic and population growth that Las Vegas has attained has been accompanied by increases in crime.[92] The 2017 crime rate in Las Vegas (violent: 607.9 per 100,000 population; property: 2,779.2 per 100,000 population) remains slightly above the state average (violent: 555.9 per 100,000 population; property: 2,612.4 per 100,000 population) as well as the corresponding averages in Reno-Sparks (violent: 514.7 per 100,000 population; property: 2,549.7 per 100,000 population). However, this is understandable given the rapid growth seen in the Las Vegas metropolitan area as well as the city's size relative to other population centers in the state.[93]

Las Vegas is working to address concerns of crime in the metropolitan area, primarily by hiring more police officers. To fund the additional officers, Clark County passed the "More Cops" tax, an increase in the sales tax in 2017 that enables the department to replace officers lost through attrition during the Great Recession hiring freeze.[94] For the Las Vegas-Henderson-Paradise metropolitan area, there are approximately 323.3 police and sheriff's patrol officers per 100,000 population. This is slightly below the Nevada state average of 361.9 officers per 100,000 population and the Reno-Sparks metropolitan average of 372.9 officers per 100,000 population. However, Las Vegas police and sheriff's patrol officers remain among the best-paid in the state ($80,670/year), above the state average ($73,930/year) as well as the national average ($64,690/year). This provides substantial incentive for officers in the Las Vegas metropolitan area, allowing the city to recruit well-trained and qualified individuals to keep the city safe.[95]

Economy

Strengths

Diversification of Economic Base. Though Las Vegas's regional economy remains dominated by the presence of the tourism, gaming, and entertainment industry, notable growth and demand can be seen for occupations in other industries. Similarly, growth and demand seem well aligned for many of the region's occupations, such as engineering and architecture, construction and extraction, healthcare practitioner, and technical worker occupations. These occupations represent a marked departure from the typical drive for jobs in Las Vegas's traditional sectors and hint at the region's early successes with diversification.

Weaknesses

Attraction/Retention of Skilled Workforce. Due to the continued prominence of tourism, gaming, and entertainment in the Las Vegas metropolitan area, as well as the sector's prevalence at UNLV, the sector remains a popular employer for many of the region's residents. While the days of the $80,000 valet jobs at casinos are coming to an end, it appears that many believe high-paying opportunities continue to exist in the industry without any formal qualifications required.

Likewise, Las Vegas's reputation as a 24-hour nightlife city continues to be an obstacle for attracting talent to the region. Concerns that there are few options for families was a popular issue cited by many stakeholders. Similar to the rest of the state, the "trailing spouse" dilemma (when the spouse of an individual has a difficult time finding a professional-level job in the area) can also be a hindrance to importing talent that is not already present in the region.

Asset Map: Reno-Sparks

Reno-Sparks has a broad array of outdoor recreation opportunities and has become home to a number of advanced manufacturing companies in recent years. A summary of assets for the Reno-Sparks area is available in Table 36.

Table 36. Reno-Sparks Asset Summary

Category		Assets
Physical Infrastructure	**Transportation (e.g., road, air)**	• Roadways are increasingly congested. • Airports have good service but lack non-stop flights to many larger cities.
	Housing	• Housing prices are increasing rapidly. • Not enough new housing is being built.
	Broadband	• There is strong broadband connectivity in the urban area, though residents have less choice than their counterparts in Las Vegas.
Natural Resources	**Land**	• The amount of federal land that can be developed is running out. • There's a very low industrial vacancy rate (about 3%).
	Water	• The city has done well in mitigating water waste, but changes in the climate and environment may prove threatening for future water security.
Quality of Life	**Health**	• The region is more active than many others in the state and performs well at the state level. • A lack of primary care physicians is a threat to the health of the community, as many people experience long wait times.
	Education	• K-12 education is better than average for the state but does not meet the needs of many firms. • There is good diversity among institution types.
	Safety	• Violent crime per capita is lower in the area than in other regions of Nevada, but property crime is an issue.
	Recreation	• The surrounding landscape provides many opportunities for outdoor recreation. • There is a burgeoning arts and culture scene.
Economy	**Diversification of Economic Base**	• The area has been more successful at moving away from tourism and gaming industry and attracting new industries, such as advanced manufacturing and logistics.
	Attraction/Retention of Skilled Workforce	• The area successfully attracts new jobs, though typically lower-skill and low-medium wages. • Mid-career professionals looking for a change or former Reno-Sparks residents are attracted to the area.

Physical Infrastructure

Strengths

Broadband. Using the FCC's definition of broadband internet, 100% of the Reno-Sparks metropolitan area has at least one provider for internet speeds of at least 25 Mbps for downloading and 3 Mbps for uploading. Approximately 97% of the population has access to at least two providers for the same 25/3 download/upload speeds, and more than 63% of the population is serviced by at least three providers. This is above state averages for the same speeds and number of providers, which stand at 100%, slightly less than 93%, and over 53%, respectively.[96]

In the Reno-Sparks metropolitan area, there are far fewer options for internet speeds above 25/3 download/upload. Nearly 95% of the population has no access to speeds greater than 100/10 download/upload; about 6% have access through one or more providers, and less than 0.5% have access through at least two providers.[97]

Housing. The economic recovery has been kind to northwestern Nevada, attracting many workers to the Reno-Sparks area as more employment opportunities arise in emerging industries (e.g., advanced manufacturing). The Reno housing market has worked to meet the needs of the incoming residents as well as existing Nevadans. The first quarter of 2018 showed that new home construction is 76% higher than in the same period in 2017—with over 2,800 new homes begun in by May 2018—and 51% higher than 2017 overall.

To mitigate the question of affordability in Reno, developers have begun purchasing and building properties in Reno's suburbs and surrounding areas. For example, Fernley has experienced an increase in new home builds of 164%. Overall, the Reno-Sparks metropolitan area is expected to add at least 3,000 new homes to the market in 2018, 2% higher than the rate of new homes in 2017.[98] Additionally, while affordability is a growing concern, the housing affordability metric (HAI) for a single-family home in Reno stood at 128.6 in 2016, indicating that the area's average income was sufficient to purchase a home in the Reno area. However, it is important to note that while housing remains affordable for the average earner in Reno, affordability has, overall, decreased in the area by approximately 15% from 2013 to 2016.[99]

Transportation. Reno-Sparks has access to numerous state and federal highways, totaling more than 1,000 miles of paved and gravel roads (US-395, NV-443, NV-445, I-580, NV-659, and I-80).[100] Northwest Nevada's geographic location, with close proximity to many western states, is a significant asset for not only the region, but the state as well. With several major western metropolitan areas within a single-day's drive, Reno-Sparks is well-poised for growth in industries that rely on proximity to markets in California, Oregon, Washington, Idaho, Utah, Arizona, and New Mexico, as well as throughout Nevada.

Weaknesses

Transportation. Reno-Sparks is serviced by Reno-Tahoe International Airport as well as the highways mentioned previously. The influx of new residents has strained the area's existing transportation infrastructure, with an estimated 52% of major area roads and highways rated as poor or mediocre.[101]

Commute times have been a growing concern for the region's residents. However, according to the American Community Survey, while the average Reno-Sparks commuter reported a commute time of 21.4 minutes in 2016, this is only slightly above the average commute time reported in 2009 of 21.2 minutes.[102] Nevertheless, a 2016 report by TRIP Research Group found that the average wear-and-tear on residents' vehicles, congestion-related delays, and traffic crashes added an additional $1,192 per year to each resident's cost of living in the Reno-Sparks area.[103] Likewise, the average area resident loses 18 hours annually due to traffic congestion.[104]

Reno-Tahoe International Airport is serviced by ten commercial airlines with non-stop service to one international and 23 domestic destinations. In 2017, the airport saw a total passenger count of over four million passengers, a 10% increase over the previous year and the highest annual total since 2008. Regarding cargo, however, RNO has seen a continued decrease in recent years. Cargo has fallen from over 156 million pounds in 2016 to 152.2 million pounds in 2017; by the second quarter of 2018, 35.3 million pounds had passed through the Reno airport, a 4.7% decrease from the same period in 2017. Additionally, the airport lacks non-stop flights to many major metropolitan and economic centers throughout the United States, particularly on the East Coast. The city's connectivity with the rest of the nation is likely to be inadequate to meet future needs.[105]

Housing. More so than other metropolitan areas in Nevada, Reno has struggled to provide housing for many of its new residents. Though new home starts are up for 2018, the low supply of construction labor, as well as the shrinking supply of developable land, has resulted in longer construction schedules and ever-increasing housing prices.

Prior to the Great Recession, single family home sale values in Washoe County had peaked at about $378,800 (February 2006); by April 2012, amid the lowest point of the recession in Nevada, average sale prices had plummeted to $150,000. In August 2018, though, the average price had soared past pre-recession levels to $395,000. Affordability has now become an issue not only for those looking to relocate to northwestern Nevada, but also those currently living in the region.[106]

The question of affordability may be the largest factor to overcome for the Reno-Sparks housing market. Whereas in Las Vegas developers have met the affordability concern with an increase in attached and multi-family housing developments, Reno developers continue to emphasize single family detached housing further away from the urban core; multifamily housing units were down 42% in Reno-Sparks from July 2017 to 2018. The average new home is base-priced above $400,000, with only 10% priced below $300,000. Even with the level of new builds slated for 2018, the region's housing market has less than one month of supply for individuals looking to move to the area. Contributing significantly to the housing shortage and cost of development is the lack of available land, which will be discussed further in the next section.[107]

Natural Resources

Strengths

Water. Similar to the rest of the state, Reno has had to adjust to doing more with less. After joining the Department of Energy's Better Buildings Challenge in 2017, the city has begun monitoring water usage in municipal buildings, with the objective to cut consumption by 20% over a 10-year period.[108]

The Truckee Meadows Water Authority (TMWA) provides much of the region's drinking water and is responsible for the region's 2,000 miles of water mains, 94 wells, 93 storage tanks, and 113 pump stations. TMWA is very active in educating residents on how to conserve water: in 2015, which was the driest year on record, TMWA customers managed to cut their water consumption by 20%.[109]

Weaknesses

Land. The rapid expansion witnessed in northwestern Nevada is hindered by the availability of developable land. Much of the land surrounding the metropolitan area is owned by the federal government, which limits the extent to which Reno-Sparks can expand into surrounding areas. Similarly, concerns over the loss of the region's natural beauty due to further development is a concern for many residents, as the landscape is often a motivator for settling in the Reno-Sparks area. As a result, fewer homes and businesses can be built; for instance, the industrial vacancy rate for Reno-Sparks sits at just 3%.

Water. Despite its successes, Reno is battling global trends in environmental and climate change, resulting in fewer resources. Reno is the fastest warming city in the United States, experiencing an average annual temperature increase of 1.39 degrees Fahrenheit per decade.[110] This has resulted in less snowmelt and annual precipitation, which provides much of the region's water. If this trend continues, Reno-Sparks may face significant issues with continuing to support growth in the region.

Quality of Life

Strengths

Health. Washoe County competes strongly with the rest of the state in terms of health. While 22% of the county's population is obese, this is well below the statewide average of 27%. A slightly smaller proportion of Washoe County residents smoke (15%), compared to the rest of the state (16%). Washoe County residents are, on average, more active than many of their Nevadan counterparts, with only 17% of the county considered to be physically inactive, compared to the statewide average of 22%.[111]

Though comparatively less of the county is uninsured (12%) compared to the state overall (14%), a lack of insurance remains an issue for many Washoe County residents. Similar to the rest of the state, Washoe County suffers from a shortage of primary care physicians, with only one physician available for every 1,397 county residents, or about 72 per 100,000 population. This is significantly lower than the U.S. average of 149.7 per 100,000 population.[112] This shortfall can only be expected to grow as the county's population increases.[113]

K-12 Education. Washoe County School District (WCSD) ranks highly within the state, though it deserves increased attention and dedication in order to provide the strong workforce base required for the industries the region hopes to attract. WCSD ranks above the state average (80.85%) for graduation rates, with 84% of high schoolers earning their diplomas. The average composite ACT score for WCSD students is 18.05, again scoring higher than Nevada as a whole (17.55).[114]

In November 2016, Washoe County voters approved a sales tax increase to fund the construction of new schools and renovation of existing schools throughout WCSD. Over the next decade, three new high schools, three new middle schools, and nine new elementary schools are slated for construction, in addition to the expansion of an existing high school.[115]

Higher Education. The Reno-Sparks metropolitan area is well-served by a variety of education institutions, ranging from kindergarten through higher education institutions. UNR provides a strong research institution for not only Reno-Sparks, but for the state of Nevada overall. UNR has consistently been ranked highly in national tables and is one of the nation's fastest-growing flagship universities.[116] Reno-Sparks is also home to one of DRI's two locations in the state, which adds to the area's burgeoning research infrastructure.

There is a strong network of community colleges in northwestern Nevada, notably TMCC and Western Nevada College. These institutions have been successful forming relationships with firms in the area to ensure Reno-Sparks is able to offer a workforce that is relevant to industry needs. For instance, TMCC's partnerships with Tesla and Panasonic have provided the firms with a dedicated workforce pipeline and students with near-guaranteed employment opportunities.

Recreation. Perhaps one of the strongest assets of the Reno-Sparks area is the natural landscape that cradles the metropolitan area. This landscape provides ample opportunities for all-season recreation, including hiking, skiing, mountain biking, swimming, horseback riding, and many other activities. The abundance of recreation is not limited to outdoor activities, however; an emerging arts and culture scene and "creative class" provides additional activities for the area's residents.

Recreation opportunities are not limited to outdoor activities in Reno-Sparks, which is also home to an emerging arts and culture scene.

Northwestern Nevada's geography and landscape is thought to be a significant factor in the attractiveness of the region to artists and those in the creative class. Additionally, world-renowned festivals such as Burning Man, which is located a few hours outside of the metropolitan area, further attract such individuals to the region. The creative class poses an important opportunity for northwestern Nevada to capitalize on a unique industry that has historically not been abundant in the state.

Safety. The Reno-Sparks 2017 violent crime rate (514.7 per 100,000 population) remains below the Nevada state average (555.9 per 100,000 population) as well

as the Las Vegas metropolitan area average (607.9 per 100,000 population). In 2017, Reno-Sparks remained below the state average (2,612.4 per 100,000) and Las Vegas average (2,779.2 per 100,000) for property crime as well; for 2017, the metropolitan area experienced 2,549.7 property crimes per 100,000 population.[117]

For its size, the Reno-Sparks metropolitan area maintains a considerable police force, with 372.9 police and sheriff's patrol officers per 100,000 population. This is above both the Nevada state average (361.9 per 100,000 population) as well as the Las Vegas metropolitan area average (323.3 per 100,000 population). However, officers in the Reno-Sparks metropolitan area are paid comparatively less than many of their counterparts. On average, Reno-Sparks officers earn $64,500 per year, far below their Las Vegas ($80,670/year) and state-level ($73,930/year) counterparts. As the city continues to grow, Reno-Sparks will need to balance the need for more officers with the need to pay officers at a rate that represents the cost of living in the Reno-Sparks metropolitan area.[118]

Weaknesses

K-12 Education. Though WCSD outperforms many of its counterparts throughout the state, it still exhibits signs of underfunding and underperformance. Additionally, the expansion of facilities funded by the voter-approved 2016 sales tax increase lacks any funding allocated for staffing the new schools with teachers and administrators.

Concerns also exist over the relevancy of the curriculum to local and state industry needs as well as the rigor of some of the high school diploma programs. Proficiencies in the English language arts as well as in mathematics remain lackluster, with less than half of elementary students scoring as proficient in either category (48.1% and 43.5%, respectively); scores for middle school students are similarly low (51.1% and 38.3%, respectively). Likewise, a high student-to-teacher ratio, roughly 23 students per teacher, means students receive less individualized attention.[119]

These weaknesses are not limited in their effect over time, with these deficiencies impacting the ability for high school students to go on to further education and decreasing the competitiveness of the region when attracting firms.

Higher Education. While the area's community colleges have been largely successful at working with firms to design programs that lead to employment, there remains limited coordination between these institutions. This results in competition between community colleges for funding and an uncoordinated approach to workforce development. There are also concerns that the region's premier four-year institution, UNR, is not nimble enough when addressing gaps in workforce capabilities.

Regarding higher educational attainment, Reno scores above state averages. 86% of the Reno population has a high school degree or higher (Nevada: 85.4%) and 30.7% possess a bachelor's degree or higher (Nevada: 23.2%). Differing from trends in the state, Reno's population aged 25 to 44 is comparatively better educated than its 45+ population, with 31.3% of the former possessing a bachelor's degree or higher and about 30% of the latter possessing the same qualifications.[120]

Economy

Strengths

Diversification of Economic Base. While hit hard by the Great Recession, Reno-Sparks has shown a strong interest in increasing its industry mix so that it can better weather future economic downturns. Though tourism, gaming, and entertainment remains a prominent industry in the area and employs many locals, the emergence of advanced manufacturing has provided many residents with additional opportunities that did not exist a decade ago. EDAWN has identified five industries that it is particularly interested in attracting, including advanced manufacturing, technology and data centers, logistics and e-commerce, back-office business support, and aerospace and defense.

Attraction/Retention of Skilled Workforce. Reno-Sparks has been successful at attracting new workers to the area as well as retaining many of its existing workforce. A 2015 study by RCG Economics[121] forecasts an increase of more than 52,000 new jobs in the northwestern Nevada region (including Washoe, Storey, Lyon, Douglas and Carson City counties) from 2015 to 2019, with nearly 30,000 of these expected in the Reno-Sparks metropolitan area and Storey County. The new industries that have emerged due to the diversification efforts have attracted different classes of workers, with many new jobs paying higher wages and expecting higher skills in return. For instance, growth and demand remain well aligned in many higher-tech, higher-skilled occupations, such as engineering and mathematics.

Weaknesses

Diversification of Economic Base. There is little doubt that northwestern Nevada has been successful at attracting different industries that have not traditionally been present in the Reno-Sparks area. However, the extent to which these new industries have penetrated the local economy is less certain. Additionally, while the new jobs have helped to drastically reduce unemployment in the Reno-Sparks area, the new industries typically have not brought a significant amount of high-wage high-skill jobs.

Attraction/Retention of Skilled Workforce. The new jobs that have come to the Reno-Sparks area bring with them new workers and new workforce skill sets. However, though these jobs have attracted many workers for entry-level positions, Reno-Sparks has struggled to attract professionals to fill mid- or executive-level positions in larger firms.

Likewise, the workforce skill set remains underdeveloped for many of the new industries Reno-Sparks is trying to attract. Many local firms have noted the lack of soft skills within the workforce as well as specialty skills within the STEM field.

Demand for occupations remains high in many low-wage jobs, particularly within the construction trades. This is not necessarily surprising, however, as northwestern Nevada is experiencing a shortage in new housing construction for its growing population.

Asset Map: Rural Nevada

Though small in terms of population, the micropolitan areas that are found throughout the state of Nevada play important roles in the state's economy. While the larger cities of Las Vegas and Reno-Sparks have focused attention on industries such as tourism and entertainment, manufacturing, and technology, smaller towns like Elko and Winnemucca have benefited from long-standing, well-established industries such as mining.[f] A summary of rural Nevada's assets can be found in Table 37.

Table 37. Rural Nevada Asset Summary

Category		Assets
Physical Infrastructure	**Transportation (e.g., road, air)**	• The small tax base and mountainous topography of rural Nevada can make it difficult to maintain long stretches of roads and other community infrastructure. • Many of Nevada's rural areas are geographically isolated and located a long distance from the metropolitan regions. I-11 represents a potential opportunity to bridge some of these gaps. • Many small airports in Nevada have long runways as a result of the World War II era.
	Housing	• Housing is more affordable in rural areas of Nevada, but supply is tight.
	Broadband	• Broadband access is improving, but redundancy and stable access remains a key challenge for many rural areas.
Natural Resources	**Land**	• Most of Nevada is owned by the federal government, which has created conflicts for current and potential land users.
	Minerals	• There are many minerals to mine in Nevada, and lithium is an important consideration for future mining growth as the demand for electric batteries grows. • Mining supply chain companies offer a potential source of growth that could also increase supply chain insourcing for agriculture and construction sectors.
	Water	• Senior and junior water rights holders come into conflict in times of drought and as regions grow.
Quality of Life	**Health**	• Many of Nevada's rural counties struggle with high adult obesity rates and other indicators of poor health. • Rural areas have a particularly difficult time attracting physicians, especially specialty practices. • There is great potential for remedying the physician shortage with telemedicine in rural areas, but stable broadband is crucial for success.

[f] Carson City is technically classified as a metropolitan area, but due to its small population size of about 55,000 and other similarities to micropolitan areas it is included in this section.

Category		Assets
	Education	• K-12 education in rural Nevada is underperforming but on par with the state as a whole. • There are no major universities or research institutions located in Nevada's rural areas, and some community college satellite campuses have closed due to lack of funding. • Distance learning has potential for rural Nevada, but stable broadband must be in place to provide reliable connections.
	Safety	• Many of Nevada's rural areas are relatively safe places to live, with crime rates below the state average.
	Recreation	• There are ample opportunities for outdoor recreation, including a number of state parks and one national park. • Large events like Burning Man bring tens of thousands of visitors each year, which strains local emergency and public safety resources.
Economy	**Diversification of Economic Base**	• The composition of the economy in Nevada's micropolitan and rural areas is becoming more diversified through new industry and occupation opportunities.
	Attraction/Retention of Skilled Workforce	• There is limited availability of skilled workers in Nevada's rural areas, and there are few workforce training program opportunities. • Nevada's rural areas remain largely disconnected from neighboring metropolitan regions and other rural areas and exist as separate economies.

Physical Infrastructure

Access to reliable broadband continues to be a struggle for many rural areas in the state, which has adverse implications for distance learning in schools, healthcare (including telemedicine), and public safety. The Governor's Office of Science, Innovation & Technology (OSIT) works collaboratively with rural communities to apply for state and federal funds to increase holistic, community-wide broadband access, including providing matching funds for schools through the Nevada Connect Kids Initiative. As a result of SB53, OSIT is able to work with the Nevada Department of Transportation (NDOT) to form public-private partnerships and lay access conduit as part of new projects; these conduits can then be filled with a fiber optic cable to provide a robust internet connection to businesses and residents. For example, NDOT is constructing new roads in the Ely area while also laying cable conduit to improve broadband access in that region.

Access to reliable broadband continues to be a struggle for many rural areas in the state, which has adverse implications for distance learning in schools, healthcare (including telemedicine), and public safety.

The mountainous topography of Nevada makes it challenging and expensive to lay cable conduits across the entire state, however, and each county has its own infrastructure-related challenges as well. This makes it difficult to offer a single one-size-fits-all solution to the broadband access issue. Redundancy concerns are also an issue, as technology companies are hesitant to select a site in a town that is served by a single cable line. Microwave and millimeter wave options are improving[122] and may be a viable option for more remote areas, especially tribal lands. Creative solutions, such as providing Wi-Fi access on school buses, should also be examined and considered to boost internet access in rural parts of Nevada.

The exit of construction workers from Nevada during the Great Recession has left rural and urban areas with a tight housing supply. In rural areas, housing affordability is generally better than the urban areas, and property taxes are lower as well. However, the smaller tax base means that many rural counties are operating on very lean budgets, which makes it difficult to make large infrastructure or economic development investments, including maintaining support for vast swaths of roads to serve a relatively small population. It should also be noted that the I-11 highway route is of great interest to rural areas. I-11's final route in the state has the potential to greatly impact smaller towns with the promise of increased highway traffic and expected increases in sales tax revenues from visitors, which could help infrastructure investments in rural Nevada. It should also be noted that runways at many of Nevada's smaller municipal and regional airports are quite long and have the capacity to land large planes, a remnant of defenses put in place during World War II.

Natural Resources

Water scarcity is an ongoing issue for most rural areas in the state due to Nevada's high mountain desert climate. Senior and junior water rights holders come into conflict in times of drought and as regions grow. The generous allowance of automatic water rights for domestic wells in accordance with state law also creates challenges in areas that are experiencing growth, as existing water rights come into conflict with new water access and strain water supplies.

Rural Nevada boasts millions of acres of open space; although most of the land is owned by the federal government, the quietness of this open space is particularly attractive to artists, outdoor enthusiasts, and others. The ownership of Nevada's vast tracts of land continues to present hurdles for rural areas, as wild horse populations are not always managed well and there are ongoing struggles to define how the land should be used.

Nevada's historical legacy as a mining state continues today, though land access remains an issue due to continued federal land withdrawals and recreational designations that restrict mining and geothermal energy resource development. While gold is the primary mineral produced in the state, a number of other minerals are available for mining, including copper, lithium, molybdenum, vanadium, silver, dolomite, and various salts.[123] Several projects are currently in the financing or permitting stages for copper, lithium, molybdenum, and vanadium and are expected to diversify Nevada's mining outputs if successful.

Out-of-state mining supply chain companies present an economic development opportunity for Nevada's rural areas, as these companies currently export many products into Nevada.

Nevada is home to the only currently operating lithium mine in the United States. Lithium is commonly used by electronics manufacturers and is particularly important for battery development.[124] Lithium mined in Nevada is currently exported overseas for processing, but the presence of Tesla's Gigafactory and Nevada's monopoly on lithium mining in the United States presents great potential for Nevada to attract a lithium processing plant that could process the lithium in state instead of exporting and re-importing lithium components.

Out-of-state mining supply chain companies also present an economic development opportunity for Nevada's rural areas, as these companies currently export many products into Nevada. Co-location could save on transportation costs into the state. Crossover companies that also provide products to the agriculture or construction industries should be seriously considered since they offer a more diversified alternative to traditional mining companies. Tax abatement packages are not currently available to mining companies due to statutory limitations. Also, mining supply companies are often not eligible because of the 51% product export requirement that is very hard to meet, given that these companies' products would remain in the state.

Quality of Life

Many of Nevada's rural counties struggle with high adult obesity rates and other indicators of poor health, as seen in Table 38. Elko, Lander, Lyon, Mineral, Nye, Pershing, and White Pine counties all have adult obesity rates much higher than the state average of 26%, and only Douglas County has a lower-than-average obesity rate (23%). Smoking rates are slightly higher than the state average of 16%, although 21% of adults in Lyon and Esmeralda counties smoke compared to only 15% in Storey County. Inactivity rates are also particularly high in Nye (32%) and Lyon (29%) counties compared to the state average of 22%. The relative remoteness of these areas is less conducive to alternative forms of transportation, which may contribute to the relatively high rates of physical inactivity. Most rural counties are at or slightly above the statewide uninsured rate of 14%, with the notable exceptions of Eureka, Storey, and White Pine counties, which all have rates dramatically below the state average.[125]

One of the biggest hurdles for Nevada's rural areas is the shortage of primary care physicians. Esmeralda County is very small and has no physicians. Lyon County has only one physician available for every 5,843 residents, which is nearly five times higher than Carson City's relatively low ratio of one physician to 1,212 residents. White Pine, Mineral, Humboldt, and Douglas counties also fare better compared to the other rural counties.[126]

Rural areas have a particularly difficult time attracting physicians, especially specialty practices. Spouses of physicians are often hesitant to move to rural areas due to limited opportunities for professional occupations. Advances in telemedicine are opening more doors to rural areas, but stable broadband is

crucial for success. Some rural hospitals have also adopted rotation schedules for medical staff based in urban areas to decrease the burden of finding local practitioners.

Table 38. Health Indicators for Rural Nevada, 2018. Source: County Health Rankings

County	Percent in Poor or Fair Health	Percent Adults Who Smoke	Percent Adults Obese	Percent Adults Physically Inactive	Percent Uninsured	Resident to Primary Care Physician Ratio
Nevada (state)	21	16	27	22	14	1,764:1
Carson City	19	18	26	19	14	1,212:1
Churchill	12	18	27	22	14	2,200:1
Douglas	13	14	23	18	12	1,645:1
Elko	16	18	31	23	13	2,733:1
Esmeralda	23	21	26	22	16	829:0
Eureka	14	16	27	21	8	2,016:1
Humboldt	16	18	26	22	14	1,891:1
Lander	16	16	31	20	12	2,952:1
Lincoln	15	16	27	24	15	2,518:1
Lyon	18	21	34	29	14	5,843:1
Mineral	20	20	29	26	13	1,493:1
Nye	19	19	33	32	14	3,267:1
Pershing	17	18	31	23	14	N/A
Storey	13	15	26	24	9	N/A
White Pine	17	20	30	25	10	1,402:1

K-12 education in rural Nevada is underperforming but on par with the state as a whole, as shown in Table 39. Eureka and Pershing counties have particularly high graduation rates of 100%. White Pine and Churchill counties have the lowest graduation rates at about 70% and 73%, respectively. The average ACT scores for Mineral, White Pine, Lincoln, Pershing, Humboldt, and Nye are all below 17 points, which is very low for the state. Only a handful of rural counties have ACT scores above the state average of 17.55, and none are above the national average of 21.

Table 39. Education Indicators in Rural Nevada, 2017-2018. Source: Nevada Report Card

School District	Graduation Rate	Average ACT Composite	ELA Proficiency (elementary/middle)	Math Proficiency (elementary/middle)	Student/Teacher Ratio
Nevada (state)	80.85%	17.55	50.1% / 47.8%	43.4% / 32.2%	23:1
Carson City	83.93%	17.92	45.6% / 43.4%	38.2% / 30.5%	15:1
Churchill	73.26%	18.05	45% / 40.9%	41.6% / 21.2%	23:1
Douglas	87.53%	19.42	58.7% / 49.5%	52.1% / 33.1%	23:1
Elko	88.49%	17.53	42.9% / 40.7%	36.4% / 27%	21:1
Esmeralda	N/A	N/A	42.8% / 28.5%	28.5% / 28.5%	12:1
Eureka	100%	18.71	59.4% / 80.5%	45% / 30.3%	15:1
Humboldt	89.5%	16.77	39.2% / 35.9%	34.8% / 23.4%	20:1
Lander	92.31%	17.66	54.6% / 46.7%	42.3% / 21.6%	21:1
Lincoln	86.08%	16.59	50.6% / 38.1%	48.3% / 31.6%	15:1
Lyon	83.59%	17.72	44.1% / 41.3%	40.3% / 30.3%	23:1
Mineral	84.38%	15.66	35.3% / 26.6%	16.4% / 5.3%	19:1
Nye	79.31%	16.89	43.4% / 39.1%	35.3% / 24.1%	21:1

School District	Graduation Rate	Average ACT Composite	ELA Proficiency (elementary/middle)	Math Proficiency (elementary/middle)	Student/Teacher Ratio
Pershing	100%	16.7	40.7% / 31.4%	27.6% / 12.9%	21:1
Storey	90.63%	18.48	42.7% / 55%	53.1% / 39.8%	20:1
White Pine	69.92%	16.33	28.6% / 42.4%	21.8% / 27.8%	18:1

Eureka, Douglas, Lander, and Lincoln counties lead the rural areas in English and language arts proficiency at the elementary school level, with Eureka county outperforming all other rural areas at the middle school level. Storey, Douglas, and Lincoln counties have high rates of math proficiency at the elementary school level, with most rates dropping off at the middle school level. The student-to-teacher ratio is relatively low in Esmeralda, Carson City, Eureka, and Lincoln counties, compared to higher ratios in Douglas and Lyon counties.

There are no major universities or research institutions located in Nevada's rural areas. Some community college satellite campuses have closed in rural areas due to lack of funding, which makes it difficult to provide a robust offering of CTE classes. While several of these courses have been replaced by distance learning options, the lack of stable broadband access in many rural areas has made it difficult for students to take full advantage of these classes. Technical programs for professions, such as diesel mechanics, welders, and nurses, require hands-on training that must be provided in person, so students now must drive long distances or move to larger towns to enroll in these areas of study. It should be noted that mining companies continue to be large investors in K-12 and college education, as they offer a variety of direct programming, mine tours, and scholarships to bolster local workforce development.

The ample opportunities for outdoor recreation attract many visitors to the rural parts of the state, including hiking, biking, camping, hunting, fishing, and a variety of other activities. Burning Man is also a major attraction in rural Nevada, with tens of thousands of attendees flocking to this countercultural event each year. While the event increases visitors to nearby rural areas, it has strained rural infrastructure in recent years, including local emergency and public safety resources.

The rural areas in Nevada are relatively safe places to live, and most cities in rural areas have violent crime rates well below the Nevada state average (555.9 per 100,000 population, 2017), though above the national average (382.9 per 100,000 population, 2017). As shown in Table 40, more than half of the rural areas examined have property crime rates well below the Nevada state average (2,612.4 per 100,000 population, 2017) and the national average (2,362.2 per 100,000 population, 2017). Carlin, Lovelock, and West Wendover are above the state average for violent crime, and Elko, Fallon, Lovelock, and West Wendover are above the state average for property crime.[127]

Table 40. Crime Rates in Rural Nevada, 2017. Source: Federal Bureau of Investigation Uniform Crime Reporting Program.

City	Violent Crime per 100,000 People	Property Crime per 100,000 People
Nevada (state)	555.9	2,612.4
Boulder City	56.9	860.5
Carlin	1,000.4	913.4
Elko	389.3	3,196.0
Fallon	272.2	3,467.5
Lovelock	763.4	2,835.3
Mesquite	167.8	1,710.3
West Wendover	637.4	3,328.6
Winnemucca	516.5	2,053.4
Yerington	127.1	508.4

For northern Nevada's rural communities, there are 629.4 officers per 100,000 population, earning $60,160/year. In southern Nevada, rural communities are served by approximately 721.1 officers per 100,000 population, on average earning $54,340/year. For both of these regions, there are proportionately more officers per population than in Nevada's metropolitan areas (Las Vegas: 323.3 per 100,000; Reno: 372.9 per 100,000). However, officers in these rural communities earn notably less than their metropolitan counterparts (Las Vegas: $80,760/year; Reno: $64,500/year) and less than the state average ($73,930/year).[128]

Economy

The composition of the economy in Nevada's micropolitan and rural areas is changing rapidly. Between 2011 and 2017, Nevada's micropolitan regions added 112 new industries. Of these new industries, 87 of them were in at least one of the seven sectors specifically targeted by GOED. The largest new industry was all other nonmetallic mineral mining. Given Nevada's historic strength in gold mining, this growth in nonmetallic mineral mining may be indicative of underlying, structural changes in the economy. Other high-wage, new industries include primary battery manufacturing, secondary market financing, and commodity contracts brokerage. Micropolitan regions added jobs in 22 occupations that did not exist in 2011. Some of these occupations, including architects, chemical engineers, architectural and civil drafters, and nurse practitioners. Diversification in Nevada's rural economy is progressing quickly.

Winnemucca lost jobs between 2011 and 2017, and Elko saw a massive shift towards local industries at the expense of jobs in more dynamic, supply chain sector industries. Wages in Fallon remain concerningly low, and there is limited availability of skilled workers in the micropolitan and rural areas. Additionally, Nevada's micropolitan regions remain largely disconnected from the neighboring metropolitan regions, existing as separate economies. As such, there are limited synergies between regions. Workforce training programs are likewise limited, hampering regional access to skilled labor.

SWOT Analysis

SWOT Analysis

The ability to foresee change and analyze current capacity to handle change not only increases the resiliency of an organization during times of economic turmoil, but also assists an organization to capitalize on opportunities during times of growth. In the 1960s and '70s, a team of researchers at SRI undertook the monumental effort of creating a blueprint for this process. In order to create this guide, researchers surveyed thousands of organizations and executives to best understand how organizations were managing perceived changes to their industries, and how change management could be improved. Their findings led to what eventually came to be known as the SWOT analysis.

Strength refers to what is satisfactory in the present (internal).

Weakness refers to what is currently unsatisfactory (internal).

Opportunity is an emerging trend that presents a chance for growth (external).

Threat is an emerging trend that presents an obstacle for growth (external).

A SWOT analysis enables organizations to assess their current capabilities and understand how to work with them in order to navigate future uncertainty. This powerful analysis serves as the basis for strategy and highlights sources of strength to be relied on, weakness that may be addressed, opportunities to be realized, and dangers and difficulties to be avoided or addressed. These elements—in the case of Nevada today—are summarized in this section, based on the analyses and asset map in the preceding sections. Table 41 provides a complete overview of the SWOT. The sections immediately below provide a short description of each element.

Strength

Culture and Quality of Life

Nevada is home to a variety of people who are independent, inclined to enterprise, and hold strong values of innovation and entrepreneurship.

- **Frontier spirit**
  Nevada, especially in more rural areas, still sees itself as embodying a frontier spirit of self-reliance and hard work.
- **Enterprising migrants**
  Nevada continues to be a destination for in-migration by people with modest skills determined to make a reasonable living by working in the job-rich hospitality and gaming sector.
- **Artists, musicians, and performers**
  Las Vegas is relatively rich in highly professional participants in the performing arts, while in the north many enjoy countercultural events like Burning Man.
- **Outdoor enthusiasts**
  Nevada presents many opportunities for outdoor recreation and lifestyle businesses that draw tourists away from the hotels.

Workforce and Education

While workforce and education remain challenging for the state, there are areas of strength.

- **Established models of success**
  TMCC has shown how to tightly align course offerings and training with the needs of local industrial partners.
- **WINN and other CTE booster programs**
  WINN and Learn and Earn Advanced-career Pathways (LEAP) provide custom training and industry-recognized qualifications curriculum that industry needs.

Innovation

Nevada's innovation ecosystem has several strengths and benefits from proximity to the West Coast.

- **Connections to the West Coast**
  Nevada benefits as a low-cost destination for startups from Southern California and the Bay Area. Venture capitalists and entrepreneurs value its low-cost environment.
- **Low barriers for new businesses**
  Permitting, access to low-cost office space, and institutional support make entry into a new business relatively easy.
- **Pervasive small business ethic**
  People in Nevada start small businesses at a very high rate, albeit typically aimed at the local service sector.

Industry

- **Increasing diversification**
  The regional economy in Las Vegas has begun to diversify beyond hospitality, gambling, and entertainment and now includes health services, logistics, and IT. In the Reno-Sparks area, this process is even further developed and includes advanced manufacturing, IT, and aerospace businesses.
- **Value-chain opportunities**
  There are opportunities for investment and recruitment into high-growth value chains.

Infrastructure

- **Inexpensive energy**
  Energy prices in Nevada have become significantly more competitive since 2011.
- **Increasing use of renewable energy**
  Nevada is home to a renewable energy portfolio standard with the goal of 25% of its energy from renewable sources by 2025. Owners of data storage facilities increasingly require renewable energy.
- **Advanced water management**
  Las Vegas has been especially proactive in developing and implementing advanced water management.
- **Urban connectivity**
  Both Las Vegas and Reno have access to world-class broadband connectivity.

- **Stable environment**
  Nevada is sheltered from many natural disasters and offers a secure environment for key corporate assets.

Governance

Nevada has a reputation as a business-friendly state, with state leaders focused on economic development.

- **Low taxes and regulation**
  Nevada has no personal or corporate income tax (although it does have a Modified Business Tax), and permitting for new business and business expansion tends to be quick and low cost.
- **"Small state" advantage**
  State leadership is compact and generally operates on a shared vision for the future, with relatively easy access to key decisionmakers.

Weakness

Culture and Quality of Life

Nevada's quality of life is exposed to stress in part because of the economic successes of recent years, in combination with underlying behaviors and attitudes

- **Housing affordability**
  Nevada's advantage in affordable housing has been eroded over the course of the recovery, especially in Reno-Sparks area. Limited land for development and limited workforce for building trades has driven up prices.
- **Low trust in government institutions**
  Presence of significant federal land holdings and a population accustomed to an independent and self-sufficient life fosters distrust and disinterest in government.
- **Lack of collaboration**
  Long distances and isolated communities have undermined the habit of collaboration across jurisdictions, especially for statewide initiatives.
- **Poor health indicators**
  Lack of adequate access to healthcare combined with sedentary habits has led to poor health outcomes.
- **Harsh desert climate**
  Southern Nevada experiences very harsh summer conditions, which limits access to outdoor activities.
- **Identity clash**
  A tension exists between old and new Nevada, in which growth is seen as undermining more traditional attributes of the state.

Workforce and Education

Nevada's workforce and the performance of its educational institutions is the single greatest challenge to the future of the state.

- **Weak institutional performance in K-12 and higher education**
  In spite of pockets of success, both K-12 institutions and NSHE are inadequate in institutional capacity and performance to meet Nevada's needs.
- **Lack of K-12 and higher education funding**
  Some of the problems of educational performance are the result of persistent inadequate funding of both the K-12 and higher educational system.
- **Low educational attainment**
  Educational attainment is relatively low across the state, although generally higher in the Reno-Sparks metropolitan area.
- **Poor career guidance for mid-skill workers**
  Career guidance towards mid-skill occupations (certificates and two-year degrees) is deficient. Emphasis remains on four-year degrees as the main post-secondary pathway.
- **Shortages in building and other skilled trades**
  Following the steep downturn in the Great Recession, many building trades workers left Nevada. The numbers have not recovered, and limited pipeline capacity has led to persistent shortages.

Innovation

There are clear signs of progress for Nevada's innovation ecosystems, but gaps remain.

- **Immature mentor networks**
  Because the innovation ecosystem is in its infancy in Las Vegas and Reno-Sparks, there are few serial entrepreneurs available to serve as mentors, a key element in growing startups.
- **Lack of early-stage funding**
  There are investors available for later stages in the development of a startup, but sources of pre-seed funding and the development of angel networks are very limited.
- **Underutilized tools and programs**
  Nevada is home to a variety of initiatives and facilities designed to support startups, but they are not as widely promoted or used as they could be.
- **Weak connections to research institutions**
  UNR, UNLV, and DRI have all increased their level of engagement with entrepreneurs and regional innovation ecosystems; however, the level and quality of engagement are judged by stakeholders to be far short of what is required for truly vibrant innovation ecosystems.

Industry

- **Persistently low wages**
  In part due to low educational attainment of the workforce, wages are generally low in Nevada compared to peer states. While a competitive advantage, it also limits access to higher-skilled in-migration and hurts housing affordability.

Infrastructure

Infrastructure is generally good, though some areas are under stress due to growth. Access to land and water remain enduring constraints.

- **Energy market uncertainty**
  A variety of contests before the Public Utilities Commission, within the legislature, and through ballot initiatives have led to significant uncertainty in energy markets. This has slowed the adoption of rooftop solar and the development of distributed power generation.
- **Water rights**
  Long-term claims on water, a declining resource, including generous well provisions, will lead to shortages.
- **Rural broadband connectivity**
  Broadband in rural areas is characterized by lack of choice and is vulnerable to disruption in supply due to a lack of redundancy.
- **Congestion in suburban and urban areas**
  Rapid growth in the years following the Great Recession has led to increased congestion and higher travel times during rush hour. Road funding and construction is not keeping up, and geography has limited the ability to develop new routes.
- **Federal land ownership**
  A high percentage of Nevada's land is owned by the federal government, which limits its use and excludes it from the tax base.

Governance

Nevada has relatively small and agile government, but some policies require refinement or more effective implementation.

- **Incomplete tax abatements**
  While a recent study found that Nevada's tax abatements are competitive with other states in the Mountain West, the existing system is deficient regarding the development of the innovation ecosystem—it cannot easily support small, technology intensive firms—and the development of an in-state mining supply chain.
- **Property tax limitations**
  Due to the dramatic collapse in asset prices during the Great Recession, the state capped property taxes. This has led to inadequate funding for schools and other local amenities.
- **Impact of the Knowledge Fund**
  While the Knowledge Fund can provide a key link in the state's innovation ecosystem, existing investments are too removed from the market and overly centered on university research.
- **Economic development collaboration**
  Lack of communication, inconsistent program implementation, and limited collaboration across economic development agencies has limited the impact of several of Nevada's otherwise effective economic development programs.

Opportunity

There are regional, national, and international developments that represent opportunities for Nevada businesses and policy makers.

- **Access to West Coast networks**
  The costs and other difficulties of doing business in the Bay Area have led venture capitalists and their networks to seek locations and investments elsewhere, with northwestern Nevada a strong candidate.
- **Access to Mountain West markets**
  There are near-at-hand markets for Nevadans in Idaho, Utah, and Arizona with opportunities for Nevada business to participate in supply chain traded goods and services.
- **Las Vegas World brand**
  While Las Vegas's established brand may not capture all aspect of Nevada's economy or society, it remains a unique, recognized world brand—a vehicle for promoting the state everywhere.
- **Opportunities for mining diversification**
  Mining is one of Nevada's foundational industries. Opportunities to diversify into rare metals in demand by new technologies can limit the cyclical character of precious metals output.
- **Testbed for new technology**
  New technologies that rely on autonomy, aerial vehicles, new sources of energy, smart networks, and other "smart city" applications, need areas appropriate for large-scale testing. Nevada (in collaboration with federal land owners) offers a less restrictive environment for innovators who want to move fast and break things.
- **Mobile Millennials and Generation Z**
  Younger talent is increasingly mobile and motivated by quality of life. Nevada's relatively low-cost quality of life can compare favorably to life in expensive coastal cities.
- **West Coast costs and congestion**
  Congestion, lack of housing, costly workforce, and livability issues in the Bay Area and Southern California are driving established and new businesses away and into neighboring states, including Nevada.

Threat

Some external challenges cannot be addressed directly by Nevada leaders, but only managed. Others, in particular policy uncertainty around the management of land by the federal government, may be susceptible to action by the state's leaders.

- **Impact of climate change**
  Climate change may accelerate the spread of desert conditions and cause water shortages.
- **Exposure to economic cycles**
  Hospitality, gaming, entertainment, and gold mining remain key sectors for Nevada's economy and remain at the mercy of national and world economic cycles.

- **Uncertain federal policies**
  Through its landholdings and environmental and other regulations, the federal government retains an oversized influence on business and development in Nevada. This includes land management practices, U.S. Department of Defense land withdrawals, and available grants and programs.
- **Competition from Mountain West states**
  Nevada is in direct competition with other Mountain West states for talent, investment, and visitors. Even as Nevada pursues a high quality of life and attractive business climate, competing states with many natural advantages are doing likewise.
- **Costs and congestion**
  Increasing congestion, housing, and workforce costs in Nevada's metropolitan areas may erode Nevada's advantages in comparison to the West Coast.

Table 41. SWOT Analysis

SWOT Analysis	
Strength	**Weakness**
Culture and Quality of Life • Enterprising migrants • Frontier spirit • Artists, musicians, and performers • Outdoor enthusiasts **Workforce and Education** • Established models of success • WINN and other CTE booster programs **Innovation** • Connections to the West Coast • Low barriers for new businesses • Pervasive small business ethic **Industry** • Increasing diversification • Value-chain opportunities **Infrastructure** • Inexpensive energy • Increasing use of renewable energy • Advanced water management • Urban connectivity • Stable environment **Governance** • Low taxes and regulation • "Small state" advantage	**Culture and Quality of Life** • Housing affordability • Low trust in government institutions • Lack of collaboration • Poor health indicators • Harsh desert climate **Workforce and Education** • Weak institutional performance • Lack of K-12 and higher education funding • Low educational attainment • Poor career guidance for mid-skill workers • Shortages in building and other skilled trades **Innovation** • Immature mentor networks • Lack of early-stage funding • Underutilized tools and programs • Weak connections to research institutions **Industry** • Persistently low wages **Infrastructure** • Energy market uncertainty • Water rights • Rural broadband connectivity • Congestion in suburban and urban areas • Federal land ownership **Governance** • Incomplete tax abatements • Property tax limitations • Impact of the Knowledge Fund • Economic development collaboration
Opportunity	**Threat**
• Access to West Coast networks • Access to Mountain West markets • Las Vegas world brand • Opportunities for mining diversification • Testbed for new technologies • Mobile Millennials and Generation Z • West Coast costs and congestion	• Impact of climate change • Exposure to economic cycles • Uncertain federal policies • Competition from Mountain West states • Costs and congestion

Strategic Directions

Strategic Directions

Outlined in this section are three strategic directions based on the SWOT analysis. Nevada has pursued a variety of successful initiatives aimed at economic diversification over the last seven years; however, some policy fragmentation may have occurred. Furthermore, in addition to economic diversification, Nevada needs to complete the transition to an innovation-based economy. Finally, many of the current policies and programs have been effective but, as is often the case, require some refinement and expansion to provide better support for new and existing businesses. In summary, the SRI team has identified three broad strategic directions—collaborate, innovate, and refine—to pursue in order to address the challenges identified earlier in this report.

Each action is accompanied by a high-level indication of who the relevant owners should be, the level of resources required, the timeline, and a sample metric or milestone for judging success. These indications are designed to help set priorities and remind the audience for this report of what will be required, by who, and for how long, if the possibilities identified below are to be realized.

Collaborate: **Work together to build on existing programs, avoid duplication of effort, and address known gaps in services and resources.**

Build formal mentorship and angel investor networks, in part by drawing on Nevada's access to West Coast ecosystems.

Action: Hold mentoring and networking events for high net-worth individuals.


Prominent business leaders, RDAs


Immediate


Three events in a 12-month period with significant earned media


$

Action: Seed rural area investor networks.


RDAs, GOED


Medium-term


Target funding raised in a 36-month period


$$

Action: Support the SBIR/STTR application process and provide a match for successful SBIR/STTR grants.


NSHE, GOED, Business


Medium-term


Number of submitted/successful applications in a 36-month period


$$

Reformulate and increase investment in the Knowledge Fund to be an external partnership between universities, entrepreneurs, and industry.

Action: Fund joint enterprise/university partnerships directly through private partners.

GOED, RDAs

Medium-term

Number of enterprise/university joint projects

$$

Action: Support virtual accelerators in Northwest and South Nevada to provide wraparound services to entrepreneurs, startups, and small businesses.

RDAs, GOED

Medium-term

Funding events, technology developed (Technology Readiness Level), and sales

$$

Integrate economic development activities.

Action: Pool leads among economic development entities, and celebrate economic development wins as a state.

GOED, RDAs

Immediate

Six successfully shared leads in 12 months (success = deal)

$

Action: Collaborate across state lines by working with economic development entities in other locations (Boise, Sacramento) to build regional value chains and production networks.

RDAs, GOED

Medium-term

Six new supply chain partnerships established across state lines in 12 months

$

Action: Create and increase support for information hubs that integrate workforce development, entrepreneurship, and business retention programs across different state agencies and RDAs to eliminate duplication of effort and provide a one-stop shop for key information, including OWINN.

RDAs, GOED, State agencies, OWINN

Medium-term

Two virtual hubs established for Las Vegas and Reno Sparks in a 36-month period

$$

Innovate: **Complete the development of statewide and regional innovation ecosystems through new initiatives, effective marketing, and implementation of existing programs. Emphasize Nevada's potential to be a testbed for new technology, drawing on a culture of individualism, adventure, and risk-taking.**

Redefine Nevada as the state for ambitious entrepreneurs who take calculated risks on big ideas.

Action: Define Nevada's image as the next frontier for experimentation and innovation, focusing on an overall attitude of "move fast and break things."

GOED, RDAs, TravelNevada

Medium-term

Earned media hits over 36 months

$$

Action: Create unique programs for lifestyle entrepreneurs at regional colleges in both urban and rural areas that integrate business skills and technology into outdoor recreation, tourism, art, history, and culture.

GOED, TravelNevada, NSHE

Medium-term

Programs established in a 36-month period

$$

Action: Support high-profile outdoor events around extreme sports, endurance competitions, and adventure tourism in order to encourage younger visitors and promote healthier lifestyles.

RDAs, GOED

Medium-term

Three new high-profile events in a 36-month period

$$

Provide meaningful support for targeted advanced research and applied research activities.

Action: Build a capability for research and testing for drone delivery, autonomous last-mile delivery, autonomous trucks, warehouse robotics, and associated support systems.


Business leaders, GOED, RDAs, NSHE


Long-term


One research entity established with industry partners


$$$

Action: Expand capabilities for research and testing renewable energy technologies suitable for Nevada's unique environment.


Business leaders, GOED, RDAs, NSHE


Medium-term


Identify and increase support for two NSHE-private partnerships


$$

Refine: **Adjust current programs and policies to better align with the needs of Nevadans and Nevada's growing industries.**

Refine workforce programs and policies to better align them with present and future needs.

Action: Accelerate mid-skill careers by training high school counselors and educating parents on the many career pathways offered by technical education, emphasizing those aligned with the value-chain opportunities in Nevada's diversifying economic sectors.

K-12 schools, OWINN, NSHE

Medium-term

Number of training events, number of participants in 36 months

$$

Action: Scale successful programs, such as ScienceAlive, LifeWorks, Jump Start, and LEAP, to improve access to rigorous STEM learning opportunities.

OWINN, K-12 schools

Medium-term

A 10% increase in PISA scores in the target population over a 36-month period

$$

Action: Increase overall funding for career and technical placement programs and pioneer creative and innovative initiatives to transition unskilled workers to higher-wage occupations, taking the lead from TMCC's successful partnerships with industry.

OWINN, Legislature

Medium-term

20% increase over 36 months, job placement rate of new initiatives

$$

Align state and local tax and finance around economic development priorities.

Action: Retool tax abatement packages to focus on growth in high-wage sectors (including advanced manufacturing and mining supply chain companies) and internal growth by technology-based startups.

GOED, Legislature

Medium-term

Legislative action within one biennium

$$

Action: Review and amend the revenue mix for regional and local governments (including property taxes) to ensure an appropriately sized tax base that can meet the needs of future growth.

Legislature, counties, cities

Long-term

Legislative study, Legislation action over 48 months

$$$

Action: Incorporate Opportunity Zone designations into business recruitment strategies.

Legislature, RDAs, GOED

Medium-term

Legislative action within one biennium

$$

Fill infrastructure gaps in connectivity and energy.

Action: Invest in broadband improvements, including redundancy measures and creative non-wired solutions, in rural and remote areas to improve education, health (telemedicine), and public safety.

Legislature, RDAs, OSIT, rural counties and cities

Long-term

Increase in download and upload speeds, reliability, and choice of provider over a five-year period

$$$

Action: Promote a balanced energy market that keeps rates low while encouraging distributed generation to accommodate energy needs in rural areas of the state and that allows for additional renewable energy generation assets.

NV Energy, major consumers, cities

Medium-term

Increase in renewable share, increase in local systems

$$$

Strategic Directions: Renew NSHE

High performance institutions of higher education, research, and innovation lie at the heart of any successful 21st century economy. But while NSHE has made measurable improvements since the Great Recession, by almost any measure the system as a whole falls far short of the level of performance required to ensure that the state of Nevada continues its transformation to an innovation-based economy. In almost every case, NSHE is a key component of the strategic directions, initiatives, and actions outlined in this section. Almost anything the state's leaders and stakeholders seek to achieve depends upon it.

The NSHE-specific recommendations that follow are aimed at turning the system into an innovative, responsive, and effective partner with business and government. The SRI team does not expect the level of investment to be available that would raise NSHE's two principal research institutions far higher in the rankings of research institutions. That path is costly and heavily travelled. Instead, the research team sees NSHE as an opportunity to reimagine higher education and research by aligning it tightly at every level with the needs of the state. These recommendations propose the redesign of its governance and institutions in ways that will allow strong leadership to flourish at every level and provide pathways for deep engagement with the outside world.

By accepting the need for change and acting accordingly, state leaders will be better positioned to realize their long-term goals. It is important not to let the actions identified below be deferred by a long process of stakeholder and legislative review (except where constitutional or legal change is required). For example, it is recognized that formal change at the level of the board will take time. Other initiatives cannot wait and can be pursued on parallel paths. State leaders should begin the public debate on the need for change immediately, and they should begin recruitment of change agents for the system immediately. This will set the stage for a commitment to broad innovation across all NSHE institutions. (It is less practical in the case of NSHE to offer an indication of owners, resources, and the time required to make changes focused largely on institutional design.)

Renew: Pursue comprehensive reform of NSHE through root and branch improvements to governance, institutional design, and innovation investments.

Reform NSHE governance through fundamental changes to its governing board and the delegation of authority.

Action: Change or end the present system of government by an elected board and place NSHE under the direction of the governor and legislature.

Action: Alter the community college funding formula to include local sources of funding and recognize different kinds of success beyond graduation rates.

Action: Delegate the government of all NSHE institutions to boards of trustees.

Action: Invest in nationwide recruitment for senior leadership committed to radical innovation in higher education.

Redesign NSHE institutions around challenges faced by the region, the nation, and the world.

Action: Organize disciplines and departments into colleges focused on interdisciplinary challenges.

Action: Rework ranks, pathways, and hiring contracts for all categories of professional staff to allow and reward a complex mix of responsibilities and career choices (teaching, research, engagement).

Invest in new ways into innovation institutions.

Action: Establish semi-independent entities at UNR, UNLV, and the Desert Research Institute (DRI) for entering into agile partnerships with business that allow flexibility in employment, contracting, and intellectual (IP) management.

Action: Grow evergreen venture funds at UNR, UNLV, and DRI targeting IP at each institution, to work in collaboration with Battle Born Venture.

Appendices

Appendix A: Acronyms List

ACGR: adjusted cohort graduation rate

AUTM: Association of University Technology Managers

BEA: Bureau of Economic Analysis

BLM: Bureau of Land Management

BLS: Bureau of Labor Statistics

CCSD: Clark County School District

CSN: College of Southern Nevada

CTE: Career and Technical Education

DCI: Distressed Communities Index

DoD: Department of Defense

DRI: Desert Research Institute

EDAWN: Economic Development Authority of Western Nevada

EIG: Economic Innovation Group

FCC: Federal Communications Commission

FTE: full-time enrollment

FY: fiscal year

GDP: gross domestic product

GOED: Governor's Office of Economic Development

HAI: Housing Affordability Index

Highway 95 RDA: Highway 95 Rural Development Authority

HVAC: heating, ventilation, and air conditioning

IP: intellectual property

ISP: internet service provider

IT: information technology

kWh: kilowatt hour

LAUS: Local Area Unemployment Statistics

LCRDA: Lincoln County Regional Development Authority

LEAP: Learn & Earn Advanced-career Pathways

LVCVA: Las Vegas Convention and Visitors Authority

LVGEA: Las Vegas Global Economic Alliance

Mbps: megabits per second

NCAR: Nevada Center for Applied Research

NCREDA: Nye County Regional Economic Development Authority

NDOT: Nevada Department of Transportation

NIAS: Nevada Institute for Autonomous Systems

NNDA: Northern Nevada Development Authority

NNRDA: Northeastern Nevada Regional Development Authority

NSHE: Nevada System of Higher Education

OSIT: Governor's Office of Science, Innovation & Technology

OWINN: Office of Workforce Innovation

QCEW: Quarterly Census of Employment and Wages

R&D: research and development

RDA: Regional Development Authority

RPS: renewable portfolio standard

SBIR: Small Business Innovation Research

STTR: Small Business Technology Transfer

SOC: Standard Occupational Classification

STEM: science, technology, engineering, and mathematics

SWOT: strengths, weaknesses, opportunities, threats

TGE: tourism, gaming, and entertainment

TMCC: Truckee Meadows Community College

TMWA: Truckee Meadows Water Authority

TRIC: Tahoe-Reno Industrial Center

UAS: unmanned autonomous systems

UNLV: University of Nevada, Las Vegas

UNR: University of Nevada, Reno

U.S.: United States

VC: venture capital

WCSD: Washoe County School District

WINN: Workforce Innovations for a New Nevada

Appendix B: Interviewee List

SRI thanks each of the interviewees listed below for graciously providing their time to be interviewed for this project. Interviewees were not provided with an opportunity to review this report due to timeline constraints of this project, so the inclusion of a participant's name on this list in no way signifies their agreement with this report's findings, conclusions, or recommendations. Interviewees are listed alphabetically by last name.

Paul Acosta, Loon

Bill Anderson, Nevada Department of Taxation

Mark Anderson, Nevada Industry Excellence (Reno)

Tera Anderson, City of North Las Vegas

Hugh Anderson, Las Vegas Metro Chamber

Paul Anderson, Nevada Governor's Office of Economic Development

Derek Armstrong, Nevada Governor's Office of Economic Development

Kristen Averyt, Desert Research Institute

James Barrett, JABarrett Company

Dana Bennett, Nevada Mining Association

Mary Beth Sewald, Las Vegas Metro Chamber

Stacey Bostwick, Governor's Office of Economic Development

Bruce Breslow, Public Utilities Commission

Jeff Brigger, NV Energy

Sonja Brown, Great Basin College

Jason Bruckman, Eastridge Workforce Solutions

Irene Bustamante Adams, Nevada State Legislature

Steve Canavero, Nevada Department of Education

Ken Chapa, City of Henderson

Grace Chou, Nevada Governor's Office of Economic Development

Glenn Christenson, Velstand Investments

Todd Clark, Scientific Games

Brian Classen, Bender Group

Barbra Coffee, City of Henderson

Valerie Cotta, Economic Development Authority of Western Nevada (EDAWN)

Rick Crawford, Green Valley Grocery

Jaime Cruz, Workforce Connections

Terry Culp, Nevada Industry Excellence (Las Vegas)

Kyle Dalpe, Truckee Meadows Community College (TMCC)

Angela Dykema, Nevada Governor's Office of Energy

Doug Erwin, Economic Development Authority of Western Nevada (EDAWN)

Ken Evans, Las Vegas Urban Chamber

Mark Evatz, Newmont Mining

Jeff Fontaine, Lincoln County Regional Development Authority (LCRDA)

Art Frable, Humboldt General Hospital

Betsy Fretwell, Switch

Heidi Gansert, University of Nevada, Reno

Mridul Gautam, University of Nevada, Reno

Michelle Gavorsky, Great Basin College

Doug Geinzer, Las Vegas HEALS

Harold Gudmundsen, PC Internet

Claudia Hanson, City of Reno

Johnny Hargrove, NV Energy

Melissa Harmon, Newmont Mining

Tom Harris, University of Nevada, Reno

Shelley Hartmann, Mineral County Economic Development Authority

Erin Hasty, Governor's Office of Workforce Innovation for a New Nevada

Don Havins, Touro University Nevada

Karsten Heise, Nevada Governor's Office of Economic Development

Jeff Hendrickson, University of Phoenix

Patricia Herzog, Nevada Governor's Office of Economic Development

Derrick Hill, Cox Communications

Steve Hill, Las Vegas Convention and Visitors Authority (LVCVA)

Rob Hooper, Northern Nevada Development Authority (NNDA)

Cory Hunt, Applied Analysis

Mark Hutchinson, Lieutenant Governor

Aric Jensen, City of Reno

Mike Kazmierski, Economic Development Authority of Western Nevada (EDAWN)

Dan Klaich, Nevada Governor’s Office of Economic Development Advisory Board

Carol Kolson, Mesquite Chamber

Adam Kramer, Switch

Manny Lamarre, Governor's Office of Workforce Innovation for a New Nevada

Dan Langford, Nevada Governor's Office of Economic Development

Jim Lawrence, Nevada Department of Conservation and Natural Resources

Joel Lenz, Nevada Governor's Office Economic Development

Jeff Limpert, City of Reno

Bonnie Long, Nevada Governor's Office of Economic Development

Heidi Lusby-Angvick, Pershing County Economic Development Authority

Nate Mackinnon, Nevada System of Higher Education

Mike Majewski, Boulder City

Rob Mallery, AI Foundation

Jim Maniaci, Laughlin Economic Development Corporation

Sunny Maniaci, Laughlin Economic Development Corporation

C.J. Manthe, Nevada Department of Business and Industry

Sean McCaffrey, VGT by Aristocrat

Nancy McCormick, Economic Development Authority of Western Nevada (EDAWN)

Zachary Miles, University of Nevada, Las Vegas

Paul Miller, Nye County Regional Economic Development Authority (NCREDA)

Steve Miller, University of Nevada, Las Vegas

Brian Mitchell, Nevada Governor's Office of Science, Innovation and Technology (OSIT)

Mike Mixer, Colliers International

Melissa Molyneaux, Colliers International

Matt Moore, Nevada Governor's Office of Economic Development

Jan Morrison, Northeastern Nevada Regional Development Authority (NNRDA)

Sheldon Mudd, Northeastern Nevada Regional Development Authority (NNRDA)

Bret Murphy, Great Basin College

Alletha Muzorewa, Workforce Connections

Jojo Myers Campos, Nevada Governor's Office of Science, Innovation and Technology (OSIT)

David Noble, Nevada Governor's Office of Energy

Bill O'Donnell, AviSight Drone Academy

Dan Oster, NAI Alliance

Dan Palmeri, Cushman & Wakefield

Bart Patterson, Nevada State College

Dennis Perea, Nevada Department of Employment, Training, and Rehabilitation (DETR)

Karla Perez, Valley Health System/Universal Health Services

David Peterson, Nevada Department of Tourism

Jonas Peterson, Las Vegas Global Economic Alliance (LVGEA)

Pawel Pietrasienski, Nevada Governor's Office of Economic Development

Bob Potts, Nevada Governor's Office of Economic Development

Eric Preiss, Nevada Governor's Office of Economic Development

Sienna Reid, City of Reno

Steve Reid, Bender Group

Jason Riederer, Flirtey

Thom Reilly, Nevada System of Higher Education

Josh Reimer, Grand Rounds

Terry Reynolds, Nevada Department of Business and Industry

Chris Roman, Las Vegas Latin Chamber of Commerce

Kylie Rowe, Las Vegas Global Economic Alliance (LVGEA)

Joan Rueben, Nevada Governor's Office of Economic Development

Michael Sauer, University of Nevada, Las Vegas

Marcel Schaerer, Nevada Department of Business and Industry

Brad Schnepf, Marnell Properties

Melanie Sheldon, Nevada Governor's Office of Economic Development

Terri Sheridan, City of North Las Vegas

Bob Shriver, Highway 95 RDA

Michelle Sibley, Nevada Governor's Office of Economic Development

Ann Silver, Reno/Sparks Chamber of Commerce

Ryan Smith, City of Las Vegas

Jared Smith, Las Vegas Global Economic Alliance (LVGEA)

Amber Smyer, Nevada Department of Agriculture

Don Soderberg, Nevada Department of Employment, Training, and Rehabilitation (DETR)

Vincent Solis, Western Nevada College

Ray Specht, Specht Leadership Consulting

Spencer Stewart, Western Governors University

Jeff Sutich, Nevada Department of Agriculture

Colton Teerlink, Mesquite Regional Business

Bill Thomas, City of Reno

Garrett Toft, CBRE/SIOR

Jill Tolles, Nevada State Legislature

Marcia Turner, University Medical Center of Southern Nevada

Wes Van Dyke, YESCO

Ricardo Villalobos, College of Southern Nevada

Tatjana Vukovic, Nevada Department of Agriculture

Chris Walach, Nevada Institute for Autonomous Systems (NIAS)

Rebecca Walker Comba, Charles River Laboratories

Michael Walsh, Las Vegas Global Economic Alliance (LVGEA)

Jerri Williams-Conrad, Department of Agriculture

Calli Wilsey, City of Reno

Bill Wilson, Alchemy

Clark Wood, US Bank

Frank Woodbeck, Nevada System of Higher Education

Appendix C: Interview Protocols

The following interview protocols provided the outline for each interview or stakeholder session, with questions in bold representing the most important topics of interest. Interviewees were not necessarily asked every single question due to time constraints, and follow-up questions beyond the interview protocols listed here were asked as needed to clarify responses or better understand an interviewee's area of expertise. All interviews began with a summary of the project and a disclaimer statement about how information the interviewee provided would be used.

Background & Disclaimer Statement

SRI International's Center for Innovation Strategy and Policy (CISP) is working with the Governor's Office of Economic Development (GOED) to revisit Nevada's economic development agenda, as outlined in the 2011 report from Brookings and SRI International. As part of this process, the Department has contracted with SRI International to return to the state and conduct wide-ranging stakeholder interviews as part of its review of Nevada's economic development strategy. This review will include a scorecard on progress over the last 6 years, an analysis of Nevada's current assets (including industry base, talent and workforce mix, innovation ecosystem, and economic development policies and programs) and strategic possibilities for the future.

As part of this research, SRI International is conducting interviews with Nevada stakeholders to gather an updated understanding of the state's economic policies, programs, issues, and challenges. We are interviewing economic development practitioners, government agencies, and industry representatives and our team will develop a balanced synthesis of these interviews for the final report.

The questions we will ask are intended to provide information about your understanding of Nevada's current situation, policies and practices in the area of economic development. Participation in this interview is completely voluntary. No personal information will be collected, and no one will be identified in any published reports without their written permission. In your answers please take care not to identify any colleague or collaborator by name. By continuing with this interview or survey you are giving your verbal consent. If you have any questions about the interview, please ask me now. If you have any questions about our use of human subjects, please contact SRI's institutional review board at: human-subjects@sri.com.

Questions for Economic Development Practitioners

Background Questions

1. Tell us a little about your organization and your position.

2. What is your organization's mission? What role does it play in the state's economy?

Industry-Focused Questions

3. **What are Nevada's greatest assets, from the point of view of businesses and residents, both those already in Nevada, and those being recruited?**

4. **What are Nevada's greatest challenges, from the point of view of businesses and residents, both those already in Nevada, and those being recruited?**

5. **To what extent are different regions in Nevada facing different economic challenges? Are there clear differences among regions not be captured by statewide data?**

6. In general, how would you describe the policy environment for doing business in Nevada [permitting, taxes, etc.]?

7. What kind of feedback, positive or negative, have you received from businesses and residents about the state's economic development programs? Do some constituencies report more concerns than others?

8. **What are the most promising businesses in your region? What kind of new initiatives do you think should be emphasized to encourage the development of the region's most promising businesses?** [e.g., workforce, business support services, finance, etc.]

9. Overall, Nevada has really bounced back from the recession. What sectors and/or regions still lag behind? What key pieces are missing from the recovery?

Workforce-Focused Questions

10. How does your agency market Nevada's workforce and skill set to prospective employers? What particular skills or attributes of the state's workforce do employers find valuable?

11. Are there specific business/industries that have challenges in hiring the workers they need? What occupations, skill-sets, or areas of technical expertise do your local employers say are in highest demand and/or least supply?

12. How would you judge the quality of the links between workforce institutions and employers in Nevada? Can you name any examples of particularly innovative or successful partnerships between universities/community colleges and private business?

13. What types of new programs are being considered or could be implemented to improve the region's workforce programs?

Innovation-Focused Questions

14. (**Idea Generation)** What sectors or industries in the Nevada are known for doing a lot of innovation, R&D, and technology development, and why?

15. (**Innovation Culture**) How would you characterize the entrepreneurial culture in Nevada? Are people willing to take risks and start new companies?

16. (**Risk Capital**) Is there sufficient risk capital available in the region to entrepreneurs to advance their technologies and get to market? Do startups have access to either public or private seed funding, venture capital?

17. (**Programs**): What programs/resources in Nevada support innovation, R&D, and tech-based development? *(e.g., incubators, special VC/financing programs, university technology transfer offices, etc.)*? How well are these programs doing? What gaps are there that need to be improved upon?

18. (**Talent**) Where do startups go to recruit skilled workers in the state? Are they able to find the employees with the technical skills they need?

19. (**Talent**) Do entrepreneurs and startups know how to scale their businesses successfully? Is there a shortage of managerial talent in the state?

20. (**Networks**) In general, how would you rate the linkages among universities, research institutions, and entrepreneurs/the private sector in Nevada?

21. (**Networks**) Where can entrepreneurs and startups go for mentorship or advice in Nevada [*or specific metro/micro areas*]? Are there experienced entrepreneurs or venture capitalists who are available to serve as mentors for incubators, accelerators?

Questions for Academic Stakeholders

Background Questions

1. **Tell us a little about your institution and your position.**

2. **What role do you see your institution playing in Nevada's economy?**

Industry-Focused Questions

3. **What are Nevada's greatest assets, from the point of view of businesses and residents, both those already in Nevada, and those being recruited?**

4. **What are Nevada's greatest challenges, from the point of view of businesses and residents, both those already in Nevada, and those being recruited?**

5. **To what extent are different regions in Nevada facing different economic challenges? Are there clear differences among regions not be captured by statewide data?**

6. What are the most promising businesses in your region? What kind of new initiatives do you think should be emphasized to encourage the development of the region's most promising businesses? [e.g., workforce, business support services, finance, etc.]

7. Overall, Nevada has really bounced back from the recession. What sectors and/or regions still lag behind? What key pieces are missing from the recovery?

Workforce-Focused Questions

8. What particular skills or attributes of the state's workforce do employers find valuable?

9. Are there specific business/industries that have challenges in hiring the workers they need? What occupations, skill-sets, or areas of technical expertise do local employers say are in highest demand and/or least supply?

10. **How would you judge the quality of the links between workforce institutions and employers in Nevada? Can you name any examples of particularly innovative or successful partnerships between universities/community colleges and private business?**

11. What could be done to improve the academic preparedness of students coming into higher education from Nevada's K-12 system?

12. What types of new programs are being considered or could be implemented to improve the region's workforce programs?

Innovation-Focused Questions

13. **(Idea Generation) What sectors or industries in the Nevada are known for doing a lot of innovation, R&D, and technology development, and why?**

14. (**Innovation Culture**) How would you characterize the entrepreneurial culture in Nevada? Are people willing to take risks and start new companies?

15. (**Risk Capital**) Is there sufficient risk capital available in the region to entrepreneurs to advance their technologies and get to market? Do startups have access to either public or private seed funding, venture capital?

16. **(Programs): What programs/resources in Nevada support innovation, R&D, and tech-based development? *(e.g., incubators, special VC/financing programs, university technology transfer offices, etc.)*? How well are these programs doing? What gaps are there that need to be improved upon?**

17. (**Talent**) Where do startups go to recruit skilled workers in the state? Are they able to find the employees with the technical skills they need?

18. (**Talent**) Do entrepreneurs and startups know how to scale their businesses successfully? Is there a shortage of managerial talent in the state?

19. (**Networks**) **In general, how would you rate the linkages among universities, research institutions, and entrepreneurs/the private sector in Nevada?**

20. (**Networks**) **Where can entrepreneurs and startups go for mentorship or advice in Nevada [*or specific metro/micro areas*]? Are there experienced entrepreneurs or venture capitalists who are available to serve as mentors for incubators, accelerators?**

Questions for Industry Representatives

Background Questions

1. Tell us a little about your company, the products or services you offer, and your customers.

2. How many people do you employ in the area? Overall? What is the mix of occupations like?

3. What made you decide to locate in Nevada? Do you have offices in other locations? If so, how is your experience different in Nevada?

Industry-Focused Questions

4. **From your perspective, what are Nevada's greatest assets? What is most compelling to you about keeping your company's operations in Nevada?**

5. **From your perspective, what are Nevada's greatest challenges? What is the biggest barrier to growing your business in Nevada?**

6. How has your sector been doing since 2011, both in Nevada as well as in your other locations (if applicable)? What are the growth trends in your sector?

7. In general, how would you describe the policy environment for doing business in Nevada *[permitting, taxes, etc.]*?

8. What kind of experience have you had with the state's economic development programs? For instance, Nevada offers tax abatements for relocating and expanding in the state. Have you taken advantage of these types of programs? If so, how did it go? Do you have any suggestions for improvements to existing economic development programs?

9. What kind of new initiatives do you think should be emphasized to encourage the development of the region's most promising businesses? *[e.g., workforce, business support services, finance, etc.]* What is the biggest opportunity that is currently being missed by the state?

Workforce-Focused Questions

10. What particular skills or attributes of the state's workforce does your company find valuable? How do you advertise job postings?

11. Does your company encounter challenges in hiring the workers they need? What occupations, skill-sets, or areas of technical expertise are in highest demand and/or least supply?

12. How would you judge the quality of the links between workforce institutions and employers in Nevada? Can you name any examples of particularly innovative or successful partnerships between universities/community colleges and private business?

13. What types of new programs could be implemented to improve the region's workforce programs?

Innovation-Focused Questions

14. (Innovation Culture) **How would you characterize the entrepreneurial culture in Nevada? Are people willing to take risks and start new companies?**

15. (**Risk Capital**) Is there sufficient risk capital available in the region to entrepreneurs to advance their technologies and get to market? Do startups have access to either public or private seed funding, venture capital?

16. (**Programs**): What programs/resources in Nevada support innovation, R&D, and tech-based development? *(e.g., incubators, special VC/financing programs, university technology transfer offices, etc.)*? How well are these programs doing? What gaps are there that need to be improved upon?

17. (**Talent**) Where do startups go to recruit skilled workers in the state? Are they able to find the employees with the technical skills they need?

18. (**Talent**) Do entrepreneurs and startups know how to scale their businesses successfully? Is there a shortage of managerial talent in the state?

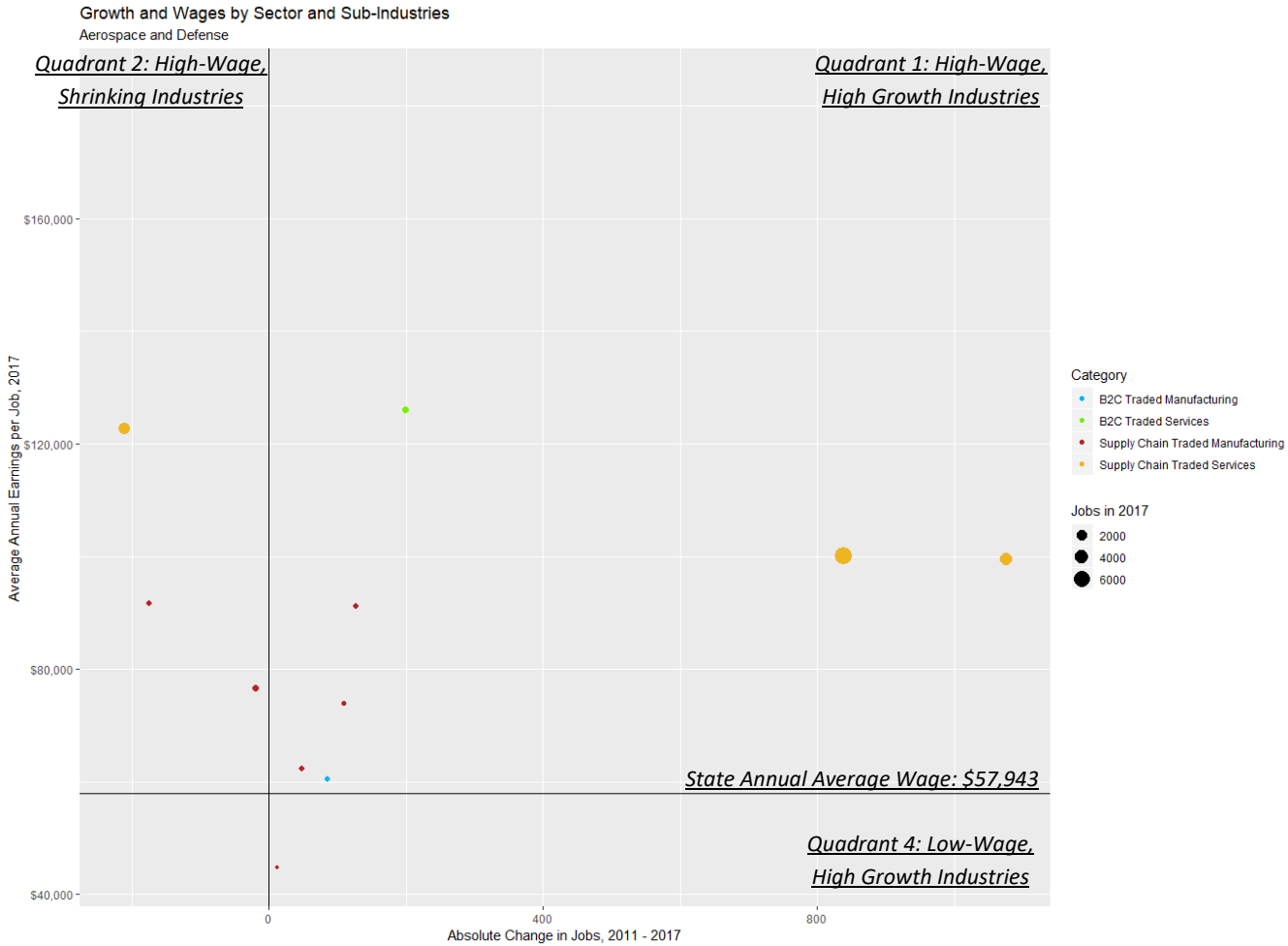
19. (**Networks**) In general, how would you rate the linkages among universities, research institutions, and entrepreneurs/the private sector in Nevada?

20. (**Networks**) Where can entrepreneurs and startups go for mentorship or advice in Nevada [*or specific metro/micro areas*]? Are there experienced entrepreneurs or venture capitalists who are available to serve as mentors for incubators, accelerators?

Appendix D: Sub-Industries Within Each GOED Target Sector

Aerospace and Defense

Appendix Figure 1. Growth and Wages for the Sub-Industries within the Aerospace and Defense Target Sector. Source: EMSI

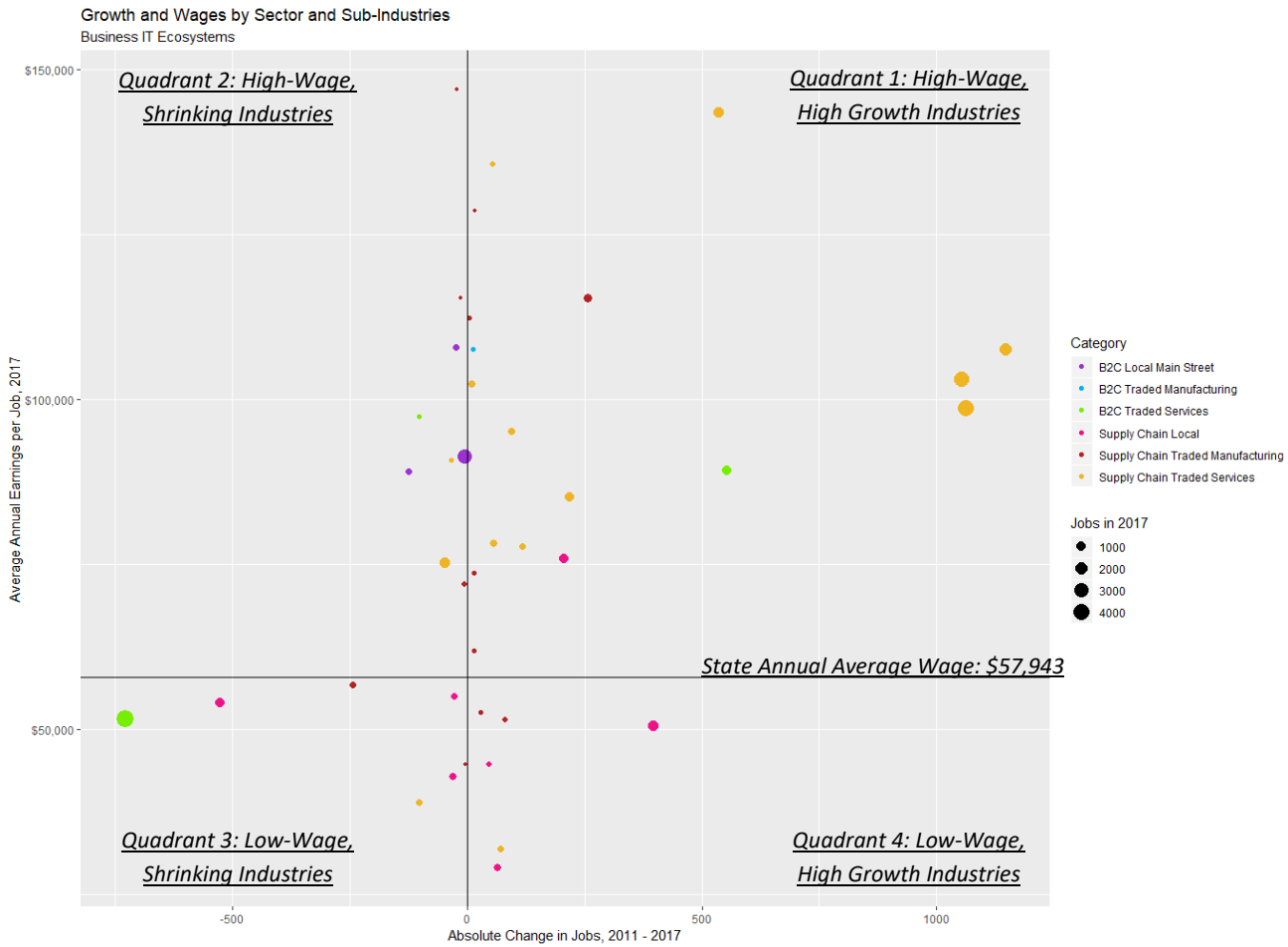


NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
488190	Other Support Activities for Air Transportation	2080	3152	1072	51.54%	99548	Supply Chain Traded Services
541330	Engineering Services	6466	7311	845	13.07%	100205	Supply Chain Traded Services
336411	Aircraft Manufacturing	#N/A	104	104	#N/A	73860	Supply Chain Traded Manufacturing
611512	Flight Training	113	315	202	178.76%	125867	B2C Traded Services
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	92	224	132	143.48%	91198	Supply Chain Traded Manufacturing
332994	Small Arms, Ordnance, and Ordnance Accessories Manufacturing	97	174	77	79.38%	60470	B2C Traded Manufacturing
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	127	166	39	30.71%	62306	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
332992	Small Arms Ammunition Manufacturing	31	47	16	51.61%	44657	Supply Chain Traded Manufacturing
332722	Bolt, Nut, Screw, Rivet, and Washer Manufacturing	550	539	-11	-2.00%	76854	Supply Chain Traded Manufacturing
336412	Aircraft Engine and Engine Parts Manufacturing	463	290	-173	-37.37%	91601	Supply Chain Traded Manufacturing
336414	Guided Missile and Space Vehicle Manufacturing	48	#N/A	-48	#N/A	183034	Supply Chain Traded Manufacturing
541715	Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	2892	2673	-219	-7.57%	122601	Supply Chain Traded Services

Business IT Ecosystems

Appendix Figure 2. Growth and Wages for the Sub-Industries within the Business IT Ecosystem Target Sector. Source: EMSI



NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
561422	Telemarketing Bureaus and Other Contact Centers	5415	14145	8730	161.22%	37316	Supply Chain Traded Services
561320	Temporary Help Services	18352	21441	3089	16.83%	31476	Supply Chain Local
518210	Data Processing, Hosting, and Related Services	794	1941	1147	144.46%	107688	Supply Chain Traded Services
541511	Custom Computer Programming Services	3310	4371	1061	32.05%	98759	Supply Chain Traded Services
541512	Computer Systems Design Services	2486	3540	1054	42.40%	103074	Supply Chain Traded Services
519130	Internet Publishing and Broadcasting and Web Search Portals	464	1018	554	119.40%	89315	B2C Traded Services
511210	Software Publishers	636	1172	536	84.28%	143541	Supply Chain Traded Services
561410	Document Preparation Services	973	1369	396	40.70%	50587	Supply Chain Local
334516	Analytical Laboratory Instrument Manufacturing	339	596	257	75.81%	115481	Supply Chain Traded Manufacturing
541214	Payroll Services	728	947	219	30.08%	85211	Supply Chain Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
561110	Office Administrative Services	677	884	207	30.58%	75894	Supply Chain Local
561311	Employment Placement Agencies	198	316	118	59.60%	77799	Supply Chain Traded Services
541519	Other Computer Related Services	274	369	95	34.67%	95197	Supply Chain Traded Services
334111	Electronic Computer Manufacturing	76	157	81	106.58%	51422	Supply Chain Traded Manufacturing
561421	Telephone Answering Services	208	280	72	34.62%	31957	Supply Chain Traded Services
561431	Private Mail Centers	429	495	66	15.38%	29066	Supply Chain Local
334614	Software and Other Prerecorded Compact Disc, Tape, and Record Reproducing	#N/A	16	16	#N/A	128588	Supply Chain Traded Manufacturing
561330	Professional Employer Organizations	441	498	57	12.93%	78166	Supply Chain Traded Services
561450	Credit Bureaus	63	117	54	85.71%	135683	Supply Chain Traded Services
561491	Repossession Services	128	175	47	36.72%	44763	Supply Chain Local
334412	Bare Printed Circuit Board Manufacturing	51	80	29	56.86%	52637	Supply Chain Traded Manufacturing

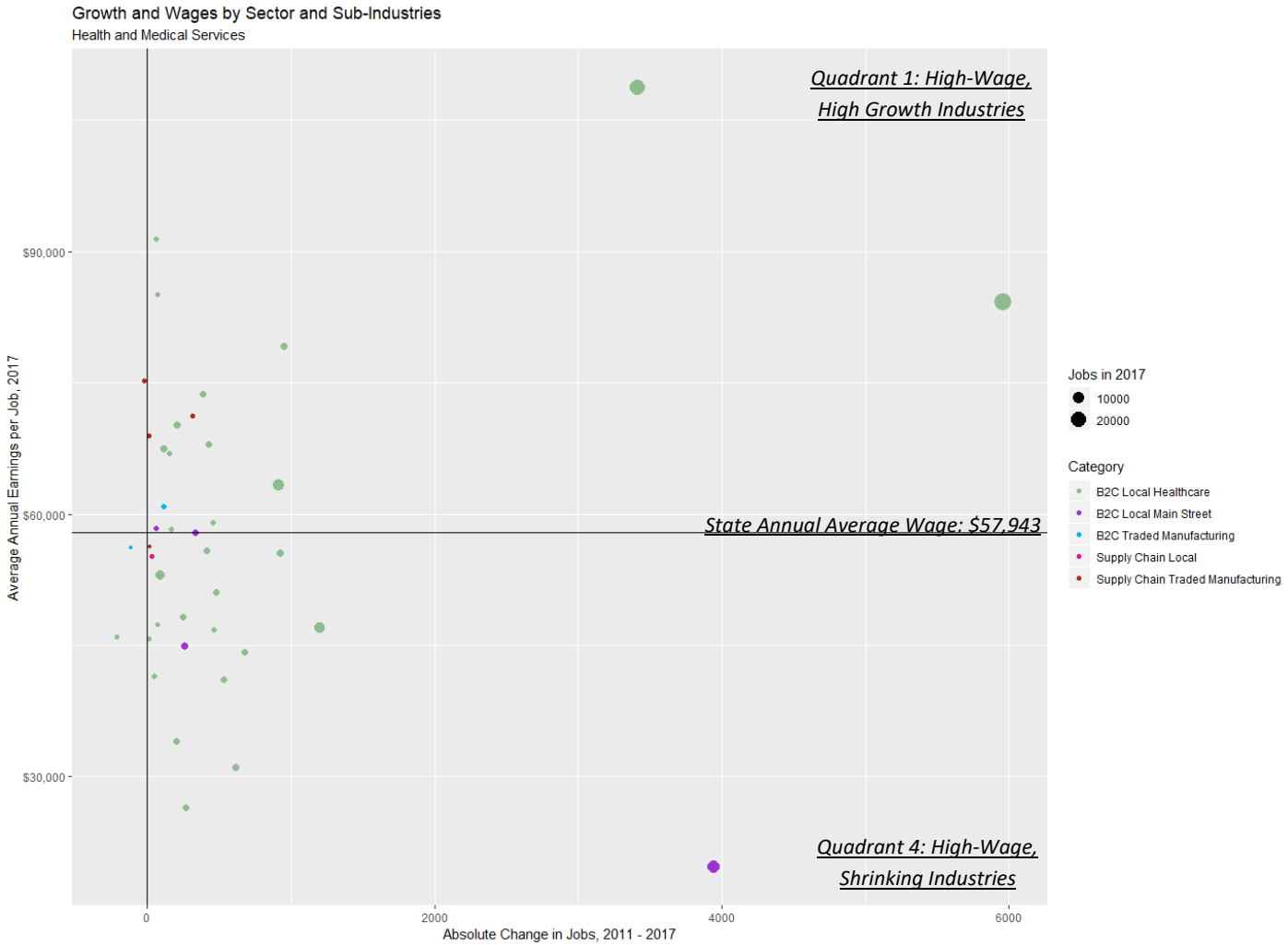
NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
334290	Other Communications Equipment Manufacturing	58	72	14	24.14%	61926	Supply Chain Traded Manufacturing
335314	Relay and Industrial Control Manufacturing	16	30	14	87.50%	73708	Supply Chain Traded Manufacturing
334310	Audio and Video Equipment Manufacturing	24	37	13	54.17%	107695	B2C Traded Manufacturing
541513	Computer Facilities Management Services	411	422	11	2.68%	102305	Supply Chain Traded Services
334413	Semiconductor and Related Device Manufacturing	30	34	4	13.33%	112460	Supply Chain Traded Manufacturing
334613	Blank Magnetic and Optical Recording Media Manufacturing	26	23	-3	-11.54%	44680	Supply Chain Traded Manufacturing
517311	Wired Telecommunications Carriers	3287	3282	-5	-0.15%	91484	B2C Local Main Street
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	108	102	-6	-5.56%	71981	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	33	20	-13	-39.39%	115395	Supply Chain Traded Manufacturing
335313	Switchgear and Switchboard Apparatus Manufacturing	45	24	-21	-46.67%	146955	Supply Chain Traded Manufacturing
517312	Wireless Telecommunications Carriers (except Satellite)	354	330	-24	-6.78%	107935	B2C Local Main Street
561492	Court Reporting and Stenotype Services	364	336	-28	-7.69%	55018	Supply Chain Local
561439	Other Business Service Centers (including Copy Shops)	511	482	-29	-5.68%	42865	Supply Chain Local
561312	Executive Search Services	98	64	-34	-34.69%	90791	Supply Chain Traded Services
561210	Facilities Support Services	1477	1429	-48	-3.25%	75373	Supply Chain Traded Services
334210	Telephone Apparatus Manufacturing	21	#N/A	-21	#N/A	#N/A	Supply Chain Traded Manufacturing
517919	All Other Telecommunications	148	46	-102	-68.92%	97437	B2C Traded Services
561499	All Other Business Support Services	328	225	-103	-31.40%	38956	Supply Chain Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
517911	Telecommunications Resellers	460	336	-124	-26.96%	89115	B2C Local Main Street
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing	583	339	-244	-41.85%	56765	Supply Chain Traded Manufacturing
334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing	90	#N/A	-90	#N/A	#N/A	Supply Chain Traded Manufacturing
561440	Collection Agencies	1571	1045	-526	-33.48%	54074	Supply Chain Local
454110	Electronic Shopping and Mail-Order Houses	5599	4870	-729	-13.02%	51646	B2C Traded Services

Health and Medical Services

Appendix Figure 3. Growth and Wages for the Sub-Industries within the Health and Medical Services Target Sector. Source: EMSI

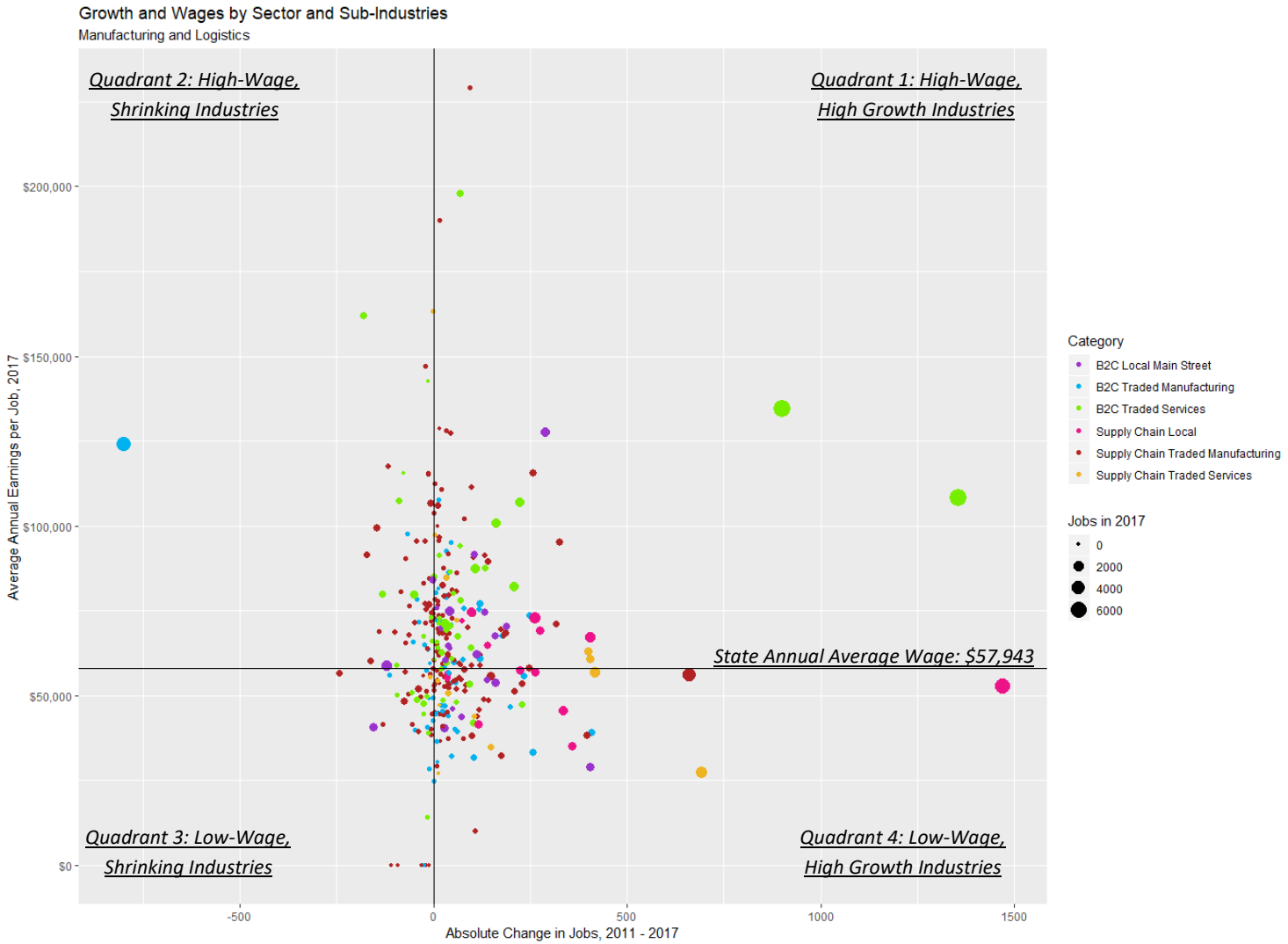


NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs
622110	General Medical and Surgical Hospitals	21199	27155	5956	28.10%	84237
624120	Services for the Elderly and Persons with Disabilities	7026	10965	3939	56.06%	19730
621111	Offices of Physicians (except Mental Health Specialists)	17013	20424	3411	20.05%	108706
623110	Nursing Care Facilities (Skilled Nursing Facilities)	5643	6843	1200	21.27%	47049
621512	Diagnostic Imaging Centers	1179	2132	953	80.83%	79153
621340	Offices of Physical, Occupational and Speech Therapists, and Audiologists	2055	2983	928	45.16%	55511
621210	Offices of Dentists	7578	8492	914	12.06%	63282
623220	Residential Mental Health and Substance Abuse Facilities	999	1674	675	67.57%	44261
623312	Assisted Living Facilities for the Elderly	2097	2716	619	29.52%	30939
621330	Offices of Mental Health Practitioners (except Physicians)	543	1075	532	97.97%	41103
621320	Offices of Optometrists	1060	1542	482	45.47%	51016
621420	Outpatient Mental Health and Substance Abuse Centers	383	852	469	122.45%	46712
621498	All Other Outpatient Care Centers	267	728	461	172.66%	59034
621493	Freestanding Ambulatory Surgical and Emergency Centers	1375	1802	427	31.05%	68041
622210	Psychiatric and Substance Abuse Hospitals	907	1318	411	45.31%	55894
621492	Kidney Dialysis Centers	833	1220	387	46.46%	73711
621910	Ambulance Services	1292	1627	335	25.93%	57897
325411	Medicinal and Botanical Manufacturing	31	348	317	1022.58%	71171
623210	Residential Intellectual and Developmental Disability Facilities	953	1223	270	28.33%	26460
624190	Other Individual and Family Services	1756	2020	264	15.03%	44924
621310	Offices of Chiropractors	988	1235	247	25.00%	48257
621511	Medical Laboratories	1673	1882	209	12.49%	70120
623311	Continuing Care Retirement Communities	982	1185	203	20.67%	34037
621991	Blood and Organ Banks	655	826	171	26.11%	58207
621399	Offices of All Other Miscellaneous Health Practitioners	810	965	155	19.14%	66943

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs
325412	Pharmaceutical Preparation Manufacturing	463	584	121	26.13%	60782
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	2059	2177	118	5.73%	67496
621610	Home Health Care Services	5226	5318	92	1.76%	53036
621410	Family Planning Centers	94	167	73	77.66%	47410
621112	Offices of Physicians, Mental Health Specialists	222	293	71	31.98%	85111
621491	HMO Medical Centers	907	971	64	7.06%	91423
532283	Home Health Equipment Rental	667	730	63	9.45%	58265
623990	Other Residential Care Facilities	485	539	54	11.13%	41405
541714	Research and Development in Biotechnology (except Nanobiotechnology)	158	207	49	31.01%	78087
339116	Dental Laboratories	353	388	35	9.92%	55146
339114	Dental Equipment and Supplies Manufacturing	18	36	18	100.00%	56275
339113	Surgical Appliance and Supplies Manufacturing	115	130	15	13.04%	68969
621391	Offices of Podiatrists	238	247	9	3.78%	45797
339112	Surgical and Medical Instrument Manufacturing	184	166	-18	-9.78%	75250
541713	Research and Development in Nanotechnology	162	63	-99	-61.11%	129451
339115	Ophthalmic Goods Manufacturing	180	67	-113	-62.78%	56190
621999	All Other Miscellaneous Ambulatory Health Care Services	446	233	-213	-47.76%	46005

Manufacturing and Logistics

Appendix Figure 4. Growth and Wages for the Sub-Industries within the Manufacturing and Logistics Target Sector. Source: EMSI



NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
493110	General Warehousing and Storage	9104	18052	8948	98.29%	46499	Supply Chain Traded Services
335911	Storage Battery Manufacturing	0	3013	3013	#N/A	84532	Supply Chain Traded Manufacturing
492110	Couriers and Express Delivery Services	3406	4877	1471	43.19%	52681	Supply Chain Local
481111	Scheduled Passenger Air Transportation	5346	6701	1355	25.35%	108359	B2C Traded Services
425120	Wholesale Trade Agents and Brokers	6281	7183	902	14.36%	134605	B2C Traded Services
488119	Other Airport Operations	1711	2405	694	40.56%	27246	Supply Chain Traded Services
323111	Commercial Printing (except Screen and Books)	2714	3375	661	24.36%	56084	Supply Chain Traded Manufacturing
326130	Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing	#N/A	114	114	#N/A	43901	Supply Chain Traded Manufacturing
484121	General Freight Trucking, Long-Distance, Truckload	1686	2104	418	24.79%	56815	Supply Chain Traded Services
311412	Frozen Specialty Food Manufacturing	218	628	410	188.07%	39087	B2C Traded Manufacturing
484220	Specialized Freight (except Used Goods) Trucking, Local	1481	1886	405	27.35%	67179	Supply Chain Local
488510	Freight Transportation Arrangement	505	910	405	80.20%	60712	Supply Chain Traded Services
311811	Retail Bakeries	543	947	404	74.40%	28876	B2C Local Main Street

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
336411	Aircraft Manufacturing	#N/A	104	104	#N/A	73860	Supply Chain Traded Manufacturing
484230	Specialized Freight (except Used Goods) Trucking, Long-Distance	563	962	399	70.87%	63081	Supply Chain Traded Services
323113	Commercial Screen Printing	292	689	397	135.96%	38217	Supply Chain Traded Manufacturing
335311	Power, Distribution, and Specialty Transformer Manufacturing	#N/A	95	95	#N/A	229017	Supply Chain Traded Manufacturing
492210	Local Messengers and Local Delivery	699	1056	357	51.07%	35028	Supply Chain Local
488410	Motor Vehicle Towing	863	1199	336	38.93%	45555	Supply Chain Local
332312	Fabricated Structural Metal Manufacturing	305	631	326	106.89%	95094	Supply Chain Traded Manufacturing
325411	Medicinal and Botanical Manufacturing	31	348	317	1022.58%	71171	Supply Chain Traded Manufacturing
423990	Other Miscellaneous Durable Goods Merchant Wholesalers	1010	1300	290	28.71%	127503	B2C Local Main Street
327320	Ready-Mix Concrete Manufacturing	859	1133	274	31.90%	69285	Supply Chain Local
484122	General Freight Trucking, Long-Distance, Less Than Truckload	2187	2451	264	12.07%	72877	Supply Chain Local
332322	Sheet Metal Work Manufacturing	682	944	262	38.42%	57061	Supply Chain Local

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
311991	Perishable Prepared Food Manufacturing	290	548	258	88.97%	33250	B2C Traded Manufacturing
334516	Analytical Laboratory Instrument Manufacturing	339	596	257	75.81%	115481	Supply Chain Traded Manufacturing
332323	Ornamental and Architectural Metal Work Manufacturing	371	620	249	67.12%	57984	Supply Chain Traded Manufacturing
312112	Bottled Water Manufacturing	74	322	248	335.14%	73770	B2C Traded Manufacturing
327991	Cut Stone and Stone Product Manufacturing	239	473	234	97.91%	55845	B2C Traded Manufacturing
321214	Truss Manufacturing	250	478	228	91.20%	53573	Supply Chain Traded Manufacturing
424940	Tobacco and Tobacco Product Merchant Wholesalers	228	456	228	100.00%	47564	B2C Traded Services
424820	Wine and Distilled Alcoholic Beverage Merchant Wholesalers	1228	1452	224	18.24%	106755	B2C Traded Services
484110	General Freight Trucking, Local	762	985	223	29.27%	57398	Supply Chain Local
423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers	953	1162	209	21.93%	82007	B2C Traded Services
337127	Institutional Furniture Manufacturing	130	338	208	160.00%	51257	Supply Chain Traded Manufacturing
333241	Food Product Machinery Manufacturing	#N/A	53	53	#N/A	60655	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
311612	Meat Processed from Carcasses	42	240	198	471.43%	46666	B2C Traded Manufacturing
423320	Brick, Stone, and Related Construction Material Merchant Wholesalers	352	542	190	53.98%	70456	B2C Local Main Street
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing	311	497	186	59.81%	68414	Supply Chain Traded Manufacturing
333924	Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing	60	243	183	305.00%	67595	Supply Chain Traded Manufacturing
335931	Current-Carrying Wiring Device Manufacturing	#N/A	47	47	#N/A	81323	Supply Chain Traded Manufacturing
335912	Primary Battery Manufacturing	#N/A	47	47	#N/A	81092	B2C Traded Manufacturing
311941	Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing	65	241	176	270.77%	67441	B2C Traded Manufacturing
321920	Wood Container and Pallet Manufacturing	139	314	175	125.90%	32297	Supply Chain Traded Manufacturing
326121	Unlaminated Plastics Profile Shape Manufacturing	73	247	174	238.36%	69548	Supply Chain Traded Manufacturing
311813	Frozen Cakes, Pies, and Other Pastries Manufacturing	#N/A	44	44	#N/A	70889	B2C Traded Manufacturing
423810	Construction and Mining (except Oil Well) Machinery and	1246	1408	162	13.00%	100804	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
	Equipment Merchant Wholesalers						
423110	Automobile and Other Motor Vehicle Merchant Wholesalers	569	729	160	28.12%	67496	B2C Local Main Street
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers	797	956	159	19.95%	53932	B2C Local Main Street
333511	Industrial Mold Manufacturing	#N/A	41	41	#N/A	68277	Supply Chain Traded Manufacturing
488490	Other Support Activities for Road Transportation	253	402	149	58.89%	34840	Supply Chain Traded Services
326199	All Other Plastics Product Manufacturing	864	1012	148	17.13%	55766	Supply Chain Traded Manufacturing
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	93	236	143	153.76%	48557	Supply Chain Traded Manufacturing
327390	Other Concrete Product Manufacturing	459	600	141	30.72%	64796	Supply Chain Local
325510	Paint and Coating Manufacturing	159	299	140	88.05%	89670	Supply Chain Traded Manufacturing
424420	Packaged Frozen Food Merchant Wholesalers	193	330	137	70.98%	54812	B2C Local Main Street
333994	Industrial Process Furnace and Oven Manufacturing	#N/A	35	35	#N/A	54516	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
424720	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)	239	372	133	55.65%	87641	B2C Traded Services
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	92	224	132	143.48%	91198	Supply Chain Traded Manufacturing
423720	Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers	534	666	132	24.72%	74493	B2C Local Main Street
314910	Textile Bag and Canvas Mills	129	260	131	101.55%	48856	Supply Chain Traded Manufacturing
325211	Plastics Material and Resin Manufacturing	#N/A	34	34	#N/A	66840	Supply Chain Traded Manufacturing
311119	Other Animal Food Manufacturing	28	150	122	435.71%	58996	Supply Chain Traded Manufacturing
321918	Other Millwork (including Flooring)	131	253	122	93.13%	61830	Supply Chain Traded Manufacturing
322291	Sanitary Paper Product Manufacturing	472	593	121	25.64%	77127	B2C Traded Manufacturing
325412	Pharmaceutical Preparation Manufacturing	463	584	121	26.13%	60782	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
327215	Glass Product Manufacturing Made of Purchased Glass	96	215	119	123.96%	45697	Supply Chain Traded Manufacturing
311821	Cookie and Cracker Manufacturing	25	143	118	472.00%	75319	B2C Traded Manufacturing
484210	Used Household and Office Goods Moving	855	971	116	13.57%	41604	Supply Chain Local
424810	Beer and Ale Merchant Wholesalers	897	1007	110	12.26%	62216	B2C Local Main Street
321999	All Other Miscellaneous Wood Product Manufacturing	39	148	109	279.49%	9908	Supply Chain Traded Manufacturing
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers	1065	1173	108	10.14%	87433	B2C Traded Services
423710	Hardware Merchant Wholesalers	500	607	107	21.40%	91403	B2C Local Main Street
488991	Packing and Crating	52	159	107	205.77%	43754	Supply Chain Traded Services
311352	Confectionery Manufacturing from Purchased Chocolate	185	289	104	56.22%	31751	B2C Traded Manufacturing
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	109	213	104	95.41%	90746	Supply Chain Traded Manufacturing
424320	Men's and Boys' Clothing and Furnishings Merchant Wholesalers	647	750	103	15.92%	41811	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
332313	Plate Work Manufacturing	28	128	100	357.14%	58798	Supply Chain Traded Manufacturing
314999	All Other Miscellaneous Textile Product Mills	221	320	99	44.80%	38315	Supply Chain Traded Manufacturing
327410	Lime Manufacturing	122	221	99	81.15%	111481	Supply Chain Traded Manufacturing
339950	Sign Manufacturing	1235	1333	98	7.94%	74486	Supply Chain Local
423220	Home Furnishing Merchant Wholesalers	287	384	97	33.80%	64086	B2C Traded Services
336330	Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	#N/A	25	25	#N/A	44242	Supply Chain Traded Manufacturing
424480	Fresh Fruit and Vegetable Merchant Wholesalers	468	563	95	20.30%	53405	B2C Traded Services
337121	Upholstered Household Furniture Manufacturing	#N/A	24	24	#N/A	45452	B2C Traded Manufacturing
326112	Plastics Packaging Film and Sheet (including Laminated) Manufacturing	18	107	89	494.44%	70023	Supply Chain Traded Manufacturing
336510	Railroad Rolling Stock Manufacturing	#N/A	22	22	#N/A	73584	Supply Chain Traded Manufacturing
332321	Metal Window and Door Manufacturing	132	216	84	63.64%	52969	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
334111	Electronic Computer Manufacturing	76	157	81	106.58%	51422	Supply Chain Traded Manufacturing
311421	Fruit and Vegetable Canning	118	198	80	67.80%	75518	B2C Traded Manufacturing
332431	Metal Can Manufacturing	0	80	80	#N/A	102096	Supply Chain Traded Manufacturing
336310	Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	197	276	79	40.10%	57709	Supply Chain Traded Manufacturing
314994	Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills	11	89	78	709.09%	37293	Supply Chain Traded Manufacturing
332994	Small Arms, Ordnance, and Ordnance Accessories Manufacturing	97	174	77	79.38%	60470	B2C Traded Manufacturing
337212	Custom Architectural Woodwork and Millwork Manufacturing	173	248	75	43.35%	72077	Supply Chain Local
337214	Office Furniture (except Wood) Manufacturing	90	162	72	80.00%	54829	Supply Chain Traded Manufacturing
423140	Motor Vehicle Parts (Used) Merchant Wholesalers	306	378	72	23.53%	43709	B2C Local Main Street
423620	Household Appliances, Electric Housewares, and Consumer Electronics Merchant Wholesalers	85	155	70	82.35%	94107	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
424210	Drugs and Druggists' Sundries Merchant Wholesalers	604	674	70	11.59%	197923	B2C Traded Services
424690	Other Chemical and Allied Products Merchant Wholesalers	303	373	70	23.10%	78098	B2C Traded Services
331210	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	0	69	69	#N/A	59171	Supply Chain Traded Manufacturing
326140	Polystyrene Foam Product Manufacturing	56	124	68	121.43%	59457	Supply Chain Traded Manufacturing
333997	Scale and Balance Manufacturing	#N/A	17	17	#N/A	36656	Supply Chain Traded Manufacturing
334416	Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing	69	136	67	97.10%	55367	Supply Chain Traded Manufacturing
488999	All Other Support Activities for Transportation	#N/A	17	17	#N/A	47167	Supply Chain Traded Services
334614	Software and Other Prerecorded Compact Disc, Tape, and Record Reproducing	#N/A	16	16	#N/A	128588	Supply Chain Traded Manufacturing
336214	Travel Trailer and Camper Manufacturing	88	150	62	70.45%	39465	B2C Traded Manufacturing
424470	Meat and Meat Product Merchant Wholesalers	298	360	62	20.81%	67463	B2C Traded Services
423210	Furniture Merchant Wholesalers	88	149	61	69.32%	47986	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
326191	Plastics Plumbing Fixture Manufacturing	72	132	60	83.33%	51945	Supply Chain Traded Manufacturing
488210	Support Activities for Rail Transportation	28	88	60	214.29%	72291	Supply Chain Traded Services
326291	Rubber Product Manufacturing for Mechanical Use	14	73	59	421.43%	86159	Supply Chain Traded Manufacturing
332311	Prefabricated Metal Building and Component Manufacturing	114	173	59	51.75%	80584	Supply Chain Traded Manufacturing
333995	Fluid Power Cylinder and Actuator Manufacturing	#N/A	15	15	#N/A	53574	Supply Chain Traded Manufacturing
332510	Hardware Manufacturing	76	134	58	76.32%	54470	Supply Chain Traded Manufacturing
311919	Other Snack Food Manufacturing	25	82	57	228.00%	53904	B2C Traded Manufacturing
493130	Farm Product Warehousing and Storage	#N/A	15	15	#N/A	27125	Supply Chain Traded Services
312120	Breweries	12	66	54	450.00%	40176	B2C Traded Manufacturing
311942	Spice and Extract Manufacturing	278	331	53	19.06%	59925	B2C Traded Manufacturing
334419	Other Electronic Component Manufacturing	169	222	53	31.36%	54138	Supply Chain Traded Manufacturing
424710	Petroleum Bulk Stations and Terminals	86	139	53	61.63%	80105	B2C Traded Services
312140	Distilleries	#N/A	13	13	#N/A	81411	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
424430	Dairy Product (except Dried or Canned) Merchant Wholesalers	194	244	50	25.77%	46129	B2C Local Main Street
311830	Tortilla Manufacturing	58	106	48	82.76%	32001	B2C Traded Manufacturing
332618	Other Fabricated Wire Product Manufacturing	30	78	48	160.00%	72937	Supply Chain Traded Manufacturing
423920	Toy and Hobby Goods and Supplies Merchant Wholesalers	148	195	47	31.76%	60934	B2C Traded Services
311513	Cheese Manufacturing	0	45	45	#N/A	95269	B2C Traded Manufacturing
324122	Asphalt Shingle and Coating Materials Manufacturing	65	109	44	67.69%	127205	Supply Chain Traded Manufacturing
339992	Musical Instrument Manufacturing	#N/A	11	11	#N/A	30276	B2C Traded Manufacturing
423130	Tire and Tube Merchant Wholesalers	94	137	43	45.74%	64020	B2C Local Main Street
423840	Industrial Supplies Merchant Wholesalers	246	289	43	17.48%	70468	B2C Traded Services
423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers	32	75	43	134.38%	86549	B2C Traded Services
336350	Motor Vehicle Transmission and Power Train Parts Manufacturing	#N/A	11	11	#N/A	99939	Supply Chain Traded Manufacturing
326211	Tire Manufacturing (except Retreading)	30	72	42	140.00%	53583	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
424410	General Line Grocery Merchant Wholesalers	1196	1238	42	3.51%	74828	B2C Local Main Street
321912	Cut Stock, Resawing Lumber, and Planing	#N/A	11	11	#N/A	#N/A	Supply Chain Traded Manufacturing
332112	Nonferrous Forging	91	132	41	45.05%	79646	Supply Chain Traded Manufacturing
333413	Industrial and Commercial Fan and Blower and Air Purification Equipment Manufacturing	163	204	41	25.15%	52186	Supply Chain Traded Manufacturing
311230	Breakfast Cereal Manufacturing	126	166	40	31.75%	86216	B2C Traded Manufacturing
333318	Other Commercial and Service Industry Machinery Manufacturing	207	247	40	19.32%	53227	Supply Chain Traded Manufacturing
333517	Machine Tool Manufacturing	91	131	40	43.96%	70478	Supply Chain Traded Manufacturing
339910	Jewelry and Silverware Manufacturing	185	225	40	21.62%	56598	B2C Traded Manufacturing
326160	Plastics Bottle Manufacturing	114	153	39	34.21%	61657	Supply Chain Traded Manufacturing
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	127	166	39	30.71%	62306	Supply Chain Traded Manufacturing
493190	Other Warehousing and Storage	253	292	39	15.42%	50855	Supply Chain Traded Services
311824	Dry Pasta, Dough, and Flour Mixes	18	56	38	211.11%	43981	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
	Manufacturing from Purchased Flour						
332119	Metal Crown, Closure, and Other Metal Stamping (except Automotive)	39	77	38	97.44%	91943	Supply Chain Traded Manufacturing
423390	Other Construction Material Merchant Wholesalers	227	265	38	16.74%	64764	B2C Local Main Street
321992	Prefabricated Wood Building Manufacturing	46	83	37	80.43%	37399	Supply Chain Traded Manufacturing
332710	Machine Shops	686	723	37	5.39%	56335	Supply Chain Local
322299	All Other Converted Paper Product Manufacturing	49	84	35	71.43%	45289	Supply Chain Traded Manufacturing
331524	Aluminum Foundries (except Die-Casting)	132	167	35	26.52%	67989	Supply Chain Traded Manufacturing
339116	Dental Laboratories	353	388	35	9.92%	55146	Supply Chain Local
325620	Toilet Preparation Manufacturing	37	71	34	91.89%	92788	B2C Traded Manufacturing
423910	Sporting and Recreational Goods and Supplies Merchant Wholesalers	355	389	34	9.58%	59739	B2C Traded Services
541614	Process, Physical Distribution, and Logistics Consulting Services	272	306	34	12.50%	84915	Supply Chain Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
333912	Air and Gas Compressor Manufacturing	54	87	33	61.11%	128051	Supply Chain Traded Manufacturing
311511	Fluid Milk Manufacturing	277	309	32	11.55%	79392	B2C Traded Manufacturing
423850	Service Establishment Equipment and Supplies Merchant Wholesalers	375	407	32	8.53%	69355	B2C Traded Services
314120	Curtain and Linen Mills	96	127	31	32.29%	46767	B2C Traded Manufacturing
423690	Other Electronic Parts and Equipment Merchant Wholesalers	1547	1578	31	2.00%	71041	B2C Traded Services
424450	Confectionery Merchant Wholesalers	434	465	31	7.14%	60544	B2C Local Main Street
311812	Commercial Bakeries	910	939	29	3.19%	40385	B2C Local Main Street
327331	Concrete Block and Brick Manufacturing	100	129	29	29.00%	79263	Supply Chain Traded Manufacturing
332216	Saw Blade and Handtool Manufacturing	25	54	29	116.00%	55642	Supply Chain Traded Manufacturing
334412	Bare Printed Circuit Board Manufacturing	51	80	29	56.86%	52637	Supply Chain Traded Manufacturing
311611	Animal (except Poultry) Slaughtering	0	28	28	#N/A	58508	B2C Traded Manufacturing
333991	Power-Driven Handtool Manufacturing	28	53	25	89.29%	87708	Supply Chain Traded Manufacturing
424340	Footwear Merchant Wholesalers	79	104	25	31.65%	48486	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
331110	Iron and Steel Mills and Ferroalloy Manufacturing	0	24	24	#N/A	40882	Supply Chain Traded Manufacturing
311615	Poultry Processing	0	23	23	#N/A	58125	B2C Traded Manufacturing
325314	Fertilizer (Mixing Only) Manufacturing	23	46	23	100.00%	68391	Supply Chain Traded Manufacturing
322211	Corrugated and Solid Fiber Box Manufacturing	28	50	22	78.57%	59567	Supply Chain Traded Manufacturing
327420	Gypsum Product Manufacturing	344	366	22	6.40%	82725	Supply Chain Traded Manufacturing
337125	Household Furniture (except Wood and Metal) Manufacturing	0	21	21	#N/A	47061	B2C Traded Manufacturing
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers	446	467	21	4.71%	70093	B2C Local Main Street
423440	Other Commercial Equipment Merchant Wholesalers	361	382	21	5.82%	62852	B2C Traded Services
423820	Farm and Garden Machinery and Equipment Merchant Wholesalers	195	216	21	10.77%	57670	B2C Traded Services
324110	Petroleum Refineries	69	89	20	28.99%	110722	Supply Chain Traded Manufacturing
339920	Sporting and Athletic Goods Manufacturing	89	108	19	21.35%	71703	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
339114	Dental Equipment and Supplies Manufacturing	18	36	18	100.00%	56275	Supply Chain Traded Manufacturing
425110	Business to Business Electronic Markets	35	52	17	48.57%	72712	B2C Traded Services
327310	Cement Manufacturing	99	115	16	16.16%	96560	Supply Chain Traded Manufacturing
332992	Small Arms Ammunition Manufacturing	31	47	16	51.61%	44657	Supply Chain Traded Manufacturing
335312	Motor and Generator Manufacturing	68	84	16	23.53%	189941	Supply Chain Traded Manufacturing
424130	Industrial and Personal Service Paper Merchant Wholesalers	180	196	16	8.89%	91186	B2C Traded Services
312111	Soft Drink Manufacturing	91	106	15	16.48%	62825	B2C Traded Manufacturing
321219	Reconstituted Wood Product Manufacturing	114	129	15	13.16%	68462	Supply Chain Traded Manufacturing
339113	Surgical Appliance and Supplies Manufacturing	115	130	15	13.04%	68969	Supply Chain Traded Manufacturing
332912	Fluid Power Valve and Hose Fitting Manufacturing	64	78	14	21.88%	68754	Supply Chain Traded Manufacturing
333242	Semiconductor Machinery Manufacturing	0	14	14	#N/A	#N/A	Supply Chain Traded Manufacturing
334290	Other Communications Equipment Manufacturing	58	72	14	24.14%	61926	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
335314	Relay and Industrial Control Manufacturing	16	30	14	87.50%	73708	Supply Chain Traded Manufacturing
424610	Plastics Materials and Basic Forms and Shapes Merchant Wholesalers	34	48	14	41.18%	71457	B2C Traded Services
333612	Speed Changer, Industrial High-Speed Drive, and Gear Manufacturing	69	82	13	18.84%	95653	Supply Chain Traded Manufacturing
334310	Audio and Video Equipment Manufacturing	24	37	13	54.17%	107695	B2C Traded Manufacturing
325991	Custom Compounding of Purchased Resins	23	35	12	52.17%	76828	Supply Chain Traded Manufacturing
333993	Packaging Machinery Manufacturing	21	33	12	57.14%	77724	Supply Chain Traded Manufacturing
424950	Paint, Varnish, and Supplies Merchant Wholesalers	63	75	12	19.05%	64224	B2C Traded Services
488111	Air Traffic Control	10	22	12	120.00%	54439	Supply Chain Traded Services
336320	Motor Vehicle Electrical and Electronic Equipment Manufacturing	104	115	11	10.58%	54475	Supply Chain Traded Manufacturing
311422	Specialty Canning	0	10	10	#N/A	#N/A	B2C Traded Manufacturing
325611	Soap and Other Detergent Manufacturing	11	21	10	90.91%	45023	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
332420	Metal Tank (Heavy Gauge) Manufacturing	71	81	10	14.08%	69710	Supply Chain Traded Manufacturing
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	289	299	10	3.46%	106016	Supply Chain Traded Manufacturing
325520	Adhesive Manufacturing	20	29	9	45.00%	65060	Supply Chain Traded Manufacturing
325612	Polish and Other Sanitation Good Manufacturing	18	27	9	50.00%	72283	B2C Traded Manufacturing
332811	Metal Heat Treating	12	21	9	75.00%	62991	Supply Chain Traded Manufacturing
337910	Mattress Manufacturing	52	61	9	17.31%	36642	B2C Traded Manufacturing
423740	Refrigeration Equipment and Supplies Merchant Wholesalers	48	57	9	18.75%	75950	B2C Local Main Street
315210	Cut and Sew Apparel Contractors	16	24	8	50.00%	29285	Supply Chain Traded Manufacturing
332613	Spring Manufacturing	13	21	8	61.54%	57424	Supply Chain Traded Manufacturing
423490	Other Professional Equipment and Supplies Merchant Wholesalers	61	69	8	13.11%	65761	B2C Traded Services
311111	Dog and Cat Food Manufacturing	89	96	7	7.87%	80242	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
337122	Nonupholstered Wood Household Furniture Manufacturing	34	40	6	17.65%	44527	B2C Traded Manufacturing
333515	Cutting Tool and Machine Tool Accessory Manufacturing	47	51	4	8.51%	78276	Supply Chain Traded Manufacturing
334413	Semiconductor and Related Device Manufacturing	30	34	4	13.33%	112460	Supply Chain Traded Manufacturing
335122	Commercial, Industrial, and Institutional Electric Lighting Fixture Manufacturing	42	46	4	9.52%	53509	Supply Chain Traded Manufacturing
532411	Commercial Air, Rail, and Water Transportation Equipment Rental and Leasing	22	26	4	18.18%	97361	Supply Chain Traded Services
333120	Construction Machinery Manufacturing	14	17	3	21.43%	45075	Supply Chain Traded Manufacturing
333922	Conveyor and Conveying Equipment Manufacturing	14	17	3	21.43%	72943	Supply Chain Traded Manufacturing
424110	Printing and Writing Paper Merchant Wholesalers	14	17	3	21.43%	60523	B2C Traded Services
321911	Wood Window and Door Manufacturing	34	36	2	5.88%	60553	Supply Chain Traded Manufacturing
333514	Special Die and Tool, Die Set, Jig, and Fixture Manufacturing	47	49	2	4.26%	51510	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
337215	Showcase, Partition, Shelving, and Locker Manufacturing	99	101	2	2.02%	52991	Supply Chain Traded Manufacturing
325120	Industrial Gas Manufacturing	16	17	1	6.25%	75293	Supply Chain Traded Manufacturing
337920	Blind and Shade Manufacturing	35	36	1	2.86%	24690	B2C Traded Manufacturing
423510	Metal Service Centers and Other Metal Merchant Wholesalers	294	295	1	0.34%	85175	B2C Traded Services
325910	Printing Ink Manufacturing	47	47	0	0.00%	103702	Supply Chain Traded Manufacturing
311930	Flavoring Syrup and Concentrate Manufacturing	22	21	-1	-4.55%	57950	Supply Chain Traded Manufacturing
312113	Ice Manufacturing	65	64	-1	-1.54%	49344	B2C Traded Manufacturing
322230	Stationery Product Manufacturing	14	13	-1	-7.14%	70540	Supply Chain Traded Manufacturing
334519	Other Measuring and Controlling Device Manufacturing	62	61	-1	-1.61%	74184	Supply Chain Traded Manufacturing
483111	Deep Sea Freight Transportation	36	35	-1	-2.78%	163362	Supply Chain Traded Services
326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing	76	74	-2	-2.63%	74358	Supply Chain Traded Manufacturing
339930	Doll, Toy, and Game Manufacturing	77	75	-2	-2.60%	42559	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
482110	Rail transportation	700	698	-2	-0.29%	84029	B2C Local Main Street
334613	Blank Magnetic and Optical Recording Media Manufacturing	26	23	-3	-11.54%	44680	Supply Chain Traded Manufacturing
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	82	78	-4	-4.88%	72196	Supply Chain Traded Manufacturing
424310	Piece Goods, Notions, and Other Dry Goods Merchant Wholesalers	30	26	-4	-13.33%	66084	B2C Traded Services
483112	Deep Sea Passenger Transportation	14	10	-4	-28.57%	#N/A	Supply Chain Traded Services
334417	Electronic Connector Manufacturing	88	83	-5	-5.68%	38446	Supply Chain Traded Manufacturing
423460	Ophthalmic Goods Merchant Wholesalers	23	18	-5	-21.74%	73103	B2C Traded Services
331410	Nonferrous Metal (except Aluminum) Smelting and Refining	515	509	-6	-1.17%	106521	Supply Chain Traded Manufacturing
333249	Other Industrial Machinery Manufacturing	26	20	-6	-23.08%	74395	Supply Chain Traded Manufacturing
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	108	102	-6	-5.56%	71981	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
322219	Other Paperboard Container Manufacturing	40	33	-7	-17.50%	40222	Supply Chain Traded Manufacturing
493120	Refrigerated Warehousing and Storage	103	95	-8	-7.77%	55457	Supply Chain Traded Services
327992	Ground or Treated Mineral and Earth Manufacturing	75	66	-9	-12.00%	56293	Supply Chain Traded Manufacturing
336999	All Other Transportation Equipment Manufacturing	24	15	-9	-37.50%	59478	B2C Traded Manufacturing
316998	All Other Leather Good and Allied Product Manufacturing	20	10	-10	-50.00%	49172	B2C Traded Manufacturing
332410	Power Boiler and Heat Exchanger Manufacturing	10	0	-10	-100.00%	0	Supply Chain Traded Manufacturing
325311	Nitrogenous Fertilizer Manufacturing	11	0	-11	-100.00%	0	Supply Chain Traded Manufacturing
332722	Bolt, Nut, Screw, Rivet, and Washer Manufacturing	550	539	-11	-2.00%	76854	Supply Chain Traded Manufacturing
315240	Women's, Girls', and Infants' Cut and Sew Apparel Manufacturing	33	21	-12	-36.36%	28536	B2C Traded Manufacturing
336390	Other Motor Vehicle Parts Manufacturing	96	84	-12	-12.50%	84608	Supply Chain Traded Manufacturing
311920	Coffee and Tea Manufacturing	221	208	-13	-5.88%	63732	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	33	20	-13	-39.39%	115395	Supply Chain Traded Manufacturing
423410	Photographic Equipment and Supplies Merchant Wholesalers	34	21	-13	-38.24%	38980	B2C Traded Services
481212	Nonscheduled Chartered Freight Air Transportation	26	13	-13	-50.00%	142524	B2C Traded Services
324121	Asphalt Paving Mixture and Block Manufacturing	42	28	-14	-33.33%	115615	Supply Chain Traded Manufacturing
336211	Motor Vehicle Body Manufacturing	43	27	-16	-37.21%	63968	Supply Chain Traded Manufacturing
424330	Women's, Children's, and Infants' Clothing and Accessories Merchant Wholesalers	141	125	-16	-11.35%	49636	B2C Traded Services
424520	Livestock Merchant Wholesalers	52	36	-16	-30.77%	14189	B2C Traded Services
336991	Motorcycle, Bicycle, and Parts Manufacturing	91	74	-17	-18.68%	40864	B2C Traded Manufacturing
311340	Nonchocolate Confectionery Manufacturing	98	80	-18	-18.37%	57461	B2C Traded Manufacturing
313210	Broadwoven Fabric Mills	18	0	-18	-100.00%	0	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
339112	Surgical and Medical Instrument Manufacturing	184	166	-18	-9.78%	75250	Supply Chain Traded Manufacturing
327999	All Other Miscellaneous Nonmetallic Mineral Product Manufacturing	75	56	-19	-25.33%	51322	Supply Chain Traded Manufacturing
321114	Wood Preservation	49	29	-20	-40.82%	71571	Supply Chain Traded Manufacturing
332919	Other Metal Valve and Pipe Fitting Manufacturing	34	14	-20	-58.82%	#N/A	Supply Chain Traded Manufacturing
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	161	140	-21	-13.04%	95416	Supply Chain Traded Manufacturing
335313	Switchgear and Switchboard Apparatus Manufacturing	45	24	-21	-46.67%	146955	Supply Chain Traded Manufacturing
331491	Nonferrous Metal (except Copper and Aluminum) Rolling, Drawing, and Extruding	207	185	-22	-10.63%	77031	Supply Chain Traded Manufacturing
339940	Office Supplies (except Paper) Manufacturing	112	89	-23	-20.54%	65078	B2C Traded Manufacturing
315190	Other Apparel Knitting Mills	24	0	-24	-100.00%	0	B2C Traded Manufacturing
332996	Fabricated Pipe and Pipe Fitting Manufacturing	36	11	-25	-69.44%	55875	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
424910	Farm Supplies Merchant Wholesalers	72	47	-25	-34.72%	67480	B2C Traded Services
316110	Leather and Hide Tanning and Finishing	26	0	-26	-100.00%	0	Supply Chain Traded Manufacturing
316210	Footwear Manufacturing	26	0	-26	-100.00%	0	B2C Traded Manufacturing
335929	Other Communication and Energy Wire Manufacturing	46	20	-26	-56.52%	83242	Supply Chain Traded Manufacturing
424920	Book, Periodical, and Newspaper Merchant Wholesalers	362	336	-26	-7.18%	47649	B2C Traded Services
424930	Flower, Nursery Stock, and Florists' Supplies Merchant Wholesalers	125	99	-26	-20.80%	44623	B2C Traded Services
331222	Steel Wire Drawing	31	0	-31	-100.00%	0	Supply Chain Traded Manufacturing
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	102	70	-32	-31.37%	49686	Supply Chain Traded Manufacturing
311999	All Other Miscellaneous Food Manufacturing	71	34	-37	-52.11%	71598	B2C Traded Manufacturing
326299	All Other Rubber Product Manufacturing	169	132	-37	-21.89%	39242	Supply Chain Traded Manufacturing
337110	Wood Kitchen Cabinet and Countertop Manufacturing	682	643	-39	-5.72%	51796	Supply Chain Traded Manufacturing
311411	Frozen Fruit, Juice, and Vegetable Manufacturing	76	34	-42	-55.26%	78363	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	179	135	-44	-24.58%	95481	Supply Chain Traded Manufacturing
424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers	501	457	-44	-8.78%	48770	B2C Traded Services
327120	Clay Building Material and Refractories Manufacturing	12	#N/A	-12	#N/A	#N/A	Supply Chain Traded Manufacturing
331512	Steel Investment Foundries	240	193	-47	-19.58%	71452	Supply Chain Traded Manufacturing
333996	Fluid Power Pump and Motor Manufacturing	57	10	-47	-82.46%	#N/A	Supply Chain Traded Manufacturing
315990	Apparel Accessories and Other Apparel Manufacturing	12	#N/A	-12	#N/A	#N/A	B2C Traded Manufacturing
311423	Dried and Dehydrated Food Manufacturing	132	84	-48	-36.36%	40006	B2C Traded Manufacturing
483212	Inland Water Passenger Transportation	12	#N/A	-12	#N/A	#N/A	Supply Chain Traded Services
423830	Industrial Machinery and Equipment Merchant Wholesalers	941	890	-51	-5.42%	79745	B2C Traded Services
311710	Seafood Product Preparation and Packaging	101	48	-53	-52.48%	65808	B2C Traded Manufacturing
424460	Fish and Seafood Merchant Wholesalers	165	110	-55	-33.33%	50704	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
323120	Support Activities for Printing	80	24	-56	-70.00%	41625	Supply Chain Traded Manufacturing
332911	Industrial Valve Manufacturing	265	203	-62	-23.40%	67684	Supply Chain Traded Manufacturing
339991	Gasket, Packing, and Sealing Device Manufacturing	119	56	-63	-52.94%	76424	Supply Chain Traded Manufacturing
322220	Paper Bag and Coated and Treated Paper Manufacturing	142	78	-64	-45.07%	50473	Supply Chain Traded Manufacturing
324191	Petroleum Lubricating Oil and Grease Manufacturing	18	#N/A	-18	#N/A	#N/A	Supply Chain Traded Manufacturing
336111	Automobile Manufacturing	166	98	-68	-40.96%	97547	B2C Traded Manufacturing
326220	Rubber and Plastics Hoses and Belting Manufacturing	116	45	-71	-61.21%	65636	Supply Chain Traded Manufacturing
326122	Plastics Pipe and Pipe Fitting Manufacturing	260	188	-72	-27.69%	56945	Supply Chain Traded Manufacturing
334512	Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use	125	53	-72	-57.60%	90307	Supply Chain Traded Manufacturing
336340	Motor Vehicle Brake System Manufacturing	19	#N/A	-19	#N/A	#N/A	Supply Chain Traded Manufacturing
326212	Tire Retreading	19	#N/A	-19	#N/A	42697	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
326111	Plastics Bag and Pouch Manufacturing	693	618	-75	-10.82%	48204	Supply Chain Traded Manufacturing
481112	Scheduled Freight Air Transportation	95	17	-78	-82.11%	115647	B2C Traded Services
334210	Telephone Apparatus Manufacturing	21	#N/A	-21	#N/A	#N/A	Supply Chain Traded Manufacturing
333999	All Other Miscellaneous General Purpose Machinery Manufacturing	139	54	-85	-61.15%	80761	Supply Chain Traded Manufacturing
481211	Nonscheduled Chartered Passenger Air Transportation	454	365	-89	-19.60%	107431	B2C Traded Services
325199	All Other Basic Organic Chemical Manufacturing	23	#N/A	-23	#N/A	#N/A	Supply Chain Traded Manufacturing
334514	Totalizing Fluid Meter and Counting Device Manufacturing	91	0	-91	-100.00%	0	Supply Chain Traded Manufacturing
423940	Jewelry, Watch, Precious Stone, and Precious Metal Merchant Wholesalers	237	142	-95	-40.08%	58760	B2C Traded Services
424120	Stationery and Office Supplies Merchant Wholesalers	186	91	-95	-51.08%	50340	B2C Traded Services
327993	Mineral Wool Manufacturing	25	#N/A	-25	#N/A	#N/A	Supply Chain Traded Manufacturing
326113	Unlaminated Plastics Film and Sheet (except	310	211	-99	-31.94%	68641	Supply Chain Traded Manufacturing

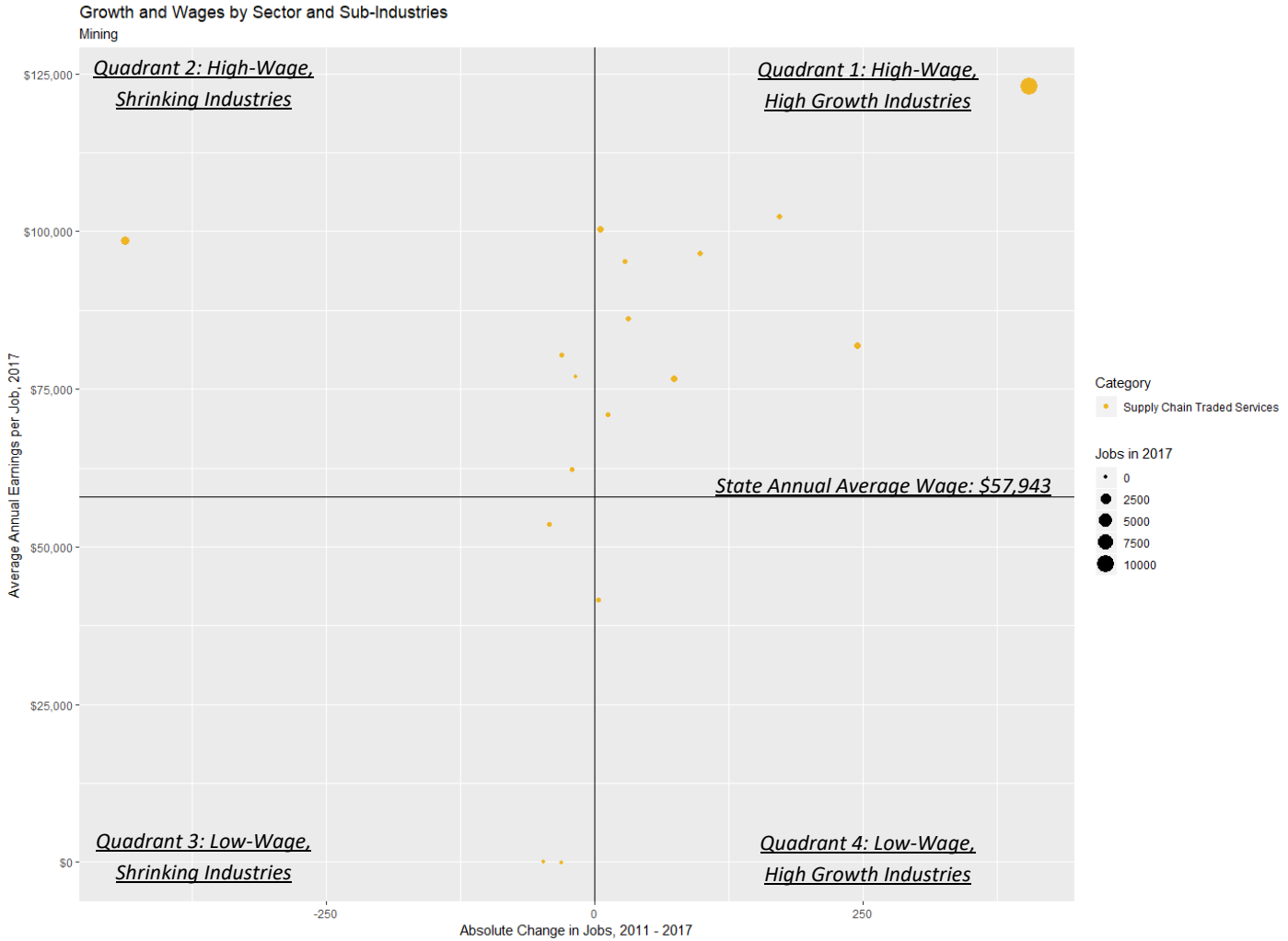
NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
	Packaging) Manufacturing						
313320	Fabric Coating Mills	108	0	-108	-100.00%	0	Supply Chain Traded Manufacturing
332991	Ball and Roller Bearing Manufacturing	28	#N/A	-28	#N/A	#N/A	Supply Chain Traded Manufacturing
339115	Ophthalmic Goods Manufacturing	180	67	-113	-62.78%	56190	B2C Traded Manufacturing
325180	Other Basic Inorganic Chemical Manufacturing	235	119	-116	-49.36%	117384	Supply Chain Traded Manufacturing
481219	Other Nonscheduled Air Transportation	30	#N/A	-30	#N/A	#N/A	B2C Traded Services
424490	Other Grocery and Related Products Merchant Wholesalers	1738	1618	-120	-6.90%	58968	B2C Local Main Street
332721	Precision Turned Product Manufacturing	212	82	-130	-61.32%	41698	Supply Chain Traded Manufacturing
423420	Office Equipment Merchant Wholesalers	883	751	-132	-14.95%	79917	B2C Traded Services
332439	Other Metal Container Manufacturing	159	19	-140	-88.05%	68823	Supply Chain Traded Manufacturing
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	807	662	-145	-17.97%	99396	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
423930	Recyclable Material Merchant Wholesalers	972	817	-155	-15.95%	40835	B2C Local Main Street
311520	Ice Cream and Frozen Dessert Manufacturing	557	394	-163	-29.26%	60281	Supply Chain Traded Manufacturing
336412	Aircraft Engine and Engine Parts Manufacturing	463	290	-173	-37.37%	91601	Supply Chain Traded Manufacturing
423430	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	689	509	-180	-26.12%	161810	B2C Traded Services
336414	Guided Missile and Space Vehicle Manufacturing	48	#N/A	-48	#N/A	183034	Supply Chain Traded Manufacturing
333611	Turbine and Turbine Generator Set Units Manufacturing	50	#N/A	-50	#N/A	#N/A	Supply Chain Traded Manufacturing
316992	Women's Handbag and Purse Manufacturing	50	#N/A	-50	#N/A	#N/A	B2C Traded Manufacturing
313230	Nonwoven Fabric Mills	53	#N/A	-53	#N/A	#N/A	Supply Chain Traded Manufacturing
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing	583	339	-244	-41.85%	56765	Supply Chain Traded Manufacturing
311613	Rendering and Meat Byproduct Processing	80	#N/A	-80	#N/A	#N/A	B2C Traded Manufacturing
327110	Pottery, Ceramics, and Plumbing Fixture Manufacturing	86	#N/A	-86	#N/A	#N/A	B2C Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing	90	#N/A	-90	#N/A	#N/A	Supply Chain Traded Manufacturing
339999	All Other Miscellaneous Manufacturing	5575	4773	-802	-14.39%	124250	B2C Traded Manufacturing

Mining

Appendix Figure 5. Growth and Wages for the Sub-Industries within the Mining Target Sector. Source: EMSI

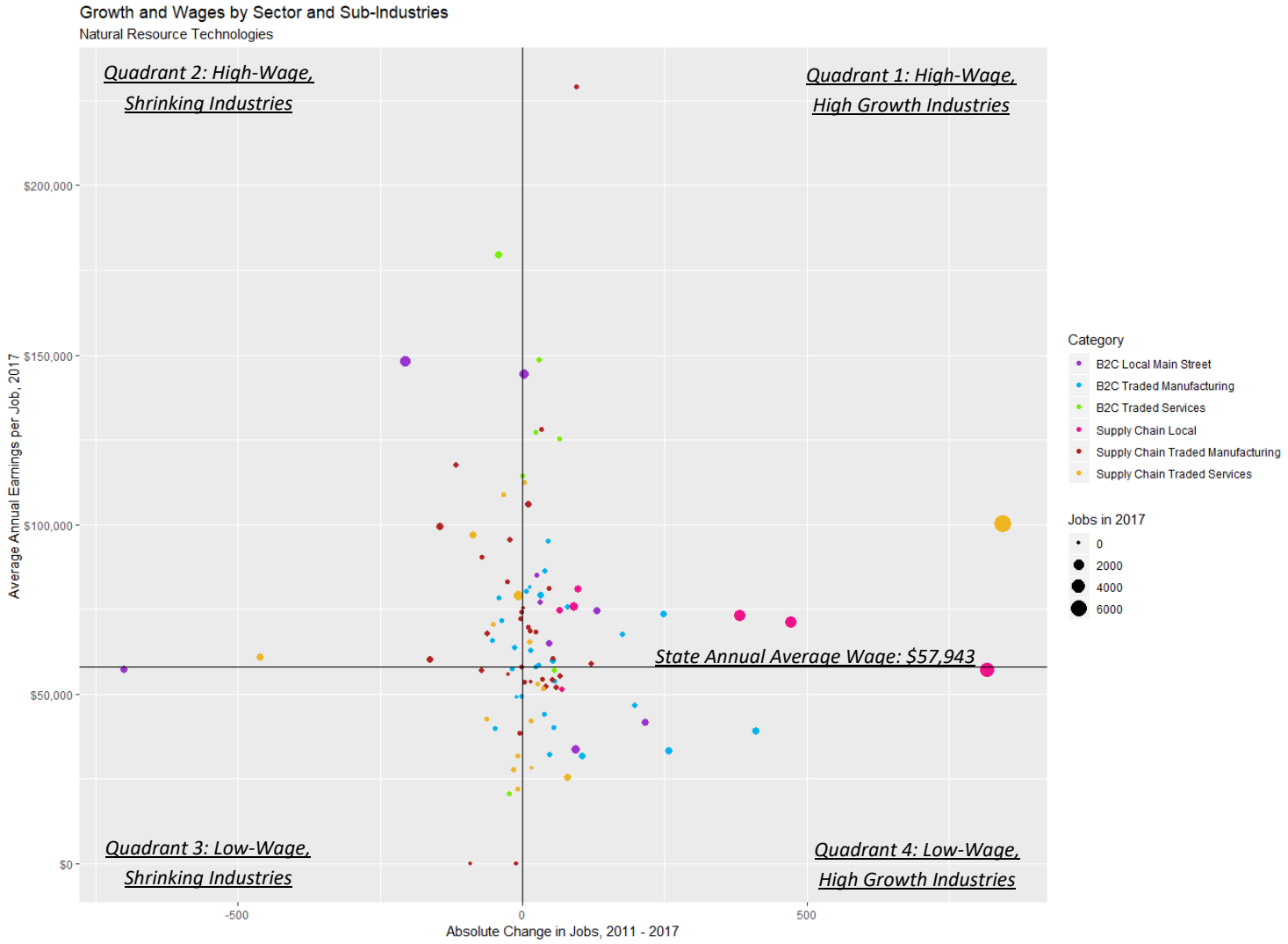


NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
211120	Crude Petroleum Extraction	43	25	-18	-41.86%	76988	Supply Chain Traded Services
212221	Gold Ore Mining	9931	10336	405	4.08%	122947	Supply Chain Traded Services
212222	Silver Ore Mining	104	277	173	166.35%	102456	Supply Chain Traded Services
212230	Copper, Nickel, Lead, and Zinc Mining	574	579	5	0.87%	100286	Supply Chain Traded Services
212291	Uranium-Radium-Vanadium Ore Mining	48	0	-48	-100.00%	0	Supply Chain Traded Services
212299	All Other Metal Ore Mining	56	#N/A	-56	#N/A	#N/A	Supply Chain Traded Services
212311	Dimension Stone Mining and Quarrying	14	#N/A	-14	#N/A	#N/A	Supply Chain Traded Services
212312	Crushed and Broken Limestone Mining and Quarrying	79	107	28	35.44%	95308	Supply Chain Traded Services
212313	Crushed and Broken Granite Mining and Quarrying	14	#N/A	-14	#N/A	#N/A	Supply Chain Traded Services
212319	Other Crushed and Broken Stone Mining and Quarrying	55	34	-21	-38.18%	62398	Supply Chain Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
212321	Construction Sand and Gravel Mining	317	391	74	23.34%	76713	Supply Chain Traded Services
212322	Industrial Sand Mining	96	54	-42	-43.75%	53589	Supply Chain Traded Services
212325	Clay and Ceramic and Refractory Minerals Mining	68	167	99	145.59%	96539	Supply Chain Traded Services
212391	Potash, Soda, and Borate Mineral Mining	31	0	-31	-100.00%	0	Supply Chain Traded Services
212393	Other Chemical and Fertilizer Mineral Mining	200	232	32	16.00%	86145	Supply Chain Traded Services
212399	All Other Nonmetallic Mineral Mining	294	539	245	83.33%	81910	Supply Chain Traded Services
213111	Drilling Oil and Gas Wells	58	27	-31	-53.45%	80364	Supply Chain Traded Services
213112	Support Activities for Oil and Gas Operations	95	98	3	3.16%	41564	Supply Chain Traded Services
213114	Support Activities for Metal Mining	1904	1466	-438	-23.00%	98608	Supply Chain Traded Services
213115	Support Activities for Nonmetallic Minerals (except Fuels) Mining	25	37	12	48.00%	70948	Supply Chain Traded Services

Natural Resource Technologies

Appendix Figure 6. Growth and Wages for the Sub-Industries within the Natural Resource Technologies Target Sector. Source: EMSI



NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
238220	Plumbing, Heating, and Air-Conditioning Contractors	7144	11860	4716	66.01%	70891	Supply Chain Local
335911	Storage Battery Manufacturing	0	3013	3013	#N/A	84532	Supply Chain Traded Manufacturing
111000	Crop Production	1335	3038	1703	127.57%	38630	#N/A
541330	Engineering Services	6466	7311	845	13.07%	100205	Supply Chain Traded Services
238910	Site Preparation Contractors	3631	4448	817	22.50%	57166	Supply Chain Local
237110	Water and Sewer Line and Related Structures Construction	1706	2178	472	27.67%	71146	Supply Chain Local
311412	Frozen Specialty Food Manufacturing	218	628	410	188.07%	39087	B2C Traded Manufacturing
541380	Testing Laboratories	1777	2160	383	21.55%	73000	Supply Chain Local
335311	Power, Distribution, and Specialty Transformer Manufacturing	#N/A	95	95	#N/A	229017	Supply Chain Traded Manufacturing
311991	Perishable Prepared Food Manufacturing	290	548	258	88.97%	33250	B2C Traded Manufacturing
312112	Bottled Water Manufacturing	74	322	248	335.14%	73770	B2C Traded Manufacturing
813312	Environment, Conservation	385	601	216	56.10%	41449	B2C Local Main Street

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
	and Wildlife Organizations						
333241	Food Product Machinery Manufacturing	#N/A	53	53	#N/A	60655	Supply Chain Traded Manufacturing
311612	Meat Processed from Carcasses	42	240	198	471.43%	46666	B2C Traded Manufacturing
335931	Current-Carrying Wiring Device Manufacturing	#N/A	47	47	#N/A	81323	Supply Chain Traded Manufacturing
335912	Primary Battery Manufacturing	#N/A	47	47	#N/A	81092	B2C Traded Manufacturing
311941	Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing	65	241	176	270.77%	67441	B2C Traded Manufacturing
112000	Animal Production	1549	1687	138	8.91%	34267	#N/A
333994	Industrial Process Furnace and Oven Manufacturing	#N/A	35	35	#N/A	54516	Supply Chain Traded Manufacturing
423720	Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers	534	666	132	24.72%	74493	B2C Local Main Street
311119	Other Animal Food Manufacturing	28	150	122	435.71%	58996	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
311352	Confectionery Manufacturing from Purchased Chocolate	185	289	104	56.22%	31751	B2C Traded Manufacturing
562212	Solid Waste Landfill	415	513	98	23.61%	80962	Supply Chain Local
221320	Sewage Treatment Facilities	#N/A	24	24	#N/A	85247	B2C Local Main Street
444220	Nursery, Garden Center, and Farm Supply Stores	740	833	93	12.57%	33731	B2C Local Main Street
541620	Environmental Consulting Services	720	810	90	12.50%	76033	Supply Chain Local
115115	Farm Labor Contractors and Crew Leaders	421	501	80	19.00%	25330	Supply Chain Traded Services
311421	Fruit and Vegetable Canning	118	198	80	67.80%	75518	B2C Traded Manufacturing
562991	Septic Tank and Related Services	182	251	69	37.91%	51353	Supply Chain Local
334416	Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing	69	136	67	97.10%	55367	Supply Chain Traded Manufacturing
541370	Surveying and Mapping (except Geophysical) Services	261	326	65	24.90%	74702	Supply Chain Local

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
115113	Crop Harvesting, Primarily by Machine	#N/A	17	17	#N/A	28244	Supply Chain Traded Services
221121	Electric Bulk Power Transmission and Control	0	64	64	#N/A	125320	B2C Traded Services
326191	Plastics Plumbing Fixture Manufacturing	72	132	60	83.33%	51945	Supply Chain Traded Manufacturing
333995	Fluid Power Cylinder and Actuator Manufacturing	#N/A	15	15	#N/A	53574	Supply Chain Traded Manufacturing
311919	Other Snack Food Manufacturing	25	82	57	228.00%	53904	B2C Traded Manufacturing
221310	Water Supply and Irrigation Systems	97	153	56	57.73%	56870	B2C Traded Services
312120	Breweries	12	66	54	450.00%	40176	B2C Traded Manufacturing
311942	Spice and Extract Manufacturing	278	331	53	19.06%	59925	B2C Traded Manufacturing
334419	Other Electronic Component Manufacturing	169	222	53	31.36%	54138	Supply Chain Traded Manufacturing
312140	Distilleries	#N/A	13	13	#N/A	81411	B2C Traded Manufacturing
311830	Tortilla Manufacturing	58	106	48	82.76%	32001	B2C Traded Manufacturing
423730	Warm Air Heating and Air-Conditioning	355	402	47	13.24%	64875	B2C Local Main Street

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
	Equipment and Supplies Merchant Wholesalers						
311513	Cheese Manufacturing	0	45	45	#N/A	95269	B2C Traded Manufacturing
333413	Industrial and Commercial Fan and Blower and Air Purification Equipment Manufacturing	163	204	41	25.15%	52186	Supply Chain Traded Manufacturing
311230	Breakfast Cereal Manufacturing	126	166	40	31.75%	86216	B2C Traded Manufacturing
311824	Dry Pasta, Dough, and Flour Mixes Manufacturing from Purchased Flour	18	56	38	211.11%	43981	B2C Traded Manufacturing
562998	All Other Miscellaneous Waste Management Services	39	75	36	92.31%	51727	Supply Chain Traded Services
333912	Air and Gas Compressor Manufacturing	54	87	33	61.11%	128051	Supply Chain Traded Manufacturing
311511	Fluid Milk Manufacturing	277	309	32	11.55%	79392	B2C Traded Manufacturing
423330	Roofing, Siding, and Insulation Material	99	130	31	31.31%	76889	B2C Local Main Street

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
	Merchant Wholesalers						
221116	Geothermal Electric Power Generation	172	201	29	16.86%	148472	B2C Traded Services
311611	Animal (except Poultry) Slaughtering	0	28	28	#N/A	58508	B2C Traded Manufacturing
562219	Other Nonhazardous Waste Treatment and Disposal	21	48	27	128.57%	53059	Supply Chain Traded Services
221114	Solar Electric Power Generation	18	42	24	133.33%	127205	B2C Traded Services
311615	Poultry Processing	0	23	23	#N/A	58125	B2C Traded Manufacturing
325314	Fertilizer (Mixing Only) Manufacturing	23	46	23	100.00%	68391	Supply Chain Traded Manufacturing
115112	Soil Preparation, Planting, and Cultivating	45	60	15	33.33%	42069	Supply Chain Traded Services
312111	Soft Drink Manufacturing	91	106	15	16.48%	62825	B2C Traded Manufacturing
332912	Fluid Power Valve and Hose Fitting Manufacturing	64	78	14	21.88%	68754	Supply Chain Traded Manufacturing
562211	Hazardous Waste Treatment and Disposal	133	146	13	9.77%	65205	Supply Chain Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
311422	Specialty Canning	0	10	10	#N/A	#N/A	B2C Traded Manufacturing
332420	Metal Tank (Heavy Gauge) Manufacturing	71	81	10	14.08%	69710	Supply Chain Traded Manufacturing
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	289	299	10	3.46%	106016	Supply Chain Traded Manufacturing
311111	Dog and Cat Food Manufacturing	89	96	7	7.87%	80242	B2C Traded Manufacturing
335122	Commercial, Industrial, and Institutional Electric Lighting Fixture Manufacturing	42	46	4	9.52%	53509	Supply Chain Traded Manufacturing
486210	Pipeline Transportation of Natural Gas	28	32	4	14.29%	112390	Supply Chain Traded Services
221210	Natural Gas Distribution	1244	1247	3	0.24%	144370	B2C Local Main Street
325120	Industrial Gas Manufacturing	16	17	1	6.25%	75293	Supply Chain Traded Manufacturing
221330	Steam and Air-Conditioning Supply	67	67	0	0.00%	114422	B2C Traded Services
311930	Flavoring Syrup and Concentrate Manufacturing	22	21	-1	-4.55%	57950	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
312113	Ice Manufacturing	65	64	-1	-1.54%	49344	B2C Traded Manufacturing
334519	Other Measuring and Controlling Device Manufacturing	62	61	-1	-1.61%	74184	Supply Chain Traded Manufacturing
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	82	78	-4	-4.88%	72196	Supply Chain Traded Manufacturing
334417	Electronic Connector Manufacturing	88	83	-5	-5.68%	38446	Supply Chain Traded Manufacturing
237130	Power and Communication Line and Related Structures Construction	1488	1482	-6	-0.40%	79034	Supply Chain Traded Services
115116	Farm Management Services	44	36	-8	-18.18%	31703	Supply Chain Traded Services
115310	Support Activities for Forestry	31	23	-8	-25.81%	22071	Supply Chain Traded Services
316998	All Other Leather Good and Allied Product Manufacturing	20	10	-10	-50.00%	49172	B2C Traded Manufacturing
332410	Power Boiler and Heat Exchanger Manufacturing	10	0	-10	-100.00%	0	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
325311	Nitrogenous Fertilizer Manufacturing	11	0	-11	-100.00%	0	Supply Chain Traded Manufacturing
311920	Coffee and Tea Manufacturing	221	208	-13	-5.88%	63732	B2C Traded Manufacturing
115210	Support Activities for Animal Production	183	168	-15	-8.20%	27531	Supply Chain Traded Services
311340	Nonchocolate Confectionery Manufacturing	98	80	-18	-18.37%	57461	B2C Traded Manufacturing
332919	Other Metal Valve and Pipe Fitting Manufacturing	34	14	-20	-58.82%	#N/A	Supply Chain Traded Manufacturing
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	161	140	-21	-13.04%	95416	Supply Chain Traded Manufacturing
114210	Hunting and Trapping	61	37	-24	-39.34%	20566	B2C Traded Services
332996	Fabricated Pipe and Pipe Fitting Manufacturing	36	11	-25	-69.44%	55875	Supply Chain Traded Manufacturing
335929	Other Communication and Energy Wire Manufacturing	46	20	-26	-56.52%	83242	Supply Chain Traded Manufacturing

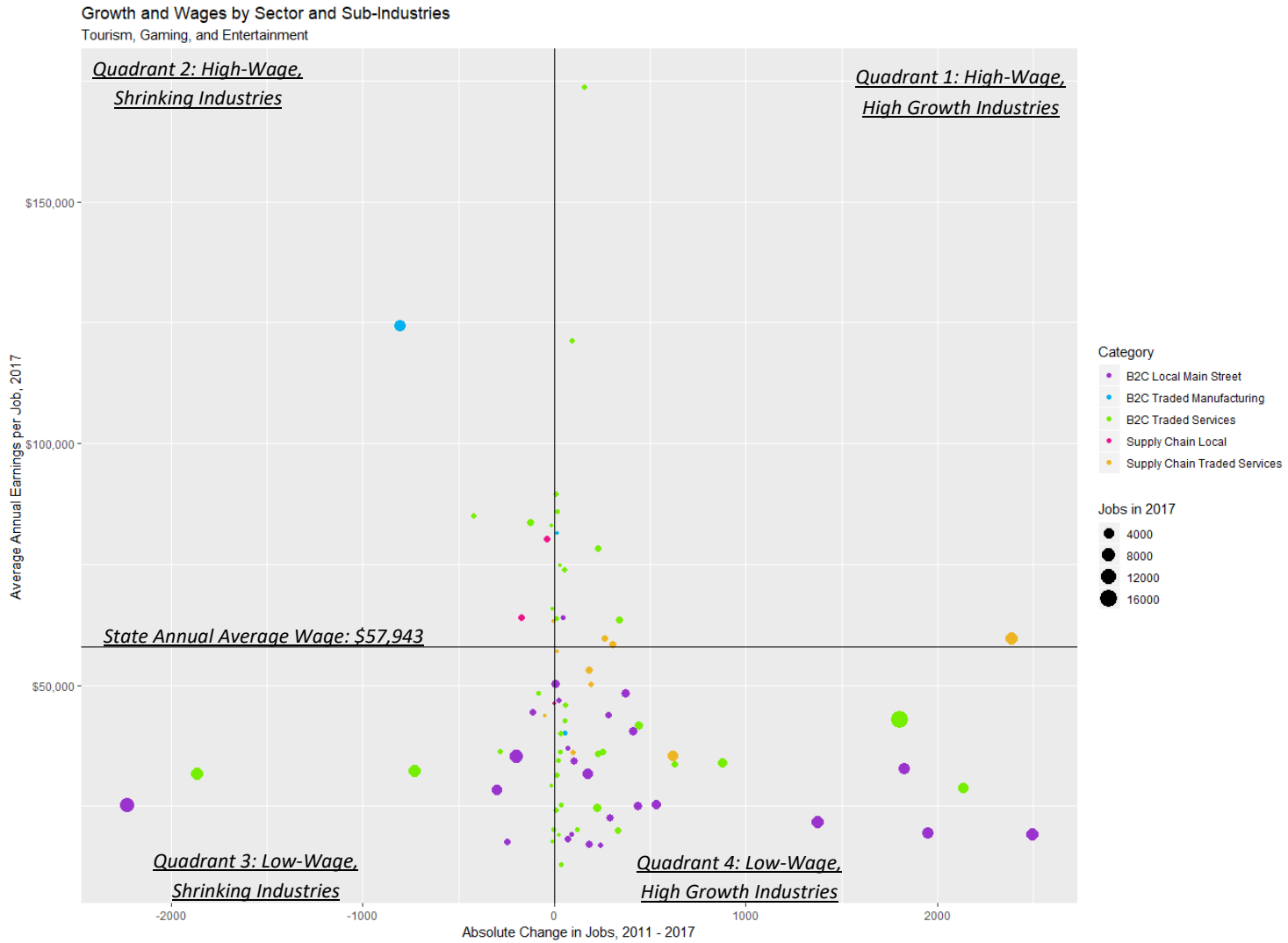
NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
114111	Finfish Fishing	96	62	-34	-35.42%	108906	Supply Chain Traded Services
311999	All Other Miscellaneous Food Manufacturing	71	34	-37	-52.11%	71598	B2C Traded Manufacturing
221112	Fossil Fuel Electric Power Generation	655	613	-42	-6.41%	179408	B2C Traded Services
311411	Frozen Fruit, Juice, and Vegetable Manufacturing	76	34	-42	-55.26%	78363	B2C Traded Manufacturing
333996	Fluid Power Pump and Motor Manufacturing	57	10	-47	-82.46%	#N/A	Supply Chain Traded Manufacturing
311423	Dried and Dehydrated Food Manufacturing	132	84	-48	-36.36%	40006	B2C Traded Manufacturing
541360	Geophysical Surveying and Mapping Services	124	73	-51	-41.13%	70500	Supply Chain Traded Services
311710	Seafood Product Preparation and Packaging	101	48	-53	-52.48%	65808	B2C Traded Manufacturing
332911	Industrial Valve Manufacturing	265	203	-62	-23.40%	67684	Supply Chain Traded Manufacturing
115114	Postharvest Crop Activities (except Cotton Ginning)	109	46	-63	-57.80%	42702	Supply Chain Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
326122	Plastics Pipe and Pipe Fitting Manufacturing	260	188	-72	-27.69%	56945	Supply Chain Traded Manufacturing
334512	Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use	125	53	-72	-57.60%	90307	Supply Chain Traded Manufacturing
237990	Other Heavy and Civil Engineering Construction	649	562	-87	-13.41%	96817	Supply Chain Traded Services
325199	All Other Basic Organic Chemical Manufacturing	23	#N/A	-23	#N/A	#N/A	Supply Chain Traded Manufacturing
334514	Totalizing Fluid Meter and Counting Device Manufacturing	91	0	-91	-100.00%	0	Supply Chain Traded Manufacturing
325180	Other Basic Inorganic Chemical Manufacturing	235	119	-116	-49.36%	117384	Supply Chain Traded Manufacturing
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	807	662	-145	-17.97%	99396	Supply Chain Traded Manufacturing

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
311520	Ice Cream and Frozen Dessert Manufacturing	557	394	-163	-29.26%	60281	Supply Chain Traded Manufacturing
333611	Turbine and Turbine Generator Set Units Manufacturing	50	#N/A	-50	#N/A	#N/A	Supply Chain Traded Manufacturing
221122	Electric Power Distribution	1927	1720	-207	-10.74%	148321	B2C Local Main Street
311613	Rendering and Meat Byproduct Processing	80	#N/A	-80	#N/A	#N/A	B2C Traded Manufacturing
237120	Oil and Gas Pipeline and Related Structures Construction	1235	774	-461	-37.33%	60881	Supply Chain Traded Services
812332	Industrial Launderers	1210	509	-701	-57.93%	57322	B2C Local Main Street

Tourism, Gaming, and Entertainment

Appendix Figure 7. Growth and Wages for the Sub-Industries within the TGE Target Sector. Source: EMSI



NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
722511	Full-Service Restaurants	48503	61668	13165	27.14%	28520	B2C Local Main Street
722513	Limited-Service Restaurants	31730	43791	12061	38.01%	18550	B2C Local Main Street
722515	Snack and Nonalcoholic Beverage Bars	4012	6505	2493	62.14%	19110	B2C Local Main Street
561920	Convention and Trade Show Organizers	4890	7273	2383	48.73%	59721	Supply Chain Traded Services
713990	All Other Amusement and Recreation Industries	1528	3662	2134	139.66%	28696	B2C Traded Services
713940	Fitness and Recreational Sports Centers	3901	5850	1949	49.96%	19385	B2C Local Main Street
722310	Food Service Contractors	3550	5375	1825	51.41%	32776	B2C Local Main Street
721110	Hotels (except Casino Hotels) and Motels	14388	16193	1805	12.55%	42913	B2C Traded Services
448140	Family Clothing Stores	5591	6966	1375	24.59%	21632	B2C Local Main Street
713290	Other Gambling Industries	2596	3473	877	33.78%	33802	B2C Traded Services
711310	Promoters of Performing Arts, Sports, and Similar Events with Facilities	327	953	626	191.44%	33674	B2C Traded Services
711510	Independent Artists, Writers, and Performers	3513	4133	620	17.65%	35482	Supply Chain Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
448210	Shoe Stores	2897	3429	532	18.36%	25274	B2C Local Main Street
512110	Motion Picture and Video Production	1576	2018	442	28.05%	41777	B2C Traded Services
448190	Other Clothing Stores	1737	2171	434	24.99%	25034	B2C Local Main Street
532111	Passenger Car Rental	1640	2049	409	24.94%	40437	B2C Local Main Street
485113	Bus and Other Motor Vehicle Transit Systems	1880	2253	373	19.84%	48431	B2C Local Main Street
711320	Promoters of Performing Arts, Sports, and Similar Events without Facilities	804	1146	342	42.54%	63369	B2C Traded Services
713110	Amusement and Theme Parks	335	664	329	98.21%	19963	B2C Traded Services
561510	Travel Agencies	1197	1504	307	25.65%	58268	Supply Chain Traded Services
722320	Caterers	875	1165	290	33.14%	22542	B2C Local Main Street
532120	Truck, Utility Trailer, and RV (Recreational Vehicle) Rental and Leasing	458	741	283	61.79%	43844	B2C Local Main Street
487990	Scenic and Sightseeing Transportation, Other	660	924	264	40.00%	59724	Supply Chain Traded Services
712110	Museums	419	669	250	59.67%	36243	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
722330	Mobile Food Services	200	442	242	121.00%	16827	B2C Local Main Street
485999	All Other Transit and Ground Passenger Transportation	482	712	230	47.72%	35834	B2C Traded Services
711130	Musical Groups and Artists	506	734	228	45.06%	78296	B2C Traded Services
485320	Limousine Service	2228	2451	223	10.01%	24634	B2C Traded Services
561520	Tour Operators	403	595	192	47.64%	50060	Supply Chain Traded Services
561599	All Other Travel Arrangement and Reservation Services	1465	1649	184	12.56%	53042	Supply Chain Traded Services
512131	Motion Picture Theaters (except Drive-Ins)	1334	1516	182	13.64%	17046	B2C Local Main Street
713910	Golf Courses and Country Clubs	4022	4193	171	4.25%	31752	B2C Local Main Street
711211	Sports Teams and Clubs	340	501	161	47.35%	173507	B2C Traded Services
512240	Sound Recording Studios	96	216	120	125.00%	20209	B2C Traded Services
448150	Clothing Accessories Stores	1280	1382	102	7.97%	34294	B2C Local Main Street
487110	Scenic and Sightseeing Transportation, Land	340	439	99	29.12%	35981	Supply Chain Traded Services
711219	Other Spectator Sports	418	513	95	22.73%	121056	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
713950	Bowling Centers	150	239	89	59.33%	19251	B2C Local Main Street
532284	Recreational Goods Rental	98	170	72	73.47%	37000	B2C Local Main Street
722514	Cafeterias, Grill Buffets, and Buffets	719	787	68	9.46%	18153	B2C Local Main Street
711410	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures	266	328	62	23.31%	45721	B2C Traded Services
512290	Other Sound Recording Industries	246	302	56	22.76%	73717	B2C Traded Services
312120	Breweries	12	66	54	450.00%	40176	B2C Traded Manufacturing
485210	Interurban and Rural Bus Transportation	120	174	54	45.00%	42726	B2C Traded Services
312140	Distilleries	#N/A	13	13	#N/A	81411	B2C Traded Manufacturing
485119	Other Urban Transit Systems	45	88	43	95.56%	64079	B2C Local Main Street
712130	Zoos and Botanical Gardens	43	78	35	81.40%	25339	B2C Traded Services
512230	Music Publishers	54	88	34	62.96%	12925	B2C Traded Services
713930	Marinas	242	276	34	14.05%	39969	B2C Traded Services
721310	Rooming and Boarding	123	155	32	26.02%	36240	B2C Traded Services

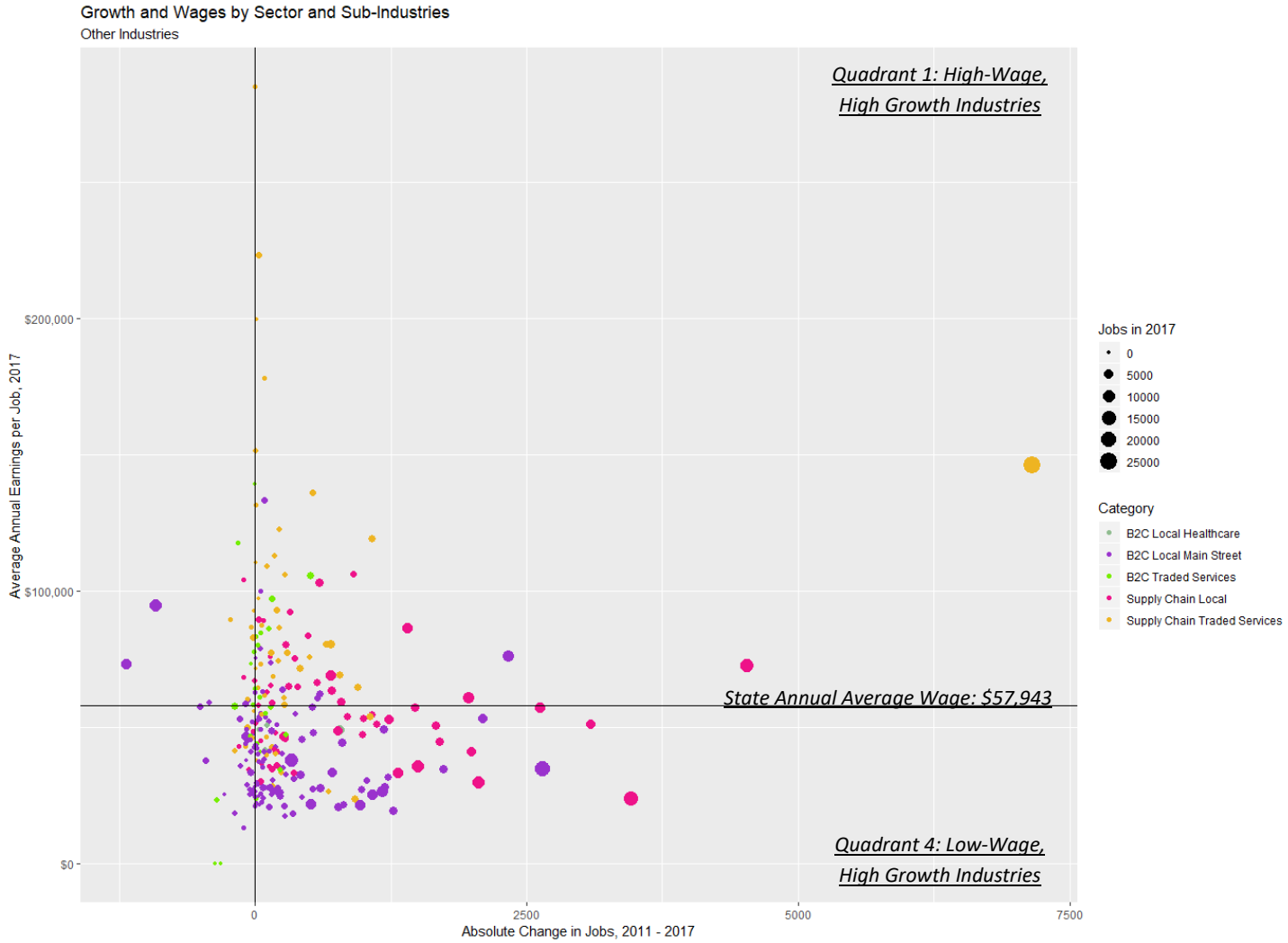
NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
	Houses, Dormitories, and Workers' Camps						
512120	Motion Picture and Video Distribution	0	28	28	#N/A	74816	B2C Traded Services
448320	Luggage and Leather Goods Stores	430	453	23	5.35%	46817	B2C Local Main Street
721191	Bed-and-Breakfast Inns	16	39	23	143.75%	18931	B2C Traded Services
712190	Nature Parks and Other Similar Institutions	46	67	21	45.65%	34351	B2C Traded Services
713920	Skiing Facilities	479	496	17	3.55%	31292	B2C Traded Services
561591	Convention and Visitors Bureaus	15	29	14	93.33%	56933	Supply Chain Traded Services
711120	Dance Companies	203	216	13	6.40%	85846	B2C Traded Services
721211	RV (Recreational Vehicle) Parks and Campgrounds	314	326	12	3.82%	24115	B2C Traded Services
519190	All Other Information Services	102	113	11	10.78%	63749	B2C Traded Services
711212	Racetracks	240	249	9	3.75%	89491	B2C Traded Services
721214	Recreational and Vacation Camps (except Campgrounds)	16	21	5	31.25%	#N/A	B2C Traded Services

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
448310	Jewelry Stores	1794	1798	4	0.22%	50334	B2C Local Main Street
515111	Radio Networks	36	36	0	0.00%	46101	Supply Chain Local
713120	Amusement Arcades	216	212	-4	-1.85%	20239	B2C Traded Services
515210	Cable and Other Subscription Programming	31	26	-5	-16.13%	63244	Supply Chain Traded Services
512132	Drive-In Motion Picture Theaters	43	35	-8	-18.60%	17519	B2C Traded Services
519110	News Syndicates	31	21	-10	-32.26%	65826	B2C Traded Services
512199	Other Motion Picture and Video Industries	26	14	-12	-46.15%	83036	B2C Traded Services
721199	All Other Traveler Accommodation	26	11	-15	-57.69%	29182	B2C Traded Services
515120	Television Broadcasting	1031	992	-39	-3.78%	80263	Supply Chain Local
487210	Scenic and Sightseeing Transportation, Water	84	33	-51	-60.71%	43639	Supply Chain Traded Services
512250	Record Production and Distribution	20	#N/A	-20	#N/A	#N/A	B2C Traded Services
512191	Teleproduction and Other Postproduction Services	164	81	-83	-50.61%	48303	B2C Traded Services
448110	Men's Clothing Stores	962	850	-112	-11.64%	44436	B2C Local Main Street

NAICS	Description	Jobs in 2011	Jobs in 2017	2011 - 2017 Change	2011 - 2017 Percent Change	Average Annual Earnings Per Jobs	Category
711190	Other Performing Arts Companies	1235	1112	-123	-9.96%	83542	B2C Traded Services
515112	Radio Stations	901	731	-170	-18.87%	63942	Supply Chain Local
722410	Drinking Places (Alcoholic Beverages)	8612	8413	-199	-2.31%	35321	B2C Local Main Street
448130	Children's and Infants' Clothing Stores	980	736	-244	-24.90%	17575	B2C Local Main Street
485510	Charter Bus Industry	803	524	-279	-34.74%	36273	B2C Traded Services
448120	Women's Clothing Stores	4351	4052	-299	-6.87%	28350	B2C Local Main Street
711110	Theater Companies and Dinner Theaters	931	511	-420	-45.11%	84849	B2C Traded Services
485310	Taxi Service	7834	7103	-731	-9.33%	32238	B2C Traded Services
339999	All Other Miscellaneous Manufacturing	5575	4773	-802	-14.39%	124250	B2C Traded Manufacturing
713210	Casinos (except Casino Hotels)	8946	7080	-1866	-20.86%	31745	B2C Traded Services
452210	Department Stores	12135	9903	-2232	-18.39%	25332	B2C Local Main Street
721120	Casino Hotels	177607	174514	-3093	-1.74%	46629	B2C Traded Services

Other Industries

Appendix Figure 8. Growth and Wages for Sub-Industries within Other Industries. Source: EMSI



Appendix E: References

[1] "Unify|Regionlize|Diversify: An Economic Development Agenda for Nevada." The Brookings Institution and SRI International (October 2011).

[2] Economic Innovation Group, 2018, "Distressed Communities Index." Economic Innovation Group (2018). https://eig.org/dci.

[3] Delgado, M., and K. Mills. 2018. "The Supply Chain Economy: A New Framework for Understand Innovation and Services." Harvard Business School Working Paper (2018).

[4] Applied Analysis (2018). *Southern Nevada Sports & Entertainment Outlook.* Prepared for Las Vegas Global Economic Alliance

[5] "Science & Engineering Indicators 2018." S&E Indicators 2018 | NSF - National Science Foundation, National Science Board, www.nsf.gov/statistics/2018/nsb20181/.

[6] "Science & Engineering Indicators 2018." *S&E Indicators 2018 | NSF - National Science Foundation*, National Science Board, www.nsf.gov/statistics/2018/nsb20181/.

[7] "Partners in Prosperity: A Report on the Communities We Serve". University of Nevada-Reno 2018. University of Nevada-Reno.

[8] "Science & Engineering Indicators 2018." *S&E Indicators 2018 | NSF - National Science Foundation*, National Science Board, www.nsf.gov/statistics/2018/nsb20181/.

[9] "Pitchbook-NVCA Venture Monitor". National Venture Capital Association 2018. National Venture Capital Association, https://nvca.org/research/venture-monitor/.

[10] "Higher Education Research and Development Survey (HERD)". National Center for Science and Engineering Statistics (NCSES), US National Science Foundation (NSF), www.nsf.gov/statistics/srvyherd/.

[11] Association of University Technology Managers (AUTM), https://autm.net/.

[12] "Business Research and Development and Innovation Survey (BRDIS)". National Center for Science and Engineering Statistics (NCSES), US National Science Foundation (NSF), www.nsf.gov/statistics/srvyherd/.

[13] "SBIR.gov." Small Business Administration, www.sbir.gov/.

[14] Census Bureau, and Center for Economic Studies. "US Census Bureau Center for Economic Studies, Business Dynamics Statistics Page." BDS Main - Business Dynamics Statistics - Center for Economic Studies, 2013, www.census.gov/ces/dataproducts/bds/.

[15] US Census Bureau. "Data." State Population Totals: 2010-2017, 2018, www.census.gov/data/tables/2017/demo/popest/state-total.html.

[16] "StartUpNV Services." StartUpNV. (2018). https://startupnv.org/services/.

[17] "FundNV FAQs." FundNV. (2018). https://fundnv.com/faq/.

[18] "Coworking/Incubator/Accelerator Spaces." Nevada Department of Business & Industry. (2018). http://business.nv.gov/Resource_Center/Coworking/_Incubator/_Accelerator_Spaces/.

[19] "2017 Status of Energy Report." State of Nevada Governor's Office of Energy. http://energy.nv.gov/uploadedFiles/energynvgov/content/About/2017%20SOE%20v10.4%20(High%20Res).pdf.

[20] Ibid.

[21] Ibid.

[22] Ibid.

[23] "Electricity Data Browser", US. Energy Information Administration (2018). https://www.eia.gov/electricity/data/browser/.

[24] "Nevada State Profile and Energy Estimates: Profile Overview." U.S. Energy Information Administration (2018). https://www.eia.gov/state/?sid=NV.

[25] "Nevada Transportation by the Numbers: Meeting the State's Need for Safe, Smooth and Efficient Mobility." TRIP (October 2016). http://www.tripnet.org/docs/NV_Transportation_by_the_Numbers_TRIP_Report_October_2016.pdf.

[26] "Infrastructure Report Card: Nevada 2014 Report." Infrastructure Report Card (2014). https://www.infrastructurereportcard.org/state-item/nevada/
[27] El-Sibaie, A. "Electric Vehicles Will Have a Long-Term Impact on the Gas Tax." Tax Foundation (2018). https://taxfoundation.org/electric-vehicles-gas-tax/.
[28] "Paying Our Way: A New Framework for Transportation Finance." National Surface Transportation Infrastructure Financing Commission (2009). http://www.fltod.com/research/transportation/paying_our_way.pdf
[29] Hartman, K. and Pula, K. "New Fees on Hybrid and Electric Vehicles." National Conference of State Legislatures (2018). http://www.ncsl.org/research/energy/new-fees-on-hybrid-and-electric-vehicles.aspx.
[30] "Nevada Transportation by the Numbers: Meeting the State's Need for Safe, Smooth and Efficient Mobility." TRIP (October 2016). http://www.tripnet.org/docs/NV_Transportation_by_the_Numbers_TRIP_Report_October_2016.pdf.
[31] "Infrastructure Report Card: Nevada 2014 Report." Infrastructure Report Card (2014). https://www.infrastructurereportcard.org/state-item/nevada/
[32] "Data." Zillow (2018). https://www.zillow.com/research/data/.
"Household Income: 2016." U.S. Census Bureau (2016). https://www.census.gov/content/dam/Census/library/publications/2017/acs/acsbr16-02.pdf
[33] "Housing Affordability Index: About the Index." National Association of Realtors. https://www.nar.realtor/research-and-statistics/housing-statistics/housing-affordability-index/methodology.
[34] "Building Permits by State and Metro Area." National Association of Home Builders (2018). https://www.nahb.org/en/research/housing-economics/construction-statistics/state-and-local/building-permits-states-and-msas.aspx
[35] "Faster Internet: FCC Sets New Definition for Broadband Speeds." NBC News (Jan. 2015). https://www.nbcnews.com/tech/internet/faster-internet-fcc-sets-new-definition-broadband-speeds-n296276
[36] "Compare Broadband Availability in Different Areas." Federal Communications Commission (June 2017). https://broadbandmap.fcc.gov/#/area-comparison?version=jun2017&tech=acfosw&speed=100_10&searchtype=cbsa&geoid=32&searched=y.
[37] Ibid.
[38] Ibid.
[39] "State of Nevada." Federal Emergency Management Agency (2016). https://www.fema.gov/state-nevada
[40] "Federal Land Ownership: Overview and Data." Congressional Research Service (March 2017). https://fas.org/sgp/crs/misc/R42346.pdf.
[41] "Nevada State Profile and Energy Estimates: Profile Analysis." U.S. Energy Information Administration (December 2017). https://www.eia.gov/state/analysis.php?sid=NV.
[42] Lenz, J. "Nevada's Lithium Industry." Governor's Office of Economic Development (August 2018).
[43] "Nevada State Profile and Energy Estimates: Profile Analysis." U.S. Energy Information Administration (December 2017). https://www.eia.gov/state/analysis.php?sid=NV.
[44] "Infrastructure Report Card: Nevada 2014 Report." Infrastructure Report Card (2014). https://www.infrastructurereportcard.org/state-item/nevada/
[45] "Nevada State Profile and Energy Estimates: Profile Analysis." U.S. Energy Information Administration (December 2017). https://www.eia.gov/state/analysis.php?sid=NV.
[46] "Infrastructure Report Card: Nevada 2014 Report." Infrastructure Report Card (2014). https://www.infrastructurereportcard.org/state-item/nevada/
[47] "Nevada State Health Facts." Henry J. Kaiser Family Foundation (2017). https://www.kff.org/state-category/health-status/.
"Nevada." County Health Rankings & Roadmaps (2018). http://www.countyhealthrankings.org/app/nevada/2018/overview.
[48] "2017 ACS Educational Attainment, 2017." U.S. Census Bureau (2017). https://www.census.gov/data/tables/2017/demo/education-attainment/cps-detailed-tables.html

[49] "Student-Teacher Ratio and Average Class Size." Organisation for Economic Cooperation and Development (September 2018). https://stats.oecd.org/Index.aspx?DataSetCode=EAG_PERS_RATIO; "2017-2018 Nevada at a Glance." Nevada Department of Education (2018). http://nevadareportcard.com/DI/nv.

[50] "Public High School Graduation Rates." National Center for Education Statistics (May 2018). https://nces.ed.gov/programs/coe/indicator_coi.asp.

[51] "Average ACT Scores by State Graduating Class 2017." ACT.org (2017). https://www.act.org/content/dam/act/unsecured/documents/cccr2017/ACT_2017-Average_Scores_by_State.pdf.

[52] "Complete College America Goals for Nevada." Nevada System of Higher Education Institutional Research (2016). https://www.nevada.edu/ir/dashboard.php?d=cca_goals.

[53] "State Higher Education Finance: FY 2017." State Higher Education Executive Officers Association (2017). http://www.sheeo.org/sites/default/files/project-files/SHEEO_SHEF_FY2017_FINAL.pdf

[54] "Basic Classification Description." The Carnegie Classification of Institutions of Higher Education, The Carnegie Foundation (2018). http://carnegieclassifications.iu.edu/classification_descriptions/basic.php.

[55] "NSHE Graduation Rates." Nevada System of Higher Education Institutional Research (2016). https://www.nevada.edu/ir/dashboard.php?d=graduation_rates.

[56] "2016 American Community Survey." U.S. Census Bureau (2016). https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

[57] "Occupational Employment Statistics: Police and Sheriff's Patrol Officers." United States Department of Labor Bureau of Labor Statistics (2018). https://data.bls.gov/oes/#/geoOcc/Multiple%20occupations%20for%20one%20geographical%20area

[58] "State-by-State and National Crime Estimates by Year(s)." Federal Bureau of Investigation: Uniform Crime Reporting Statistics (2017). https://www.ucrdatatool.gov/Search/Crime/State/RunCrimeStatebyState.cfm.

[59] "Unify|Regionlize|Diversify: An Economic Development Agenda for Nevada." The Brookings Institution and SRI International (October 2011).

[60] "Las Vegas, Nevada Sales Tax Rate." Avalara TaxRates. https://www.avalara.com/taxrates/en/state-rates/nevada/cities/las-vegas/;
"Reno, Nevada Sales Tax Rate." Avalara TaxRates. https://www.avalara.com/taxrates/en/state-rates/nevada/cities/reno/

[61] "Nevada Urban / Rural Incentive Guide." Governor's Office of Economic Development (2018). http://www.diversifynevada.com/wp-content/uploads/2018/10/201810_GOED_incentive_guide.pdf

[62] Cahn, M. "Sales Tax Exemptions Vary on Manufacturing Equipment." AccountingToday (2016). https://www.accountingtoday.com/opinion/sales-tax-exemptions-vary-on-manufacturing-equipment

[63] "Clark County School District: Fast Facts 2018-19." Clark County School District (2018). https://newsroom.ccsd.net/wp-content/uploads/2018/10/Fast-Facts-2018-19-Eng.pdf.

[64] "Compare Broadband Availability in Different Areas." Federal Communications Commission (June 2017). https://broadbandmap.fcc.gov/#/area-comparison?version=jun2017&tech=acfosw&speed=100_10&searchtype=cbsa&geoid=32&searched=y.

[65] Ibid.

[66] "Las Vegas Major Streets and Roadways." Las Vegas Community Guide. http://www.lasvegascommunityguide.com/pages/las-vegas-major-streets-and-roadways.html.

[67] "Southern Nevada 2021: Target Industry Validation Study." Emergent Method (2017).

[68] Alonzo, M. "McCarran International Airport, Clark County Department of Aviation." McCarran International Airport (January 2017). https://www.mccarran.com/pubfile/0932face-6691-4d4e-8cd5-7bcc709a87ef/396252/2016%20Detailed%20Cargo%20Report.pdf?t=20170126-161120.

[69] "Southern Nevada 2021: Target Industry Validation Study." Emergent Method (2017).

[70] "Route Map." Las Vegas Monorail. https://www.lvmonorail.com/route-map/.

[71] "Las Vegas-Henderson-Paradise Metro Home Prices & Values." Zillow (Sept. 2018). https://www.zillow.com/las-vegas-henderson-paradise-metro-nv_r394775/home-values/.

[72] "Affordability Index of Existing Single-Family Homes for Metropolitan Areas." National Association of Realtors (2016). https://www.nar.realtor/sites/default/files/reports/2017/embargoes/2017-q1-metro-home-prices/metro-affordability-2016-existing-single-family-2017-05-15.pdf.

[73] Davidson, M.S. "Clark County Population Approaching 2.25M." Las Vegas Review Journal (2018). https://www.reviewjournal.com/news/politics-and-government/clark-county/clark-county-population-approaching-2-25m/.

[74] "Nevada Transportation by the Numbers: Meeting the State's Need for Safe, Smooth and Efficient Mobility." TRIP (October 2016). http://www.tripnet.org/docs/NV_Transportation_by_the_Numbers_TRIP_Report_October_2016.pdf.

[75] "Commuting Characteristics by Sex: 2012-2016 American Community Survey 5-Year Estimates." United States Census Bureau. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF.

[76] "Nevada Transportation by the Numbers: Meeting the State's Need for Safe, Smooth and Efficient Mobility." TRIP (October 2016). http://www.tripnet.org/docs/NV_Transportation_by_the_Numbers_TRIP_Report_October_2016.pdf.

[77] "Las Vegas 3Q18 Housing: With Affordability Pressures Rising, Production Moves into Attached Housing." MetroStudy (Oct. 2018). https://www.metrostudy.com/las-vegas-3q18-housing-affordability-pressures-rising-production-moves-attached-housing/.

[78] Ibid.

[79] "Clark County Seeks Federal Bill as it Looks to Open More Public Lands for Development." The Nevada Independent (Mar. 2018). https://thenevadaindependent.com/article/clark-county-seeks-federal-bill-as-it-looks-to-open-more-public-lands-for-development.

[80] "BLM Seeks Comments on Designated Leasing Area Related to Solar Development Near the APEX Industrial Area." U.S. Department of the Interior Bureau of Land Management (Oct. 2018). https://www.blm.gov/press-release/blm-seeks-comments-designated-leasing-area-related-solar-development-near-apex-0;

"BLM Seeks Public Comment to Lease Land to the Clark County School District for an Elementary School." U.S. Department of the Interior Bureau of Land Management (Oct. 2018). https://www.blm.gov/press-release/blm-seeks-public-comment-lease-land-clark-county-school-district-elementary-school-0.

[81] "Water Summary." Lake Mead Water Database (Nov. 2018). http://lakemead.water-data.com/.

[82] "Hospitality and Leisure Management." QS World University Rankings (2018). https://www.topuniversities.com/university-rankings/university-subject-rankings/2018/hospitality-leisure-management.

[83] "Number of Lodging Rooms in Las Vegas in the United States from 2000 to 2017." Statista (2018). https://www.statista.com/statistics/221045/room-inventory-in-las-vegas/.

[84] "How Many Casinos are there in Las Vegas?" Casinopedia (Jan. 2017). https://www.casinopedia.org/faq/many-casinos-las-vegas.

[85] "Nevada." County Health Rankings & Roadmaps (2018). http://www.countyhealthrankings.org/app/nevada/2018/overview.

"Primary Care Physicians in 2017: Annual Report." America's Health Rankings, United Health Foundation (2017). https://www.americashealthrankings.org/explore/annual/measure/PCP/state/ALL

[86] Ibid.

[87] "Clark County School District: Fast Facts 2018-19." Clark County School District (2018). https://newsroom.ccsd.net/wp-content/uploads/2018/10/Fast-Facts-2018-19-Eng.pdf.

[88] Ibid.

[89] "2017-2018 Clark at a Glance." Nevada Department of Education (2018). http://nevadareportcard.com/DI/nv/clark/2018.

[90] "UNLV Aspires to be Tier 1 University in 5 to 15 Years, President Says." Las Vegas Sun (Sept. 2013). https://lasvegassun.com/news/2013/sep/12/unlv-aspires-be-tier-1-university-5-15-years-presi/.

[91] "2016 American Community Survey." U.S. Census Bureau (2016). https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

[92]James, N. "Recent Violent Crime Trends in the United States." Congressional Research Service (2018). https://fas.org/sgp/crs/misc/R45236.pdf

[93] "Nevada: Offenses Known to Law Enforcement." Federal Bureau of Investigation: 2017 Crime in the United States (2017). https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/tables/table-6/table-6-state-cuts/nevada.xls.

[94] "Metro Poised to Hire 600 Officers as 'More Cops' Sales Tax Kicks In." Nevada Public Radio (2017). https://knpr.org/knpr/2017-02/metro-poised-hire-600-officers-more-cops-sales-tax-kicks.

[95] "Occupational Employment Statistics: Police and Sheriff's Patrol Officers." United States Department of Labor Bureau of Labor Statistics (2018). https://data.bls.gov/oes/#/geoOcc/Multiple%20occupations%20for%20one%20geographical%20area

[96] "Compare Broadband Availability in Different Areas." Federal Communications Commission (June 2017). https://broadbandmap.fcc.gov/#/areacomparison?version=jun2017&tech=acfosw&speed=100_10&searchtype=cbsa&geoid=32&searched=y.

[97] Ibid.

[98] "Reno Housing 1Q18: Affordability Limits are Tested as New Home Starts Surge." MetroStudy (May 2018). https://www.metrostudy.com/reno-housing-1q18-affordability-limits-tested-new-home-starts-surge/.

[99] "Affordability Index of Existing Single-Family Homes for Metropolitan Areas." National Association of Realtors (2016). https://www.nar.realtor/sites/default/files/reports/2017/embargoes/2017-q1-metro-home-prices/metro-affordability-2016-existing-single-family-2017-05-15.pdf.

[100] "Roads." Washoe County, NV. https://www.washoecounty.us/csd/operations/roads/index.php.

[101] "Nevada Transportation by the Numbers: Meeting the State's Need for Safe, Smooth and Efficient Mobility." TRIP (October 2016). http://www.tripnet.org/docs/NV_Transportation_by_the_Numbers_TRIP_Report_October_2016.pdf.

[102] "Commuting Characteristics by Sex: 2012-2016 American Community Survey 5-Year Estimates." United States Census Bureau. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF.

[103] "Nevada Transportation by the Numbers: Meeting the State's Need for Safe, Smooth and Efficient Mobility." TRIP (October 2016). http://www.tripnet.org/docs/NV_Transportation_by_the_Numbers_TRIP_Report_October_2016.pdf.

[104] "Nevada Transportation by the Numbers: Meeting the State's Need for Safe, Smooth and Efficient Mobility." TRIP (October 2016). http://www.tripnet.org/docs/NV_Transportation_by_the_Numbers_TRIP_Report_October_2016.pdf.

[105] "Non-Stop Destinations." Reno-Tahoe International Airport. https://renoairport.com/flight-info/non-stopsone-stops;

"Passenger and Cargo Statistics Report: Reno-Tahoe International Airport." Reno-Tahoe International Airport (Sept. 2018). https://renoairport.com/sites/default/files/statistics10/25/2018%20-%2015%3A50/Passenger%20and%20Cargo%20Statistics%20-%20Sep%202018.pdf.

[106] "Median Sales Chart." Washoe County, NV (Sept. 2018). https://www.washoeounty.us/assessor/real_property/SalesHistoryChart.php.

[107] "Building Permits by State and Metro Area." National Association of Home Builders (2018). https://www.nahb.org/en/research/housing-economics/construction-statistics/state-and-local/building-permits-states-and-msas.aspx;

"Reno Housing 1Q18: Affordability Limits are Tested as New Home Starts Surge." MetroStudy (May 2018). https://www.metrostudy.com/reno-housing-1q18-affordability-limits-tested-new-home-starts-surge/.

[108] "Reno Resilience: 2017 Sustainability Report." City of Reno (2017). https://www.reno.gov/home/showdocument?id=73671.

[109] Ibid.

[110] Ibid.

[111] "Nevada." County Health Rankings & Roadmaps (2018). http://www.countyhealthrankings.org/app/nevada/2018/overview.

[112] "Primary Care Physicians in 2017: Annual Report." America's Health Rankings, United Health Foundation (2017). https://www.americashealthrankings.org/explore/annual/measure/PCP/state/ALL

[113] Ibid.

[114] "2017-2018 WCSD At a Glance." Nevada Department of Education (2018). http://nevadareportcard.com/DI/nv/wcsd/2018.

[115] "New Schools." WCSD Infrastructure Plan. www.wcsdbuilding.com/new-school-construction.

[116] "University Ranked 'Top Tier' Public University for Seventh Consecutive Year by U.S. News & World Report." University of Nevada, Reno (Sept. 2016). https://www.unr.edu/nevada-today/news/2016/top-tier-for-seventh-year.

[117] "Nevada: Offenses Known to Law Enforcement." Federal Bureau of Investigation: 2017 Crime in the United States (2017). https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/tables/table-6/table-6-state-cuts/nevada.xls.

[118] "Occupational Employment Statistics: Police and Sheriff's Patrol Officers." United States Department of Labor Bureau of Labor Statistics (2018). https://data.bls.gov/oes/#/geoOcc/Multiple%20occupations%20for%20one%20geographical%20area

[119] "2017-2018 WCSD At a Glance." Nevada Department of Education (2018). http://nevadareportcard.com/DI/nv/wcsd/2018.

[120] "2016 American Community Survey." U.S. Census Bureau (2016). https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

[121] "Northern Nevada Regional Growth Study: 2015-2019." RCG Economics (2015).

[122] Garg, S. "Is millimeter wave technology future of wireless communications?" Microwave Journal (July 2017). http://www.microwavejournal.com/blogs/25-5g/post/28775-is-millimeter-wave-technology-future-of-wireless-communications

[123] "Minerals in Nevada." Nevada Mining Association (2018). https://www.nevadamining.org/minerals-in-nevada/.

[124] Lenz, J. "Nevada's Lithium Industry." Governor's Office of Economic Development (August 2018).

[125] "Nevada." County Health Rankings & Roadmaps (2018). http://www.countyhealthrankings.org/app/nevada/2018/overview.

[126] Ibid.

[127] "Nevada: Offenses Known to Law Enforcement." Federal Bureau of Investigation: 2017 Crime in the United States (2017). https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/tables/table-8/table-8-state-cuts/nevada.xls.

[128] "Occupational Employment Statistics: Police and Sheriff's Patrol Officers." United States Department of Labor Bureau of Labor Statistics (2018). https://data.bls.gov/oes/#/geoOcc/Multiple%20occupations%20for%20one%20geographical%20area

SRI International®

SRI is one of the world's most diverse, independent, non-profit research and development (R&D) organizations, working on some of the most important global problems. Its research and innovations have led to new industries and products that affect people's lives every day—from the computer mouse and interactive computing to medical ultrasound, cancer drugs, and much more. SRI's Center for Innovation Strategy and Policy helps organizations, regions, and countries achieve long-term economic and social outcomes through effective investments in science, technology, and innovation. Based in Washington D.C., the Center is staffed with experienced professionals who conduct research, analysis, and strategic planning for private and public sector clients around the world.

SILICON VALLEY
333 Ravenswood Avenue
Menlo Park, CA 94025
+1.650.859.2000

WASHINGTON, D.C.
1100 Wilson Boulevard, Suite 2800
Arlington, VA 22209
+1.703.524.2053