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Nevada Economic Diversification

Planning for Nevada's Economic Future in the Wake of the COVID-19 Epidemic

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I. Executive Summary

ECONOMIC DIVERSIFICATION IN NEVADA

For many years, Nevada's economy has been defined by the hospitality and tourism industry clusters in Las Vegas. According to the U.S. Census Bureau and Bureau of Labor Statistics, nearly 3 in 4 Nevadans lived in the Las Vegas metropolitan area in 2019, and nearly 2 in 5 Nevada workers worked in hospitality and tourism.[1] The state's reliance on hospitality and tourism, and to a lesser extent on construction and mining (clusters largely driven by consumer spending) has left it prone to wide swings in economic growth and decline.

Near the end of the Great Recession, Nevada began exploring ways to diversify its economy to make it less vulnerable to economic downturns. The state commissioned the Brookings Institution to analyze its competitive position and to recommend economic diversification strategies.[2] The report helped inform Nevada's overall economic development strategy, culminating in an official document from former Governor Brian Sandoval's office outlining a plan of action in 2012 that is now the foundation of the state's economic development strategy.[3]

Since then, Nevada has had success in diversifying its economy, though hospitality and tourism remain key economic drivers. Now in the middle of the COVID-19 epidemic, Nevada again faces dire economic consequences. The epidemic has presented immediate questions about revenue and short-term relief. It has also forced policymakers to return to questions about the state's economic future and facilitating a more diverse economy capable of withstanding economic downturns.

PURPOSE OF REPORT

The Clark County Education Association (CCEA) retained Anderson Economic Group to analyze the state of Nevada's economy, identify industry clusters that promote stable and sustainable economic growth, and provide recommendations on how to support those clusters.

CCEA strongly believes that, now more than ever, policymakers must review and refine the state's economic development strategy to ensure continued economic diversification, attract new businesses, and provide quality jobs for Nevadans. This report provides a foundation for those discussions and policies. Education will play a significant role in creating the workforce for tomorrow's

1. Estimates based on data from the U.S. Census Bureau and the U.S. Bureau of Labor Statistics respectively.
2. Metropolitan Policy Program (2011). *Unify, Regionalize, Diversify—Economic Development Agenda for Nevada.* The Brookings Institution.
3. Brookings Institution and SRI International (2012). *Moving Nevada Forward: A Plan for Excellence in Economic Development 2012-2014*, prepared for Nevada Governor's Office of Economic Development.

economy, and in building a robust a workforce pipeline that will be essential to the Nevada's success.

OVERVIEW OF APPROACH

This report contains three distinct analyses, including an analysis of COVID-19's impact on Nevada's economy, an analysis of emerging industry clusters in Nevada, and an analysis of economic development strategies and best practices. We describe our approach below.

COVID-19's impact on Nevada's economy. We reviewed recent economic data to determine the impact of COVID-19 on Nevada's economy. We collected data on job growth and unemployment for the state, as well as data on visitor volume, hotel occupancy, and employment in industries including manufacturing, mining, and transportation and warehousing. We also compared statewide unemployment and output data to peer states.

For more details see "COVID-19 and the Nevada Economy" on page 6.

Emerging Industries and New Key Clusters. We reviewed industry cluster growth patterns to identify clusters that have strong growth potential. Growing these clusters can improve the state's economic diversity, making the state less reliant on existing clusters. We first identified the state's largest and fastest growing industry clusters. We then measured each cluster's location quotient and determined how each cluster's location quotient has changed over time. We used the results from this analysis to identify a set of key emerging clusters with promising growth potential.

For more details, see "Nevada Industry Cluster Strengths" on page 11.

Economic Development Strategies and Best Practices. After identifying promising industry clusters, we reviewed best practices for encouraging cluster growth. We took the following steps:

- Conducted a literature review of economic development best practices in other states.
- Reviewed examples of economic development "success stories" across Nevada.
- Interviewed economic development officials, researchers, and policymakers across the state.

For more information see "Advancing Nevada's Target Industry Clusters" on page 30.

For a more detailed discussion of our analysis methodology see "Appendix A. Methodology" on page A-1.

OVERVIEW OF FINDINGS

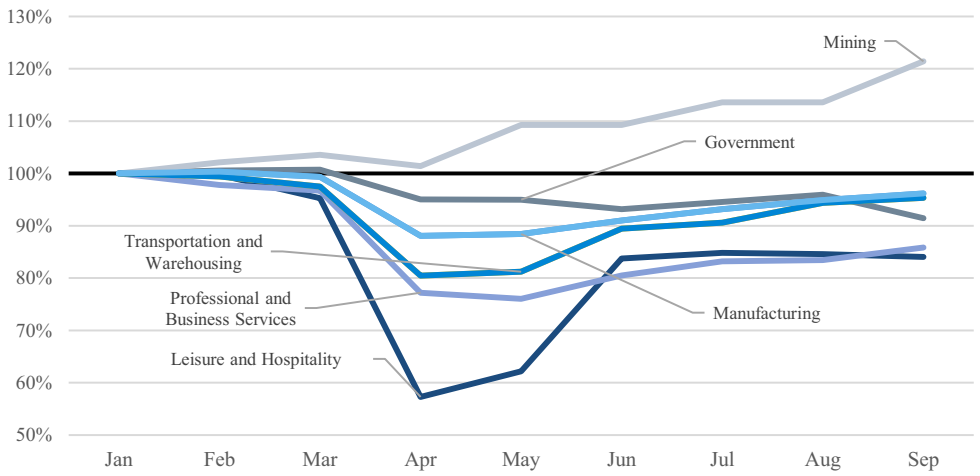
Using the information available to us and the methodology described above, we concluded the following:

1. *COVID-19 has had an unprecedented impact on the national economy. This impact has been especially severe in Nevada, which saw unemployment rates climb to more than 30%.*

An initial wave of COVID-19 infections in February and March caused policymakers in a number of states to take drastic action and close their economies to slow the spread of the virus. In Nevada, Governor Steve Sisolak ordered nonessential businesses to close beginning on April 1st and allowed most businesses to reopen in May.[4] These decisions slowed the spread of the virus but had significant ramifications for Nevada workers as a strong economy quickly saw its sharpest downturn in history with unemployment hitting 30.1% in April.

To date, the leisure and hospitality industry continues to be hardest hit both nationally and in every state. In Nevada, the industry lost more than 40% of its jobs between January in April, as shown in Figure 1. Since then, hospitality employment has only recovered to 85% of its pre-pandemic level. Other industries experienced sharp (albeit less severe) employment declines, and have recovered more jobs than the hospitality industry has.

FIGURE 1. Change in Employment in Select Industries in Nevada, January-September 2020



Source: AEG analysis using base data from the U.S. Bureau of Labor Statistics

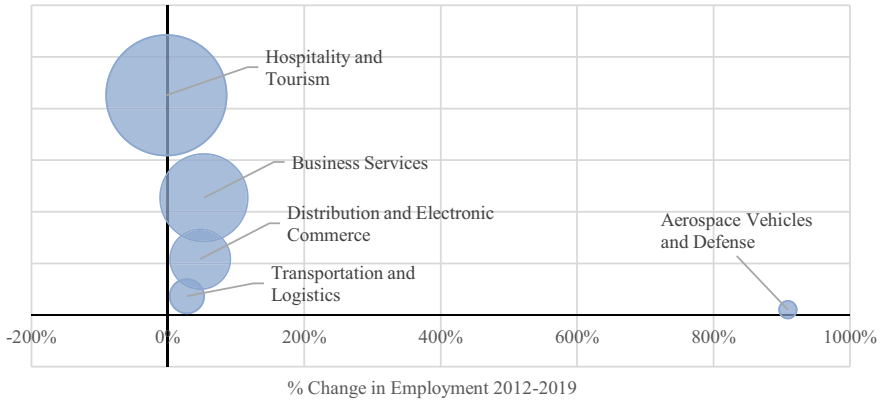
4. Nevada, Office of the Governor [Steve Sisolak]. Declaration of Emergency for COVID-19—Directive 003. March 20, 2020. Declaration of Emergency Directive 018. May 7, 2020.

See “COVID-19 and the Nevada Economy” on page 6 for more detailed discussion of the economic impacts of COVID-19.

2. Nevada is home to four growing industry clusters that could help the state diversify its economy. These include aerospace vehicles and defense, business services, distribution and electronic commerce, and transportation and logistics.

Employment trends over the last seven years suggest that there are several emerging industry clusters in Nevada that could help diversify the economy. Four clusters—aerospace vehicles and defense, business services, distribution and electronic commerce, and transportation and logistics—have become increasingly concentrated in the state in recent years and have relatively high levels of employment, as shown in Figure 2. If this trend continues, these clusters will play an increasingly important role in the state’s economy.

FIGURE 2. Change in Employment in Nevada’s Target Clusters, 2012-2019



Note: The size of the circle corresponds to the 2019 employment level. Larger circles represent larger levels of employment.
Source: AEG analysis using data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

See “Nevada Industry Cluster Strengths” on page 11 for more information on Nevada’s industry clusters.

3. Policymakers can help grow these new target clusters through a number of initiatives. These include addressing workforce gaps, ensuring that the infrastructure needs of each cluster are met, and reviewing the effectiveness of incentive programs.

Policymakers should explore new strategies to address the needs of target industry clusters by:

- Supporting the development of Career and Technical Education (CTE) for the transportation and logistics and distribution and electronic commerce sectors,

along with postsecondary programs for business services and aerospace vehicles and defense.

- Ensuring that each cluster has access to a modern and efficient transportation network.
- Addressing affordable housing needs in areas where jobs are growing quickly.
- Reviewing incentives to determine whether current programs, developed nearly a decade ago, are still necessary to encourage economic growth.

For a more detailed discussion of our recommendations please see "Advancing Nevada's Target Industry Clusters" on page 30.

ABOUT ANDERSON ECONOMIC GROUP

Founded in 1996, Anderson Economic Group is a boutique research and consulting firm with offices in East Lansing, Michigan, and Chicago, Illinois. We specialize in strategy, public policy, and market analyses. We insist on a high level of integrity in our analyses, combined with technical expertise in the field. The team of experts at AEG have conducted nationally recognized economic impact and benchmarking studies for private, public, and non-profit clients across the United States, covering topics such as industry cluster development, state economic development strategy, entrepreneurship, and industry benchmarking.

Work by Anderson Economic Group has been utilized in legislative hearings, legal proceedings, and public debates, as well as major planning exercises and executive strategy discussions.

For more information, please see "Appendix D. About Anderson Economic Group" on page D-1 or visit www.AndersonEconomicGroup.com.

II. COVID-19 and the Nevada Economy

The COVID-19 pandemic has created a public health and economic crisis on a scale not seen in the last 100 years. Shelter-in-place and social distancing measures intended to prevent the spread of the virus have precipitated record declines in economic activity and employment across the country, especially in Nevada. In this chapter we discuss the impact of COVID-19 on the Nevada economy.

Prior to the onset of the pandemic, the Nevada economy was experiencing strong growth, with one of the fastest job growth rates of any state. Forecasts projected 2% job growth (29,200 new jobs) in 2020. Hiring in the construction industry was gaining momentum, with almost $23 billion in construction projects underway in Las Vegas alone. Near Reno, Tesla and Panasonic were busy expanding the Gigafactory, a multi-billion-dollar plant that makes batteries and parts for Tesla's Model 3 electric car.[5]

By March, however, everything had changed. The arrival and spread of the coronavirus prompted many states to issue emergency orders closing nonessential businesses and implementing social distancing measures. In March, Governor Steve Sisolak issued emergency directives to:

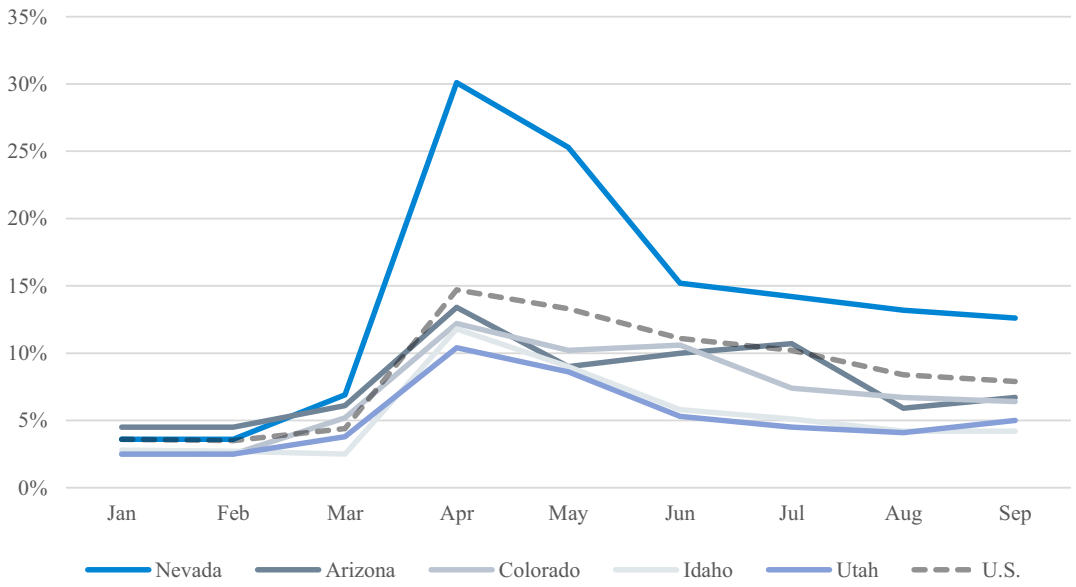
- Temporarily close public, private, and charter schools;
- Temporarily close all State of Nevada offices;
- Temporarily close all gaming machines and establishments;
- Temporarily close all nonessential businesses;
- Prohibit indoor and outdoor gatherings of 10 or more people; and
- Direct citizens to stay at home except for essential activities.[6]

While these measures were effective in slowing the spread of the virus, the economic consequences were great. Unemployment in Nevada skyrocketed to 30.1% in April, double the U.S. unemployment rate, as shown in Figure 3 on page 7. The state also lost 280,000 jobs in two months, which is 80,000 more than the net decrease in employment Nevada experienced during the two and a half years of the Great Recession.[7]

5. David Payne. "Kiplinger's Economic Outlook for All 50 States, 2020." *The Kiplinger Letter,* October 16, 2020. www.kiplinger.com.
6. Emergency orders are found on the Nevada governor's website, gov.nv.gov. Full citation for each order can be found in Appendix B in "COVID-19 Executive Orders" on page B-5.
7. Data from the U.S. Bureau of Labor Statistics.

In April, an average of 55,000 initial unemployment claims were filed in Nevada each week—nearly 4% of the state's labor force. That number is 20 times higher than January's average weekly claims.[8]

FIGURE 3. Nevada, Peer State, and U.S. Unemployment Rates, Jan-Sep 2020



Source: AEG analysis using base data from the U.S. Bureau of Labor Statistics

The economic downturn caused by the virus and subsequent emergency orders has left policymakers with mounting concerns about state and local government budgets. The State of Nevada is largely dependent on three sources of revenue: sales and use tax, property tax, and casino gaming and other tourism-related taxes. Sales and use taxes, which are a function of consumer spending, are on the decline. Casino gaming and tourism-related taxes, which are predominately a function of visitor volume and visitor spending, have also declined significantly.[9]

Nevada received support from federal programs that likely forestalled a crisis of even greater magnitude. Since March, Nevada and its residents have received more than $20 billion in aid from the federal government, including $17 billion under the CARES Act. Economists estimate that these programs helped nearly 46,000 business retain 430,000 jobs.[10] However, the effects of the federal assis-

8. Estimates based on unemployment claims data from the U.S. Department of Labor and labor force data from the U.S. Bureau of Labor Statistics.

9. *Nevada COVID-19 Fiscal Report*, Nevada Governor's Office, July 6, 2020.

tance have slowed in recent months as funds have dried up and programs have come to an end.

COVID-19 and Nevada's Regional Economies

The economic impact of COVID-19 has varied across different parts of the state because each region has a unique mix of industries. The most devastating employment losses have occurred in tourism-reliant southern Nevada, where Clark County accounted for 80% of all jobs lost between January and March. Some of these jobs have been regained, but the southern Nevada economy remains far from recovery. The northern portion of the state also experienced severe job losses, albeit to a lesser extent.

In the early stages of the pandemic, Nevada's gaming and hospitality sectors were affected by a sharp decline in tourism. In March 2020, total passenger traffic at the McCarran International Airport was 53% lower than it had been one year earlier as travelers cancelled plans amidst fears of catching the virus.[11] The initial slowdown in leisure travel was soon followed by the rescheduling or cancellation of major conventions and events that further reduced demand for hospitality, entertainment, and dining services. Major conventions like Oracle's Collaborate 20 and the inaugural NXT Global Summit were canceled. Nightclubs canceled live entertainment, and many performing arts shows like Cirque du Soleil canceled all events indefinitely.[12] Between June and August 2020, visitors to Las Vegas were down 63% and occupancy rates at Las Vegas hotels were only 42% of the 2019 average.[13]

The decline in economic activity in southern Nevada triggered a severe statewide economic downturn. For many years, the hospitality industry has been one of the largest contributors to Nevada's Gross State Product (GSP) and has employed the largest share of the state's workforce. In 2019, the hospitality industry (which includes arts, entertainment, recreation, accommodation, and food services) accounted for 17% of Nevada's GSP, compared to only 4% of GSP in Colorado, Arizona, Utah, and Idaho.[14] The hospitality industry also employs the highest share of the state's workforce. In 2019, this industry represented 21% of the state's nonfarm employment—double the average share of nonfarm employment in other states.[15]

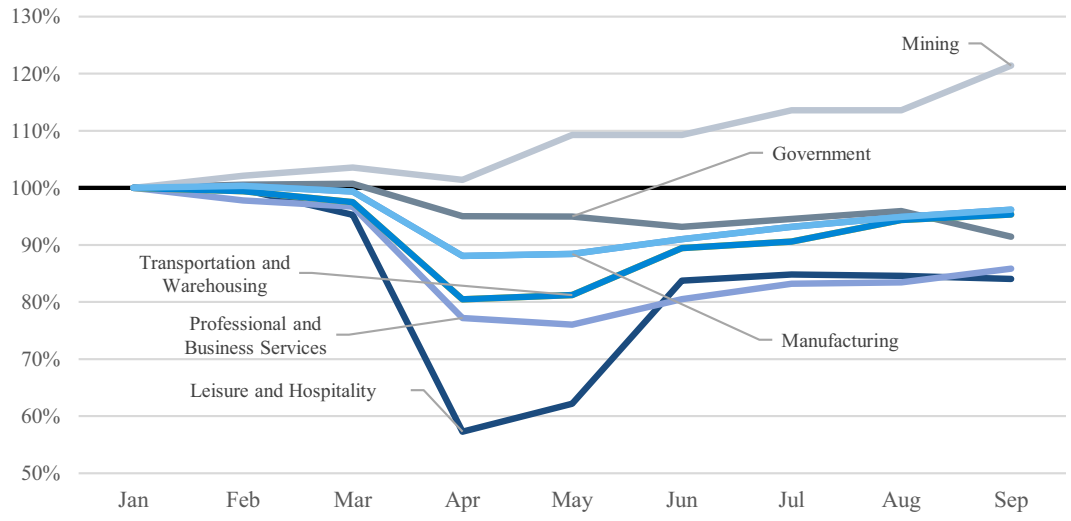
10. Bill Dentzer. "Economic experts fret about Nevada's fiscal future," *Las Vegas Review-Journal.* October 15, 2020. www.reviewjournal.com.
11. Calculated using 2019 and 2020 enplaned and deplaned passenger data from the Clark County Department of Aviation.
12. Rhona Prast. "Update: Many 2020 Las Vegas conventions move to 2021, go virtual," *Las Vegas Review Journal.* September 9, 2020. www.reviewjournal.com.
13. Data from the Las Vegas Convention and Visitors Authority.
14. Calculated using data from the U.S. Regional Economic Analysis Project.
15. ibid.

No other industry in the state was as severely impacted as leisure and hospitality. In April, employment in the industry declined by more than 40% as shown in Figure 4. Since April, many industries have recovered a significant portion of employment losses, but leisure and hospitality employment has remained well below its pre-recession peak.

Other industries, like manufacturing and mining, faced some downward pressure on demand and production, but many businesses in these industries were deemed essential and remained open. This resulted in smaller changes in employment between January and September. By September, the manufacturing industry had recovered to 96% of its pre-recession employment level, and employment in the mining industry was above its pre-recession level.

Between January and September, employment in the transportation and warehousing industry decreased slightly as social distancing guidelines impacted the number of workers allowed in warehouses and fulfillment centers at one time. If the pandemic continues, some warehouses may adopt new automation technologies that could permanently impact jobs.[16]

FIGURE 4. Statewide Employment Recovery in Select Industries, Jan-Sep 2020

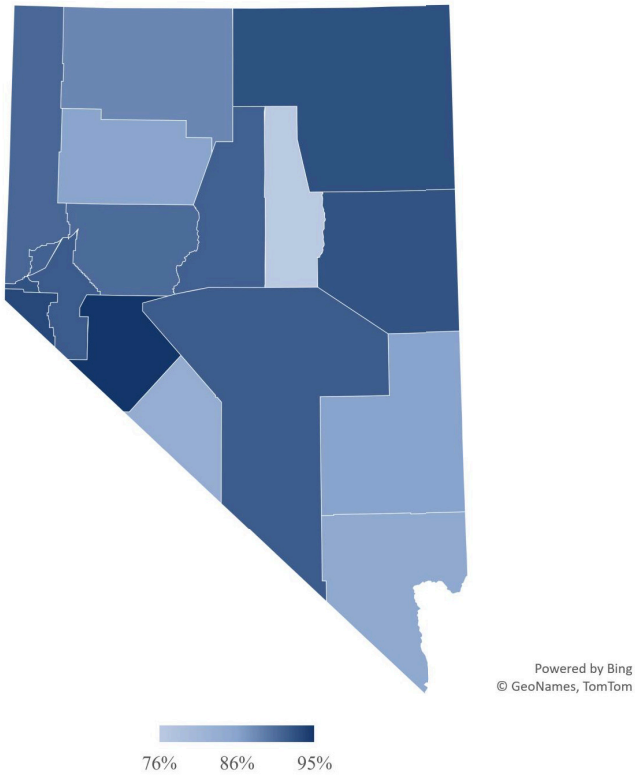


Source: AEG analysis using base data from the U.S. Bureau of Labor Statistics

16. Josh Knapp. "COVID_19's Impact on Warehouse Automation and What it Means for Supply Chain Management," Supply & Demand Chain Executive. October 13, 2020. www.sdcexec.com.

As of August, no county in Nevada had returned to its January employment level, though a handful came close. Map 1 shows that counties in the northern and western parts of the state recovered to more than 90% of pre-recession employment, on average. Clark and Lincoln Counties, however, only recovered to about 85% of their pre-pandemic employment level.

MAP 1. Recovery of Pre-Pandemic Employment by County, August 2020



Source: AEG analysis using base data from the Nevada Department of Employment, Training & Rehabilitation

Some of the variation in employment recovery can also be attributed to how quickly each industry was allowed to reopen. For example, manufacturing and mining firms could operate with social distancing and workplace hygiene protocols while other businesses were ordered closed in March. Casinos and other large hospitality employers had few or no options for providing alternative or remote services, leading to a number of layoffs.[17] It is clear that not every industry suffered equally from the economic downturn, and that southern Nevada was disproportionately impacted because of its high employment concentration in leisure and hospitality.

17. John P. Tuman, "The impact of the COVID-19 pandemic on labor market conditions in Nevada: A preliminary assessment," *Journal of Labor and Society.* August 16, 2020.

III. Nevada Industry Cluster Strengths

This chapter describes the current composition of Nevada's economy, identifies how this composition has changed over time, and discusses the industry clusters that present the most promising opportunities for economic development. We use two important framing mechanisms to describe and analyze the state's economy—industry clusters and location quotient analysis. We describe each below.

Describing the Nevada economy in terms of industry cluster composition. In this chapter, we describe Nevada's economy in terms of its industry "clusters," rather than individual industries. An industry cluster is a concentration of related industries that are located near one another. Industries that cluster together do so to realize many benefits, including increased exposure to new ideas, access to shared infrastructure, lower cost of communication with complementary businesses, and access to a larger labor pool with industry cluster skills. Viewing state economies through the lens of clusters is an approach based on the latest economic research into how businesses interact with one another. Our cluster analysis in this chapter is based largely on the work of Mercedes Delgado, Michael Porter, and Scott Stern at the Harvard Business School Institute for Strategy and Competitiveness.[18,19]

Industry clusters are generally grouped into two broad categories—traded and local. Traded clusters, the engines of regional and state economic growth, are the focus of this analysis. Traded clusters serve markets beyond their local region, allowing them to grow by meeting an increasing share of national or global demand. These clusters tend to only appear in regions that afford specific competitive advantages. Examples of well-known traded clusters include information technology in Silicon Valley, autos and automotive parts in Detroit, and entertainment and gaming in Las Vegas. All of these clusters attract or serve customers from outside of their respective geographies. Mobile applications developed in Silicon Valley are used by customers across the world, vehicles manufactured in Detroit are sold on nearly every continent, and Las Vegas attracts visitors from outside of Nevada.

In contrast, local clusters consist of industries that serve the local population. These clusters are prevalent in every state and region in the country because they exist to meet the needs of the local consumers. Examples of local cluster businesses include drug stores, hospitals, or local commercial services such as dry cleaners or lawn care. These local clusters are generally not considered

18. See Mercedes Delgado, Michael Porter, and Scott Stern, "Defining clusters of related industries," *Journal of Economic Geography* 16 no. 1 (January 2016): 1-38.

19. The 2012 Brookings and SRI International economic development plan prepared for GOED also employs a cluster-based approach. Our cluster analysis utilizes new research published since 2012 that has improved researchers' understanding of how industry clusters work.

engines of economic growth since their size is typically constrained by the size of the local population.

For full definitions of each cluster we discuss in this report, see Table C-2, "Industry Cluster Definitions," on page C-4.

Identifying existing industry clusters of strength and growing clusters. We use a process known as location quotient analysis to identify industry clusters that play an outsized role in the Nevada economy and industry clusters that have shown robust growth in the past seven years. Location quotient analysis consists of measuring the concentration of state employment in each cluster relative to the concentration of employment in that cluster nationwide.

For example, Nevada's hospitality and tourism industry cluster accounts for 41% of the state's total traded cluster employment, while hospitality and tourism accounts for 7% of traded cluster jobs nationwide. The hospitality and tourism cluster is roughly 5.6 times more concentrated in Nevada than it is nationwide, indicating that the cluster is an area of strength for Nevada. Traded clusters that have a location quotient above 1.0 are generally considered areas of economic strength for a state (also known as "specialized"), while clusters with location quotients below 1.0 play a smaller role in the state economy.

In addition to reviewing 2019 cluster location quotients, we examined how each cluster's location quotient has changed over time. Clusters that have growing location quotients are those that have added jobs faster than the national average, while clusters that have decreasing location quotients have added jobs at a rate slower than the national average, or have lost jobs a rate faster than the national average.

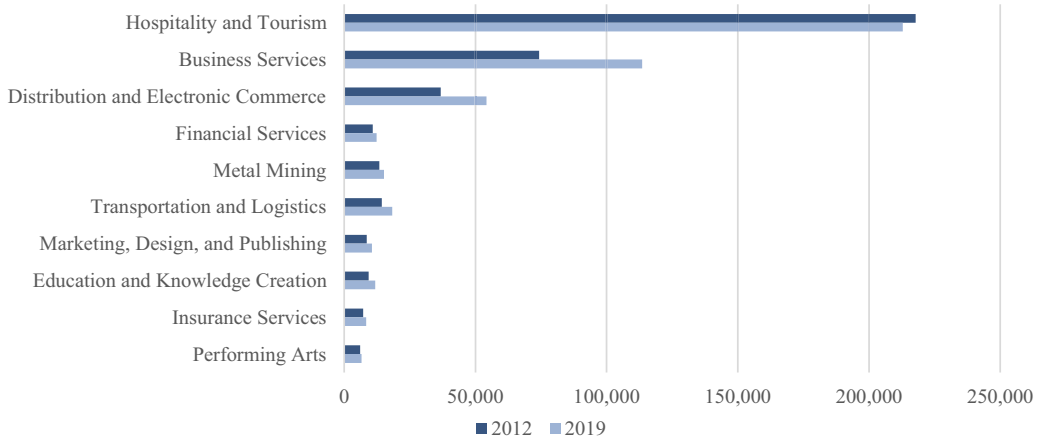
In this chapter we focus on a selection of the most economically relevant traded industry clusters in Nevada. For a full list of Nevada's industry clusters and employment change information, see "Employment Levels and Location Quotients for All Industry Clusters, 2012-2019" on page C-5.

TRADED CLUSTER EMPLOYMENT IN NEVADA

Nevada's current economy is dominated by three traded clusters—hospitality and tourism, business services, and distribution and electronic commerce. In 2019, employment in the hospitality and tourism cluster represented 41% of the state's traded cluster employment. The hospitality and tourism cluster includes firms focused on the management and operations of restaurants, hotels, attractions, and recreation events. Since 2015, the cluster has lost over 12,000 jobs, declining in total employment from 225,000 to just under 213,000. These employment declines have largely been driven by the legalization of gaming in other states and online. As gaming and sports betting become more prevalent outside Las Vegas, fewer visitors need to travel to Nevada for gaming.

Although the state has lost employment in hospitality and tourism, it has added jobs over the past seven years in its second and third largest traded clusters. Business services, the state's second largest cluster, encompasses many different categories of business operations, like corporate headquarters and computer, engineering, and consulting services, among others. Employment in business services has increased by 53% since 2012. At the same time, employment in distribution and electronic commerce (which includes warehousing and storage industries as well as numerous wholesale industries) has grown by 47%. Employment in the metal mining cluster, another cornerstone of the state's economy, has also increased slightly since 2012. We show employment trends in the state's largest traded industry clusters between 2012 and 2019 in Figure 5 below.

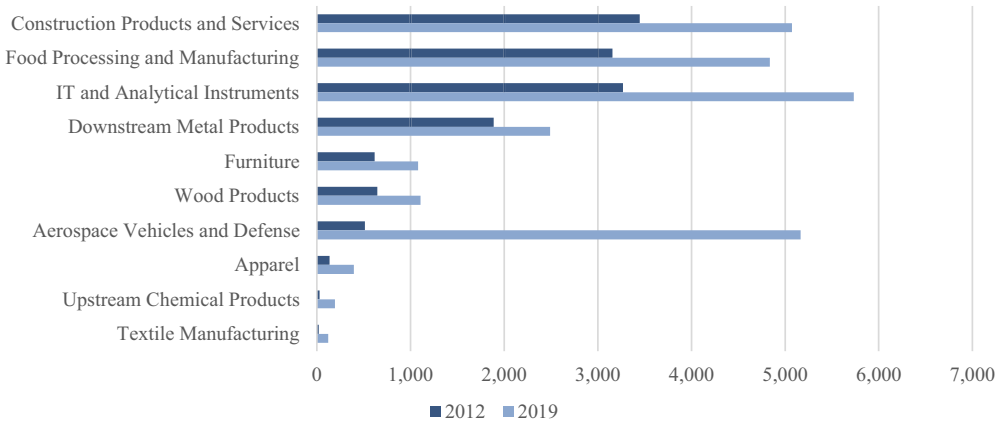
FIGURE 5. Change in Employment for Nevada's Ten Largest Clusters, 2012-2019



Source: AEG analysis using base data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

In addition to these larger clusters, Nevada is home to a handful of small clusters that have grown rapidly since 2012, shown in Figure 6 on page 14. In 2012, these clusters represented 2% of total traded cluster employment statewide. Since then, employment in these clusters has more than doubled. Most of the growth in employment among these smaller clusters was driven by the aerospace vehicles and defense cluster, which added more than 4,600 jobs over the last seven years.

FIGURE 6. Change in Employment for Fast Growing Clusters 2012-2019



Source: AEG analysis using base data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

LOCATION QUOTIENT ANALYSIS

The figures above show how employment in notable traded clusters has changed over the last seven years. Some of these clusters saw a high percentage of employment growth because they had so few jobs in 2012. Others grew quickly because they mirrored national trends. Controlling for national economic performance provides additional insight into which industry clusters have outperformed their expected growth in the last seven years. Clusters that outperform national trends may have a competitive advantage in Nevada and may warrant further investment and focus from policymakers.

In Nevada, five clusters had a location quotient greater than 1.0 in 2019, indicating employment concentrations greater than the national average. These "specialized" clusters include hospitality and tourism, metal mining, performing arts, recreational and small electric goods, and environmental services, as shown in Table 1 below.

TABLE 1. Nevada's Specialized Clusters

Cluster	2019 LQ	2019 Employment	Share of Total Employment 2019
Hospitality and Tourism	5.61	212,800	41.2%
Metal Mining	31.43	15,200	2.9%
Performing Arts	1.45	6,600	1.3%
Recreational and Small Electronic Goods	2.00	3,600	0.7%
Environmental Services	1.11	1,200	0.2%

Source: AEG analysis using base data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

The hospitality and tourism cluster represented 41% of employment in all traded clusters in 2019 and its share of total state employment was more than five times larger than the cluster's corresponding share of total national employment. The metal mining cluster employed more than 15,000 people in 2019 and its share of total state employment was more than 31 times larger than the cluster's corresponding share of total national employment.

Two of the three other specialized clusters—performing arts and recreational and small electronic goods—share a strong relationship with hospitality and tourism. Performing arts establishments primarily cater to visitors who come to Las Vegas, and the state's recreational and small electronic goods cluster (which consists primarily of gaming device manufacturers) has grown as companies like International Game Technology and Scientific Games expand in Las Vegas. Nevada's environmental services cluster has a slightly higher than average level of specialization, but accounts for a relatively small portion of the state's economy with only 1,200 jobs. Overall, there is only one specialized cluster in Nevada that is not directly related to the hospitality and tourism or mining clusters.

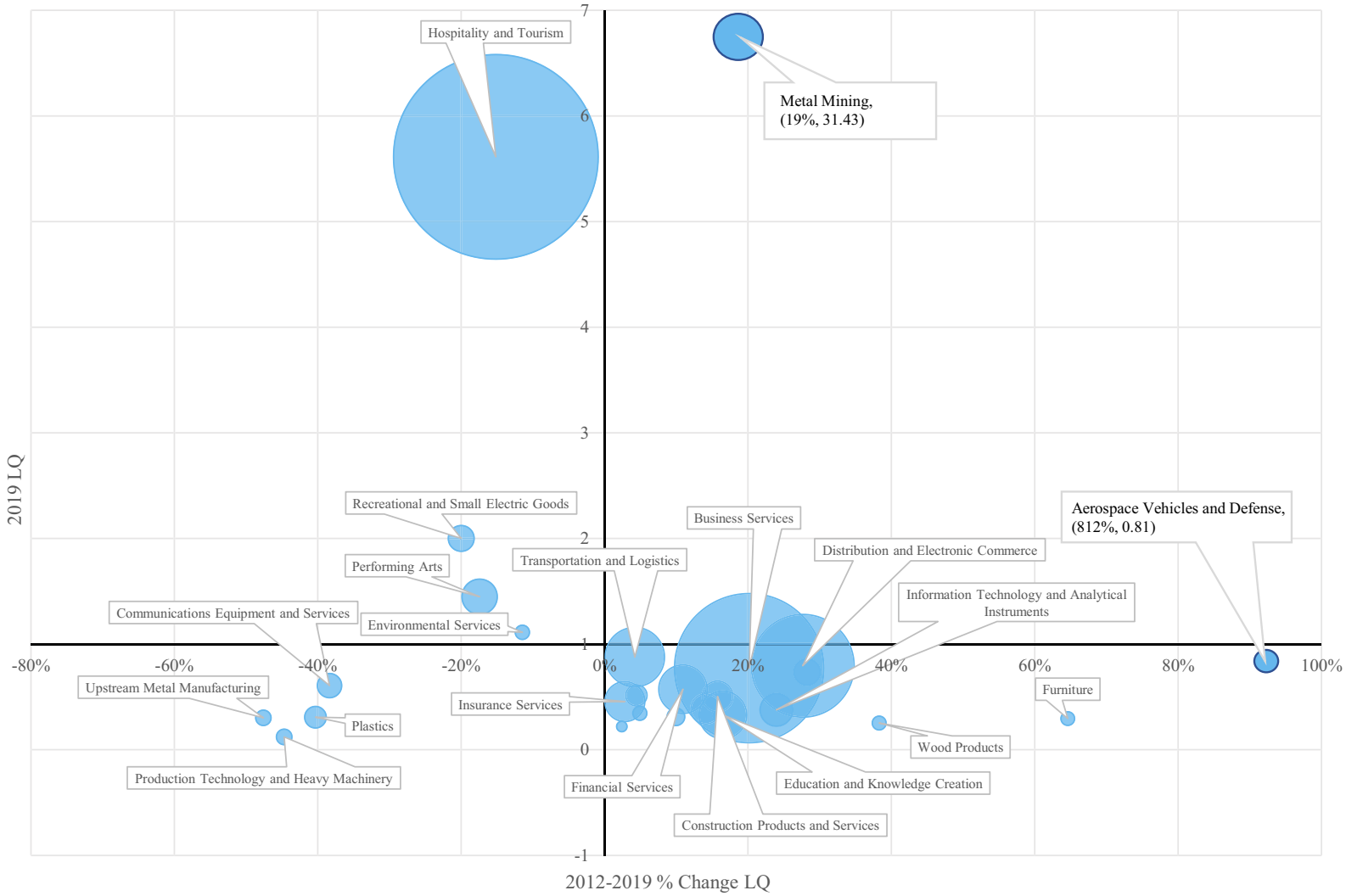
Quadrant Analysis

Quadrant analysis places the state's industry clusters into one of four categories based on employment concentration and change in employment concentration over time. Those four categories are:

- **Standout Clusters.** These clusters have a location quotient above 1.0 that has *increased* over time. These clusters play an important role in the state economy, especially if they support a large number of jobs.
- **At-Risk Clusters.** These clusters have a location quotient above 1.0 that has *decreased* over time. A cluster in this category may be growing more slowly than the national average or may be shedding employment at a faster rate than the national average.
- **Pre-Emergent Clusters.** These clusters have a location quotient less than 1.0, but that location quotient has increased over time. These clusters are not yet as concentrated in Nevada as they are at the national level, but they show robust growth.
- **Other Clusters.** These clusters have a location quotient less than 1.0 that has decreased over time. These clusters play a small role in the Nevada economy and their importance has diminished in recent years.

Figure 7 on page 16 shows Nevada's traded clusters plotted along a horizontal and vertical axis. The horizontal axis shows the percent change in location quotient for each cluster between 2012 and 2019, and the vertical axis is the 2019 location quotient. The size of each circle corresponds to the total employment in the cluster.

FIGURE 7. Quadrant Analysis of Nevada's Traded Clusters, 2012-2019



Source: AEG analysis using base data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics
Note: The scale of the figure excludes two outlier clusters-Metal Mining and Aerospace Vehicles and Defense. We include each cluster's actual x- and y-coordinate in their data label.

We discuss the performance of notable clusters below using the quadrant framework.

Standout Clusters. Metal mining was the only cluster that had both a higher employment concentration in Nevada than the national average in 2019 and outperformed national growth patterns. Total employment in metal mining is still relatively small, but the high location quotient and positive growth since 2012 indicates that Nevada remains a competitive state for metal mining.

TABLE 2. "Standout" Clusters

Cluster	2012-2019 % Change LQ	2019 LQ	2019 Employment
Metal Mining	19%	31.43	15,200

Source: AEG analysis using base data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

According to the Nevada Mining Association, Nevada produces 20 metals and minerals, including gold, silver, and copper. Most of these minerals are found in consumer electronics, and employment in this cluster correlates with demand for these products. Nevada is also the only producer of lithium in the U.S, and prospectors believe that the state's lithium reserves could become a significant growth opportunity, especially as demand for electric vehicles increases. In September, electric vehicle manufacturer Tesla announced it had secured a claim on 10,000 acres of land to extract lithium from Nevada's clay deposits and use the lithium in its battery manufacturing process.[20]

At-Risk Clusters. There were four clusters that had higher employment concentrations in Nevada than nationally but became less concentrated between 2012 and 2019. These are shown in Table 3 below.

TABLE 3. "At-Risk" Clusters

Cluster	2012-2019 % Change LQ	2019 LQ	2019 Employment
Hospitality and Tourism	-15%	5.61	212,800
Recreational and Small Electric Goods	-20%	2.00	3,600
Performing Arts	-17%	1.45	6,600
Environmental Services	-11%	1.11	1,200

Source: AEG analysis using base data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

20. "Tesla bets on mining with Nevada lithium claim," Mining.com. September 23, 2020. www.mining.com.

Growth in online gaming and the expansion of brick-and-mortar and riverboat casinos in other states have adversely impacted the hospitality and tourism cluster in Nevada. Recognizing this trend, hospitality and tourism providers in Las Vegas have attempted to transform their service offerings in recent years, switching from a gaming focus to becoming an entertainment destination where visitors come to Las Vegas for experiences, rather than gaming.[21]

While employment in this cluster has declined over the last seven years, our conversations with policymakers and economic development officials suggest that today's visitors are indeed engaging in activities beyond gaming. According to the Las Vegas Convention and Visitors Authority, almost 36% of visitors in 2019 reported that their primary reason for visiting Las Vegas was for vacation and pleasure, compared to 14% who cited gaming.[22]

As previously discussed, the other at-risk clusters have strong connections to the state's hospitality and tourism clusters, with performing arts catering to visitors and the recreational and small electric goods cluster providing gaming machines to casinos.

Pre-Emergent Clusters. Employment in 20 smaller clusters in Nevada became more concentrated between 2012 and 2019, outpacing national trends. The employment concentration for about half of these clusters, however, was still relatively low in 2019 (less than 50% of the national employment concentration).

By 2019, four clusters had employment concentrations that were approaching the national average, as shown in Table 4. The strong growth of these clusters over the last seven years indicates that these clusters have the potential to become key components of a new Nevada economy.

TABLE 4. Notable "Pre-Emergent" Clusters

Cluster	2012 LQ	2019 LQ	2012-2019 % Change LQ	2019 Employment
Aerospace Vehicles and Defense	0.09	0.81	812%	5,200
Business Services	0.64	0.77	20%	113,600
Distribution and Electronic Commerce	0.62	0.80	28%	54,200
Transportation and Logistics	0.84	0.88	4%	18,300

Source: AEG analysis using base data from U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

21. Information based on discussions with economic development specialists in the state.

22. Statistics from the Las Vegas Convention and Visitors Authority Visitor Profile Study 2019.

NEVADA'S NEW KEY CLUSTERS

Based on our location quotient and quadrant analysis we identified four key clusters that have shown promising growth and could become important areas of competitive advantage for Nevada. We discuss each cluster below.

Business Services

Cluster Definition. The business services cluster includes establishments primarily designed to support ancillary aspects of other business' operations. This includes corporate headquarters, and professional services firms that offer consulting, legal services, facilities support, computer services, engineering and architectural services, job placement, and ground passenger transportation such as taxis and limousines.

TABLE 5. Summary of Nevada's Existing Business Services Cluster, 2019

Metric	Value
Number of Establishments	5,500
Total Output (in millions)	$8,378
Number of Employees (annual average)	114,000

Source: AEG analysis using base data from ESRI Business Analyst, the U.S. Cluster Mapping Project, and the U.S. Bureau of Labor Statistics.

In Nevada, employment in this cluster grew by 53% between 2012 and 2019. During this period, Storey County added more than 1,000 jobs, due in part to companies locating offices and facilities at the Tahoe-Reno Industrial Center. Employment in Clark County also grew significantly (28%), while smaller counties like Douglas, Lincoln, and Lyon experienced employment growth in this cluster, about 14% on average.

Data centers offer one promising opportunity for future growth in this cluster. Data centers are facilities that store and process large amounts of information utilizing high powered computers. As more people across the world connect to the internet with computers, smartphones, and other devices, a significant need has arisen to ensure online services run smoothly and "cloud" data is accessible to users at all times of the day. Online service providers spend billions of dollars each year expanding existing facilities and building new centers across the country.

Nevada is an ideal location for data centers for several reasons:

- Nevada experiences minimal seismic activity, which can disrupt connectivity;
- Nevada's desert climate means there is little to no risk of flooding;
- Although Nevada experiences warm summers, average annual temperatures across the state are relatively moderate compared to other areas;
- Nevada has one of the lowest commercial electricity costs in the nation at 7.7 cents per kilowatt hour;[23,24] and

- The Las Vegas region is home to an extensive fiber optic network that data centers can utilize.

In recent years, several well-known technology companies, including Google and Apple, have built data centers near Las Vegas and Reno. Google recently announced plans to build a $600 million data center in the Tahoe-Reno Industrial Center and plans to invest an additional $600 million in its data facility in Henderson. Once finished, Google estimates that the Henderson data center will employ 50 people with an average wage of $31 per hour.[25] In 2018, Apple built a $2.6 billion data center in Reno. The data center facility has a footprint of 1.1 million square feet and employs 100 people.[26]

Undergirding Nevada's competitive advantage in attracting data centers is Nevada-based technology firm Switch. Switch designs, constructs, and operates data center facilities for online retailers such as eBay, Zappos, and Shutterfly, as well as tech companies such as Amazon Web Services, Cogent, and Citrix. Switch is headquartered in Las Vegas. The company was founded in 2000 and has capitalized on a fiber optic network built by Enron prior to its collapse, utilizing the network as a backbone of the company's service offerings.[27]

The data center industry is likely to experience significant growth in coming years as more and more devices connect to the internet and businesses and consumers increasingly rely on cloud storage. Data center managers have consistently reported difficulty in finding qualified workers to fill roles as data center technicians, engineers, and operators, and over the next ten years one-third of existing data center workers plan to retire.[28,29] Data center technician jobs can pay between $35,000 and $60,000 per year, with entry level technician positions in Las Vegas paying $37,800 annually. Roughly half of all data center positions require a bachelor's degree.[30]

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23. AEG analysis of Energy Information Administration data.
24. In recent years, some companies have pledged to use all renewable power, including Apple, Switch, and Google. As energy costs decrease and data centers convert to renewable energy, the state's low electricity prices may become less of a competitive advantage.
25. Jason Hidalgo, "Google gets $25 million tax break for data center near Reno, expanding Henderson project," *Reno Gazette Journal,* Sept. 16, 2020.
26. Jason Hidalgo, "A rare look inside Apple's expanding Reno data center," *Reno Gazette Journal,* Jan. 17, 2018.
27. Conor Shine, "How one high-tech company that you don't know about can help Las Vegas diversify," *Las Vegas Sun,* November 7, 2011.
28. Bill Kleyman, Data Center Frontier, "New Skills, Training Are Essential for the Data Center Workforce," 2018.
29. Sandra Vail, Uptime Institute, "The Data Center Staffing and Skills Shortage is here NOW!" 2019.
30. Zip Recruiter, "Entry level Data Center Technician," www.ziprecruiter.com.

While data centers themselves have low employment densities relative to their facility sizes, there is some evidence that the facilities have spillover impacts in attracting other out-of-state businesses and suppliers to locate nearby. Furthermore, attracting companies such as Apple and Google to Nevada may elevate Nevada's profile and attract other technology companies.[31]

Another important component of Nevada's business services cluster is the state's call center industry. Call centers provide customer support and telemarketing services for businesses. Nevada offers a number of competitive advantages that make it a prime location for call centers, such as:

- A large multilingual population;[32]
- A Pacific time zone location that allows call centers to accommodate East Coast calls in the evening; and
- A neutral Nevada dialect that is easily understood by most Americans.

Employment at call centers across the state increased by roughly 9,000 jobs, growing from 7,600 jobs in 2014 to 16,500 jobs in 2019. While many people would not consider a call center job to be a "career" occupation, call center jobs generally only require a high school education while providing stable full-time work and benefits. Jobs in this industry can be a stepping stone to higher paying opportunities. In 2019, the average call center annual wage was $35,300, on par with state average per-worker earnings of $35,500.[33]

In addition to data and call centers, Nevada is an attractive location for national and regional corporate headquarters. The state has had some success in attracting corporate headquarters to both Reno and Las Vegas in recent years, adding roughly 6,500 jobs in corporate headquarter offices since 2014. There are now nearly 2,000 corporate headquarter establishments in Nevada that collectively employ 27,000 workers.[34]

Headquarter facilities oversee the primary functions of multi-establishment businesses, including legal, advertising, purchasing, accounting, and strategic planning functions. Historically, corporate headquarters were often co-located with production or research and development facilities. In recent years, however, improved communication technology and decreased transportation costs have allowed corporations to decouple their headquarters from other facilities.

31. Oxford Economics, "Google Data Centers: Economic Impact and Community Benefits," 2018.
32. "Language Diversity in the U.S.: Most Multilingual States," Accredited Language Services. September 14, 2016. www.accreditedlanguage.com.
33. Data from the U.S. Bureau of Labor Statistics Occupational Employment Statistics and the U.S. Census Bureau 2019 American Community Survey.
34. ibid.

This uncoupling has resulted in large businesses locating their headquarters in markets that have a high concentration of business services while maintaining production and other operations in locations that have the workforce skills needed for those activities.

Empirical research shows that access to airports, affordable residential and corporate real estate, a growing population, and strong business and personal tax climates are all important determinants for headquarters locations, as is access to business services.[35] Las Vegas and Reno meet of all these criteria and are in a good position to attract new corporate headquarters while accommodating the growth of existing corporate headquarters.

The most common types of corporate headquarters occupations generally require a bachelor's degree or higher and include management, marketing, sales, public relations, accounting, purchasing, and human resources occupations. Although the educational requirements in this industry are higher than those in data or call centers, the average annual compensation was over $126,000 annually in 2019 and the state's postsecondary institutions are well equipped to produce an educated workforce for this cluster. According to the Integrated Postsecondary Education Data System, The University of Nevada at Las Vegas granted 1,186 undergraduate degrees in business-related fields in 2019, representing over one-quarter of the school's total undergraduate degrees granted. The University of Nevada at Reno granted 619 business degrees, accounting for 15% of all degrees granted. Both schools also offer Master of Business Administration degrees.

Distribution and Electronic Commerce

Cluster Definition. The distribution and electronic commerce cluster consists primarily of wholesalers, mail order houses, and electronic merchants. Establishments in this cluster buy, hold, and distribute a wide range of products. This cluster also contains firms that support distribution and electronic commerce operations such as packaging, labeling, and equipment rental and leasing.

TABLE 6. Summary of Nevada's Existing Distribution and Electronic Commerce Cluster, 2019

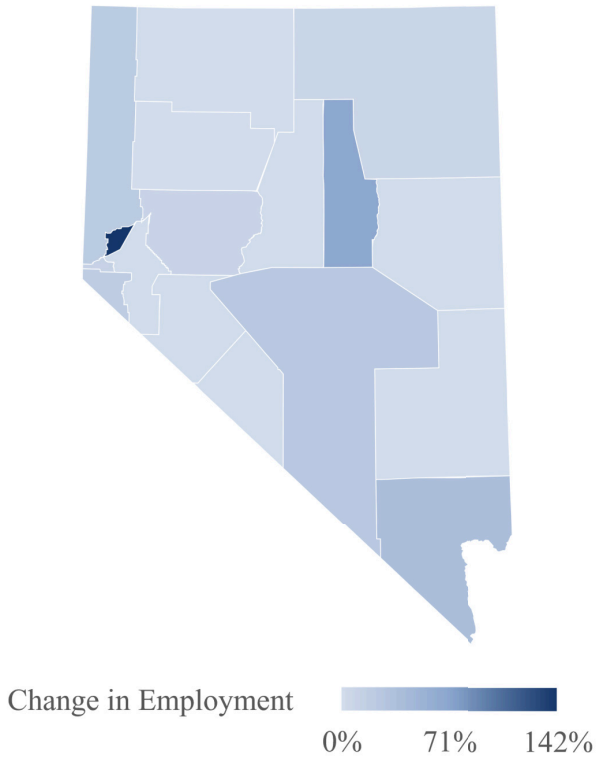
Metric	Value
Number of Establishments	2,600
Total Output (in millions)	$40,395
Number of Employees (annual average)	54,000

Source: AEG analysis using base data from ESRI Business Analyst, the U.S. Cluster Mapping Project, and the U.S. Bureau of Labor Statistics.

35. Carrie Rossenfeld, "What You Need to Know About Corporate HQ Site Selection," GlobeSt.com, October 10, 2017.

Employment in this cluster grew by 33% between 2012 and 2019. Most of this growth occurred in Storey County, where employment more than doubled. Employment in this cluster also grew in several other counties including in Eureka (68%), Clark (38%), and Nye (24%), as shown in Map 2 below.

MAP 2. Distribution and Electronic Commerce Employment Growth, 2012-2018



Source: AEG analysis using base data from the U.S. Bureau of Economic Analysis.

Much of the employment growth in this cluster can be attributed to the construction of new distribution centers, especially in southern and northwestern Nevada. Unlike warehouses, which are primarily intended to store goods, distribution centers are meant to prepare goods for transfer to customers while minimizing storage time, in accordance with lean inventory principles. Distribution centers have faster stock turnover than warehouses, and operations there may include not just short-term storage, but also product inspection and testing, order processing and packaging, and other tasks needed to prepare goods for delivery. The rapid growth of online shopping has made distribution centers more important than ever, and Nevada has been successful in attracting them. Many large e-retailers, including Amazon, Walmart, Zulily, 1-800-Diapers, and e-Bay now have distribution centers in the state.

Nevada is an ideal location for distribution centers, partly due to its central location within the western U.S. market. Nevada is less than one day's drive to five

major U.S. ports serving the Pacific Rim. Northern Nevada is at the center of the western region, with 11 states and 53 million consumers within one day's drive. Southern Nevada is just hours from the Southern California markets, and within two-day delivery of nearly every state west of the Mississippi River.[36]

Nevada also has a competitive edge in the distribution and electronic commerce cluster compared to neighboring California, where many distribution centers and warehouses are located. Nevada offers an ample supply of the open, flat land needed for distribution centers, and its regulatory environment also provides important advantages. For example, because California bans triple truck trailers, companies with hubs in Nevada can transfer California freight to more cost-effective triple truck trailers before heading on to other states. Employers in this cluster also cite the state's low taxes, business-friendly climate, labor costs, and fuel costs as factors influencing their decision to locate distribution centers there.[37]

The most common jobs in the distribution and electronic commerce cluster do not require a postsecondary education; however, many pay below the state's median wage. Many employees in this cluster work as laborers and freight, stock, and material movers; stockers and order fillers; and shipping, receiving, and inventory clerks. Average annual wages in these occupations range from $30,000 to $35,000.

This cluster does include some occupations with higher wages that only require on-the-job training, such as industrial truck and tractor operators with an annual mean wage of $40,000. Although the higher paying occupations in this cluster do not necessarily require a postsecondary education, most workers in the field report having at least some college education. Other higher paying jobs in this cluster include wholesale and manufacturing sales representatives and transportation, storage, and distribution managers, whose annual average wages in Nevada are $65,000 and $93,000, respectively.[38]

36. From GOED's "Manufacturing and Logistics" overview page, goed.nv.gov/key-industries/manufacturing-logistics/.

37. Jessica Santina, "The Logistics of Economic Recovery: The Distribution Industry in Nevada," *Nevada Business*, July 6, 2012. www.nevadabusiness.com/.

38. Data from the U.S. Bureau of Labor Statistics Occupational Employment Statistics and the U.S. Census Bureau 2019 American Community Survey.

Transportation and Logistics

Cluster Definition. This cluster contains all air, rail, bus, and freight transportation services. It also includes related service and support activities such as inspections, maintenance, repairs, security, and loading/unloading.

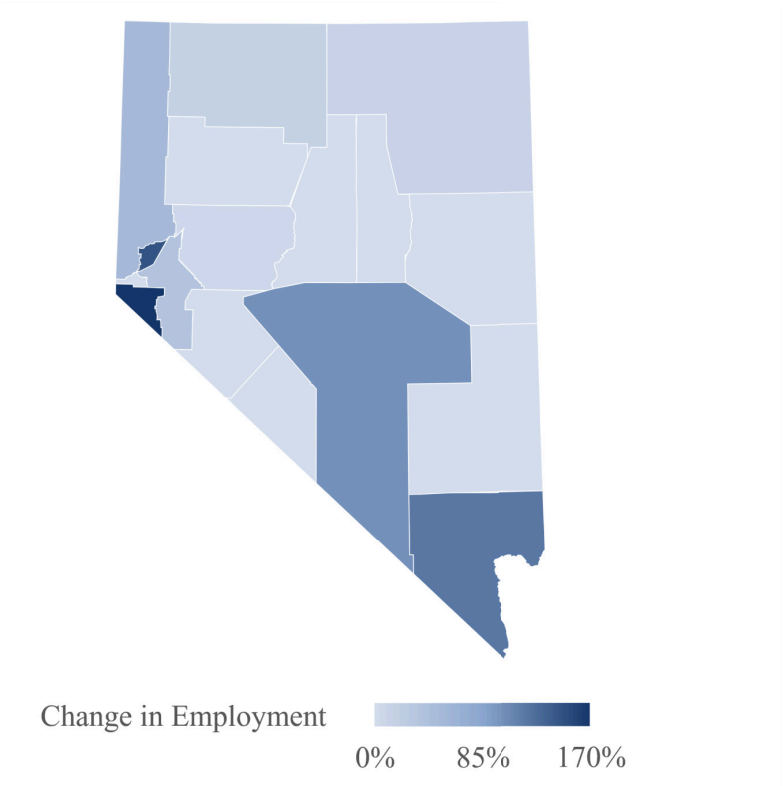
TABLE 7. Summary of Nevada's Transportation and Logistics Cluster, 2019

Metric	Value
Number of Establishments	830
Total Output (in millions)	$2,908
Number of Employees (annual average)	18,000

Source: AEG analysis using base data from ESRI Business Analyst, the U.S. Cluster Mapping Project, and the U.S. Bureau of Labor Statistics.

Employment in the transportation and logistics cluster doubled in Nevada between 2012 and 2019. Several counties experienced significant employment growth, including Douglas (170%), Storey (146%), Clark (119%), and Nye Counties (100%), as shown in Map 3 on page 25.

MAP 3. Transportation and Logistics Employment Growth, 2012-2018



Source: AEG analysis using base data from the U.S. Bureau of Economic Analysis

The state's central location within the western U.S. market and its extensive transportation infrastructure make it an ideal location for transportation and logistics companies. In southern Nevada, Las Vegas is a ground transportation hub with access to three major highways: I-15, US-95, and US-93. With over 24 million passengers, McCarran International Airport in Las Vegas was the country's tenth busiest airport in 2019.[39] The airport also processed over 400 million pounds of cargo in 2019, ranking it 69th among all U.S. airports.[40] In northwestern Nevada, access to I-80 and US-395 connect the region to most of the western U.S. Additionally, cargo volume at the Reno-Tahoe International Airport grew 18% to over 600 million pounds of cargo in 2019, ranking 41st in the country for cargo traffic.[41]

Nevada's transportation and logistics cluster is closely tied to both the hospitality and tourism and distribution and electronic commerce clusters. Tourists flying to Las Vegas and Reno from other parts of the country have resulted in a highly concentrated air passenger transportation industry, while the proliferation of distribution centers has contributed to the growth of truck transportation in the state.

Nevada has positioned itself as a leader in transportation innovation. In 2011 it became the first state to allow autonomous vehicles, and in 2017 it passed legislation that strengthened research and development efforts for driverless vehicles.[42] This legislation allowed for testing and operations of fully automated vehicles, authorized the commercial use of fully automated vehicles, and authorized testing and operations of driver-assistive platooning technologies that allow vehicle-to-vehicle communication.[43] Since then, the Nevada Center for Advanced Mobility has partnered with several private companies including Waycare, Nexar, and Genivi Alliance to deploy and test new mobility technologies in the state.

The transportation and logistics cluster contains a variety of occupations with a mix of education and training requirements, many of which offer higher wages than the state average. Dispatchers and ticket agents do not require postsecondary education but pay salaries close to the state average. Some occupations do not require postsecondary education but may require on-the-job training, such as bus and truck mechanics and diesel engine specialists with an annual mean wage of $56,000 in Nevada.[44]

39. "Airport Rankings 2019," U.S. Bureau of Transportation Statistics. https://www.bts.gov/.

40. "CY 2019 Final All-Cargo Landed Weights, Rank Order," U.S. Federal Aviation Administration, Sept. 11, 2020. https://www.faa.gov/.

41. Ibid.

42. "Autonomous Vehicles | Self-Driving Vehicles Enacted Legislation," National Conference of State Legislatures, Feb. 18, 2020. www.ncsl.org/.

43. Assembly Bill 69, 79th Session, Nevada 2017.

Other occupations, such as tractor-trailer truck drivers, aircraft mechanics, and service technicians, require postsecondary certification but offer relatively high annual mean wages of $51,000 and $76,000, respectively. Truck drivers represent a particularly important workforce development opportunity for the state, as employers both nationwide and in Nevada have expressed concern about a driver shortage.[45]

Some transportation and logistics occupations do not require a degree, but many workers in the field have at least some college, including flight attendants with an average annual wage of $57,000. Occupations with the highest wages typically require at least a four-year degree, including airline pilots, copilots, and flight engineers, with an annual mean wage of $235,000 in Nevada.[46]

Aerospace Vehicles and Defense

Cluster Definition. Establishments in this cluster manufacture aircraft, space vehicles, guided missiles, and related parts. This cluster also contains firms that manufacture the necessary search and navigation equipment used by these products.

TABLE 8. Summary of Nevada's Existing Aerospace Vehicles and Defense Cluster, 2019

Metric	Value
Number of Establishments	34
Total Output (in millions)	$271
Number of Employees (annual average)	5,200

Source: AEG analysis using base data from ESRI Business Analyst, the U.S. Cluster Mapping Project, and the U.S. Bureau of Labor Statistics.

This cluster is much smaller than other target clusters; however, it experienced the fastest growth among all four clusters since 2012, growing from only 500 jobs in 2012 to 5,200 jobs in 2019. Employment in this cluster is concentrated in Clark and Washoe Counties.

Nevada has cultivated its competitive advantage in aerospace vehicles and defense, in part by building around its three military air stations. More recently, the state passed drone-friendly legislation that has encouraged the development of unmanned aerial vehicles (UAVs).

44. Data from the U.S. Bureau of Labor Statistics Occupational Employment Statistics and the U.S. Census Bureau 2019 American Community Survey.

45. Ibid.

46. Ibid.

The state's air bases include:

- **Creech Air Force Base:** Located northwest of Las Vegas, this base focuses on military UAV operations and is home to UAV operators who fly UAVs in operations across the world.
- **Nellis Air Force Base:** Located northeast of Las Vegas, this base is home to over 10,000 active-duty personnel and focuses on advanced training for pilots as well as operational testing of advanced weapons systems.
- **Naval Air Station Fallon:** Located 70 miles west of Reno, the station provides tactical flight training in air-to-air and air-to-ground operations. The station employs roughly 1,400 individuals and 1,300 defense contractors, some of whom provide aircraft maintenance services.

Although these bases employ a number of workers and the military has made regular investments in modernizing or expanding them, the degree to which the bases interact directly with other firms in the aerospace vehicles and defense cluster is unclear, due in part to confidentiality about each base's operations. The bases themselves may draw some aerospace and defense contractors to locate in the state; however, most defense contractors service bases across the country and proximity to a smaller cluster of bases in Nevada may not warrant relocation or a significant investment in the state.[47]

Outside of its air bases, the state is home to the Nevada Institute for Autonomous Systems (NIAS), a nonprofit organization created by GOED in 2014 that aims to advance the Nevada's unmanned aircraft system (UAS), or "drone" industry. NIAS plays a key role in helping form Federal Aviation Administration (FAA) UAS policies, and has focused on beyond-line-of-sight drone operations in urban areas.

Nevada is one of seven FAA designated UAS test sites, and is the test site whose geography spans an entire state. Other sites have only received UAS designations at specific locations, such as universities or airports.[48] The fact that the entire state has been designated a UAS test site while also being home to two major commercial airports makes Nevada the preeminent UAS testing location in the country.

In addition to securing a UAS designation, the state has made notable investments in UAS workforce development. The University of Nevada, Reno "Innevation" Center acts as an accelerator for technology and aerospace start-ups. The Innevation Center is currently supporting Iris Automation, a Califor-

47. A review of economic impact studies for these bases suggests that the largest impact these bases have on the Nevada is attributed to base employees spending their wages in Nevada, rather than the bases making expenditures to local businesses.

48. See Federal Aviation Administration UAS Test Site Program, https://www.faa.gov/uas/programs_partnerships/test_sites/.

nia-based company that focuses on beyond-line-of-sight safety during drone flights. Iris recently partnered with Switch to complete the first beyond-line-of-sight drone flight in the U.S.[49] The College of Southern Nevada launched a two-year UAS-focused degree program in 2018.[50]

The UAS industry is still relatively small, but many experts believe it will grow significantly in coming years as the FAA formulates UAS policy and as UAS technology advances. Future applications could include using UASs to monitor the condition of infrastructure, crops, and mining sites; detecting environmental problems such as chemical leaks or fires; or managing ground traffic in urban areas. While many of these tasks can be completed now via satellite, UASs will make the process much more cost effective.

Outside of UASs, Nevada is home to a high concentration of aircraft mechanics who provide services to airports and air bases in the state. Las Vegas is home to the Aviation Institute of Maintenance, Nevada's only FAA designated aircraft repair school. In 2019, the school granted 147 Aviation Maintenance Technician certificates. It has seen significant growth in completions in recent years.

The Sierra Nevada Corporation (SNC) is among the more established aerospace firms in Nevada. SNC specializes in a number of aerospace fields, including helicopter, aircraft, satellite, and spacecraft design. The company is headquartered in Sparks and has worked on a number of high profile government contracts, including designing the next generation of NASA space shuttles.

Because the aerospace vehicles and defense cluster is continuously evolving and the UAS industry is so new, there is no standard cluster career path and there is relatively little information about the workforce needs of UAS firms. At the very least, UAS operators must obtain a UAV license through the FAA. Workers in this cluster may also benefit from a bachelor's degree in mechanical engineering or an advanced degree in aerospace, both of which are offered by the University of Nevada.

One of the most common aerospace cluster occupations is aircraft maintenance technician. These technicians diagnose, repair, or refurbish aircraft engines and systems. A college degree is not required for this occupation; however, most aircraft mechanics have credentials from aircraft maintenance schools. The occupation had an average median wage of nearly $76,000 in 2019.[51]

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49. Jane Tors, "Iris Automation successfully completes beyond-visual-line-of-sight drone operation," *Nevada Today.* November 13, 2019. www.unr.edu.

50. "Drone Degree Program Built to Take Off in 2018," *Coyote Student News*. November 2, 2017. coyotestudentnews.com.

51. Data from the U.S. Bureau of Labor Statistics Occupational Employment Statistics and the U.S. Census Bureau 2019 American Community Survey.

IV.Advancing Nevada's Target Industry Clusters

Nevada's economy has made significant strides toward diversifying in recent years with the emergence of several promising industry clusters including business services, aerospace vehicles and defense, distribution and electronic commerce, and transportation and logistics. Policymakers are already undertaking some critical work that will support the future of these clusters. In this section, we discuss specific opportunities that the state can undertake to encourage further cluster development. These include:

- Ensuring that the clusters have access to skilled workers
- Ensuring that the distribution and electronic commerce and transportation and logistics clusters have adequate infrastructure to move goods
- Ensuring workers have access to affordable housing
- Reviewing existing incentive programs to determine whether the programs are creating new economic activity in the state
- Increasing funding to support aerospace startups

We describe each of these recommendations in detail below.

WORKFORCE DEVELOPMENT

Ensuring that growing industry clusters have access to a well-trained workforce should be the primary economic development focus for Nevada. Clusters will not grow if there are no trained workers to fill open positions, and businesses will not relocate to Nevada if they cannot find workers. Policymakers must work to ensure that Nevada's education providers—from middle to high school and postsecondary schools—are providing educational opportunities that allow students to transition into these clusters.

For many years, Nevada's workforce development system has primarily provided a workforce for the hospitality and tourism industries. The workforce development needs of these businesses are easily met with minimal training beyond a high school diploma. The new industry clusters emerging across the state, however, have more complex workforce needs. These more complex needs, coupled with increasing technological innovations that displace workers, are leading to a nationwide paradigm shift in how workforce development systems function.

Systemwide Workforce Development Recommendations

Policymakers and educators must work together to refine Nevada's workforce development system such that it can provide training to high school graduates who need additional certifications to access new entry level jobs. Policymakers and educators must also recognize the growing need to retrain workers who lose their jobs as new, disruptive technologies are implemented. These workers may

need to return to the workforce development system several years into their careers to obtain new skills.

Nevada's workforce development system, like that of most states, is comprised of disparate institutions that must work together more closely to meet new workforce development needs. At a fundamental level, this means increasing coordination between the state's K-12 system, the workforce development boards in northern and southern Nevada, the state workforce board, local chambers of commerce, and private sector employers. These entities must identify which occupations are likely to grow in the future, along with the educational needs of those occupations. The initial steps of this approach have already begun in southern Nevada, where local institutions developed a 2019 "Workforce Blueprint 2.0" to identify future workforce needs and match those needs with training capacity.[52] A similar statewide effort, carried out on an annual basis, could help policymakers to develop a more complete understanding of current and future workforce gaps and how to address them.

Policymakers should also review how workforce development funds are distributed at the state level to determine if current funding distribution mechanisms—including funds outside of Title I—are effectively matching the needs of employers with publicly-funded workforce development programming. Local workforce development stakeholders should also review the extent of duplication in workforce development efforts. Workforce development programs often struggle with a lack of sufficient funding, and it is critical to determine whether certain entitles or organizations are duplicating efforts.

At the local level, policymakers should provide students with the opportunity to take career readiness exams in high school. These include the ACT WorkKeys exam, which helps determine whether students have the foundational skills required to succeed in the workplace. Students that complete all components of the WorkKeys exam can obtain a National Career Readiness Certificate (NCRC) that helps employer assess whether graduates have the skills to succeed in a particular job. A growing body of research shows that the WorkKeys exam serves as a useful signal to employers in determining job applicant skills.[53]

Virtually all high school students in Nevada currently take the ACT college readiness exam, but the WorkKeys exam is not required, despite the fact that nearly one-half of Nevada's high school graduates do not enroll in college immediately after graduation.[54] Offering the WorkKeys exam along with the ACT will provide a foundation to those students who do not attend college.

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52. Las Vegas Global Economic Alliance, "2019 Workforce Blueprint 2.0," http://www.lvgea.org/

53. Jeffrey Steedle and Andy Hepburn, "The ACT WorkKeys NCRC as an Indicator of Skills Needed for Success in Work-Based Learning," ACT Research & Policy, January 2020.

54. According to the National Information Center for Higher Education, 56 percent of Nevada high school grads enrolled in college immediately after graduating in 2016.

The Clark County School District has made significant progress toward providing the WorkKeys exam and NCRC certificates to students, after becoming an ACT certified "Work Ready Community" in 2019. The designation is granted to communities that have made substantial efforts not only to provide WorkKeys and NCRC certificates, but also to align workforce development initiatives with the needs of local employers. To date, Clark County is the most populous county in the nation to receive a Work Ready Community certification. Policymakers should look to replicate Clark County's workforce development success in other parts of the state.

Beyond these systemwide workforce development recommendations, policymakers can implement a number of cluster-specific recommendations. We outline workforce considerations for each cluster below.

Distribution and Electronic Commerce & Transportation and Logistics

Many occupations in the distribution and electronic commerce and transportation and logistics clusters require more education than a high school diploma but less than a bachelor's degree. Examples include heavy and tractor-trailer truck drivers, mechanics and service technicians, and logistics and inventory planners.

Policymakers can help develop workforce for this cluster by promoting Career and Technical Education (CTE) in Nevada's middle and high schools. CTE curricula helps students become familiar with the fundamentals of an industry cluster in the classroom and also provides work experience. In some cases, students can obtain industry-recognized credentials prior to graduation. Common credentials in distribution and electronic commerce and transportation and logistics include Automotive Service Excellence (ASE), forklift operator licenses, and commercial driver's licenses, among others.

Although schools in Nevada offer transportation, distribution, and logistics CTE programs, these programs are heavily focused on transportation. Opportunities exist for education providers to fill the logistics gap by providing courses that focus on concepts such as procurement, inventory planning, and supply chain management.

Aerospace Vehicles and Defense

Nevada's aerospace vehicles and defense cluster offers higher paying jobs that tend to require more advanced education than the distribution and electronic commerce or transportation and logistics clusters. The state currently offers a handful of CTE programs that focus on these clusters, including aviation maintenance, aviation technology, and aerospace engineering. The aviation maintenance and aviation technology programs are only offered in the Las Vegas metropolitan area, and only to a handful of high school students—2.2% in 2020. This program could be expanded to schools in Reno or other schools in Las

Vegas. The aerospace engineering CTE program is provided in both Las Vegas and Reno, but is still only available to 3.2% of high school students overall.[55]

Beyond CTE, the University of Nevada offers degrees in mechanical engineering, often a stepping stone to advanced aerospace jobs or graduate degree programs. The College of Southern Nevada offers an aviation technology program that focuses on commercial flight operations, as well as an associate's degree program in UAS technology. These programs should help ensure a pool of skilled workers for the state's growing aerospace cluster.

Business Services

CTE courses in business services are offered in many high schools across the state, and the University of Nevada offers undergraduate and graduate degrees in business, with business education being a particular area of strength for the University of Nevada, Las Vegas.

INFRASTRUCTURE

Transportation

Transportation infrastructure is one of Nevada's key advantages, particularly for the growth of the distribution and electronic commerce and transportation and logistics clusters. The state is home to multiple international airports, along with major highway and rail corridors. Investing in these assets and planning for growth is essential to the success of these clusters.

Nevada's freight network has historically focused on the local distribution of goods—receiving goods from other metropolitan areas and distributing them to local consumers. In recent years, however, northwestern Nevada and Las Vegas have seen a surge in transportation, logistics, and distribution growth. Additionally, the state is poised to shift from an end-point in the national freight network to a node that provides freight and logistics services to people and businesses outside of the state. This transition is primarily driven by population growth along the West Coast in San Francisco, Portland, and Seattle. It is supported by the state's access to all three modes of transportation infrastructure—road, rail, and air.

Converting Nevada from a freight end-point to a distribution node will require significant investment by to improve infrastructure. Many of these investments are already underway. The Reno area will require improvements to highways I-80, I-580, and US-395 and the interchange connecting these important routes (known as the "Spaghetti Bowl") since much of the existing highway system

55. The aviation maintenance program is offered at Rancho High School. The aviation technology program is offered at Rancho High School and Pinecrest Academy of Nevada Cadence and Sloan Canyon. The aerospace engineering program is offered at Rancho High School and Galena High School.

was built when the region's population was one-third of what it is today. In August 2020, the Nevada Department of Transportation began a $2 billion, 19-year, project known as the Spaghetti Bowl Express to revamp the interchange. This project's completion will promote economic development in the region, as the interchange is not only vital to employers relying on truck transportation (such as the area's many distribution centers), but also connects the Reno-Tahoe International Airport to the rest of northwestern Nevada.

Similarly, the Reno-Tahoe Airport Authority finalized a 20-year master plan in 2019 that includes runway improvements, new concourses, and cargo facility relocation, among other initiatives. The airport is essential to the area's passenger air industry and also to cargo shipments for the region's burgeoning warehousing and distribution industry. Continued investment in the airport master plan, despite the near-term slowdown in passenger air travel resulting from the COVID-19 pandemic, will be essential to long-term economic development efforts in the target industry clusters.

Although Nevada is home to major rail corridors, most railroad traffic today passes through the state without stopping. Policymakers can capitalize on the state's rail access by encouraging intermodal development allowing freight and logistics firms to quickly move goods between rail, truck, and air transportation. Intermodal shipping allows logistics providers to maximize the efficiency of goods movement while minimizing costs. Nevada is home to several small intermodal facilities in Reno and Las Vegas, but these facilities are not co-located with air infrastructure, and do not have strong access to major road networks. Policymakers should plan for larger, consolidated intermodal yards near McCarran and Reno-Tahoe Airports.[56] Policymakers and transportation planners should also work to improve rail connectivity between Reno and Las Vegas. There are currently no rail connections between the two cities, so goods must be transported by truck. Las Vegas also lacks direct rail connections to Phoenix—a major origin and destination for goods coming from and moving to Mexico.[57]

Opportunities for Las Vegas to become a transportation and logistics hub are not as great as those in Reno, partially because distribution and logistics activity remains concentrated in nearby Los Angeles, and because the Las Vegas rail infrastructure is not as robust as it is in Reno.[58] Nevertheless, Las Vegas' proximity to Los Angeles and the high cost of Los Angeles real estate have spurred new logistics development in the region in recent years, indicating future

56. Nevada Department of Transportation, "Nevada State Freight Plan: A Strategic Framework for Freight Mobility and Economic Competitiveness," 2018. http://nevadadot.com/.

57. Ibid.

58. Ibid.

growth opportunities (particularly if Las Vegas maintains a competitive cost of doing business).

Transportation planning near Las Vegas has focused more on passenger movement than freight movement, though any decrease in passenger traffic generally results in faster freight movement. The region is currently planning two major projects. In September 2020, Brightline initiated a bond offering for the first stage of a new high-speed passenger rail corridor that would connect Las Vegas and Los Angeles. However, the much-anticipated project was postponed when bond sale attracted limited interest amidst the economic disruption caused by COVID-19.[59] Although its future is uncertain, if the project is ultimately financed and completed, it would not only add new transportation jobs in southern Nevada, but could also prove to be a boon for truck transportation in the region by reducing passenger vehicle trips and easing congestion on I-15.

The second major transportation project proposed for the area is The Boring Company's Vegas Loop, a system of underground tunnels connecting the city's airport to Allegiant Stadium, the Las Vegas Convention Center, and hotels and casinos on the strip. The tunnels below the convention center are already under construction and are scheduled for completion in January 2021. In October 2020, the company submitted an application to develop the rest of the Loop. Critics have viewed proposed transportation innovations with skepticism, and some doubt that the Loop would meet the city's transit needs. Should the project succeed, however, it would not only ease congestion in downtown Las Vegas, it could also put southern Nevada on the map as a hub for new transportation technology.

While the state has been able to secure funding for several major transportation projects in recent years, it remains without a state-sponsored funded infrastructure bank to help local governments procure funding to build highways, railways, utilities, and other transportation projects. Infrastructure banks are initially capitalized by state and federal funds to provide low interest loans to public bodies to support transportation and utility projects. Once the loans are paid back, the funds and interest payments can be used for other projects.

In 2017, the Nevada Assembly and Senate passed legislation establishing a State Infrastructure Bank with strong support, but the bank has never been funded.[60] Today, Nevada remains in the minority of states without a functioning infrastructure bank. Without one, Nevada could potentially miss out on federal transportation funding opportunities. Funding the infrastructure bank is especially important in Nevada since most federal land granted to state or local gov-

59. Romy Varghese, "Fortress Fails to Sell Record Bond Deal for Las Vegas Rail," *Bloomberg*, Oct. 31, 2020. www.bloomberg.com/.

60. See Nevada Assembly Bill 399 of 2017.

ernments has little to no utility infrastructure and utilities must be built out in order to accommodate new transportation projects, adding to project costs. For these reasons, policymakers should seek to capitalize the bank during the next legislative session

Housing

Because housing costs constitute a large portion of household spending, housing affordability is closely intertwined with labor costs. The higher an area's housing costs, the higher its wages must be to ensure that workers can afford to live there. Housing affordability is particularly important to the continued growth of the distribution and electronic commerce and transportation and logistics clusters, because Nevada's relatively low labor costs are an important part of the state's appeal to employers in those clusters. Between 2014 and 2019, Nevada's home prices grew six times faster than wages—more than any other state.[61] Rising housing costs, especially in Reno and Las Vegas, pose a challenge to the state's economic development efforts.

In September 2020, real estate website RealtyHop ranked Reno as one of the least affordable cities in the U.S., estimating that the median housing cost was equivalent to 47% of the area's median household income.[62] According to Zillow's Home Value Index, the typical Reno home value has increased by almost 30% since early 2017. Home prices have also risen rapidly in Las Vegas in recent years. The city's typical home value increased from $214,000 in January 2017 to $299,000 in October 2020—a 40% increase. Further, according to Zillow's Observed Rent Index, the typical rent in Las Vegas increased by 25% over the same time period.

Unless the state's housing affordability challenges are addressed, rising housing costs will put pressure on wages, potentially compromising Nevada's reputation for competitive labor costs. This may prove a particular challenge for the state's distribution and electronic commerce cluster, which employs many low- and medium-wage workers who may find it especially difficult to afford housing costs without wage increases.

INCENTIVES

Incentives are one of several economic development tools policymakers can reach for to promote economic diversification, yet they often receive the most criticism. This is because incentives are generally directed to individual businesses, including larger companies that may not need incentives to relocate or expand. GOED has provided incentives to hundreds of companies over the last

61. "Cities Where Housing Costs Have Risen Fastest Relative to Income," *Construction Coverage*, Oct. 6, 2020.

62. Jason Hidalgo, "Study: Reno households spend nearly half of income on housing; city among least affordable," *Reno Gazette-Journal*, Sept. 2, 2020.

decade, prompting criticism from policymakers and whistleblowers. In late 2019, Governor Steve Sisolak promised a comprehensive review of GOED's incentive program after suggesting that Nevada's program lacks focus and requires the state to give up large amounts of future revenue in exchange for low quality jobs that do not pay well or offer benefits.[63,64]

The growing criticism levied against the state's incentive programs is partially rooted in the fact that Nevada's economic development plan is nearly a decade old and was written when the state's economic outlook was bleak. During 2009, the national economy was recovering from the Great Recession while the Nevada economy continued to perform poorly. The U.S. economy reached its peak unemployment rate of 10% in October 2009 before experiencing a ten-year downward trend prior to the current recession. While national unemployment decreased, unemployment in Nevada continued to grow, peaking at 13.7% one year later in October 2010. During this time, the economic situation in Nevada was nothing short of dire, and strong action through incentive programs was likely warranted.

While Nevada again finds itself amidst a major economic downturn, the state's economy is in a much more advantageous position to recover once a COVID-19 vaccine becomes widely available because it has diversified in the past ten years. This stronger economic footing calls into question the need for such a robust incentive program, especially given Nevada's existing business-friendly tax climate.

As policymakers and economic development officials undertake planning for the future of Nevada's economy, they should review the incentive program to ensure that incentives are only directed toward businesses that otherwise would not have relocated to or expanded in the state. Policymakers should also implement regular evaluation of new and existing incentives. Further, policymakers should consider whether businesses that receive incentives will have access to the workforce they need to fill jobs. Relocating businesses that hire local workers, rather than simply moving existing workers to the state, can have a more positive economic impact for Nevadans.

Ensure that incentives are directed towards businesses that otherwise would not have located or expanded in the state. In recent years Nevada has directed incentives to businesses in target industry clusters, including distribution and logistics (eBay, Chewy, Sephora), and business services (Google,

63. Riley Snyder. "Sisolak promises major changes to state's tax incentive program," *The Nevada Independent,* December 17, 2019. https://thenevadaindependent.com.

64. In addition to criticism from Governor Sisolak, the Pew Center has also criticized Nevada's incentive program for not requiring periodic review after incentives are granted. See https://thenevadaindependent.com/article/sisolak-promises-major-changes-to-states-tax-incentive-system.

Apple, Switch) via the state's data center incentive. Northwestern Nevada and Las Vegas have become well-established distribution and logistics hubs. Given Reno's access to multiple modes of transportation and its geographic location, it is likely that future distribution and logistics operations will develop without the need for incentives. Similarly, it is likely that new data centers may choose to locate in Nevada regardless of incentives given the state's natural competitive advantages. Policymakers should consider whether subsidizing these clusters is an effective strategy for development.

Regularly evaluate the impact of incentives. Nevada trails behind several states in evaluating the effectiveness of its incentive programs. Careful incentive analysis and economic research can discern whether past incentives have truly changed the way businesses behave. It can also determine whether incentives have encouraged economic growth beyond what would have been expected in the absence of incentives. Finally, analyzing the patterns of incentives granted by company size or industry can provide insights into how well a state is coordinating its economic development efforts. Nevada should examine practices in other states to ensure that incentives provide the best possible return on investment.[65]

VENTURE CAPITAL

Provide incentives that help small businesses in target clusters grow. While incentives are generally allocated to larger firms looking to expand or relocate to Nevada, the state can also use its economic development resources to attract smaller startup companies with high growth potential through it's Battle Born Ventures venture capital fund. In 2013, policymakers secured $5 million in funding to capitalize the fund, and have been contributing approximately $500,000 to it annually in recent years. State-backed venture funding can play a critical role in helping small businesses access funding to avoid the "valley of death"—a period in startup growth when costs exceed revenues and traditional venture capitalists are often apprehensive to invest.[66] Although the fund specifically identifies aerospace vehicles and defense as target investment sectors, annual reports show that the fund rarely receives applications from aerospace businesses.[67]

Nevada has traditionally had trouble attracting venture capital investment. In 2019, venture capital investments accounted for $19 per $100,000 in output in

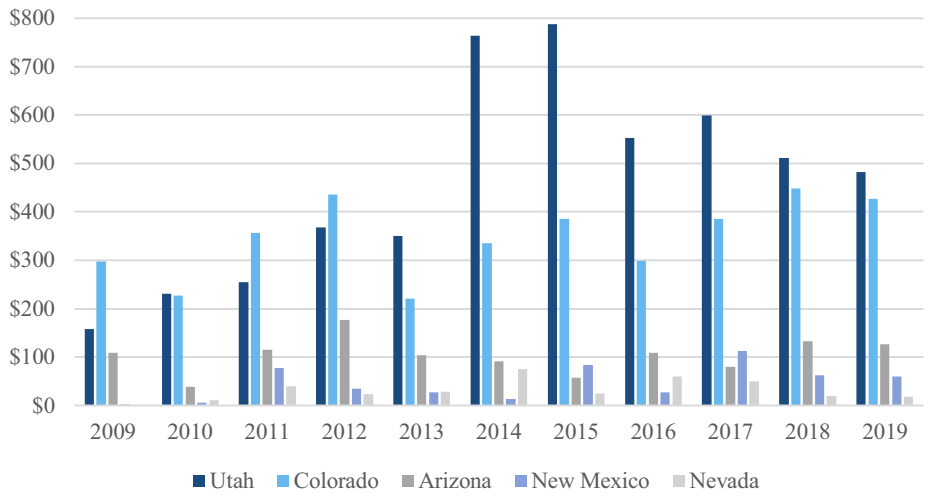
65. The Pew Foundation has conducted extensive research on incentive evaluation best practices. For more information, see "How States are Improving Tax Incentives for Jobs and Growth," 2017. http://www.pew.org/.

66. David Ketchen and Thomas Hult, "Government can help startups bridge the 'valley of death'," *The Hill,* April 20, 2019.

67. Battle Born Ventures does not report the count of applications received, however the fund's annual reports note receiving complete applications from an aerospace or defense startup in only one of the past five years. See www.battlebornventure.com.

the state, placing it 41st among all 50 states, and behind peer states such as Utah, Colorado, and Arizona, as shown in Figure 8 below.

FIGURE 8. Venture Capital Investment per $100,000 in State Output, 2009-19



Source: AEG analysis using base data from PwCMoneyTree and the U.S. Bureau of Economic Analysis

The state should work to ensure that aerospace startups, especially those in the UAS space, are aware of the program and understand the application requirements. The program could also be expanded, since the funding is relatively low compared to other state venture capital funds.

Appendix A. Methodology

In this section we outline the data sources we used in our cluster analysis and discuss the analytical steps we took to identify a new set of key clusters.

In addition to data from these sources, we also conducted a comprehensive review of economic development documents and interviewed economic development specialists in Nevada. This research is cited in "Appendix B. References" on page B-1.

DATA SOURCES

We used the following sources to complete our analysis:

- Council for Community and Economic Research State Economic Development Program Expenditure Database for data on Nevada economic development programs and incentives.
- PricewaterhouseCoopers MoneyTree™ data on venture capital investments in Nevada and peer states.
- National Center for Education Statistics Integrated Postsecondary Education Data System data on program completions at select postsecondary institutions in Nevada.
- State of Nevada executive budgets for FY 2017-19 and FY 2019-21 for information on incentive expenditures.
- U.S. Cluster Mapping Project for cluster employment data, 2007-2017.
- U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW) for employment data, 2018-2019.
- U.S. Bureau of Labor Statistics Local Area Unemployment Statistics for unemployment rates in Nevada and peer states, 2009-2020.
- U.S. Bureau of Economic Analysis for industry employment by Nevada county, 2012-2018.
- U.S. Bureau of Labor Statistics for industry employment, 2020.
- The U.S. Department of Labor for weekly unemployment claims data for Nevada and the U.S.

LOCATION QUOTIENT ANALYSIS

Cluster location quotients (LQ) are a way of quantifying how concentrated an industry cluster is in a particular region compared to a larger geographic area. In our analysis, we quantified how concentrated industry clusters in Nevada are compared to the nation. We used LQs to:

- Determine which clusters make the Nevada economy unique
- Identify emerging clusters in Nevada
- Identify industry clusters that are not performing as well as expected

We calculated LQs for each cluster in Nevada by comparing the cluster's share of regional employment with its share of national employment. We calculated cluster LQs by first dividing state cluster employment by Nevada's total traded cluster employment. Second, we divided the national cluster employment by the total U.S. traded cluster employment. Finally, we divided the Nevada ratio by the U.S. ratio.

We identified those clusters that had an LQ greater than 1.0, which indicates the cluster has a greater share of regional employment than is the case nationwide. For example, Las Vegas has an LQ greater than 1.0 in the hospitality and tourism cluster because this cluster makes up a larger share of the Las Vegas employment total than it does for the nation as a whole. These clusters are typically export-oriented clusters that bring money into the region rather than circulating money that is already in the region.

We also analyzed the percent change in LQ over time for each cluster. We plotted each cluster on a horizontal and vertical axis. The vertical axis represents 2019 LQ measurement and the horizontal axis shows the percent change in LQ between 2012-2019. Each cluster was plotted as a circle whose size corresponded to the cluster's relative size (in jobs).

Doing this places Nevada's clusters into one of four categories based on employment concentration and change in employment concentration over time. Those four categories are:

- **Standout Clusters.** These clusters have a location quotient above one that has *increased* over time. These clusters distinguish the regional economy and are especially important if they contain a large number of jobs.
- **At Risk Clusters.** These clusters have a location quotient above one that has *decreased* over time. A cluster in this category may be growing more slowly than the national average or shedding employment at a faster rate than the national average.
- **Pre-Emergent Clusters.** These clusters have a location quotient less than one that has *increased* over time. These clusters are not yet as concentrated in the region as they are at the national level, but they are becoming more concentrated.
- **Other Clusters.** These clusters have a location quotient less than one that has *decreased* over time. These clusters play a smaller role in the Nevada economy, and their importance appears to be diminishing further.

After conducting our quadrant analysis, we identified four clusters—business services, aerospace vehicles and defense, distribution and electronic commerce, and transportation and logistics—that present the most promising growth opportunities for Nevada. We based our conclusion not only on employment growth and location quotient, but also on input from individuals with intimate knowledge of the Nevada economy, a review of workforce development and infrastructure needs for each cluster, and future growth projections.

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COVID-19 Executive Orders

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- 2020-03-15—COVID-19 Declaration of Emergency Directive 001
- 2020-03-17—Governor Sisolak Announces COVID-19 Risk Mitigation Initiatives
- 2020-03-20—COVID-19 Declaration of Emergency Directives 003 (Attachments), 004, and 005
- 2020-03-20—COVID-19 Emergency Regulation Defining Essential and Non-Essential Businesses (Attachments)
- 2020-03-24—COVID-19 Declaration of Emergency Directives 007 (Attachments)
- 2020-03-31—Covid-19 Declaration of Emergency Directive 010—Stay at Home Order (Attachments)

List of Economic Policymakers and Stakeholders Interviewed

- Jeremy Aguero, Principal, Applied Analysis
- Greg Bortlin, Communications Director, Nevada Governor's Office of Economic Development.
- Jaime Cruz, Executive Director, Nevada Workforce Connections
- Jason Frierson, Speaker, Nevada Assembly
- Guy S. Hobbs, Managing Director, Hobbs, Ong & Associates, Inc.
- Ben Kieckhefer, Senator, Nevada Senate
- Dina Neal, Senator, Nevada Senate
- Bob Potts, Deputy Director, Nevada Governor's Office of Economic Development
- Mary Beth Sewald, President & CEO, Las Vegas Chamber of Commerce
- Raymond Specht, Founder & CEO, Specht Leadership Consulting

Appendix C. Summary Tables and Figures

TABLE C-1. List of Nevada Economic Development Programs

Program Name	Provider	Description
Aviation Parts Abatement	GOED	Provides partial abatements to aviation companies from Personal Property and Sales & Use Taxes. Available to aviation companies that locate or expand their business in Nevada.
Battle Born Venture	GOED	State venture capital program providing early stage investments in startups in the following industries: Aerospace & Defense, Agriculture, Energy, Health Care, IT, Logistics & Operations, Manufacturing, Mining, Tourism & Gaming, and Water.
Brownfields Cleanup Revolving Loan Fund	DCNR	Revolving loan fund providing loans at below-market rates to assist property owners and developers in covering environmental clean-up costs.
Catalyst Fund	GOED	Tax incentive fund aimed at assisting Regional Development Authorities in their effort to close deals with companies that relocate to or expand in Nevada.
Data Center Tax Abatement	GOED	Offers partial abatement from personal property tax and sales and use taxes to data center companies that locate or expand their business in Nevada.
Green Building Partial Property Tax Abatement	GOE	Provides a partial property tax abatement for new non-residential and multifamily residential "green" buildings, and existing buildings that are renovated to meet certain green building standards.
Industrial Development Revenue Bond (IDRB) Program	Department of Business and Industry	Bonds issued by the Nevada Department of Business & Industry with proceeds directed to businesses in order to help businesses lower borrowing costs.
Modified Business Tax Abatement	GOED	Partial abatement (up to 50%) of the Modified Business Tax (1.475% on taxable wages over $50,000 per quarter). Abatement is available to companies that locate or expand their business in Nevada.
Nevada New Markets Tax Credit Program	Department of Business and Industry	Assists businesses in economically distressed areas in securing loans below market rate.
Real Property Tax Abatement for Recycling	GOED	A partial abatement of real property tax for businesses using recycled material that have as a primary purpose the conservation of energy or the substitution of fossil sources for other sources of energy.
Sales and Use Tax Abatement	GOED	An abatement of sales and use taxes on the gross receipts from the sale, and the storage, use or other consumption, of eligible capital equipment by businesses.

Source: Council for Community and Economic Research, State program websites

TABLE C-1. List of Nevada Economic Development Programs

Program Name	Provider	Description
Sales and Use Tax Deferral Program	GOED	Sales and Use tax deferrals for qualified businesses that purchase specific types of capital equipment in excess of $1 million. Taxes can be deferred interest-free over a five-year period.
Transferable Tax Credit for Film and Other Productions	Film Office	Transferrable tax credit that can be applied against tax liability of qualified production companies that film in Nevada.
Workforce Innovations for the New Nevada (WINN)	GOED	Workforce development program administered by GOED in coordination with multiple state agencies. Provides customized programs to meet the needs of businesses in growing industries.

Source: Council for Community and Economic Research, State program websites

TABLE C-2. Industry Cluster Definitions

Cluster Name	Definition
Aerospace Vehicles and Defense	Establishments in this cluster manufacture aircraft, space vehicles, guided missiles, and related parts. This cluster also contains firms that manufacture the necessary search and navigation equipment used by these products.
Business Services	Firms in this cluster include establishments and services primarily designed to support other aspects of a business or to assist unrelated companies. This includes corporate headquarters. Professional services such as consulting, legal services, facilities support services, computer services, engineering and architectural services, and placement services. All for-hire ground passenger transportation services are also present in this cluster.
Distribution and Electronic Commerce	This cluster consists primarily of traditional wholesalers as well as mail order houses and electronic merchants. The companies in this cluster mostly buy, hold, and distribute a wide range of products such as apparel, food, chemicals, gasses, minerals, farm materials, machinery, and other merchandise. The cluster also contains firms that support distribution and electronic commerce operations, including packaging, labeling, and equipment rental and leasing.
Hospitality and Tourism	This cluster contains establishments related to hospitality and tourism services and venues. This includes sports venues, casinos, museums, and other attractions. It also includes hotels and other accommodations, transportation, and services related to recreational travel such as reservation services and tour operators.
Metal Mining	Establishments in this cluster mine various metals including iron, gold, silver, lead, copper, and uranium. It also includes firms involved in supporting metal mining activities.
Transportation and Logistics	Establishments in this cluster contains all air, rail, bus, and freight transportation services. It also includes related operation services and support activities such as inspections, maintenance, repairs, security, and loading/unloading.

Source: AEG summary of cluster definitions from the U.S. Cluster Mapping Project

TABLE C-3. Employment Levels and Location Quotients for All Industry Clusters, 2012-2019

Cluster	2012 Employment	2019 Employment	% Change in Employment, 2012-2019	2012 LQ	2019 LQ	% Change in LQ, 2012-2019
New Key Clusters						
Aerospace Vehicles and Defense	512	5,166	909%	0.09	0.81	812%
Business Services	74,302	113,553	53%	0.64	0.77	20%
Distribution and Electronic Commerce	36,759	54,187	47%	0.62	0.80	28%
Transportation and Logistics	14,295	18,281	28%	0.84	0.88	4%
Other Key Clusters						
Hospitality and Tourism	217,766	212,836	-2%	6.62	5.61	-15%
Metal Mining	13,382	15,180	13%	26.35	31.43	19%
All Other Industry Clusters						
Financial Services	10,878	12,323	13%	0.52	0.57	11%
Education and Knowledge Creation	9,291	11,867	28%	0.28	0.33	17%
Marketing, Design, and Publishing	8,635	10,558	22%	0.63	0.00	-100%
Insurance Services	7,253	8,418	16%	0.44	0.46	3%
Performing Arts	6,113	6,621	8%	1.75	1.45	-17%
Plastics	3,700	2,563	-31%	0.52	0.31	-40%
Recreational and Small Electric Goods	3,695	3,619	-2%	2.50	2.00	-20%
Construction Products and Services	3,448	5,073	47%	0.44	0.50	16%
Information Technology and Analytical Instruments	3,269	5,735	75%	0.30	0.38	24%
Food Processing and Manufacturing	3,156	4,836	53%	0.34	0.39	14%
Communications Equipment and Services	3,145	3,212	2%	0.99	0.61	-38%
Printing Services	2,932	3,783	29%	0.57	0.74	28%
Production Technology and Heavy Machinery	1,923	1,379	-28%	0.22	0.12	-45%
Downstream Metal Products	1,887	2,492	32%	0.49	0.52	4%
Metalworking Technology	1,382	1,747	26%	0.28	0.31	10%
Environmental Services	1,219	1,170	-4%	1.26	1.11	-11%
Oil and Gas Production and Transportation	1,173	678	-42%	0.16	0.10	-37%
Lighting and Electrical Equipment	1,038	1,144	10%	0.33	0.35	5%
Upstream Metal Manufacturing	1,027	1,350	31%	0.58	0.30	-48%
Nonmetal Mining	792	844	7%	0.94	0.81	-13%
Electric Power Generation and Transmission	760	540	-29%	0.50	0.35	-31%
Automotive	750	659	-12%	0.12	0.06	-53%
Wood Products	645	1,107	72%	0.18	0.25	38%

Source: AEG analysis using base data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

Cluster	2012 Employment	2019 Employment	% Change in Employment, 2012-2019	2012 LQ	2019 LQ	% Change in LQ, 2012-2019
Paper and Packaging	637	562	-12%	0.22	0.15	-35%
Vulcanized and Fired Materials	635	517	-19%	0.29	0.18	-38%
Biopharmaceuticals	633	598	-6%	0.24	0.20	-16%
Furniture	618	1,080	75%	0.18	0.30	65%
Downstream Chemical Products	540	658	22%	0.22	0.22	2%
Video Production and Distribution	501	609	22%	0.28	0.32	16%
Medical Devices	319	221	-31%	0.11	0.07	-31%
Agricultural Inputs and Services	283	240	-15%	0.25	0.20	-21%
Livestock Processing	140	57	-59%	0.03	0.01	-63%
Apparel	137	394	188%	0.38	0.32	-15%
Music and Sound Recording	119	60	-49%	0.47	0.22	-53%
Coal Mining	70	-	-100%	0.06	0.00	-100%
Water Transportation	50	-	-100%	0.02	0.00	-100%
Upstream Chemical Products	30	192	540%	0.02	0.10	371%
Forestry	30	-	-100%	0.04	0.00	-100%
Fishing and Fishing Products	22	11	-52%	0.33	0.02	-93%
Textile Manufacturing	20	120	500%	0.03	0.06	144%
Trailers, Motor Homes, and Appliances	20	-	-100%	0.02	0.00	-100%
Jewelry and Precious Metals	-	116	-	0.00	0.00	-
Leather and Related Products	-	104	-	0.00	0.31	-
Tobacco	-	8	-	0.00	0.00	-
Footwear	-	-	-	0.00	0.00	-

Source: AEG analysis using base data from the U.S. Cluster Mapping Project and the U.S. Bureau of Labor Statistics

Appendix D. About Anderson Economic Group

Anderson Economic Group is a boutique consulting firm that offers research services in economics, valuation, market analysis, and public policy. Our work in these fields is based on our core values of professionalism, integrity, and expertise. Since our founding in 1996, our analysis has helped clients including private firms, publicly traded companies, state and local governments, and non-profit organizations.

The consultants at Anderson Economic Group have extensive experience conducting economic analyses and benchmarking studies, including:

- *Entrepreneurial Ecosystem Mapping and Needs Assessment,* City of Trenton, 2019.
- *Technology Industry Analysis,* Automation Alley, 2015.
- *Identifying Economic Growth Clusters in Michigan,* Business Leaders for Michigan, 2011.
- *Effectiveness of Michigan's Key Business Tax Incentives,* Michigan Education Association and National Education Association, 2010.
- *Michigan Economic Diversification Study,* Michigan Economic Development Corporation, 1999.

Past clients of Anderson Economic Group include:

- *Governments:* The government of Canada; the states of Michigan, North Carolina, and Wisconsin; the cities of Detroit, Cincinnati, and Sandusky; counties such as Oakland County, and Collier County; and authorities such as the Detroit-Wayne County Port Authority.
- *Corporations:* Bank of America Merrill Lynch, InBev USA, ITC Holdings Corp., Ford Motor Company, First Merit Bank, Labatt USA, Lithia Motors, Meijer, Inc., National Wine & Spirits, Nestle, and Relevent Sports; automobile dealers and dealership groups representing Toyota, Honda, Chrysler, Mercedes-Benz, General Motors, Kia, and other brands.
- *Nonprofit organizations:* Convention and visitor bureaus of several major cities; higher education institutions including Michigan State University, Wayne State University, and University of Michigan; trade associations such as the Michigan Manufacturers Association, Service Employees International Union, Automation Alley, and Business Leaders for Michigan.

Please visit www.AndersonEconomicGroup.com for more information.

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