

Industry Overview

The broadcasting and telecommunications cluster includes companies that help deliver voice, data, and video to end users. This cluster includes landline and wireless telephone communications companies, radio and television communications services, and cable and Internet service providers.

The Denver South region¹ is an established, nationally recognized center for the broadcasting and telecommunications industry. Broadcasting and telecommunications companies employed 5.6 percent of the Denver South region's total employment base and comprised 42 percent of the broadcasting and telecommunications employment in the nine-county Metro Denver and Northern Colorado region². The broadcasting and telecommunications industry is one of the region's largest clusters, with nearly 17,910 employees working in more than 380 companies. Further, approximately 1.6 percent of the nation's broadcasting and telecommunications employment is located in the region.

The region is also home to some of the world's largest broadcast and telecommunications companies. These companies are developing next-generation products in the region and all major technologies are represented including cellular, fixed wireless systems, and satellite.

The Denver South region is home to numerous broadcasting and telecommunications assets, including:

- **Data Centers** – The region has one of the highest concentrations of high-tech data centers in Metro Denver, with low risk of natural disasters and a thriving economy. Centers for both private companies and government entities are located throughout the region.
- **Satellite** – Metro Denver's unique geographic location in the Mountain time zone makes it possible to have same day, real-time connections around the globe. Two of the nation's largest satellite television providers have a major presence in the Denver South region.
- **Subscription TV** – Metro Denver is the birthplace of the cable television industry and the Denver South region is home to a significant concentration of broadcasting and telecommunications companies including Comcast Corp., Level 3 Communications, DISH Network, and others. In fact, Comcast Corp. has its second-largest employment presence in Colorado outside of Philadelphia. The Cable Center, located on the University of Denver campus centrally located to Denver South, provides education, training, and research in all aspects of cable telecommunications.
- **Federal Laboratories and Research Centers** – The Denver South region is within close proximity to major broadcasting and telecommunications-related federal laboratories and research institutions including Boulder's Institute for Telecommunication Sciences and the National Institute of Standards and Technology's Communications Technology Laboratory. These laboratories perform research in radio science, unite wireless communications efforts, and develop instruments, create protocols, and simulation tools.
- **Voice and Data Services** - Businesses and households in the Denver South region have access to numerous providers that offer landline and wireless phone services and high-speed Internet. The region has access to numerous long-distance providers for intraLATA calls, or long distance calls within a local access transport area (LATA). The Denver South region's extensive fiber optic network allows the flow of voice and data traffic at lower prices.

Telecommunications carriers have made significant investments in high-performance wireless and wired infrastructure across the Denver South region, offering high-capacity network connectivity, reliability, speed, and coverage for residents and businesses. AT&T invested nearly \$300 million to upgrade its Denver infrastructure and wireless networks from 2013 to 2015, boosting reliability, coverage, speed, and performance. The company

¹ The Denver South region consists of zip codes 80111, 80112, 80124, 80126, 80129, 80130, 80134, and 80237.

² The nine-county region is comprised of two principal areas, Metro Denver and Northern Colorado. Metro Denver consists of Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, and Jefferson counties. Northern Colorado consists of Larimer and Weld counties.

added capacity in the Colorado Convention Center, Coors Field, and Denver International Airport, among others. Canada-based Tucows Inc. will begin construction of a fiber network in Centennial in 2017. The company's Ting Internet service will bring speeds of an estimated 1,000 megabits per second (Mbps), expanding opportunities for both residents and businesses. Further, Comcast Corp. will offer 1 gigabit-per-second Internet service to customers in the Front Range in 2017 using existing coaxial cable and fiber optic lines that are already in place in most neighborhoods and homes.

According to BroadbandNow.com, more than 94 percent of residents across the Denver South region have access to broadband speeds of 25 Mbps or faster and 93 percent of residents have access to broadband speeds of 100 Mbps or faster. A number of cities were recognized for providing exemplary digital service and increased connectivity to residents. Governments and local communities in the Denver South region use digital technologies and expanded information technology networks to serve their populations and streamline operations. The City and County of Denver ranked seventh in the "2016 Digital Cities Survey" among cities with a population greater than 250,000 people. Compiled by e.Republic's Center for Digital Government and Digital Communities, the survey recognized cities that provided exemplary digital service to their residents and highlighted the areas' best practices. Further, Douglas County ranked ninth in the nation on the 14th Annual Digital Counties Survey. The survey recognizes counties that understand technology's value, empower their tech leaders, and implement new ideas to improve quality of life.

2016 Industry Highlights

Key Company Announcements

The Denver South region is a center of technology and innovation, attracting and growing broadcasting and telecommunications companies. Notable company announcements in 2016 included:

- Comcast Corp. leased a 212,000-square-foot office building in the Dry Creek Business Park in Centennial.
- Charter Spectrum plans to lease 306,000 square feet in Village Center Station in Greenwood Village and will add 800 jobs to the area. The new space will be home to the company's corporate functions, software and product development, and regional operations.
- The 2016 *Fortune 500* list included two Denver South broadcasting and telecommunications companies among the nation's largest public and private corporations. DISH Network (187) and Liberty Interactive (284) were included with revenues totaling more than \$25 billion.
- Two broadcasting and telecommunications companies in the Denver South region were included in *Fortune's* latest edition of the world's "most admired companies." DISH Network ranked third out of three companies in the "satellite and cable providers" category. Liberty Media ranked fifth out of seven in the "entertainment" category.

Expanded Broadband and Network Improvements

The Denver South region's broadcasting and telecommunications companies offered expanded broadband, new product offerings, and increased network speeds in 2016.

- Fiber-to-the-home connections are becoming standard for new housing developments in the region. The fiber networks replace traditional copper phone wires and coaxial cables for television and broadband. In 2016, CenturyLink Inc. and Comcast Corp. completed fiber-to-home connections in 75,000 new homes built or under construction.
- Cable and satellite TV providers are expanding over-the-top (OTT) streaming services in the Denver South region. DISH Network introduced Sling TV and several other companies are launching similar services including AT&T, CenturyLink, Comcast Corp., and Direct TV. OTT allows consumers to stream

live cable television channels and video over Internet-connected devices with low-cost subscriptions and no long-term contracts.

- Denver-based WOW! Internet, Cable & Phone raised \$40 million in financing to expand its product offerings. The broadband service provider has 2,800 employees and 784,600 customers.
- Prism TV is expanding and is currently available to 500,000 homes in Metro Denver. The service is similar to cable, with hundreds of channels and limited-time deals that require a 12-month contract. It also allows wireless set-top boxes so customers are not limited to keeping the box near a CenturyLink connection in the wall.

Merger and Acquisition Activity

Broadcasting and telecommunications companies in the Denver South region announced several mergers and acquisitions in 2016.

- Charter Spectrum merged with Time Warner Cable Inc. and Bright House Networks in May 2016. The company is the second largest cable operator in the U.S., offering a full range of broadband communications services and serving over 25 million customers in 41 states.
- California-based Lions Gate acquired Douglas County-based Starz in a \$4.4 billion deal. The deal will create worldwide growth opportunities for the combined company.
- AT&T plans to purchase Time Warner in an \$85.4 billion deal. The merger would allow AT&T to control the distribution of both company's shows, movies, and other content. The deal is expected to require antitrust hearings from the U.S. Justice Department and federal regulators.
- WOW! Internet, Cable & Phone acquired Newnan, Ga.-based NuLink systems. The acquisition will extend WOW!'s customer support and high-speed Internet, cable television, and phone service to more than 34,000 additional homes and businesses.

Broadcasting and Telecommunications Economic Profile

The broadcasting and telecommunications industry cluster consists of 16, six-digit North American Industry Classification System (NAICS) codes including radio and television communications equipment, telephone communications, and cable television services.

Broadcasting and Telecommunications Employment and Company Profile, 2016

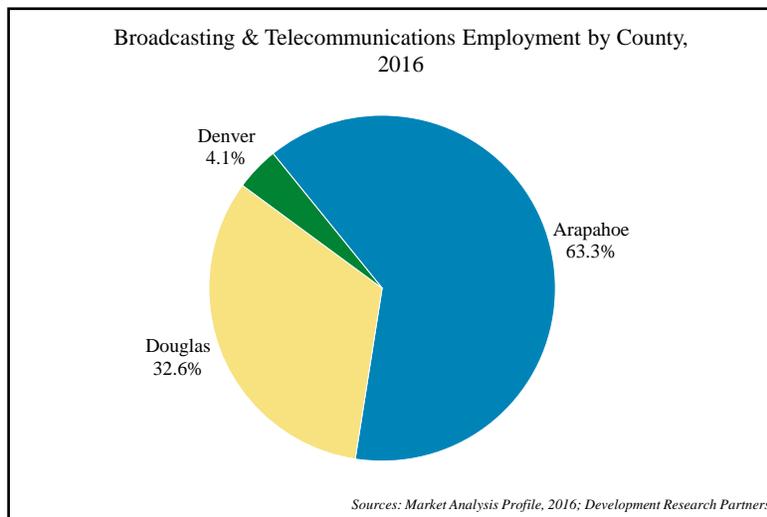
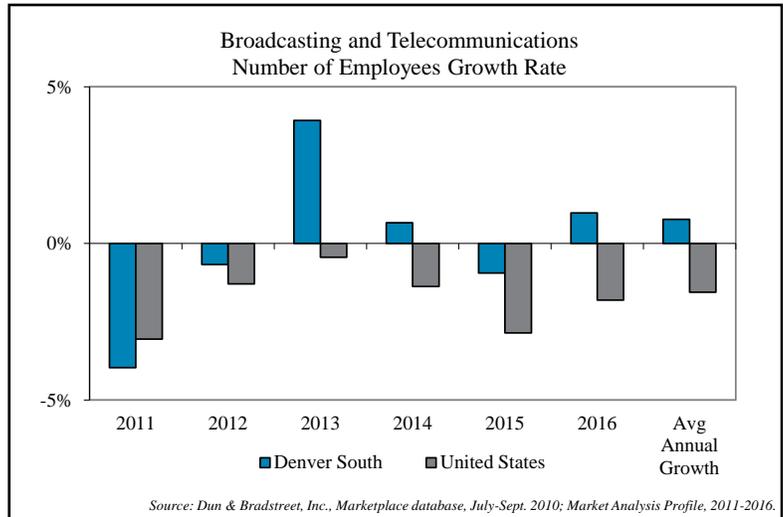
	Denver South	United States
Direct employment, 2016	17,910	1,134,550
Number of direct companies, 2016	390	141,170
One-year direct employment growth, 2015-2016	1.0%	-1.8%
Five-year direct employment growth, 2011-2016	3.9%	-7.5%
Avg. annual direct employment growth, 2011-2016	0.8%	-1.6%
Direct employment concentration	5.6%	0.7%

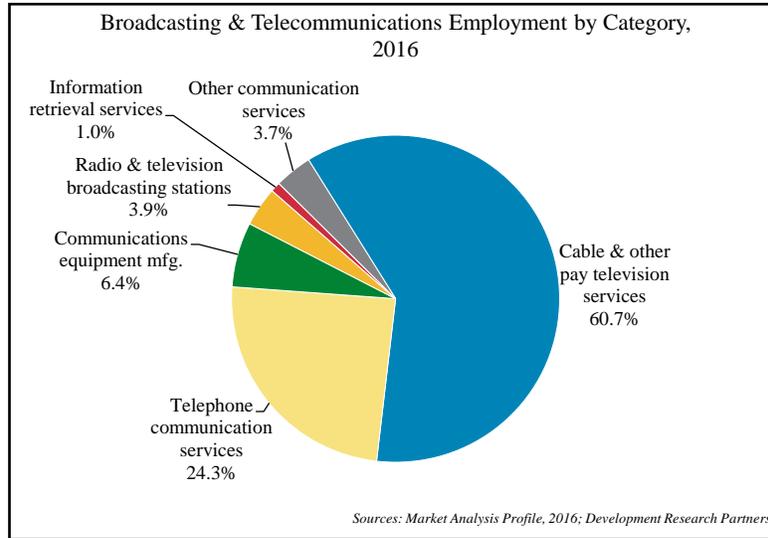
Sources: Dun & Bradstreet, Inc. Marketplace database, July-Sept. 2010; Market Analysis Profile, 2011-2016; Development Research Partners.

Broadcasting and Telecommunications Employment

The Denver South region’s broadcasting and telecommunications employment (17,910 workers) rose 1 percent in 2016, compared with the previous year’s level, adding 170 new jobs over the same period. National employment levels decreased 1.8 percent over-the-year. Broadcasting and telecommunications companies employed 5.6 percent of the region’s total employment base, compared with 0.7 percent employment concentration nationwide.

Approximately 390 broadcasting and telecommunications companies operated in the Denver South region in 2016. Seventy-four percent of the region’s broadcasting and telecommunications companies employed fewer than 10 people, while 2.9 percent employed 250 or more.





Major Broadcasting and Telecommunication Companies

- AT&T Inc. www.att.com
- Avaya Inc. www.avaya.com
- Charter Spectrum www.charter.com
- Comcast Corp. www.xfinity.com
- DIRECTV, Inc. www.directv.com
- DISH Network www.dish.com
- EchoStar Corp. www.echostar.com
- Liberty Media Corp. www.libertymedia.com
- Nokia (formerly Alcatel-Lucent) www.nokia.com
- RingCentral, Inc. www.ringcentral.com
- Sprint Corp. www.sprint.com
- Starz www.starz.com
- Verizon www.verizon.com
- ViaSat, Inc. www.viasat.com

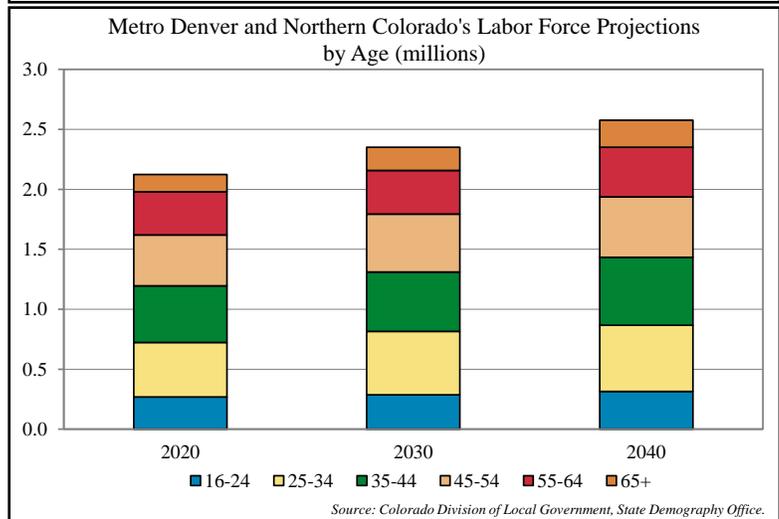
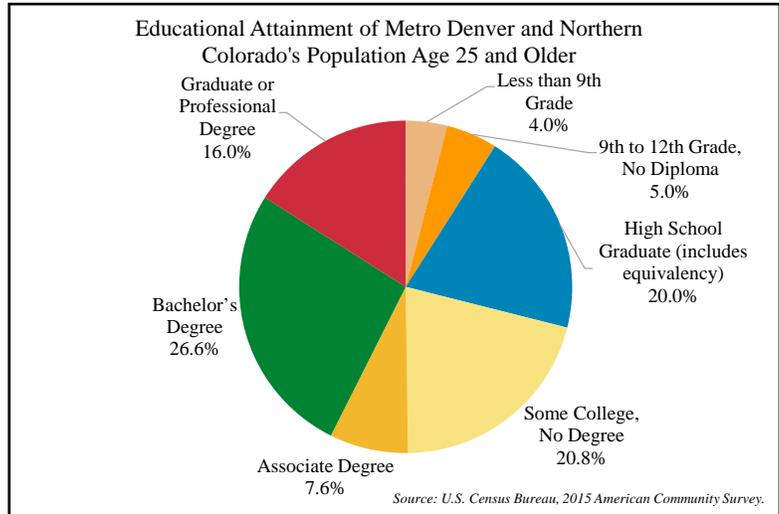
Major Broadcasting and Telecommunication Companies Cont'd

- iHeartMedia, Inc. www.iheartmedia.com
- Level 3 Communications, Inc. www.level3.com
- WOW! Internet, Cable & Phone www.wowway.com
- XO Communications, LLC www.xo.com

Broadcasting and Telecommunications Workforce Profile

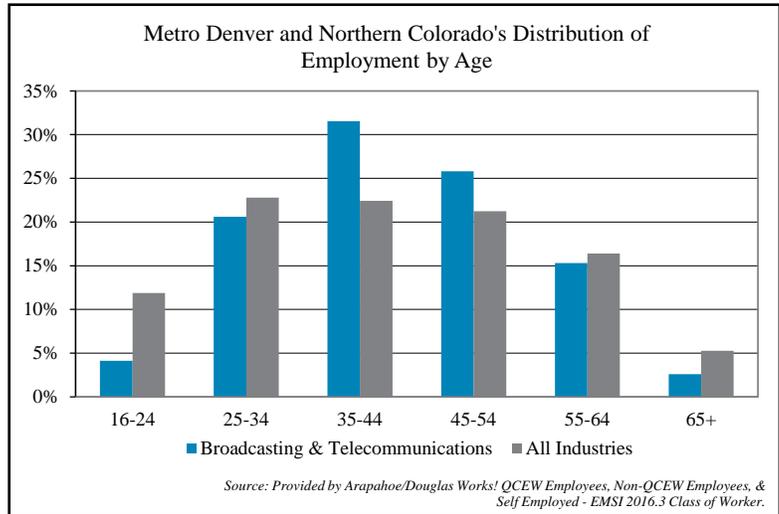
Many companies choose locations because of the available workforce. With nearly half of the nine-county region’s 3.8 million residents under the age of 35, employers can draw from a large, young, highly educated, and productive workforce. Of the region’s adult population, 42.6 percent are college graduates and 91 percent have graduated from high school. The state has the nation’s second-most highly educated workforce as measured by the percentage of residents with a bachelor’s degree or higher.

The attractiveness of the region draws new residents through in-migration. The region’s population is expected to grow 31 percent from 2020 to 2040, driving a 21.2 percent increase in the region’s labor force over the same period. It is important to note the changing composition of the workforce supply as the baby boomers begin to retire, which will pose implications for businesses whose employee pool includes significant numbers of these workers.



The Denver South region’s broadcasting and telecommunications industry employs 17,910 people and includes a large pool of talented, well-educated, and highly skilled workers. In the nine-county region, the broadcasting and telecommunications cluster has a larger share of employees (57.4 percent) that are between the ages of 35 and 54 years and older, compared with the age distribution of all industries (43.7 percent).

The broadcasting and telecommunications workforce supply consists of four main components: those currently working in the industry; those doing a similar type of job in some other industry; the unemployed; and those currently in the education pipeline. The Metro Denver and Northern Colorado Occupation & Salary Profile below includes the 10 largest broadcasting and telecommunications occupations in the region. For these 10 largest occupations, the chart details the total number of workers employed in that occupation across all industries, the number of available applicants that would like to be working in that occupation, the number of recent graduates that are qualified for that occupation, and the median and sample percentile annual salaries.



Wages

The 2015 average annual salary for broadcasting and telecommunications employees in the nine-county region was \$99,120, compared with \$84,130 nationwide. Total payroll for the broadcasting and telecommunications cluster in the region reached nearly \$4.2 billion in 2015.

Metro Denver and Northern Colorado Broadcasting and Telecommunications Occupation & Salary Profile, 2016

10 Largest Broadcasting & Telecommunications Occupations in Metro Denver and Northern Colorado	Total Working Across All Industries (2016)	Number of Available Applicants (2016)	Number of Graduates (2015)	Median Salary	10th Percentile Salary	25th Percentile Salary	75th Percentile Salary	90th Percentile Salary
1. Telecommunications equipment installers & repairers, except line installers	3,810	114	4	\$61,943	\$41,802	\$53,573	\$72,242	\$76,383
2. Sales representatives, services, all other	19,331	1,856	55	\$67,160	\$25,477	\$37,558	\$83,399	\$121,144
3. Customer service representatives	34,719	3,784	0	\$35,742	\$23,706	\$27,755	\$41,879	\$51,228
4. Business operations specialists, all other	33,547	1,510	50	\$79,615	\$41,759	\$54,434	\$97,749	\$126,953
5. Electronics engineers, except computer	4,938	123	441	\$101,396	\$64,980	\$77,300	\$122,914	\$150,057
6. Software developers, applications	19,949	339	921	\$103,454	\$65,735	\$81,356	\$122,826	\$148,422
7. Network & computer systems administrators	9,014	153	852	\$83,869	\$51,933	\$65,942	\$102,033	\$119,858
8. Telecommunications line installers & repairers	1,353	41	4	\$46,735	\$28,961	\$34,898	\$57,806	\$67,594
9. Computer network architects	3,501	60	2,251	\$106,010	\$66,384	\$82,947	\$125,442	\$150,490
10. Computer user support specialists	11,439	194	928	\$57,610	\$34,918	\$43,203	\$69,054	\$87,818

Notes: The number of available applicants is a point-in-time measurement of the number of people who have registered in Colorado's workforce development system's statewide database, Connecting Colorado, as being able and available to work in a particular occupation. Results should be interpreted with caution since registration in Connecting Colorado is self-reported. In addition, the skills rubric may assign up to four occupation codes for each registrant. Therefore, the number of available applicants could be inflated. *Source: Provided by Arapahoe/Douglas Works!; QCEW Employees, Non-QCEW Employees, & Self Employed - EMSI 2016.3 Class of Worker.*

Education & Training

Colorado's higher education system provides an excellent support system for businesses in the region. There are 28 public higher education institutions in Colorado, of which seven four-year and six two-year public institutions offering comprehensive curricula are located in the nine-county region. In addition, there are more than 100 private and religious accredited institutions and more than 350 private occupational and technical schools offering courses in dozens of program areas throughout the state. Although not exhaustive, a list of the major, accredited educational institutions with the greatest number of graduates for each of the 10 largest broadcasting and telecommunications occupations in the nine-county region are included below. A directory of all higher education institutions with corresponding websites may be accessed via <http://higher.ed.colorado.gov>.

- Colorado State University
www.colostate.edu
- Colorado State University Global Campus
www.colostate.edu
- Community College of Aurora
www.ccaurora.edu
- Front Range Community College
www.frontrange.edu
- Metropolitan State University of Denver
www.msudenver.edu
- Regis University
www.regis.edu
- University of Colorado: Boulder, Denver, South Denver
www.cu.edu
- University of Denver
www.du.edu
- University of Northern Colorado
www.unco.edu

Key Reasons for Broadcasting and Telecommunications Companies to Locate in the Denver South Region and the Surrounding Nine-County Region

1. A central location and easy global access

- Metro Denver is the largest region in the U.S. to offer one-bounce satellite uplinks to six out of seven continents in one business day due to its unique geographic location in the Mountain time zone. (Metro Denver Economic Development Corporation)
- Denver South boasts a close proximity to Denver International Airport (DEN) and Centennial Airport.
 - DEN was the sixth-busiest airport in the nation and 18th-busiest worldwide in terms of passenger traffic in 2016. (U.S. Bureau of Transportation Statistics, 2017; Airports Council International 2017; and Denver International Airport, 2017)
 - Centennial Airport is the premier reliever and business airport in the state to connect people, places and product. Supporting 23 business parks and 6,000-plus businesses in the south metro area, the airport provides all services necessary to compete in the global economy. The airport generates more than \$1.3 billion for the region annually, the highest among the state's general aviation airports. (Centennial Airport, 2016; Colorado Department of Transportation, Division of Aeronautics, 2016)
- Denver South is supported by access to national and global business hubs through a strong transportation infrastructure.
 - The region is served by I-25 and E-470, giving residents and workers easy access to DEN and downtown Denver.
 - Businesses and residents also have access to Regional Transportation Districts E and F light rail lines connecting the Denver South region to Metro Denver and DEN with six light rail stations, numerous bus connections, bike storage, and call and ride services.
 - The R Line, providing service along I-225, opened in early 2017 and construction of the southeastern light rail along I-25 that will add 2.3 miles of track and three more stations is underway. The completed rail and stations at the Sky Ridge Hospital complex, the Lone Tree City Center, and RidgeGate Parkway will open in 2019. (Denver South Economic Development Partnership, 2017)
- Metro Denver's central U.S. location on the 105th meridian at the midpoint between Tokyo and Frankfurt makes it a strategic choice for conducting national and international business. (Metro Denver Economic Development Corporation)
- More than 1,000 miles from the nearest coast and outside of Tornado Alley, Metro Denver's risk of natural disasters is minimal compared with locations in the east, west, and south. (National Oceanic and Atmospheric Administration, 2016; U.S. Geological Survey, 2016)

2. A large concentration of high-quality technology workers and entrepreneurial talent

- Colorado has one of the nation's most educated workforces, ranking second among the 50 states for percentage of residents (39.2 percent) with a bachelor's degree or higher. (U.S. Census Bureau, 2015 American Community Survey)
- Colorado ranked second in the nation for its technology employment concentration (9.3 percent) in 2016. The state had the fourth-highest innovation per capita, ranked fifth for the tech industries' contribution to the state's economy, and had the 10th-highest average high-tech wage. Colorado had the ninth-highest wage differential in the nation, with tech workers earning nearly double the average private-sector worker. (CompTIA, *Cyberstates 2017: The Definitive National, State, and City Analysis of the U.S. Tech Industry and Tech Workforce*, 2017)
- Metro Denver ranked ninth among the 40 largest metro areas for startup activity in the 2016 *Kauffman Index: Startup Activity*, with 360 people out of 100,000 adults becoming entrepreneurs each month. (Ewing Marion Kauffman Foundation, 2016)

- Metro Denver ranked as the fourth-best metro area for young entrepreneurs in 2016. The metro area received accolades for its highly educated population and high rate of small business loans. (NerdWallet, 2016)
- Denver ranked third among the top 25 U.S. cities for fostering innovation and entrepreneurial growth. The city ranked among the top five for a healthy quality of life, a well-connected ecosystem, a vibrant cultural foundation, and a highly educated young population. (U.S. Chamber of Commerce Foundation, 2016)
- Metro Denver ranked as the fourth-best metro area for science, technology, engineering, and mathematics (STEM) professionals in 2016. Metro Denver ranked seventh for the projected number of STEM jobs needed by 2020. (WalletHub, 2016)

3. Low to moderate costs of doing business

- Colorado ranked fifth on *Forbes'* 2016 “Best States for Business” list. The state received its highest rankings for labor supply (first overall), economic climate (second overall), growth prospects (third overall), and regulatory environment (ninth overall). (*Forbes*, 2016)
- Metro Denver ranked No. 1 among *Forbes'* 2016 “Best Places for Business and Careers” for the second-straight year. Four other Colorado metropolitan areas were included on the list. The Colorado Springs metro area ranked 12th, Fort Collins ranked 18th, Boulder ranked 26th, and Greeley ranked 51st. (*Forbes*, 2016)
- Denver South’s office rental rates averaged \$24.51 per square foot in the first quarter of 2017, making the region’s office market highly competitive with other major markets in the U.S. Denver South has nearly 42.5 million square feet of office space and roughly 5,000 acres of ready-to-be-developed land. (CoStar Realty Information, Q1 2017; Denver South Economic Development Partnership)

4. A pro-business environment and competitive tax structure

- Colorado has one of the nation’s most favorable corporate income tax structures. The state’s corporate income tax rate of 4.63 percent is one of the lowest in the nation and is based on single-factor apportionment, which allows companies to pay taxes based solely on their sales in the state. (State of Colorado; The Tax Foundation)
- The Denver-Aurora-Broomfield metropolitan area ranked among the top 10 for economic development and job growth in the “Leading Locations for 2016” list. Areas recognized in the study exhibited economic strength and capacity to support business prosperity. (*Area Development*, 2016)
- Colorado has the nation’s ninth-best tax climate for entrepreneurship and small business. (Small Business & Entrepreneurship Council, 2016)
- Colorado ranked among the top five “Best States for Small Business Friendliness” in 2016. Denver received an “A-” grade for overall friendliness. (Thumbtack.com, 2016; Ewing Marion Kauffman Foundation, 2016)

5. An overall better quality of life

- Highlands Ranch (sixth) and Centennial (13th) ranked among *MONEY Magazine's* 2016 “Best Places to Live” list. (*MONEY Magazine*, 2016)
- Centennial ranked among the “Best Cities for Young Families” in 2017. The city ranked No. 49 out of 510 U.S. communities. (Apartment List, 2017)
- The Denver South region boasts a variety of quality living options from expansive apartment complexes to single-family homes surrounded by open spaces. One of the largest and most comprehensive master planned communities in the nation—RidgeGate—is located conveniently along I-25 and Lincoln Avenue in Lone Tree and offers over 3,500 acres of mixed-use density. The area is also known for beautiful neighborhoods, award-winning schools, and popular parks and trail systems. (Denver South Economic Development Partnership, 2017)

- The South Metro Corridor is home to seven state parks, greenways, and a national forest and has preserved over 50,000 acres of natural open space. The High Line Canal, designated as a National Landmark Trail, contributes to the region's robust trail system. (Denver South Economic Development Partnership)
- Denver ranked fifth among the "2016's Best Large Cities to Live In." Denver scored first for livability and third for local economy and taxes. (WalletHub, 2016)
- Metro Denver ranked as the third-fittest metropolitan area in the U.S. in 2016. Increased physical activity, low obesity and diabetes rates, and access to recreational opportunities contributed to its high rank. (American College of Sports Medicine, 2016)
- Nearly 30 public and private golf courses are located in the South Metro Corridor and world-class ski resorts are located within 100 miles of the Corridor. (Denver South Economic Development Partnership)

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