ECONOMIC DEVELOPMENT STRATEGIC PLAN
CITY OF FORT WORTH, TEXAS

VOLUME 2: OPPORTUNITY

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TIP strategies
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ABOUT THIS WORK

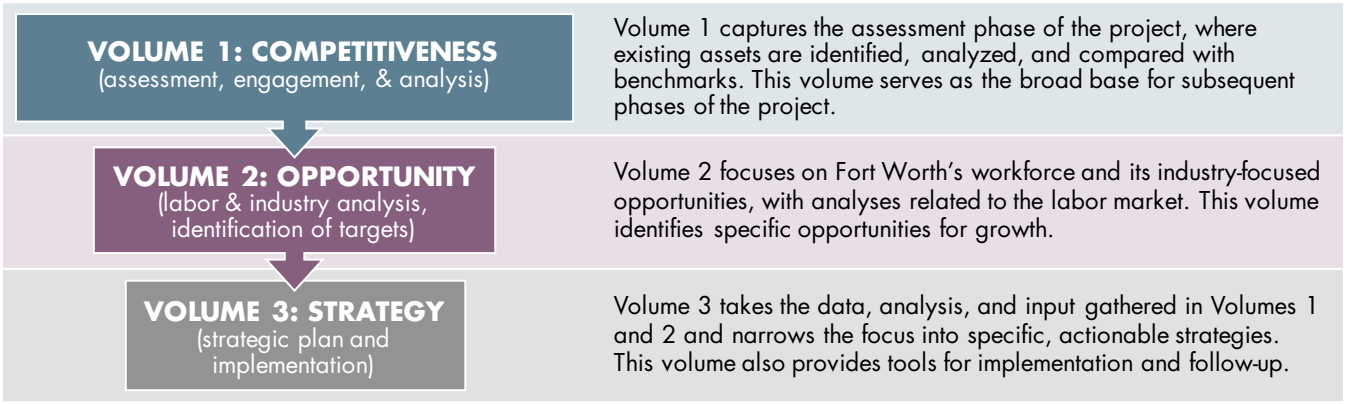
Over the last several decades, Fort Worth has been one of the fastest-growing large cities in the US. Fort Worth has a unique identity and brand that combines its rich cultural heritage with an economy driven by industry-leading employers like Lockheed Martin and American Airlines. The City has made strategic investments in districts from Sundance Square to Alliance, resulting in numerous waves of private sector investment and employment growth. However, all this has been achieved without a comprehensive, citywide approach for economic development. There is no question that Fort Worth is primed for greater economic prosperity. The challenge is not about growth in a general sense, it is about guiding growth that creates the highest overall benefit to the city. To accomplish this, future development will need to be channeled into specific districts, into generating higher income levels and capital investment, strengthening the local tax base, and supporting a more attractive environment for companies and skilled workers.

In response to these challenges, Fort Worth is embarking on its first economic development strategic plan, aimed at enhancing the city's status in the region and nation over the next five years and beyond. Working with TIP Strategies (an economic development consulting firm with offices in Austin and Seattle) and their partners (Fregonese Associates, JLL, and Isaac Barchas), the City of Fort Worth has engaged the business community and local stakeholders to create a strategic framework to guide the City's economic development activities.

Volume 2 of the Economic Development Strategic Plan focuses on Fort Worth's workforce and its industry-focused opportunities. The first major section of this document provides a detailed analysis of the area labor market, commuting patterns, workforce demographics, occupational characteristics, and postsecondary completions. In addition to the data, we analyzed the results of an online stakeholder survey, which provides qualitative insights about the area workforce from more than 300 local employers (including business owners and managers in the public and private sectors). This document also examines Fort Worth's opportunities for growth in two areas:

1. **Established industries.** Fort Worth has several long-standing industries that play a central role in the local economy (in terms of employment, visibility, and/or cultural heritage). These include: transportation and warehousing, manufacturing, healthcare, oil and gas, and tourism.
2. **Emerging opportunities.** These include new focus areas within Fort Worth's established industries and sectors which haven't fully matured locally. They include: aerospace manufacturing and design, transportation innovation, life sciences delivery and innovation, geotechnical engineering, international business, corporate and regional headquarters, professional services, and financial services.

The results of the planning process are presented in three interlinked volumes, described in the graphic below.



KEY FINDINGS

Over the last decade, economic development professionals have seen talent and workforce become integral parts of their work plans. This change in focus reflects the increasing emphasis placed on labor availability in site selection decisions and the growing awareness of the connection between talent and economic vitality. As a result, economic development success no longer rests solely on the availability of well-prepared sites, but rather, it extends to creating a climate that fosters innovation and a quality of place that will support the recruitment of both businesses and talent. Documenting the skills of the regional workforce, understanding existing industry strengths, and exploring emerging opportunities provides the foundation for this comprehensive approach.

WORKFORCE CONSIDERATIONS

GIVEN THE IMPORTANCE OF A SKILLED LABOR FORCE, FORT WORTH'S OPPORTUNITIES MUST BE CONSIDERED WITHIN THE CONTEXT OF ***ONGOING STRUCTURAL CHALLENGES****.*

A skilled labor force is the source of modern economic strength. Thus, structural challenges impacting the workforce must be addressed as part of an economic development strategy, including changes to city policy, where applicable. Our analysis shows that Fort Worth faces two key challenges that must be considered.

First, **while Fort Worth has experienced strong growth in its civilian labor force (CLF) over the past decade, job growth has not kept pace**. Among the Dallas-Fort Worth metro area peer communities, Fort Worth has seen one of the largest CLF increases relative to 2007 levels, outpaced only by McKinney and Frisco. Among the US cities benchmarked for this work, Fort Worth's 27 percent increase topped the list. Strong growth in the labor force can lead to a corresponding increase in the unemployment rate as new workers are absorbed into the labor pool, especially if employment growth does not keep pace. This lag in job growth relative to population has been the case in Fort Worth during the past decade. Estimates of employment and households prepared by the North Central Texas Council of Governments (NCTCOG) suggest the city's jobs-to-household ratio will erode further in the coming decades, dipping to 1.74 by 2040. At the same time, neighboring cities and more suburban areas are projected to see slight increases in this measure. Typically, a central city like Fort Worth would *lead* the region as an employment hub with a jobs-to-household ratio higher than its more suburban surroundings.

Second, **Fort Worth residents are increasingly dependent on jobs located in other cities**. Between 2005 and 2014, the number of residents commuting to jobs outside the city grew by 50 percent. By contrast, the share of workers commuting into Fort Worth increased by just 22 percent during the same period. Only one-third of the city's workforce (34 percent) resided in the city limits in 2014. This finding reflects Fort Worth's rapid population increase (and corresponding growth in the CLF), above-average levels of residential development, and lagging employment growth relative to the eastern side of the metro area. In addition to the fiscal and land use implications discussed in Volume 1, the threat of Fort Worth's continued "suburbanization" within the metro area extends to increased demand for government services (education, emergency services), overburdened infrastructure (transportation, parks, utilities), and the potential for greater economic and social disparity. A focused business development effort is required to balance the city's tax base and create economic opportunity for residents within the city.

A NUMBER OF FORT WORTH'S EXISTING SECTORS AND EMERGING OPPORTUNITIES WILL REQUIRE ***STEM TALENT****, WHICH IS CURRENTLY LACKING IN THE REGION.*

Location quotient (LQ) analysis is used to identify relative concentrations of employment in order to highlight competitive advantages and document areas that are underrepresented in the economy (see box below). A review of LQs at the major occupational group level reveals that the six-county Fort Worth Metropolitan Division (MD) has a much lower share of employment in key groups than would be expected in a labor market of its size, based on national patterns. (See Metropolitan Divisions, page 14, for a definition of this geography.) These underrepresented groups include STEM occupations (those in the fields of science, technology, engineering, and mathematics), which are essential to the success of the city's existing strengths and emerging opportunities. As shown below, the Fort Worth MD has the lowest concentration of computer & math and science occupations among the domestic (US) benchmark metro areas; Dallas, Denver, and Kansas City have the highest. A more detailed analysis at the individual occupation level is provided in Figure 36 (page 47). This challenge will require strategies that address talent development and retention, as well as recruitment.

FIGURE 1. CONCENTRATION OF EMPLOYMENT, 2016 (USA=1.00)
AMONG METROPOLITAN DIVISIONS (MD) AND METROPOLITAN AREAS (MSA)

	15-0000 Computer & Math	17-0000 Arch. & Engineering	19-0000 Science
Fort Worth (MD)	0.81	0.97	0.53
Dallas (MD)	**1.64**	1.10	0.60
Dallas-Fort Worth (MSA)	1.40	1.06	0.58
Columbus, OH (MSA)	1.36	0.96	0.95
Denver, CO (MSA)	1.57	**1.46**	**1.25**
Indianapolis, IN (MSA)	0.99	0.84	1.18
Kansas City, MO (MSA)	1.37	0.97	0.87
Nashville, TN (MSA)	0.83	0.81	0.65
Oklahoma City, OK (MSA)	0.83	1.17	0.99
Phoenix, AZ (MSA)	1.31	1.12	0.67
Pittsburgh, PA (MSA)	1.00	1.13	1.08

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

ABOUT LOCATION QUOTIENTS (LQS)

Location quotient analysis is a statistical technique used to suggest areas of relative advantage based on a region's employment base. LQs are calculated as an industry's share of total local employment divided by the same industry's share of employment at the national level:

(local employment in industry/
total local employment -all industries)
(national employment in industry/
total national employment-all industries)

If the local industry and national industry are perfectly proportional, the LQ will be 1.00. LQs greater than 1.25 are presumed to indicate a comparative advantage; those below 0.75 suggest areas of weakness but also point to opportunities for expansion or attraction.

EMPLOYMENT IN FORT WORTH'S URBAN CORE *GENERATES CITYWIDE ECONOMIC BENEFITS AND SHOULD BE ENCOURAGED.*

As highlighted in Volume 1, Fort Worth's existing and emerging districts have the potential to serve as drivers of the City's economic development efforts. This potential extends to their role as employment-generating nodes. While Volume 1 emphasizes the need to capitalize on the city's substantial volume of vacant land, there is an argument to be made for maximizing the central city's employment potential. Combined, the five major districts analyzed in this report accounted for 35 percent of the city's total employment as of 2016, but represented 41 percent of citywide employment growth from 2010 to 2016. Looking forward, the NCTCOG forecast predicts the majority of the city's employment growth through 2040 will occur in the central city, further demonstrating the urban core's importance to Fort Worth's job base.

Of the five districts analyzed, four are located in Fort Worth's urban core: Downtown, Near Southside, Cultural District, and Stockyards. Although these employment nodes draw in workers from a broad area, they provide an important source of jobs for the local labor force. Each of these nodes has a laborshed with at least one-third of workers residing in Fort Worth and roughly two-thirds of workers residing within Tarrant County By contrast, the fifth employment node, Alliance, primarily draws workers from outside the area. Just 15 percent of Alliance workers live in Fort Worth and 40 percent of the Alliance workforce resides in Tarrant County.

Among the most significant benefits of focusing on employment districts is the ability to help improve Fort Worth's jobs-to-household ratio. The deterioration seen in this important metric in recent years is cause for concern as imbalances typically strain transportation networks, leading to longer commute times, air quality issues, and inequalities in access to employment among residents. A focus on encouraging employment-generating uses would also lead to additional commercial and industrial development, which would help address current imbalances in the city's tax base. The urban core districts and Alliance provide complementary opportunities for addressing both issues.

EXISTING INDUSTRY STRENGTHS

The rationale for identifying target industries is to orient the community toward high-growth sectors that can provide a new wave of business growth and investment. The foundation for target industry identification begins with an understanding of the current economic base. As highlighted in Volume 1, Fort Worth has several established sectors that currently dominate the local economic landscape. Building on these existing strengths and connecting them with future opportunities is at the core of a successful targeting initiative.

THE ***TRANSPORTATION & WAREHOUSING*** *SECTOR IS THE CITY'S LARGEST IN TERMS OF ITS SHARE OF TOTAL EMPLOYMENT.*

The transportation & warehousing sector is a significant source of employment and one of the city's fastest growing. In 2016, one in every eight jobs in the city was in the transportation & warehousing sector. Between 2010 and 2016, the sector was second only to healthcare in terms of employment growth. The dominance of the transportation & warehousing sector—which includes the transport of passengers and freight using a variety of modes (e.g., truck, transit, rail, air)—reflects Fort Worth's history as a crossroads. The city's transportation assets include a network of interstate highways (I-20, I-30, and I-35), access to two Class I railroads (BNSF and UP), and two airports providing global connectivity (Alliance and DFW International Airport).

Fort Worth's strengths in this sector are also reflected in its occupational structure, with nearly 11 percent of the city's employment base in material moving jobs. This figure is significantly above the share that would be expected

for a labor force of the same size based on national patterns, as evidenced by Fort Worth's location quotient (LQ) of 1.61 for the occupational group. The city's long history as a transportation hub, its dense network of transportation infrastructure, and human capital assets create a solid foundation for capitalizing on recent innovations in the industry, as outlined in the Emerging Opportunities section.

*REGIONAL STRENGTHS IN **MANUFACTURING** ARE WEIGHTED TOWARDS FORT WORTH.*

Since 2010, manufacturing employment growth in the Dallas-Fort Worth metro area has taken place almost exclusively in the Fort Worth MD. Both the city and the Fort Worth MD have strong concentrations of employment in the sector relative to the national average, with LQs of 1.26 and 1.09 respectively. The manufacturing industries in the MD with the largest employment are aircraft, automotive, and pharmaceuticals. In Fort Worth, the employment in these industries is driven by Lockheed Martin and Bell Helicopter (for aircraft manufacturing) and Novartis's Alcon subsidiary (for pharmaceuticals). General Motors is the primary driver of the MD's automotive manufacturing employment in Arlington.

Like the transportation & warehousing sector, the city's manufacturing strengths are reflected in its occupational structure, with production workers accounting for just over 7 percent of the city's total job base. This sector's LQ of 1.22, indicates employment levels above national averages. However, as the sector becomes increasingly dependent on the development and adoption of new technologies, the ability to attract and retain a pipeline of skilled talent will become the major determinant in the health of the region's manufacturing base. Fort Worth's relative lack of workers in STEM-related occupations threatens to inhibit growth in this sector in the future.

*FORT WORTH'S RESILIENT **HEALTHCARE** EMPLOYMENT HAS AVOIDED CYCLICAL PATTERNS.*

Among the five highlighted clusters of existing industry strength in Fort Worth, healthcare is the only employment sector in the city that consistently added net new jobs each year from 2010 through 2016. This lack of employment cyclicality, during a period of national economic turbulence, reflects an inherent strength of the healthcare sector as a relatively stable economic base for the city.

Employment in healthcare occupations in the Dallas-Fort Worth MSA between 2010 and 2016 was explosive, leaping 24 percent over the period and tying the MSA with Atlanta for the fastest healthcare growth among the nation's large metros. With its high concentration of medical institutions in the Near Southside, the city of Fort Worth can (and should) play a leading role as the center of gravity for the MSA's healthcare sector.

*THE **OIL & GAS** SECTOR IS EVOLVING, AND FORT WORTH'S ROLE MUST EVOLVE AS WELL*

Fort Worth's economy has long been shaped by the volatility of the oil & gas sector. The sector has traditionally been—and will continue to be—pro-cyclical in its national and local employment patterns. Nationally, employment in the sector grew by 34 percent from 2010 to 2014. Growth in the Fort Worth MD nearly doubled that pace (62 percent) during the same period, only to shed nearly all those jobs from 2014 to 2016. Future regional job growth is projected to happen mostly in the Fort Worth MD. While it comprises a relatively small share of total employment in the Fort Worth MD, it is highly concentrated in the area relative to national employment patterns as evidenced by the sector's LQ of 3.37.

Historic trends indicate that downturns in this sector usher in job consolidation, of which Houston has often been the beneficiary over the sector's regional outposts like Fort Worth, Denver, New Orleans, Tulsa, and Midland. Denver, in particular, provides some guidance in how a major metropolitan area can redirect its growth toward other sectors (communications and technology have been important drivers for Denver in recent decades). Meanwhile, in

the greater Denver region, a more broadly defined "energy sector" has been active in the development of alternatives and renewables. As the data and trends in this report show, Fort Worth, too, may find that its best opportunities in the oil & gas sector are in selected niches where it can compete effectively. Options for this are discussed more in the "Emerging Opportunities" section of this volume.

*THE **HOSPITALITY & TOURISM** SECTOR REMAINS UNDER-DEVELOPED IN THE CITY OF FORT WORTH RELATIVE TO ITS POTENTIAL*

Fort Worth is home to an enviable array of tourism assets, including a globally connected airport, world-class museums, and a top-ranked zoo. Despite these and other strengths, a key finding presented in Volume 1 was that the City has not fully tapped into Fort Worth's potential as a visitor destination. The report, which was focused on competitiveness, concluded that "Despite a unique blend of visitor destinations (Sundance Square, the Stockyards, and the Cultural District), Fort Worth underperforms surrounding cities in terms of hotel revenues, indicating unmet demand." Moreover, the report encouraged greater collaboration with the Fort Worth Convention & Visitors Bureau (CVB) and the Fort Worth Chamber of Commerce toward their mutually shared goals.

Those opportunities identified in the first volume are further underscored by the research in Volume 2. While the Dallas-Fort Worth MSA as a whole enjoyed post-recession employment gains of more than 7,300 jobs in the hospitality & tourism sector through 2016, the city of Fort Worth saw a marginal net *decline* in total jobs in this sector. This trend correlates, to some extent, with the findings in Volume 1, which showed the city's comparatively lagging growth in hotel room revenues. Strategies relating to the city of Fort Worth's image, branding, and commitment to key districts—including the downtown district—can be tied to a reinvigoration of the city's hospitality & tourism sector.

EMERGING OPPORTUNITIES

Growth can and should take place within the city's established sectors. But a narrow focus on existing industries is not enough. In order to position the city for a higher level of economic prosperity, we have identified eight emerging opportunities with significant potential for new business creation, expansion, and relocation. Fort Worth's emerging opportunities for new investment and job growth are outlined below.

***AEROSPACE MANUFACTURING & DESIGN:** FORT WORTH'S AEROSPACE MANUFACTURING EXPERTISE AND RELATIVELY HIGH PROFILE IN THIS INDUSTRY SHOULD BE LEVERAGED TO PURSUE DESIGN AND R&D FUNCTIONS.*

Fort Worth is one of the leading aerospace manufacturing centers in North America, a position that has become even stronger over the past quarter-century as Los Angeles's strength has eroded due to industry consolidation and the migration of headquarters to be closer to the Pentagon. Numerous aerospace manufacturers operate in the Dallas-Fort Worth metro area, but the lion's share of employment resides in Fort Worth. Between Lockheed Martin Aeronautics' facility located at NAS Joint Reserve Base Fort Worth (where the F-35 and F-16 are manufactured) and Bell Helicopter Textron, there are nearly 20,000 workers in Fort Worth. Other companies, like Elbit Systems of America, play an important role in this sector as well. The industry's extensive local presence means that Fort Worth has a specialized labor pool of skilled aerospace talent, an unusual asset in the US. The LQs within the Fort Worth MD are particularly noteworthy in several aerospace and aviation occupations: aerospace engineering & operations technicians (3.07), aerospace engineers (3.06), and mechanical engineering technicians (1.84).

The convergence of unmanned air systems (UAS), drones, and in-demand electric vertical-takeoff-and-landing (e-VTOL) has the potential to create new technology and employment opportunities in the region. Uber has announced plans to team up with Fort Worth and other cities to launch in-demand e-VTOL air-taxi service in 2020. Bell Helicopter is part of the team Uber has assembled to develop the technology and infrastructure. Uber is also partnering with Hillwood to launch its UberAIR service and develop vertiports. One such vertiport is planned for downtown Fort Worth. Alliance Airport has been mentioned as a potential site for manufacturing and training center support for UberAIR.

Technological innovations in the aerospace industry are affecting the occupations and skills required by employers, especially original equipment manufacturers (OEM) such as Lockheed Martin and Bell Helicopter. The traditional emphasis on "drill and fill" assembly workers dominating the production floor is shifting. New technologies and products like fly-by-wire flight controls and unmanned systems are increasing the demand for IT specialists (e.g., software developers and computer engineers). Likewise, the growing use of composites and utilization of additive manufacturing (3D printing) and robotics is also driving demand for production workers with advanced technical skillsets. Other occupations and positions projected to grow in the coming years include logistics and supply chain management positions and repair and maintenance technicians (especially for composite materials).

These trends in the aerospace industry affect several of Fort Worth's largest employers. Working with these employers to address their specialized skill requirements, amid a rapidly changing technological environment, should be a priority for the City. Meeting the growing demand for aerospace workers with advanced skillsets will require a greater emphasis on STEM education and training at the local level. A ready-to-go replacement workforce of younger, more diverse workers with modern technological skills will benefit Fort Worth from an employer retention standpoint, and it will also empower the workforce with skills adaptable to the more entrepreneurial climate that is evolving within this sector.

TRANSPORTATION INNOVATION. *DRAMATIC TECHNOLOGICAL ADVANCES OCCURRING IN THE TRANSPORTATION INDUSTRY PRESENT A BUSINESS DEVELOPMENT OPPORTUNITY FOR THE CITY.*

Dramatic technological advances have the potential to transform the transportation industry. Disruptive developments, such as the pursuit of autonomous vehicles, the integration of drones into economic activities, and the move towards transportation as a service (e.g., ride-sharing models) are prominent examples. Cities around the world are making themselves labs for things like autonomous vehicle testing and are experimenting with investments in "smart city" technologies for seemingly mundane things like sensory-controlled traffic signals, parking meters with real-time market pricing, and GPS-enabled resident feedback loops for reporting potholes, fallen branches, graffiti, etc.

Home to some of the nation's leading transportation companies—BNSF, American Airlines, Lockheed Martin, Bell Helicopter Textron, and Epic Helicopters—Fort Worth has ample local opportunities for "partnering" with companies who need a municipal platform for testing new innovations. Local assets also include the Federal Aviation Administration's Southwest US regional office, the Erma C. Johnson Hadley Northwest Center of Excellence for Aviation, Transportation & Logistics at Tarrant County College (TCC), and transportation-focused educational programs at nearby schools, including the University of Texas at Arlington (UTA) and the University of North Texas (UNT).

LIFE SCIENCES DELIVERY & INNOVATION. *OPPORTUNITIES CREATED BY FORT WORTH'S LARGE CONCENTRATION OF HEALTHCARE EMPLOYMENT, LIFE SCIENCES FIRMS, AND NEWLY ESTABLISHED TCU-UNTHSC SCHOOL OF MEDICINE SHOULD BE AGGRESSIVELY PURSUED.*

The presence of life sciences firms, such as Alcon Laboratories, Galderma, and Encore Vision, coupled with the recently developed TCU-UNTHSC School of Medicine and the city's large concentration of medical jobs, presents a significant opportunity. The creation of a formal "innovation district" in the Near Southside medical district, with new and expanded incentives, programs, and policies, will provide a mechanism to link healthcare delivery functions with life sciences innovations, products, and devices. By facilitating partnerships between medical providers, educational institutions, and life sciences firms, a medical innovation district can foster entrepreneurship, accelerate the growth of innovative companies, and fuel citywide growth.

Medical innovation districts also have the potential to act as magnets for talent. As a result, these districts tend to favor locations with dense activity in a mixed-use environment. The mixed-use environment surrounding Fort Worth's medical district represents a major advantage and opportunity for the city versus other districts in the state and beyond.

GEOTECHNICAL ENGINEERING. *FORT WORTH IS WELL-POSITIONED FOR GROWTH AND INNOVATION IN THIS FIELD DUE TO ITS LONG-STANDING STRENGTHS IN OIL AND GAS.*

Applications for geotechnical engineering range from the military to extractive industries (like oil & gas) to public infrastructure projects. Fort Worth's ties to geotechnical engineering have traditionally been via the oil & gas sector. Yet, while Fort Worth is considered more of an oil & gas center than the rest of the metro area, the firms operating in the traditional production side of the industry employ barely more than 7,000 workers in the city, or about 1.5 percent of the municipal job base. During the field work and research for this report, however, an epiphany occurred. As part of this planning process, a group of 40 commercial real estate professionals (brokers and site selectors) completed an online questionnaire about their perceptions of Fort Worth. When asked the question, "Which of the following industries do you associate with Fort Worth," oil & gas ranked second among 12 industries listed (tied with real estate & construction), with 68 percent of respondents associating it with the city.

Indeed, specific occupational strengths exist locally in geotechnical engineering. The Fort Worth MD has high LQs in several geotechnical engineering occupations: petroleum engineers (2.13), geological & petroleum technicians (1.89), mining & geological engineers (1.75), geoscientists (1.44), nuclear engineers (1.38), and surveying & mapping technicians (1.38). These are all occupations that are as likely to be employed in oilfield services and consulting as in core oil & gas production. Fort Worth's workforce strengths in geotechnical engineering position the community to serve as a hub for development of new technologies in related sectors.

In a postscript to this analysis, XTO Energy's June 2017 announcement—late in the strategic planning process for this 3-volume study—of a pending relocation of 1,600 jobs from Fort Worth to the new Exxon campus in the Houston suburbs has sparked a robust dialogue about the future of the city's oil & gas sector. The loss of such a major local player presents obstacles to this opportunity, though there is reason for hope that some of XTO's local talent may be retained and redeployed: XTO's founder and former CEO, for example, has already launched a new venture in downtown Fort Worth.

INTERNATIONAL BUSINESS. *THE GLOBAL NAME RECOGNITION AND EXISTING INTERNATIONAL ASSETS AVAILABLE TO FORT WORTH PRESENT THE OPPORTUNITY TO STRENGTHEN INTERNATIONAL BUSINESS AND TOURISM OPPORTUNITIES.*

The opportunities for capitalizing on global trade, investment, and tourism are not evenly distributed. Cross-border connectivity must, by necessity, rely on limited gateways of entry. Chinese goods typically enter the US by containership via the San Pedro port complex in Los Angeles/Long Beach. Similarly, international visitors to North America—investors, business executives, tourists—typically arrive by air through a limited number of entry points. Few cities have international passenger airports, and those that do often offer limited options for travelers.

Fort Worth is one of the few cities with the potential to emerge onto the global stage at a rapid pace over the next 5 to 10 years. This global emergence must be done in concert with DFW International Airport's rise as a more significant global transport hub. The extensive and increasing array of international destinations offered by DFW is a unique regional asset that few locations in the US can match. It is the basis—the starting point—for crafting an international business strategy.

Beyond the airport, an international strategy must also leverage the entire metro area's growing base of foreign-owned corporations and US companies operating in the global marketplace. Fort Worth's large and increasing population of foreign talent is another key advantage for the growth of international business. As with many of the opportunities identified in this report, the city's success will also hinge on raising the profile of Fort Worth nationally and internationally and creating a quality of place that builds on the city's unique districts and authentic culture. These and other recommendations are outlined in the strategic plan (Volume 3).

CORPORATE & REGIONAL HEADQUARTERS (HQs). *A MORE AGGRESSIVE STANCE WILL BE REQUIRED FOR FORT WORTH TO CAPTURE ITS FAIR SHARE OF THESE HIGH-PROFILE PROJECTS.*

The competitiveness assessment (the first volume of this 3-volume strategic planning process) identified several untapped opportunities in Fort Worth. Three of the key findings are worth reiterating. First, residential development and population growth in Fort Worth has been robust, but employment growth in the city has lagged the rest of the Dallas-Fort Worth metro area—especially in high-wage professional jobs. Second, many recent high-profile corporate relocation projects in the metro area have landed outside Fort Worth's city limits (e.g., Toyota in Plano and Charles Schwab in Westlake). And third, the influx of tech firms and IT workers has also largely bypassed Fort Worth in favor of scattered locations in Dallas, Richardson, Plano, and Irving.

Fort Worth must take advantage of the metro area's established position as one of America's leading corporate HQ destinations. The city can ensure that it captures its fair share of corporate and regional HQ relocation projects by better marketing its advantages. For starters, Fort Worth is a city—not a suburb—in an era when cities are becoming more desirable corporate locations than suburban office parks. Established urban districts within Fort Worth provide the precise amenities most desired by corporate office tenants. Further, Fort Worth offers faster access to both DFW International Airport and Alliance Airport. Fort Worth essentially shares a metropolitan labor pool with its metro area competitors, offering equal access to the same large, rapidly expanding workforce that corporate employers are seeking. TCU Neeley Business School's nationally ranked entrepreneurship undergraduate program sweetens the deal even more with its stream of creative young graduates.

PROFESSIONAL SERVICES. *THE DRAMATIC REGIONAL GROWTH IN THIS SECTOR HAS NOT BEEN REALIZED IN FORT WORTH, BUT SHOULD BE.*

As documented in Volume 1, professional services employment is highly concentrated in the Dallas MD compared to the Fort Worth MD. Recent growth trends are even more troubling for Fort Worth. While the Dallas MD experienced rapid growth of professional services employment in the post-recession period, the Fort Worth MD essentially saw no change in its professional services job base. A similar story holds true for high-growth startups.

The Dallas-Fort Worth metro area's professional service sector is projected to add nearly 42,000 jobs over the next five years. If the recent post-recession trends persist, where will those jobs go? Without an adequate supply of office space (especially newer, Class A buildings) to support them, the answer will not be Fort Worth. Using the rule-of-thumb of 200 square feet per worker, the five-year job projection translates to about 8.4 million square feet of office space absorption by the professional services sector alone, excluding all other types of office-using industries. Where within the metro area this speculative office space is built will be an important determinant of where the job growth can feasibly be absorbed.

Fort Worth can begin to make a viable case for new office space by showcasing, for developers, the city's potential internal demand drivers including its major employers who rely on the professional services of lawyers, accountants, engineers, consultants, etc., who could just as easily be located on the western side of the metropolitan area, namely Fort Worth. Startup activity is another demand argument, especially when considering the potential that the TCU Neeley Business School's nationally ranked entrepreneurship undergraduate program could feasibly generate.

FINANCIAL SERVICES. *LEVERAGE FORT WORTH'S ROLE AS A SIGNIFICANT CENTER OF PRIVATE EQUITY.*

The broadly defined financial services sector includes, among other things, a vast array of bank branches, insurance agents, and personal financial advisors. These are the sector's traditional "retail" interfaces —the place where consumer transactions have long taken place. However, the sector is currently facing significant disruption. This shifting landscape offers multiple opportunities for the city of Fort Worth to become a larger player in the financial services sector.

One of the primary opportunities results from the continued decentralization of corporate functions like data processing and storage, accounting, procurement, customer services, and human resources. Faced with high real estate and labor costs in traditional financial centers, firms continue to look for lower cost options for these back-office activities. In addition, increasing demands for IT investments are likely to prompt the need for additional space outside of traditional financial markets. Along with the migration of corporate functions, interactions with customers are also increasingly migrating to a new venue, the internet. This trend has opened the door for both outsourcing and direct competition and has created a new market for security services that goes well beyond the armored vehicles and safe deposit boxes of yesterday.

Meanwhile, pensions and endowments, which have traditionally taken a back seat to more well-known elements of the financial services sector, have stepped forward to become more vocal front-seat actors in the allocation of investment capital. Pensions and endowments have led industry efforts to screen investments based on environmental, social, and corporate governance (ESG) standards. And private equity firms have emerged to play a vital, high-profile economic role in restructuring under-performing firms and industries.

The landscape of the financial services sector is rapidly changing and can no longer be viewed simply in terms of regional banks and insurance companies. The presence of large pools of investment capital (including major private

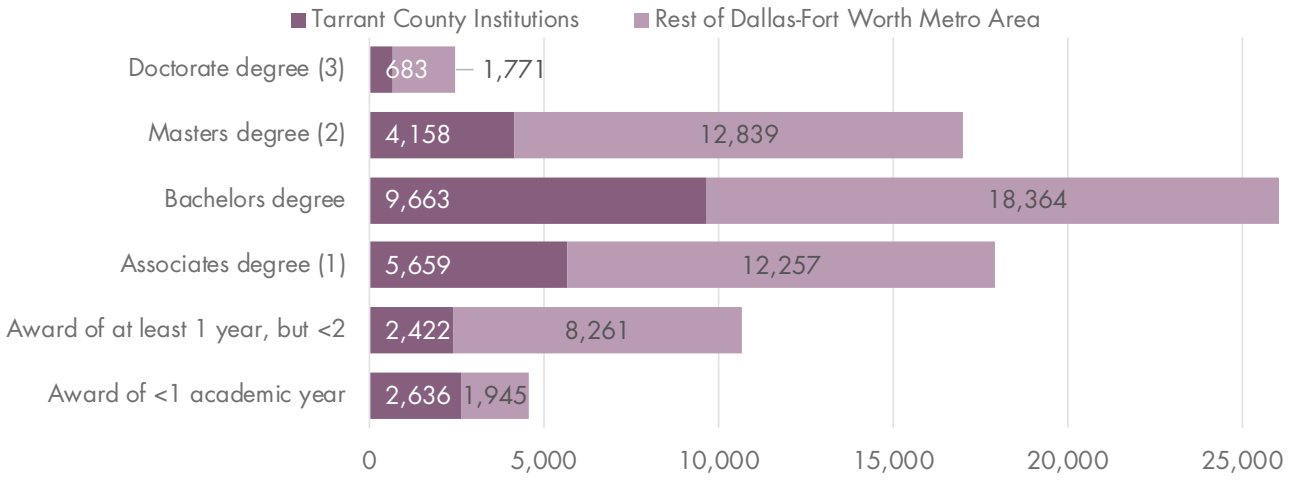
equity and high net worth individuals) creates a real opportunity for Fort Worth to capitalize on the Dallas-Fort Worth metro area's increasing role as a major national and international hub of financial services. Furthermore, the sector's significant technological disruption could be linked to Fort Worth's entrepreneurial ecosystem (mapped in Volume 1).

CONNECTING THE DOTS

*TARRANT COUNTY **HIGHER EDUCATION** INSTITUTIONS ARE A KEY COMPONENT OF THE REGION'S TALENT PIPELINE AND ARE AN ESSENTIAL PIECE OF FORT WORTH'S FUTURE SUCCESS.*

Tarrant County is a major source of college graduates for the region, with more than 25,000 annual completions out of nearly 78,000 in the entire metro area. UT-Arlington and Tarrant County College (TCC) are the first- and third-ranked higher education institutions in the metro area in terms of the number of completions in 2015. Texas Christian University (TCU) is the ninth largest. Together, those three institutions account for more than 21,000 completions. When viewed by award level, Tarrant County institutions accounted for more than one-half of the metro area's awards of less than one academic year and roughly one-third of all bachelor's degrees in 2015.

FIGURE 2. DISTRIBUTION OF AWARDS BY LEVEL, 2014-2015 ACADEMIC YEAR
TARRANT COUNTY VS. REST OF DALLAS-FORT WORTH METRO AREA



Source: Emsi 2017.2 compiled from the Integrated Postsecondary Data System (IPEDS) maintained by the Natl. Center for Education Statistics.
Notes: IPEDS data include only schools eligible to participate in federal financial aid programs. (1) Figure includes small number of awards of at least 2, but less than 4, academic years; (2) Includes post baccalaureate certificates; (3) Includes post-masters' certificates.

*MEETING THE GROWING DEMAND FOR AEROSPACE WORKERS WITH **ADVANCED SKILLSETS** WILL REQUIRE A GREATER EMPHASIS ON STEM EDUCATION AND TRAINING AT THE LOCAL LEVEL.*

The aerospace and defense industry faces a significant brain drain, the result of an aging workforce and stiff competition to attract and retain young talent. According to Aviation Week's *2016 Workforce Study*, just over one in four workers (26.8 percent) qualified for retirement in 2015. However, the industry's actual retirement rate is "staggeringly low" at roughly 3 percent of the total workforce (or just 10 percent of those eligible). As in prior years, the study highlights the need to increase the pipeline of STEM talent and increase "work-readiness" skills among younger workers. Increasing diversity in the workforce was also cited as an issue.

These issues are echoed in the forthcoming *North Texas Aerospace and Aviation Talent Pipeline Study*. Per the (unpublished) study, regional aerospace employers are concerned about a coming wave of retirements, especially among workers in key occupations. To fill many of the critical positions, employers must do a better job of attracting women and other under-represented populations.

Air transportation companies in the Dallas-Fort Worth metro area are also facing talent pipeline challenges. Similar to aerospace manufacturers, air transportation employers report difficulty in identifying and attracting IT specialists and software developers. In addition, there is a concern about meeting the future demand for pilot positions. Airlines report a significant portion of their pilots are approaching the mandatory retirement age of 65. American Airlines is also in the process of transitioning newer aircraft into its fleet, which will require hiring additional commercial pilots with training and experience in operating the new aircraft.

In order to meet the talent pipeline needs of regional aerospace and air transportation employers, the *North Texas Aerospace and Aviation Talent Pipeline Study* recommends the development of a demand-driven career pathways system to connect residents to jobs in the aerospace and aviation industries. This is especially true for building a long-term supply (within the existing K-12 population) to meet many of the critical skills needs, especially in advanced manufacturing, information technology, and systems engineering.

*THE CITY'S **INCENTIVES** POLICY SHOULD BE DESIGNED TO PROMOTE GROWTH IN SPECIFIC GEOGRAPHIC AREAS AND IN TARGET INDUSTRIES.*

The intensely competitive environment in the Dallas-Fort Worth metro area requires a bold response. For Fort Worth to compete for high-profile investments, the city's existing incentives policy will need to be re-evaluated. A competitive incentives policy should provide a citywide framework that directs resources to specific areas, industries, and skill levels in accordance with specific shared goals. Geographic priorities should include incentives for the Near Southside that encourage and support the formation of a medical innovation district in the area and policies to support residential development in downtown Fort Worth. Examples include incentivizing needed infrastructure, such as broadband, and streetscape improvements that enhance walkability and connectivity. In terms of industry, the focus should be on supporting the region's existing industry strengths, while helping encouraging growth and innovation around the emerging opportunities. Examples of skills-driven incentives could include the recruitment of life science researchers, top-level clinicians, and related scientists to support the medical innovation district. Regardless of the incentives chosen, the policy should be transparent and consistent and should include a mechanism for measuring performance.

*FORT WORTH MUST COMMIT TO MAKING THE **PUBLIC INVESTMENTS** REQUIRED TO TAKE THE CITY TO THE NEXT LEVEL*

A bolder economic development strategy for the city will require a strong commitment to make needed public investments. At the core of this commitment, are investments in livability, "Smart City" infrastructure, and projects that support the City's business development goals. A carefully crafted economic development bond package, like the Oklahoma City Metropolitan Area Projects (MAPS) bond program, can provide the mechanism. The MAPS program, which is now in its third iteration, has helped transform the city through investments that have revitalized downtown and provided new and upgraded facilities.

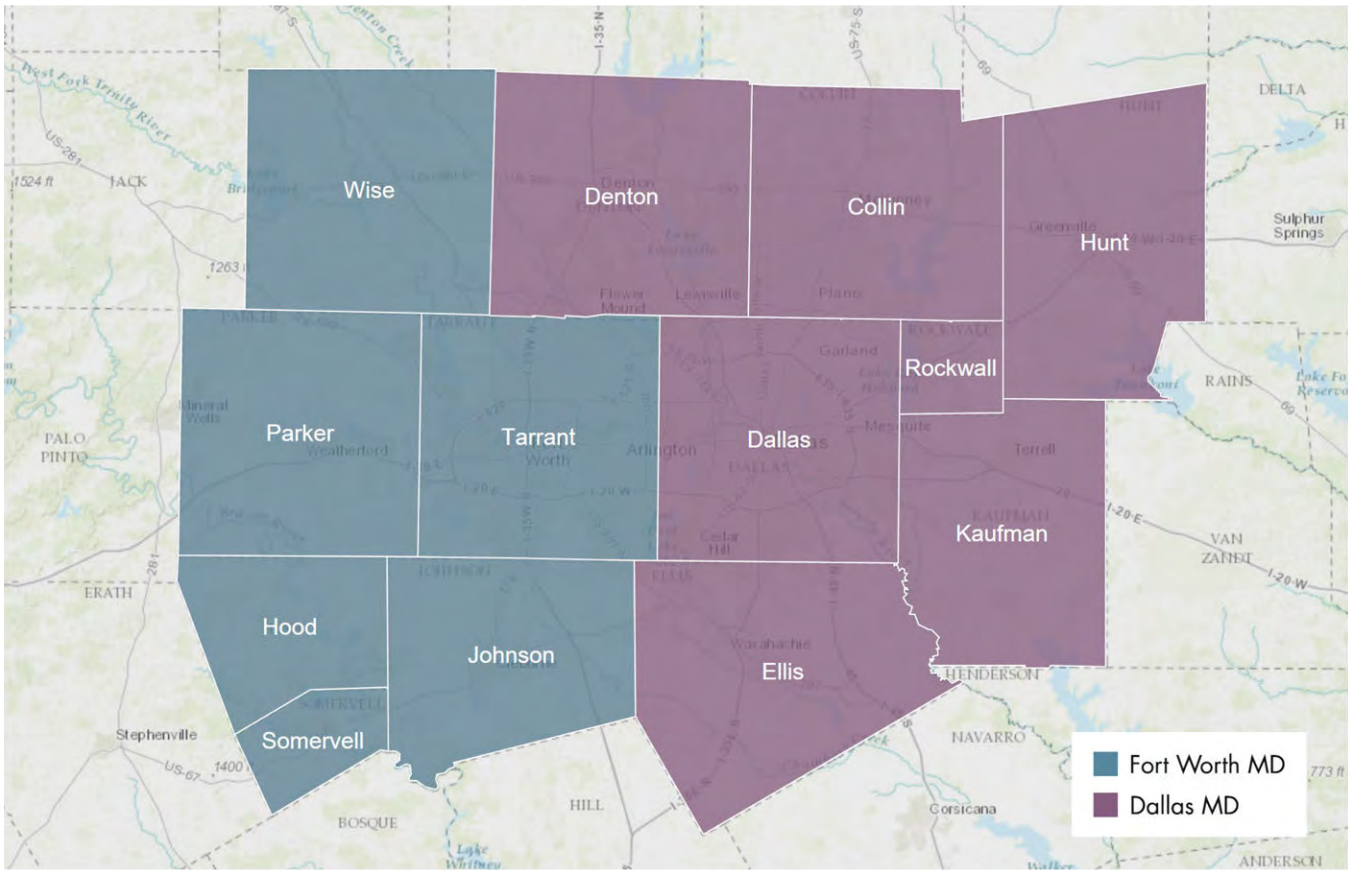
*TO **ADVANCE ECONOMIC DEVELOPMENT** TO THE NEXT LEVEL IN FORT WORTH, AN EXPANDED, COLLABORATIVE EFFORT WILL BE REQUIRED.*

Fort Worth has the potential to become a world-class city. Its assets are enviable: location in a fast-growing dynamic metropolitan area; a multi-modal transportation network, including one of the world's top airports; internationally known museums; a strong manufacturing sector that includes large multinational corporations. What has been missing are clear objectives and a collaborative, aggressive approach to meet them. The strategies outlined in Volume 3 provide a game plan for establishing Fort Worth's "competitive edge." They focus on addressing the city's branding and marketing challenges, implementing a more focused approach to business development, and creating partnerships with workforce and industry to ensure the availability of talent. In addition to these goals, a "next-level" economic development strategy must encourage innovation and creativity, build an environment that is attractive to talented individuals and dynamic businesses, and maintain a forward-looking organizational structure. Carrying out these goals will require a collaborative effort that is built on a clear understanding of roles and desired outcomes.

REFERENCE APPENDIX

1. METROPOLITAN DIVISIONS

The Dallas–Fort Worth–Arlington, TX Metropolitan Statistical Area (Dallas-Fort Worth metro area) includes two metropolitan divisions (MDs): the Fort Worth-Arlington, TX Metropolitan Division (Fort Worth MD) and the Dallas-Plano-Irving, TX Metropolitan Division (Dallas MD). To better illustrate Fort Worth's performance within the larger metropolitan area, a number of the analyses conducted as part of this work use this geographic concept.



Sources: TIP Strategies (map); Office of Management and Budget, OMB Bulletin No. 15-01 (metropolitan division definitions).

ABOUT METROPOLITAN DIVISIONS

Metropolitan divisions are smaller groupings of counties or equivalent entities defined within a metropolitan statistical area containing a single core with a population of at least 2.5 million. Not all metropolitan statistical areas with a single core population of this size will contain metropolitan divisions. A metropolitan division consists of one or more main/secondary counties that represent an employment center, plus adjacent counties associated with the main/secondary county or counties through commuting ties.

2. REGIONAL LABOR STUDY

Over the last decade, labor availability has risen to the forefront of corporate strategy and site location decisions. As a result, economic development organizations have seen talent and workforce development become integral pieces of their workplans. Ensuring the availability of a skilled workforce will be essential to the city's future growth.

The Regional Labor Study includes the following elements:

- LABOR MARKET OVERVIEW. This section uses standard labor market information prepared by the US Bureau of Labor Statistics to profile the growth of the Fort Worth MD) labor force relative to the domestic benchmarks.
- COMMUTING PATTERNS. Data from the US Census Bureau's Local Employment Dynamics is used to illustrate the flow of workers to and from Fort Worth.
- OCCUPATIONAL ANALYSIS. This section provides an overview of the Fort Worth MD's occupational structure, with comparisons to the domestic benchmarks, using employment data from private data provider, Emsi. In addition, real time labor market information compiled by Emsi is used to understand the skills and certifications sought by local employers.
- POSTSECONDARY COMPLETIONS. Data from the National Center for Education Statistics' Integrated Postsecondary Data System (IPEDS), accessed via Emsi, is used to document the fields of study being pursued in the region.

LABOR MARKET OVERVIEW

The civilian labor force (CLF) in the six-county Fort Worth MD approached 1.25 million in May 2017, the most recent date for which figures are available. Unemployment rates were comparable across the region, with both metropolitan divisions and the Dallas-Fort Worth MSA outperforming both the state and the nation. Figure 4 (next page) provides a similar overview for selected Dallas-Fort Worth metro area peers and the domestic benchmarks (at the city and MSA level), including a comparison with the prior year's figures. This comparison suggests that Fort Worth's CLF growth has begun to taper off in percentage terms relative to its metro area peers. However, when viewed over the past decade, Fort Worth has outpaced all the domestic benchmarks and the vast majority of its metro area peers (Figure 8, page 22).

FIGURE 3. LABOR MARKET OVERVIEW, MAY 2017
NOT SEASONALLY ADJUSTED

	CIVILIAN LABOR FORCE	EMPLOYED	UNEMPLOYED	UNEMPLOYMENT RATE
Fort Worth (city)	408,383	392,476	15,907	3.9
Fort Worth (MD)	1,224,481	1,177,931	46,550	3.8
Dallas (MD)	2,542,796	2,446,981	95,815	3.8
Dallas-Fort Worth (MSA)	3,767,277	3,624,912	142,365	3.8
Texas	13,449,184	12,857,230	591,954	4.4
USA	159,979,000	153,407,000	6,572,000	4.1

Source: US Bureau of Labor Statistics, Local Area Unemployment Series (state and local), Current Population Survey (nation).

FIGURE 4. LABOR MARKET OVERVIEW (WITH CHANGE FROM PRIOR 12 MONTHS), MAY 2017
NOT SEASONALLY ADJUSTED
Unemployment rate change from prior year: ▲ increased ▼ decreased ◀▶ remained the same

DALLAS-FORT WORTH METRO AREA COMMUNITIES

	CIVILIAN LABOR FORCE			UNEMPLOYMENT RATE	
	Current (May 2017)	Chg. from prior year		Current (May 2017)	Chg. from prior year
		Numeric	*Percentage*		
Frisco	87,417	+2,973	+3.5%	3.5	▲
Dallas	677,502	+22,288	+3.4%	4.0	▲
Lewisville	65,022	+2,135	+3.4%	3.4	▲
Plano	163,499	+5,342	+3.4%	3.6	▲
McKinney	88,092	+2,836	+3.3%	3.6	▲
Irving	131,973	+4,223	+3.3%	3.6	▲
Mesquite	77,988	+2,485	+3.3%	4.0	▲
Carrollton	80,930	+2,561	+3.3%	3.4	▲
Richardson	61,980	+1,961	+3.3%	3.5	▲
Denton	72,670	+2,216	+3.1%	3.2	▲
Garland	125,537	+3,684	+3.0%	3.7	▲
Grand Prairie	98,197	+2,698	+2.8%	3.9	▲
Arlington	208,189	+5,162	+2.5%	3.8	▲
Fort Worth	408,383	+9,113	+2.3%	3.9	◀▶

STATES & US

	CIVILIAN LABOR FORCE			UNEMPLOYMENT RATE	
	Current (May 2017)	Chg. from prior year		Current (May 2017)	Chg. from prior year
		Numeric	*Percentage*		
Colorado	2,959,849	+87,968	+3.1%	2.4	▼
Arizona	3,300,420	+79,618	+2.5%	5.0	▼
Texas	13,449,184	+203,665	+1.5%	4.4	▲
Tennessee	3,152,400	+32,857	+1.1%	2.9	▼
Ohio	5,771,461	+57,554	+1.0%	4.6	▲
USA	159,979,000	+1,179,000	+0.7%	4.1	▼
Pennsylvania	6,476,898	-8,079	-0.1%	5.2	▼
Indiana	3,335,278	-7,045	-0.2%	2.8	▼
Oklahoma	1,813,338	-9,081	-0.5%	4.6	▼
Missouri	3,059,676	-59,968	-1.9%	4.1	▼

continued, next page

FIGURE 4. LABOR MARKET OVERVIEW (WITH CHANGE FROM PRIOR 12 MONTHS), MAY 2017 (CONTINUED)

NOT SEASONALLY ADJUSTED

Unemployment rate change from prior year: ▲ increased ▼ decreased ◀▶ remained the same

DOMESTIC BENCHMARKS (CITIES)

	CIVILIAN LABOR FORCE			UNEMPLOYMENT RATE	
	Current (May 2017)	Chg. from prior year		Current (May 2017)	Chg. from prior year
		Numeric	*Percentage*		
Dallas	677,502	+22,288	+3.4%	4.0	▲
Nashville-Davidson, TN (consolidated city)	386,850	+12,069	+3.2%	2.1	▼
Denver, CO (county/city)	394,501	+12,251	+3.2%	2.3	▼
Phoenix, AZ (city)	794,044	+23,051	+3.0%	4.5	◀▶
Fort Worth (city)	408,383	+9,113	+2.3%	3.9	◀▶
Columbus, OH (city)	457,621	+7,742	+1.7%	3.8	▲
Oklahoma City, OK (city)	312,180	+3,160	+1.0%	4.2	▲
Indianapolis, IN (consolidated city)	444,230	+1,495	+0.3%	3.0	▼
Kansas City, KS (city)	69,142	-217	-0.3%	4.9	▼
Pittsburgh, PA (city)	157,921	-612	-0.4%	5.5	▲
Kansas City, MO (city)	258,199	-1,943	-0.7%	4.4	▼

DOMESTIC BENCHMARKS (MSAs)

	CIVILIAN LABOR FORCE			UNEMPLOYMENT RATE	
	Current (May 2017)	Chg. from prior year		Current (May 2017)	Chg. from prior year
		Numeric	*Percentage*		
Dallas, TX (MD)	2,542,796	+81,282	+3.3%	3.8	▲
Denver, CO (MSA)	1,582,607	+49,087	+3.2%	2.3	▼
Nashville, TN (MSA)	996,148	+29,980	+3.1%	2.3	▼
Phoenix, AZ (MSA)	2,284,967	+66,969	+3.0%	4.3	▼
Dallas-Fort Worth, TX (MSA)	3,767,277	+108,421	+3.0%	3.8	▲
Fort Worth, TX (MD)	1,224,481	+27,139	+2.3%	3.8	▲
Columbus, OH (MSA)	1,064,850	+17,147	+1.6%	3.7	◀▶
Oklahoma City, OK (MSA)	666,848	+3,994	+0.6%	4.1	▼
Indianapolis-Carmel-Anderson, IN MSA	1,042,307	+4,986	+0.5%	2.7	▼
Kansas City, MO (MSA)	1,119,029	-5,850	-0.5%	3.9	▼
Pittsburgh, PA (MSA)	1,212,778	-8,698	-0.7%	5.3	▼

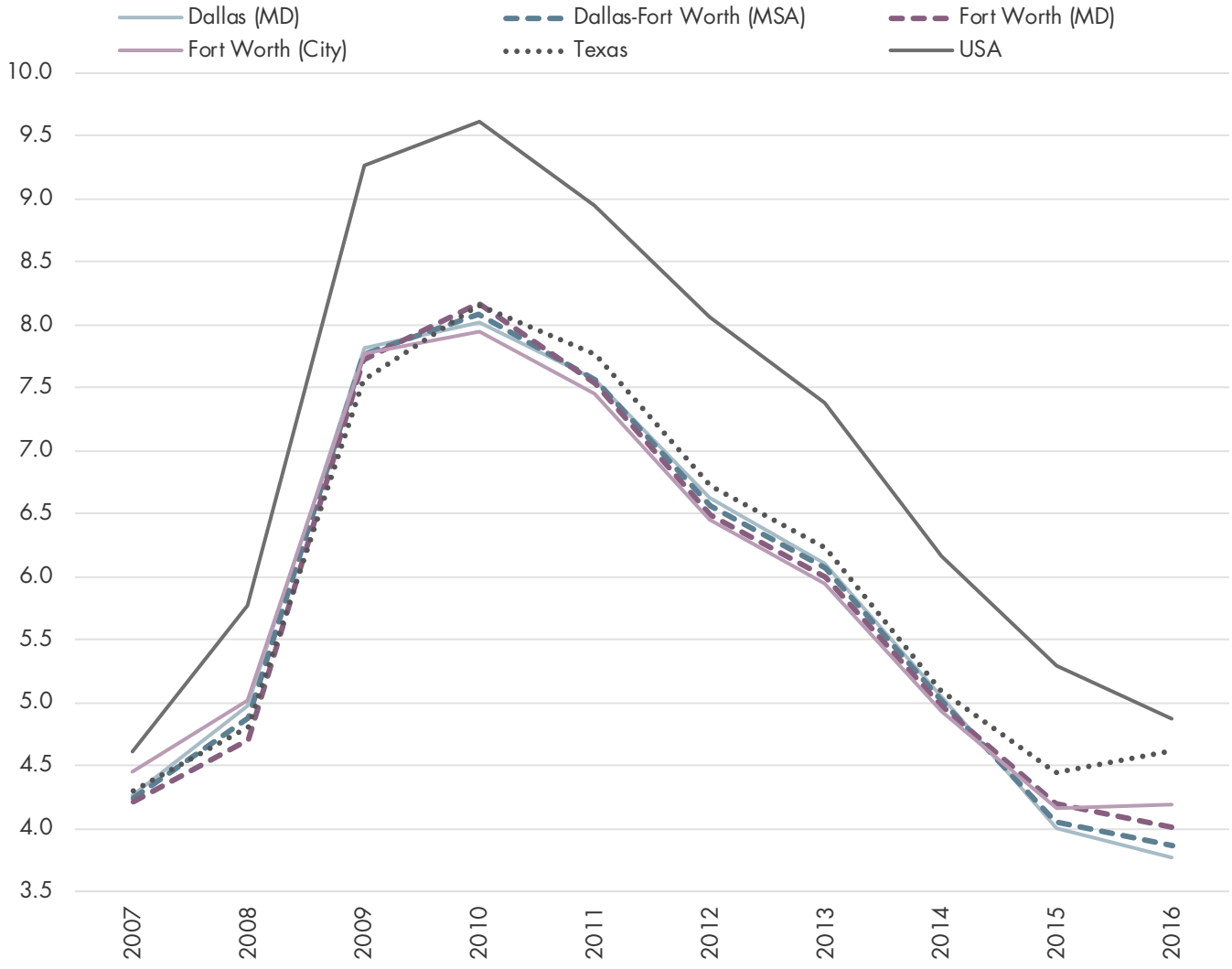
Source: US Bureau of Labor Statistics, Local Area Unemployment Statistics.

UNEMPLOYMENT RATE TRENDS

A look at long-term unemployment trends reveal that rates in the two metropolitan divisions have closely tracked the state and have remained well below the nation over the past decade. Since 2015 there has been greater divergence in the rates within the region, with the rates of both the city of Fort Worth and the state edging up slightly compared with the continued downward trend experienced by the USA and the Dallas-Fort Worth MSA.

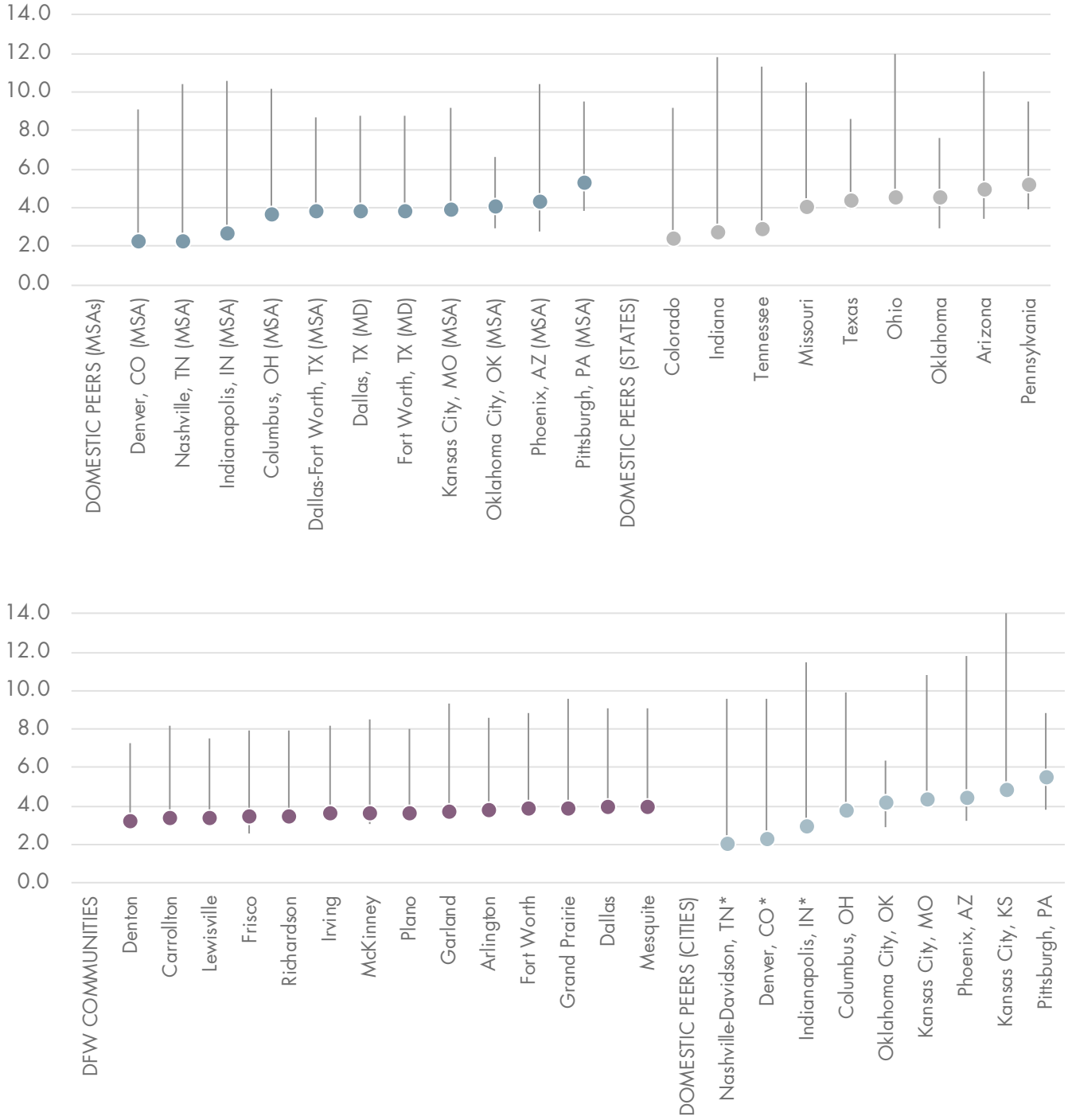
Figure 6 (next page) compares annual average unemployment rates from 2007 to the present for a variety of geographies. In the figure, the line conveys the minimum and maximum rates recorded for the geography in question over the decade, while the marker indicates the current rate. With few exceptions, unemployment rates for Dallas-Fort Worth metro area communities and the domestic benchmarks are at the very bottom of their historic range during the period. Only Oklahoma City, Phoenix, and Pittsburgh have current unemployment rates above their lowest rate.

FIGURE 5. ANNUAL AVERAGE UNEMPLOYMENT RATES, 2007-2016
CITY OF FORT WORTH, WITH COMPARISONS TO REGION, STATE, AND US



Source: US Bureau of Labor Statistics, Local Area Unemployment Statistics (state and local).
Note: Vertical axis has been adjusted to show detail.

FIGURE 6. UNEMPLOYMENT RATE TRENDS, 2007 TO PRESENT
LINE SHOWS HISTORIC RANGE (NOT SEASONALLY ADJUSTED); POINT SHOWS RATE AS OF MAY 2017



*Figures are for consolidated cities
Source: US Bureau of Labor Statistics, Local Area Unemployment Statistics (state and local).

While the prior figure illustrates the range of unemployment rates experienced by each geography, it does not convey timing. Figure 5 can be used to understand how unemployment trends varied across each group. In the case of the Dallas-Fort Worth cities profiled in Figure 7 below, unemployment rates climbed in 2009 across the board and remained elevated into 2011for several communities, including the principal cities of Dallas, Fort Worth, and Arlington. Of the cities profiled, Fort Worth recorded the highest annual average rate in 2016 and among the top rates in 2015.

FIGURE 7. UNEMPLOYMENT RATE TRENDS, 2007-2016

DALLAS-FORT WORTH METRO AREA COMMUNITIES

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Frisco	3.5	4.3	7.1	6.4	5.7	4.9	4.5	3.8	2.9	3.4
Lewisville	3.5	4.0	6.3	6.8	6.2	5.5	5.1	4.3	3.4	3.4
Denton	3.7	4.0	6.2	6.6	6.3	5.5	5.2	4.2	3.4	3.4
Carrollton	3.8	4.4	7.2	7.4	6.9	5.8	5.5	4.6	3.5	3.5
Plano	3.7	4.4	7.2	7.1	6.7	5.9	5.6	4.6	3.7	3.6
Richardson	3.8	4.4	7.0	7.5	7.0	6.1	5.8	4.6	3.7	3.6
Irving	3.9	4.6	7.5	7.8	7.4	6.5	6.0	4.9	3.9	3.6
McKinney	4.0	4.6	7.2	7.0	6.6	5.9	5.4	4.5	3.6	3.7
Garland	4.5	5.2	8.3	8.3	8.0	6.8	6.6	5.4	4.2	3.8
Arlington	4.0	4.5	7.2	8.2	7.7	6.5	6.0	5.0	4.1	3.9
Dallas	4.6	5.4	8.2	8.5	8.1	7.0	6.4	5.3	4.2	4.0
Mesquite	4.3	5.1	7.9	8.7	8.3	7.1	6.7	5.5	4.3	4.0
Grand Prairie	4.3	5.1	8.3	8.3	7.6	6.8	6.3	5.3	4.1	4.1
Fort Worth	4.5	5.0	7.8	7.9	7.5	6.5	5.9	4.9	4.2	4.2

STATES

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Colorado	3.7	4.8	7.3	8.7	8.4	7.9	6.8	5.0	3.9	3.3
Indiana	4.6	5.9	10.3	10.4	9.1	8.3	7.7	5.9	4.8	4.4
Missouri	5.1	6.1	9.3	9.6	8.5	7.0	6.7	6.1	5.0	4.5
Texas	4.3	4.8	7.6	8.2	7.8	6.7	6.2	5.1	4.4	4.6
Tennessee	4.7	6.6	10.5	9.7	9.0	7.8	7.8	6.5	5.6	4.8
Oklahoma	4.1	3.7	6.4	6.8	5.9	5.2	5.3	4.5	4.4	4.9
Ohio	5.6	6.4	10.3	10.3	8.9	7.4	7.5	5.8	4.9	4.9
Arizona	3.9	6.1	9.9	10.4	9.5	8.4	7.7	6.8	6.0	5.3
Pennsylvania	4.4	5.3	8.1	8.5	7.9	7.8	7.3	5.8	5.3	5.4

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Differences in the timing of rate increases can also be seen among the domestic benchmarks. The most significant difference is the performance of Oklahoma City, where unemployment rates remained well below the rest of the country throughout the recession. Pittsburgh also experienced lower rates of unemployment than other peers through the 2008-2009 period that covers the official dates of the recession. Both regions have been affected by the "fracking" boom, which may help explain their performance during this period. Fort Worth also participated in the boom. However, unlike Pittsburgh which has remained largely stagnant over the past decade, both Fort Worth and Oklahoma City saw significant expansion of their civilian labor force (Figure 8, top of page 22), resulting in lower rates of unemployment over the decade. By contrast, cities like Kansas City (KS), Phoenix, and Indianapolis experienced much higher rates of unemployment that persisted well beyond the recession's official end.

FIGURE 7. UNEMPLOYMENT RATE TRENDS, 2007-2016 (CONTINUED)

DOMESTIC BENCHMARKS (CITIES)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Denver, CO*	4.1	5.4	8.1	9.1	8.6	7.8	6.6	4.8	3.7	3.2
Nashville-Davidson, TN*	3.8	5.4	8.9	8.2	7.5	6.2	5.9	5.0	4.4	3.6
Dallas, TX	4.6	5.4	8.2	8.5	8.1	7.0	6.4	5.3	4.2	4.0
Oklahoma City, OK	4.6	3.7	5.8	5.6	4.9	4.4	4.5	3.9	3.6	4.0
Columbus, OH	4.8	5.6	8.5	8.9	7.8	6.5	6.5	4.9	4.1	4.1
Fort Worth, TX	4.5	5.0	7.8	7.9	7.5	6.5	5.9	4.9	4.2	4.2
Indianapolis, IN	4.5	5.6	9.3	10.6	9.9	9.3	8.6	6.5	5.1	4.5
Phoenix, AZ	3.9	6.3	10.7	10.6	9.1	7.8	6.9	6.1	5.4	4.7
Kansas City, MO	6.5	7.7	9.8	10.0	8.9	7.3	7.3	6.7	5.7	4.9
Pittsburgh, PA	4.5	5.2	7.0	8.0	7.5	7.4	6.7	5.6	5.2	5.4
Kansas City, KS	7.8	8.3	11.0	10.4	9.9	8.7	8.1	7.0	6.1	5.8

DOMESTIC BENCHMARKS (MSAs)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Denver, CO (MSA)	3.8	5.0	7.5	8.7	8.3	7.8	6.6	4.8	3.7	3.1
Dallas, TX (MD)	4.3	5.0	7.8	8.0	7.6	6.6	6.1	5.1	4.0	3.8
Nashville, TN (MSA)	4.1	5.8	9.5	8.6	7.8	6.4	6.2	5.2	4.5	3.8
Dallas-Fort Worth, TX (MSA)	4.2	4.9	7.8	8.1	7.6	6.6	6.1	5.0	4.1	3.9
Fort Worth, TX (MD)	4.2	4.7	7.7	8.2	7.5	6.5	6.0	5.0	4.2	4.0
Indianapolis, IN (MSA)	4.2	5.2	8.8	9.6	8.8	8.0	7.4	5.7	4.5	4.0
Columbus, OH (MSA)	4.8	5.7	8.7	9.0	7.9	6.5	6.5	4.9	4.2	4.1
Oklahoma City, OK (MSA)	4.2	3.7	5.9	5.9	5.0	4.5	4.6	4.0	3.8	4.2
Kansas City, MO (MSA)	5.1	5.9	8.7	8.7	7.8	6.5	6.2	5.6	4.8	4.3
Phoenix, AZ (MSA)	3.3	5.5	9.3	9.6	8.6	7.4	6.7	5.9	5.2	4.6
Pittsburgh, PA (MSA)	4.4	5.1	7.3	8.0	7.4	7.2	6.8	5.6	5.3	5.7

*Figures are for consolidated cities

Source: US Bureau of Labor Statistics, Local Area Unemployment Statistics.

CIVILIAN LABOR FORCE TRENDS

One consideration that is often overlooked when analyzing unemployment rates is the growth in the civilian labor force. Strong growth in the labor force, particularly in a relatively short period, can lead to a corresponding increase in the unemployment rate as new workers are absorbed into the labor pool. Given the dramatic population growth experienced in parts of the Dallas-Fort Worth metro area, it is no surprise that many communities have experienced similar rates of increase in their labor force. Fort Worth has seen one of the largest increases (relative to 2007 levels), outpaced only by McKinney and Frisco among the communities profiled. By contrast, the size of Arlington's labor force has remained largely unchanged for a decade.

FIGURE 8. CIVILIAN LABOR FORCE TRENDS, 2007-2016
DALLAS-FORT WORTH METRO AREA COMMUNITIES

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Frisco	100.0	107.1	112.0	131.8	137.6	142.0	151.4	160.5	170.4	178.0
McKinney	100.0	103.0	106.8	119.5	124.1	128.1	133.2	140.1	145.1	151.1
Fort Worth	100.0	102.6	105.5	113.6	117.4	119.7	122.1	123.7	124.6	127.4
Grand Prairie	100.0	101.2	102.1	117.2	119.3	120.6	121.9	122.6	122.7	126.8
Irving	100.0	100.6	101.2	107.8	109.4	111.2	112.8	114.1	115.7	120.0
Garland	100.0	99.7	100.0	108.2	109.7	110.2	111.0	110.8	110.8	114.8
Denton	100.0	101.2	101.7	97.1	99.9	102.0	103.6	107.6	109.8	114.3
Carrollton	100.0	100.5	101.8	100.1	102.6	104.0	105.3	106.5	109.8	114.2
Richardson	100.0	100.9	101.2	99.7	101.8	102.9	104.0	107.6	109.4	113.6
Dallas	100.0	100.1	100.1	102.4	104.0	104.9	106.2	107.6	108.6	112.8
Mesquite	100.0	100.0	99.5	107.4	108.5	108.8	109.0	109.1	108.8	112.7
Plano	100.0	100.9	101.6	100.3	102.6	103.7	104.9	106.1	107.7	111.9
Lewisville	100.0	101.8	103.3	98.5	100.1	101.6	103.3	105.0	105.8	110.2
Arlington	100.0	100.4	101.3	96.4	98.7	99.9	100.8	100.7	99.9	101.9

STATES

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Texas	100.0	102.0	104.2	107.1	109.4	110.8	112.6	113.8	114.1	116.2
Colorado	100.0	101.9	102.2	102.2	102.7	103.5	104.2	105.5	106.3	108.5
Arizona	100.0	102.3	103.1	101.8	100.1	99.8	100.1	102.0	104.3	106.7
Oklahoma	100.0	101.2	102.2	102.4	102.7	104.5	104.6	103.9	106.2	105.9
Indiana	100.0	100.8	99.6	99.0	99.2	98.8	99.5	100.6	102.0	103.7
Missouri	100.0	99.8	100.5	100.7	100.4	99.7	99.6	100.8	102.0	102.5
Tennessee	100.0	99.7	99.6	100.9	102.0	101.2	100.3	99.2	100.2	102.3
Pennsylvania	100.0	101.7	100.9	100.6	100.8	101.9	101.6	100.9	101.3	102.0
Ohio	100.0	99.6	98.6	97.6	96.3	95.2	95.4	95.1	95.0	95.4

continued, next page

FIGURE 8. CIVILIAN LABOR FORCE TRENDS, 2007-2016 (CONTINUED)
DOMESTIC BENCHMARKS (CITIES)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fort Worth, TX	100.0	102.6	105.5	113.6	117.4	119.7	122.1	123.7	124.6	127.4
Oklahoma City, OK	100.0	100.3	100.8	114.3	115.5	118.3	119.6	119.5	122.3	122.5
Denver, CO*	100.0	102.7	103.0	110.4	111.9	113.6	115.6	117.5	119.6	122.1
Nashville-Davidson, TN*	100.0	99.5	99.3	105.2	107.6	108.6	109.0	109.6	112.0	115.9
Dallas, TX	100.0	100.1	100.1	102.4	104.0	104.9	106.2	107.6	108.6	112.8
Kansas City, MO	100.0	99.8	99.2	105.6	105.1	104.8	104.5	106.5	109.0	110.4
Columbus, OH	100.0	100.4	100.5	101.3	101.4	101.8	103.5	104.7	106.0	107.5
Kansas City, KS	100.0	99.6	98.8	104.0	103.4	103.1	103.5	104.7	105.1	105.5
Indianapolis, IN*	100.0	100.6	99.3	98.4	99.1	99.6	100.8	101.6	102.8	105.2
Pittsburgh city, PA	100.0	101.5	101.0	102.9	103.8	105.3	104.5	103.8	103.6	103.7
Phoenix, AZ	100.0	101.6	101.9	94.8	92.9	92.7	93.2	95.1	97.7	100.5

DOMESTIC BENCHMARKS (MSAs)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pittsburgh, PA (MSA)	100.0	101.7	101.3	99.4	100.2	101.6	101.2	100.3	100.4	100.8
Columbus, OH (MSA)	100.0	100.5	100.4	101.4	101.3	101.4	102.7	103.7	104.7	106.1
Indianapolis, IN (MSA)	100.0	101.5	100.7	99.4	100.2	100.8	102.3	103.8	105.9	108.5
Phoenix, AZ (MSA)	100.0	101.8	101.8	100.8	99.4	99.4	100.1	102.7	105.8	108.8
Kansas City, MO (MSA)	100.0	100.0	101.0	105.4	105.2	105.2	105.3	107.2	108.8	109.9
Denver, CO (MSA)	100.0	102.5	102.5	104.7	105.3	106.6	108.1	109.8	111.1	113.4
Fort Worth, TX (MD)	100.0	101.6	103.5	105.8	108.5	110.1	111.9	112.6	112.5	114.8
Nashville, TN (MSA)	100.0	100.6	101.0	105.2	107.4	107.9	108.6	109.7	112.6	116.5
Dallas-Fort Worth, TX (MSA)	100.0	101.3	102.6	106.2	108.6	110.1	111.9	113.6	114.9	118.6
Oklahoma City, OK (MSA)	100.0	100.8	101.6	111.2	112.4	115.1	116.2	115.8	118.6	118.8
Dallas-Plano-IrvingMD	100.0	101.1	102.1	106.5	108.7	110.1	112.0	114.1	116.2	120.5

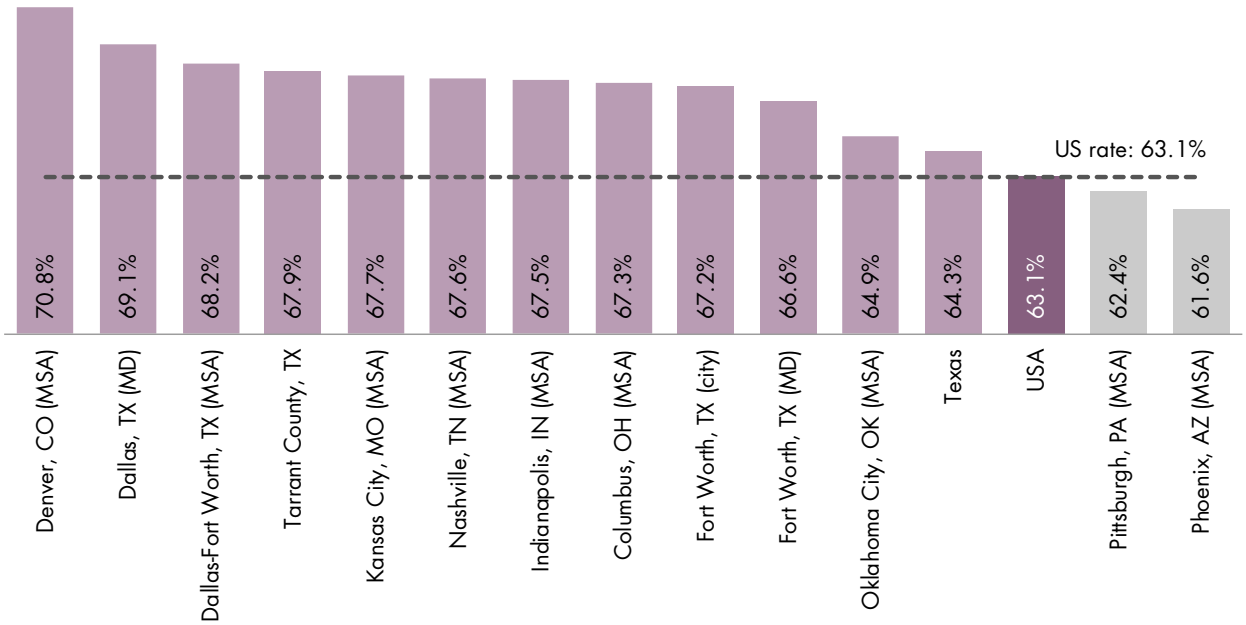
*Figures are for consolidated cities
Source: US Bureau of Labor Statistics, Local Area Unemployment Statistics.

LABOR FORCE PARTICIPATION RATES

Labor force participation rates compare the portion of a region's labor force that is employed or looking for work with the population that is labor force eligible (defined here as those who are 16 years or older). Much has been made of the US civilian labor force participation rate during the recent economic cycle. The rate rose steadily over the last quarter of the 20th century as women entered the workforce in greater numbers. More recently, the prolonged US economic recession has discouraged workers and pushed the national participation rate down. This has been a major topic of concern for labor economists.

Less discussed, however, are the wide geographic differences in participation rates across the country. (These geographic variations existed both before and after the recent recession.) All but a handful of the geographies analyzed exceeded average participation rates for the US. The Denver MSA and Dallas MD had the top labor force participation rates, with an estimated seven out of ten working age residents in the labor force in 2015 (71.5 and 71.2 percent, respectively). Only two MSAs, Pittsburgh and Phoenix, had rates below the national average. Labor force participation rates often reflect the demographics of an area. For example, an area with an above-average share of retirees would have lower labor force participation rates since these individuals would still be considered labor force eligible. High levels of unemployment can also influence this statistic, as chronic unemployment can increase the number of discouraged workers (those who are labor force eligible but who have stopped actively looking for work).

FIGURE 9. LABOR FORCE PARTICIPATION RATES
SHARE OF POPULATION AGE 16 YEARS AND OVER IN LABOR FORCE



Source: Calculated by TIP Strategies using 2015 American Community Survey 1-Year Estimates (DP-03).

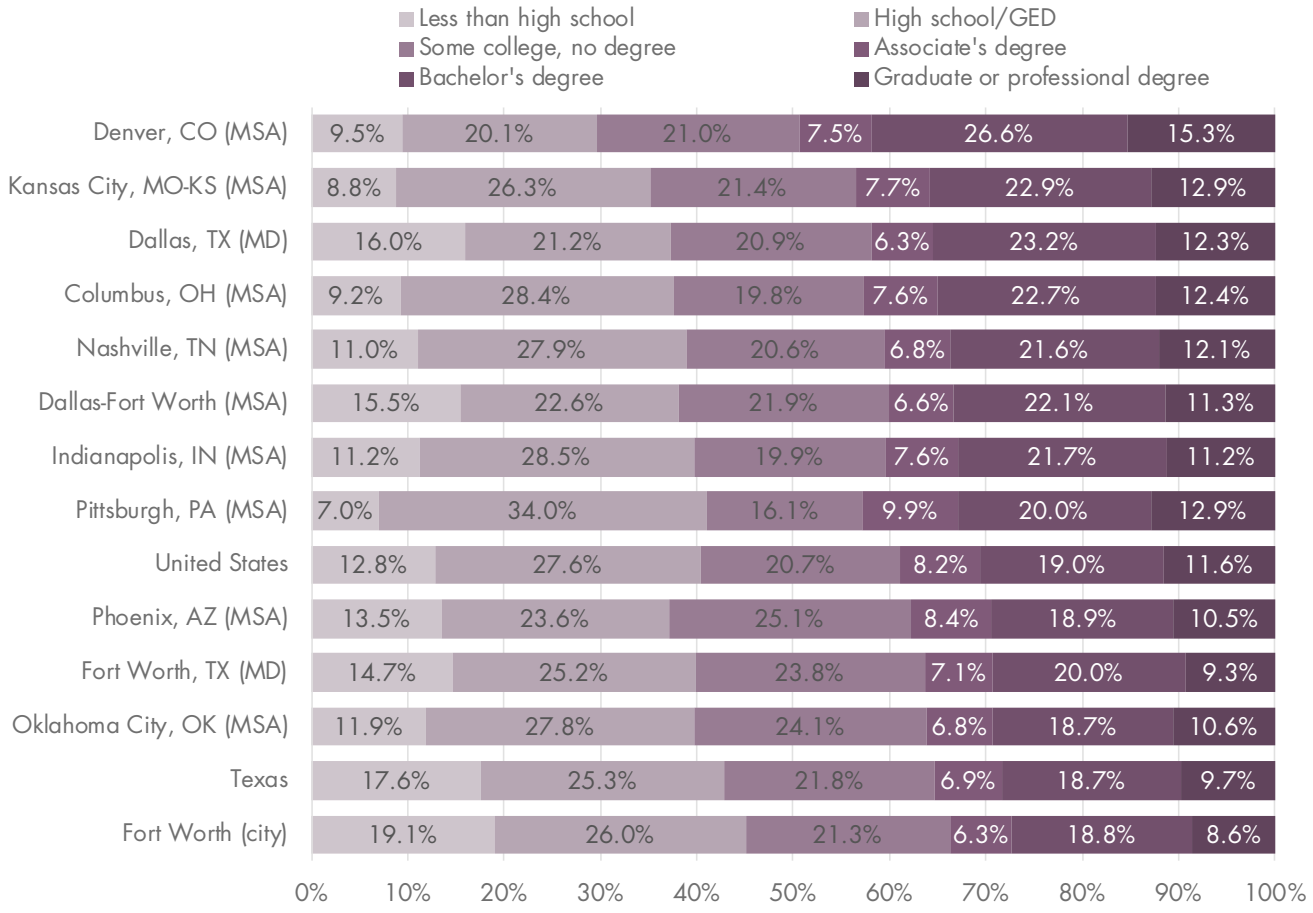
EDUCATIONAL ATTAINMENT

Educational attainment refers to the highest level of education completed for the adult population 25 years of age or older. This statistic is an indicator of workforce skills. Often the percent of the population with a bachelor's degree or higher is used as a proxy for the general education level of a population and the availability of highly skilled workers. In the US, roughly 3 out of 10 adult residents (30.6 percent) have a bachelor's degree or higher.

The percent of the population with a bachelor's degree or higher in the Fort Worth MD (29.3 percent) lags that of the US as well as most of the benchmark MSAs. Only the Oklahoma City MSA has a lower level of educational attainment than the Fort Worth MD. Among the benchmark MSAs, Denver has the highest share of individuals over the age of 25 with a bachelor's degree or higher. Almost 42 percent of the adult population over 25 in Denver has a bachelor's degree or higher.

At the other end of the educational attainment spectrum, the city of Fort Worth has the lowest level of attainment among the areas analyzed. In addition to lagging the benchmarks on the share of residents with a four-year degree or higher (27.4 percent), a significantly larger share of the city's adult residents has a high school diploma or less as their highest level of attainment. Denver has the lowest share of population with a high school diploma or less.

FIGURE 10. EDUCATIONAL ATTAINMENT LEVELS (WITH COMPARISONS TO BENCHMARK MSAS)
POPULATION AGE 25 YEARS AND OVER, RANKED BY SHARE WITH BACHELOR'S OR HIGHER, 2015

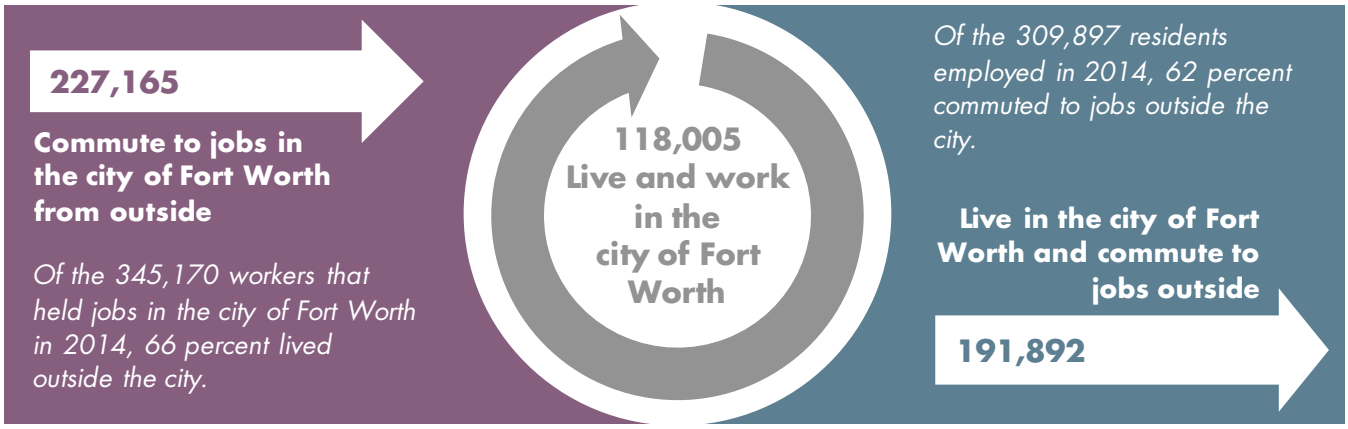


Source: 2015 American Community Survey 1-Year Estimates (DP-03).

COMMUTING PATTERNS

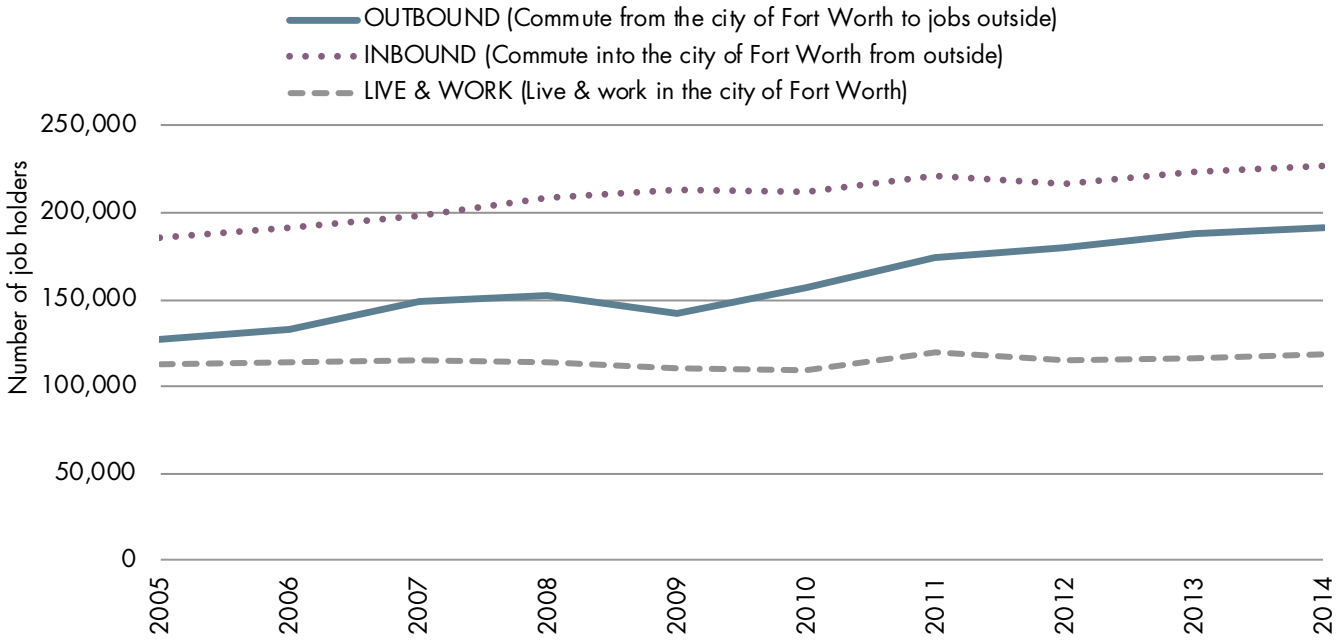
In 2014, roughly two-thirds (66 percent) of people who worked in Fort Worth lived outside the city. This figure has risen steadily over the past decade. Over the same period, the number of outbound commuters has risen more sharply. In 2005, slightly more than one-half of employed residents (53 percent) commuted to work outside the city. By 2014, nearly 62 percent of the city's residents held jobs in cities other than Fort Worth. During the same period, there was only modest growth in the number of residents who lived and worked in the city. In 2014, just over 118,000 workers met this criterion, an increase of roughly 5,600 jobholders.

FIGURE 11. INFLOW/OUTFLOW FOR CITY OF FORT WORTH, 2014
FLOW OF WORKERS TO/FROM THE CITY



Source: US Census Bureau, Local Employment Dynamics.
Notes: Overlay arrows are for illustrative purposes and do not indicate directionality of worker flow between home and employment locations.

FIGURE 12. COMMUTING FLOWS, 2005 TO 2014



Source: US Census Bureau, Local Employment Dynamics.

Of the more than 227,000 inbound commuters, Arlington represents the largest source of labor at the city level, sending roughly 24,500 workers to Fort Worth in 2014 and accounting for 7 percent of the total workforce. However, the city draws from a wide area. After Fort Worth and Arlington, the remaining eight cities combined represented less than 15 percent of the total. For the city's outbound workers, Dallas was the top employment destination, capturing roughly 24,500 of the city's employed residents, followed by Arlington and Irving. When viewed on a net flow basis (Figure 14), Fort Worth gains workers from each of the top 10 laborshed cities except Dallas and Irving.

FIGURE 13. TOP 10 COMMUTING DESTINATIONS, 2014: CITIES

FORT WORTH LABORSHED (WHERE WORKERS LIVE) & COMMUTE SHED (WHERE EMPLOYED RESIDENTS WORK)

Where the city of Fort Worth workers live

	City (Place)	Count	Share
1	Fort Worth city, TX	118,005	34.2%
2	Arlington city, TX	24,463	7.1%
3	Dallas city, TX	13,007	3.8%
4	Grand Prairie city, TX	6,763	2.0%
5	North Richland Hills city, TX	6,530	1.9%
6	Haltom City city, TX	5,436	1.6%
7	Burleson city, TX	5,414	1.6%
8	Benbrook city, TX	4,681	1.4%
9	Mansfield city, TX	4,536	1.3%
10	Irving city, TX	4,471	1.3%
	All Other Locations	151,864	44.0%
	Total	**345,170**	**100.0%**

Where employed city of Fort Worth residents work

	City (Place)	Count	Share
1	Fort Worth city, TX	118,005	38.1%
2	Dallas city, TX	24,477	7.9%
3	Arlington city, TX	18,986	6.1%
4	Irving city, TX	12,825	4.1%
5	Grapevine city, TX	7,486	2.4%
6	White Settlement city, TX	6,921	2.2%
7	Grand Prairie city, TX	5,625	1.8%
8	Houston city, TX	4,924	1.6%
9	Haltom City city, TX	4,631	1.5%
10	Plano city, TX	4,156	1.3%
	All Other Locations	101,861	32.9%
	Total	**309,897**	**100.0%**

Source: US Census Bureau, Local Employment Dynamics.

FIGURE 14. TOP 10 SOURCES OF WORKERS, 2014

CITIES WHERE CITY OF FORT WORTH WORKERS LIVE, WITH NET FLOW

		People who WORK in city of Fort Worth and live in this city	People who LIVE in city of Fort Worth and work in this city	Net flow
1	Arlington city, TX	24,463	18,986	+5,477
2	Dallas city, TX	13,007	24,477	-11,470
3	Grand Prairie city, TX	6,763	5,625	+1,138
4	North Richland Hills city, TX	6,530	3,951	+2,579
5	Haltom City city, TX	5,436	4,631	+805
6	Burleson city, TX	5,414	2,196	+3,218
7	Benbrook city, TX	4,681	1,655	+3,026
8	Mansfield city, TX	4,536	2,428	+2,108
9	Irving city, TX	4,471	12,825	-8,354
10	Euless city, TX	3,610	1,855	+1,755

Source: US Census Bureau, Local Employment Dynamics.

A look at flows by county shows that Tarrant County communities comprise the majority of Fort Worth's labor pool, accounting for nearly 62 percent of jobholders in 2014. The remaining counties in the Fort Worth MD that fall in the top 10 (Johnson, Parker, Wise, and Hood) account for roughly 9 percent of the city's jobholders. Tarrant County is also the largest employment destination for Fort Worth residents, with more than 196,000 residents holding jobs in the county in 2014. When the roughly 118,000 workers who live and work in the city of Fort Worth are subtracted (Figure 14, prior page), approximately 78,000 Fort Worth residents worked in other Tarrant County communities in 2014. Dallas County is the next largest employment destination, receiving more than 53,000 workers, or 17 percent of employed Fort Worth residents. When viewed on a net flow basis, Dallas County receives more than 22,000 workers above the number it sends to Tarrant County.

FIGURE 15. TOP 10 COMMUTING DESTINATIONS, 2014: COUNTIES

FORT WORTH LABORSHED (WHERE WORKERS LIVE) & COMMUTE SHED (WHERE EMPLOYED RESIDENTS WORK)

Where the city of Fort Worth workers live

	County	Count	Share
1	Tarrant County, TX	213,302	61.8%
2	Dallas County, TX	30,876	8.9%
3	Denton County, TX	15,787	4.6%
4	Johnson County, TX	13,545	3.9%
5	Parker County, TX	11,529	3.3%
6	Collin County, TX	7,476	2.2%
7	Harris County, TX	4,137	1.2%
8	Wise County, TX	3,026	0.9%
9	Hood County, TX	2,752	0.8%
10	Ellis County, TX	2,697	0.8%
	All Other Locations	40,043	11.6%
	Total	**345,170**	**100.0%**

Where employed city of Fort Worth residents work

	County	Count	Share
1	Tarrant County, TX	196,379	63.4%
2	Dallas County, TX	53,192	17.2%
3	Denton County, TX	11,136	3.6%
4	Collin County, TX	7,516	2.4%
5	Harris County, TX	6,196	2.0%
6	Johnson County, TX	3,823	1.2%
7	Travis County, TX	3,493	1.1%
8	Parker County, TX	3,139	1.0%
9	Bexar County, TX	1,642	0.5%
10	Wise County, TX	1,428	0.5%
	All Other Locations	21,953	7.1%
	Total	**309,897**	**100.0%**

Source: US Census Bureau, Local Employment Dynamics.

FIGURE 16. TOP 10 SOURCES OF WORKERS, 2014

COUNTIES WHERE CITY OF FORT WORTH WORKERS LIVE, WITH NET FLOW

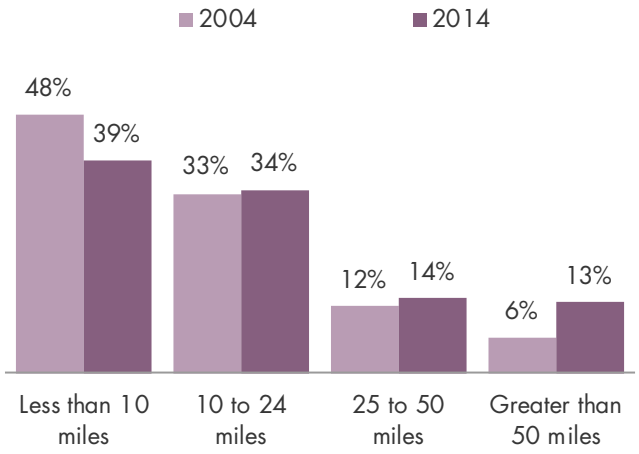
		People who WORK in the city of Fort Worth and live in this county	People who LIVE in the city of Fort Worth and work in this county	Net flow
1	Tarrant County, TX	213,302	196,379	+16,923
2	Dallas County, TX	30,876	53,192	-22,316
3	Denton County, TX	15,787	11,136	+4,651
4	Johnson County, TX	13,545	3,823	+9,722
5	Parker County, TX	11,529	3,139	+8,390
6	Collin County, TX	7,476	7,516	-40
7	Harris County, TX	4,137	6,196	-2,059
8	Wise County, TX	3,026	1,428	+1,598
9	Hood County, TX	2,752	721	+2,031
10	Ellis County, TX	2,697	1,035	+1,662

Source: US Census Bureau, Local Employment Dynamics.

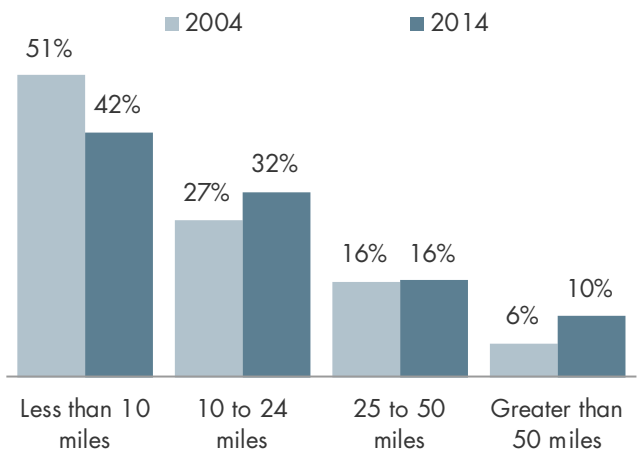
Like most areas of the country, workers in Fort Worth are driving longer distances between work and home. Between 2004 and 2014, the share of workers employed in the city of Fort Worth who commuted distances of greater than 50 miles more than doubled, increasing from 6 percent of the city's workforce to 13 percent. During the same period, the share of workers commuting less than 10 miles decreased sharply, dropping from 48 percent in 2004 to 39 percent in 2014. This pattern was also seen among the city's employed residents.

FIGURE 17. DISTANCE TRAVELED, 2004 VS. 2014
SHARE OF JOBHOLDERS

PEOPLE WHO WORK IN the city of Fort Worth



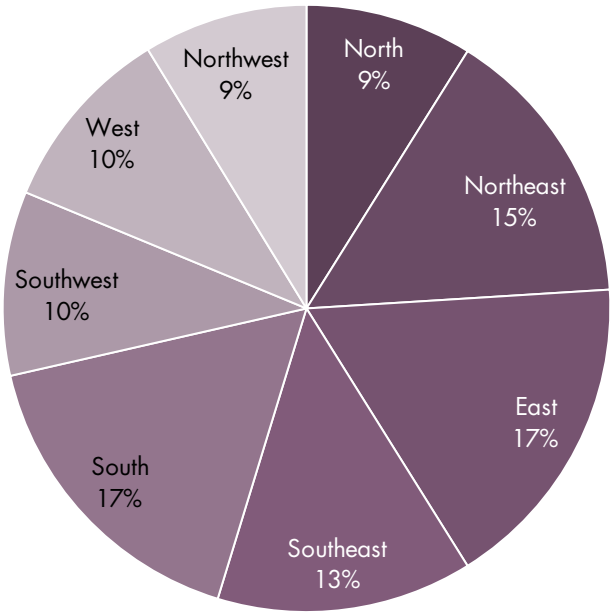
EMPLOYED PEOPLE WHO LIVE IN the city of Fort Worth



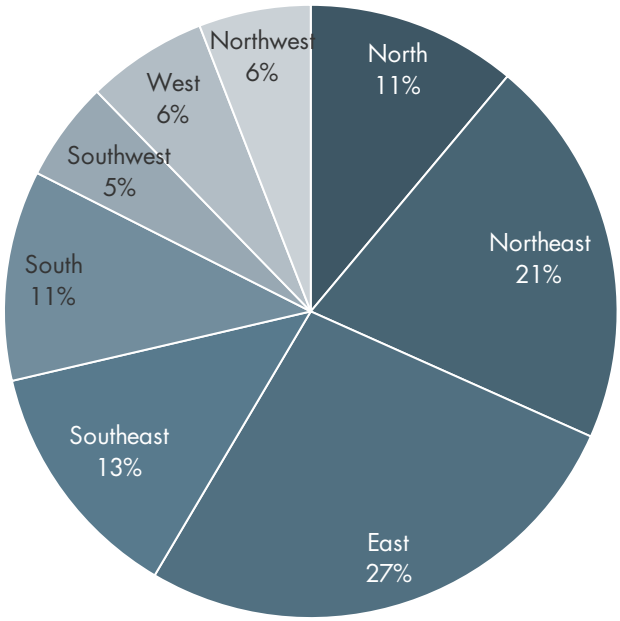
Source: US Census Bureau, Local Employment Dynamics.

FIGURE 18. DIRECTION TRAVELED DURING COMMUTE, 2014
SHARE OF JOBHOLDERS

PEOPLE WHO WORK IN the city of Fort Worth



EMPLOYED PEOPLE WHO LIVE IN the city of Fort Worth

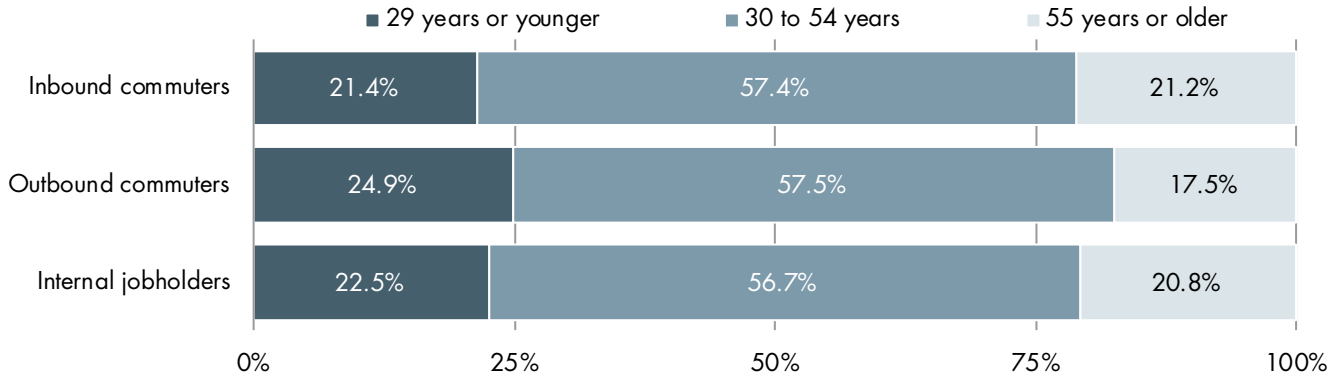


Source (both charts): US Census Bureau, Local Employment Dynamics.

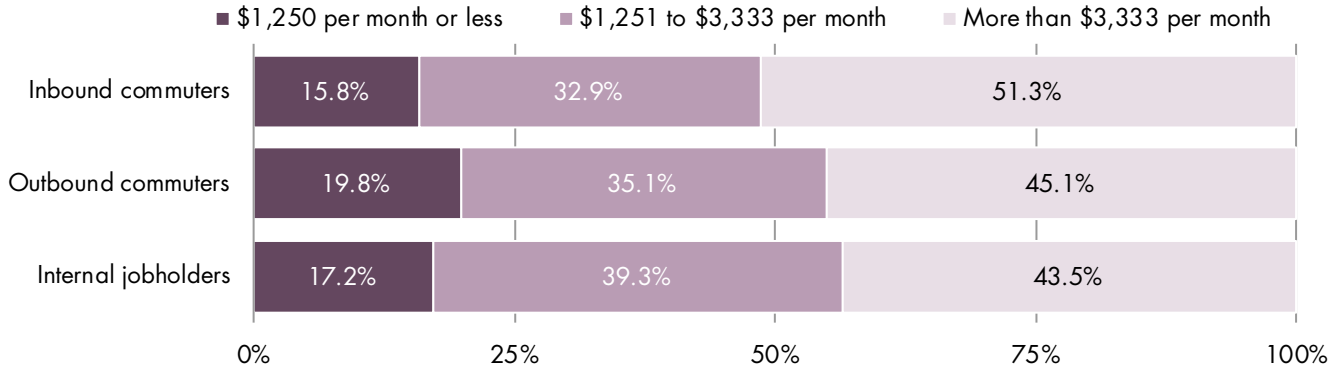
A look at age, earnings, and broad industry by type of commuting flow reveals only modest differences. Employed residents who commute out of the city were slightly more likely to be younger and to earn less than those who worked in Fort Worth. A higher percentage of internal jobholders (those who lived and worked in Fort Worth) were more likely to be employed in service industries than in goods-producing or trades, transportation, and utilities.

FIGURE 19. SELECT JOBHOLDER CHARACTERISTICS, 2014
SHARE OF WORKERS BY TYPE OF COMMUTING FLOW (INTERNAL, OUTBOUND, INBOUND)

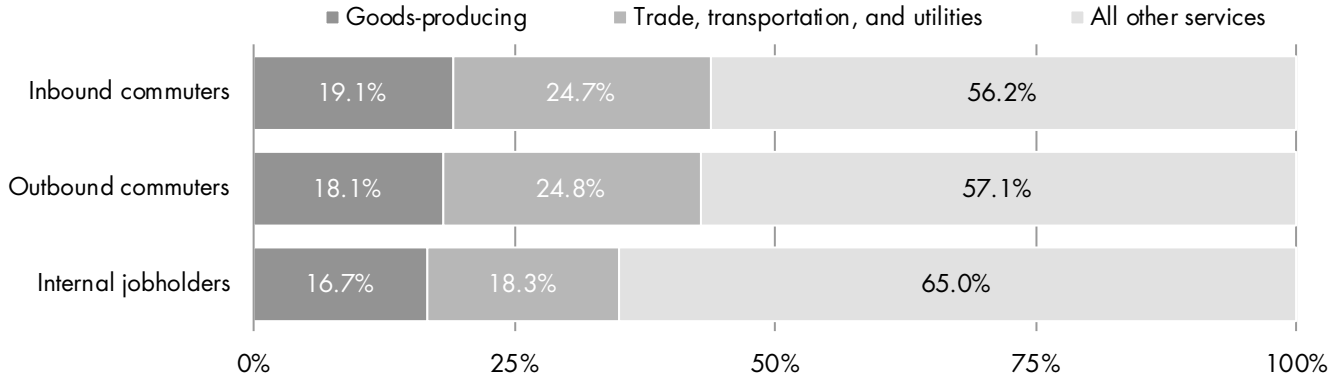
AGE



EARNINGS



INDUSTRY CLASS

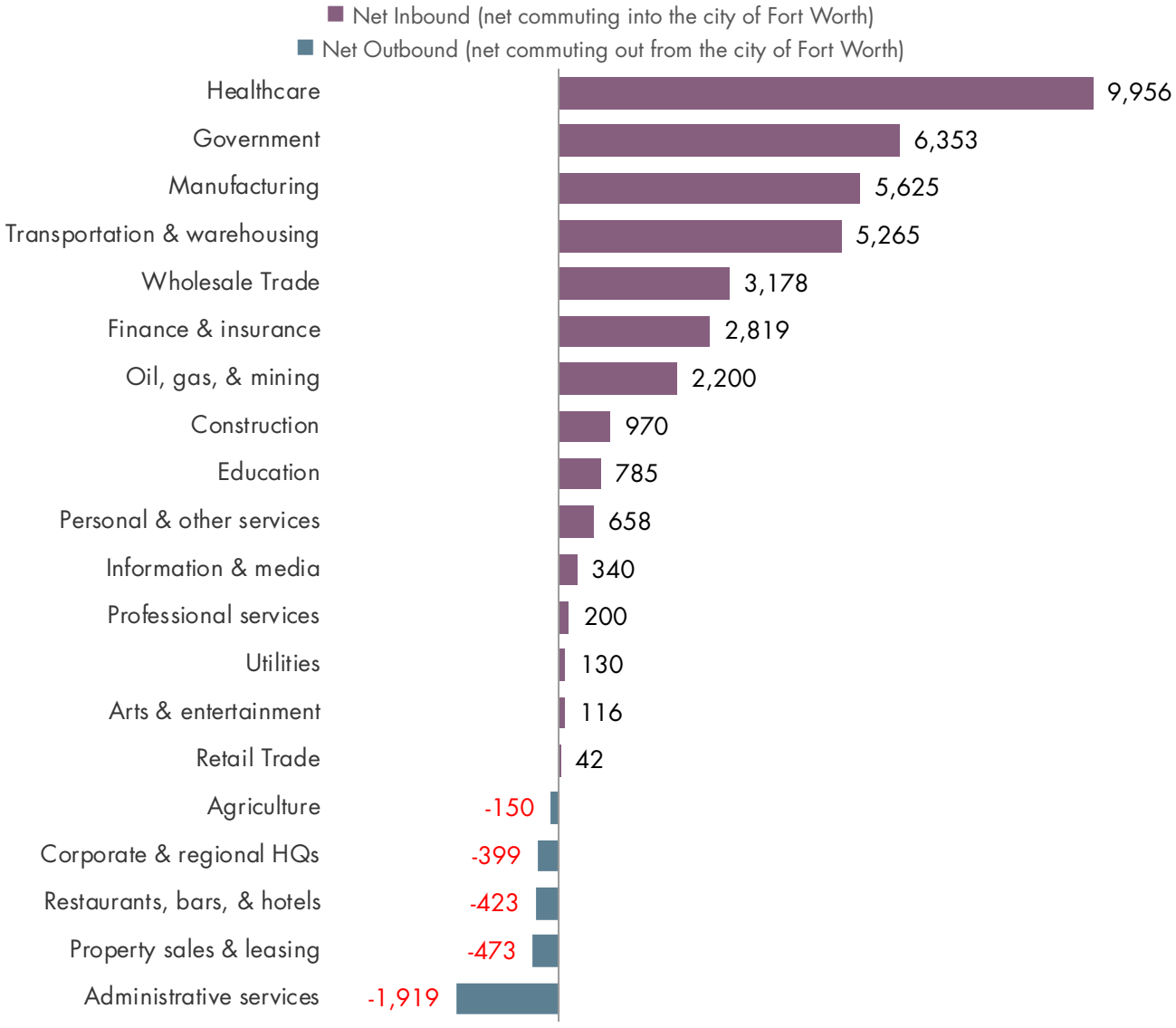


Source (all figures this page): US Census Bureau, Local Employment Dynamics

Figure 16 shows net commuting flows by major sector. The healthcare industry draws the largest flow of workers into the city, with a net gain of nearly 10,000 workers in 2014. Following healthcare, jobs in government, manufacturing, and transportation-related fields draw in roughly 6,000 more workers than leave the city for jobs in similar fields. Only a handful of sectors had negative flows. The largest of these is administrative services, which includes a range of activities related to the day-to-day support of businesses, such as human resources, clerical services, building maintenance, and waste management.

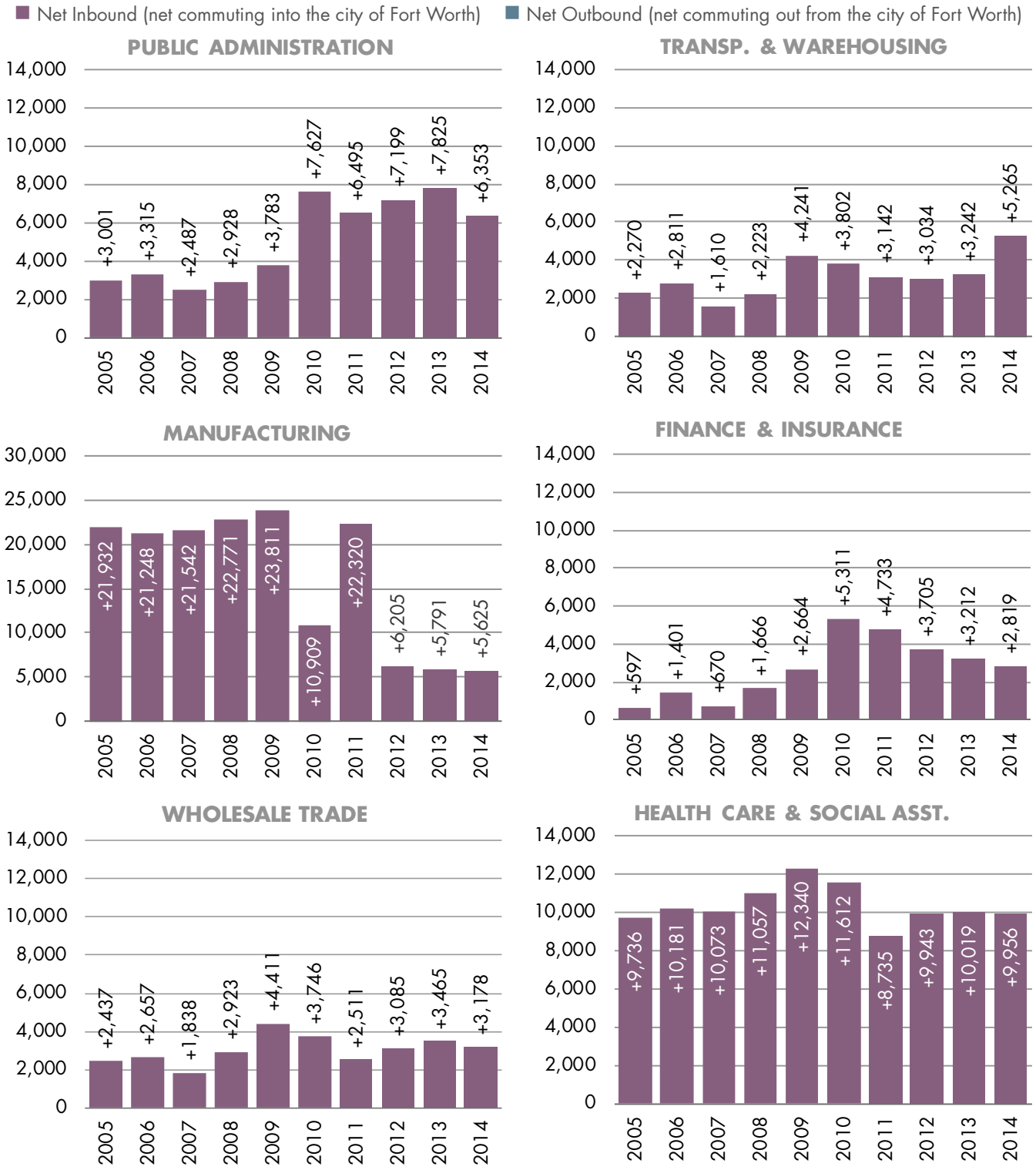
Net commuting flows over time are shown for selected sectors in Figure 17 (page 32). The charts illustrate Fort Worth's role as an employment center, with positive net flows of workers in each of the highlighted sectors.

FIGURE 20. NET COMMUTING FLOWS BY MAJOR INDUSTRY SECTOR, 2014
NET FLOWS = INBOUND - OUTBOUND FLOWS



Source: US Census Bureau, Local Employment Dynamics.
Notes: Figures shown are grouped according to the North American Classification System (NAICS).

FIGURE 21. NET COMMUTING FLOWS BY MAJOR INDUSTRY SECTOR, 2005-2014
NET FLOWS = INBOUND - OUTBOUND FLOWS



Source (all figures this page): US Census Bureau, Local Employment Dynamics
Note: Vertical axis for Manufacturing is scaled differently than the other sectors to accommodate a larger net flow of commuters. Figures shown are grouped according to the North American Classification System (NAICS).

OCCUPATIONAL ANALYSIS

This section examines the occupational composition of the region at the major group and detailed occupation level, as defined by the Standard Occupational Classification (SOC) system. The analysis highlights regional occupational strengths (concentrations) as well as occupations currently in demand by employers based both traditional and real-time labor market data.

MAJOR OCCUPATIONAL GROUP
DISTRIBUTION & CONCENTRATION OF EMPLOYMENT

Office & administrative support workers are typically the largest occupational group, due to the ubiquitous nature of the work. At the national level, this group is followed by sales positions and food preparation workers. Fort Worth's strengths in transportation and manufacturing are mirrored in its occupational distribution which breaks from the national pattern, with above average shares of transportation and production workers.

FIGURE 22. DISTRIBUTION OF EMPLOYMENT BY OCCUPATION, 2016
PERCENT OF TOTAL, CITY OF FORT WORTH, WITH COMPARISON TO REGION, STATE, AND USA

	City of Fort Worth	Fort Worth (MD)	Dallas (MD)	Dallas-Fort Worth (MSA)	Texas	USA
Office & Administrative Support	17.6%	16.0%	17.7%	17.2%	16.1%	15.2%
Transportation & Material Moving	10.6%	8.4%	7.2%	7.5%	6.9%	6.6%
Sales & Related	10.1%	11.0%	11.2%	11.1%	10.6%	10.2%
Food Prep. & Serving Related	7.9%	8.9%	8.2%	8.5%	8.7%	8.4%
Production	7.3%	6.5%	4.9%	5.4%	5.4%	6.0%
Installation, Maintenance, & Repair	5.0%	4.7%	3.9%	4.1%	4.3%	3.8%
Healthcare (Practitioners & Tech.)	4.9%	5.2%	4.8%	4.9%	5.0%	5.5%
Construction & Extraction	4.7%	5.3%	4.3%	4.6%	5.6%	4.5%
Business & Financial Operations	4.6%	4.1%	6.0%	5.5%	4.7%	5.1%
Education, Training, & Library	4.5%	5.7%	5.2%	5.3%	5.8%	5.8%
Management	4.3%	4.2%	4.7%	4.6%	4.5%	5.5%
Personal Care & Service	3.3%	4.0%	3.5%	3.6%	4.4%	4.1%
Building & Grounds Cleaning/Maint.	2.8%	3.4%	3.5%	3.5%	3.6%	3.8%
Computer & Mathematical	2.5%	2.3%	4.6%	3.9%	2.9%	2.8%
Protective Service	2.1%	2.2%	2.1%	2.1%	2.3%	2.3%
Healthcare (Support)	2.1%	2.3%	2.3%	2.3%	2.5%	2.8%
Architecture & Engineering	1.8%	1.6%	1.8%	1.8%	1.9%	1.7%
Arts, Design, Entertainment, & Media	1.3%	1.5%	1.6%	1.6%	1.4%	1.8%
Community & Social Service	1.2%	1.3%	1.1%	1.2%	1.2%	1.6%
Legal	0.8%	0.7%	0.9%	0.8%	0.8%	0.8%
Life, Physical, & Social Science	0.5%	0.4%	0.5%	0.5%	0.7%	0.8%
Farming, Fishing, & Forestry	0.2%	0.2%	0.1%	0.1%	0.5%	0.8%

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations.

A look at location quotients (LQs) can suggest areas where a region possesses a competitive advantage relative to other parts of the country (see box page 3). At the major group level, concentrations are less likely because of the wide range of individual occupations encompassed. For this reason, concentrations even slightly above the national level can be noteworthy, calling for the use of a slightly lower threshold when highlighting areas of potential advantage.

As in the prior figure, Fort Worth's strengths in transportation and manufacturing can be seen in the above-average concentration of employment in these areas. The city's LQ of 1.61 far exceeds that of the region, indicating a specialization in these skills above what would be expected for a similarly sized region based on national patterns. These strengths are obscured at the metropolitan area level, illustrating the benefit of a city-level review of the data. The analysis also highlights a potential weakness for the city in terms of computer & mathematical operations. This important occupational group is lacking in the region based on its below average LQ (0.91).

FIGURE 23. CONCENTRATION OF EMPLOYMENT, 2016 (USA=1.00)
CITY OF FORT WORTH, WITH COMPARISON TO REGION, STATE, AND USA

	City of Fort Worth	Fort Worth (MD)	Dallas (MD)	Dallas-Fort Worth (MSA)	Texas	USA
Transportation & Material Moving	1.61	1.28	1.09	1.15	1.03	1.00
Installation, Maintenance, & Repair	1.30	1.23	1.03	1.09	1.12	1.00
Production	1.22	1.10	0.82	0.90	0.90	1.00
Office & Administrative Support	1.17	1.06	1.17	1.14	1.06	1.00
Architecture & Engineering	1.07	0.97	1.10	1.06	1.11	1.00
Construction & Extraction	1.05	1.19	0.97	1.03	1.25	1.00
Sales & Related	0.99	1.08	1.10	1.10	1.04	1.00
Legal	0.96	0.82	1.08	1.00	0.92	1.00
Food Prep. & Serving Related	0.94	1.07	0.99	1.01	1.03	1.00
Protective Service	0.93	0.96	0.95	0.95	1.03	1.00
Business & Financial Operations	0.92	0.82	1.20	1.09	0.93	1.00
Computer & Mathematical	0.91	0.81	1.64	1.40	1.03	1.00
Healthcare (Practitioners & Tech.)	0.89	0.95	0.88	0.90	0.92	1.00
Personal Care & Service	0.80	0.97	0.86	0.89	1.07	1.00
Management	0.79	0.78	0.86	0.83	0.82	1.00
Education, Training, & Library	0.79	1.00	0.90	0.93	1.01	1.00
Building & Grounds Cleaning/Maint.	0.74	0.90	0.92	0.91	0.95	1.00
Healthcare (Support)	0.74	0.83	0.81	0.82	0.90	1.00
Arts, Design, Entertainment, & Media	0.72	0.81	0.91	0.88	0.79	1.00
Community & Social Service	0.72	0.80	0.67	0.71	0.74	1.00
Life, Physical, & Social Science	0.59	0.53	0.60	0.58	0.85	1.00
Farming, Fishing, & Forestry	0.26	0.26	0.16	0.19	0.65	1.00

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations.

The following figures present employment distribution (share of total employment) and concentration (location quotients) for the domestic benchmarks. Comparisons are primarily made at the MSA level in this section as it is the most appropriate level for understanding the dynamics of a regional labor force. Along with the eight peer metro areas, figures are included for both metropolitan divisions (Fort Worth and Dallas) and for the Dallas-Fort Worth MSA to facilitate comparison. Darker shading indicates a larger share of the occupation (Figure 24) or a higher concentration of the occupation (Figure 25) relative to the other benchmark communities.

FIGURE 24. DISTRIBUTION OF EMPLOYMENT BY OCCUPATION, 2016: DOMESTIC BENCHMARKS (MSAs)

	Fort Worth (MD)	Dallas (MD)	Dallas-Fort Worth (MSA)	Columbus, OH (MSA)	Denver, CO (MSA)	Indianapolis, IN (MSA)	Kansas City, MO (MSA)	Nashville, TN (MSA)	Oklahoma City, OK (MSA)	Phoenix, AZ (MSA)	Pittsburgh, PA (MSA)
11-0000 Mgmt.	4.2%	4.7%	4.6%	5.2%	5.1%	5.7%	5.8%	6.8%	6.3%	5.5%	4.2%
13-0000 Bus. & Fin.	4.1%	6.0%	5.5%	6.2%	7.8%	5.4%	5.9%	4.8%	5.0%	5.7%	5.0%
15-0000 Computer & Math	2.3%	4.6%	3.9%	3.8%	4.4%	2.8%	3.8%	2.3%	2.3%	3.6%	2.8%
17-0000 Arch. & Eng.	1.6%	1.8%	1.8%	1.6%	2.4%	1.4%	1.6%	1.3%	2.0%	1.9%	1.9%
19-0000 Science	0.4%	0.5%	0.5%	0.8%	1.0%	1.0%	0.7%	0.5%	0.8%	0.5%	0.9%
21-0000 Social Svc.	1.3%	1.1%	1.2%	1.6%	1.4%	1.5%	1.6%	1.4%	2.1%	1.6%	2.0%
23-0000 Legal	0.7%	0.9%	0.8%	0.8%	1.1%	0.8%	0.9%	0.8%	1.2%	0.8%	0.9%
25-0000 Education	5.7%	5.2%	5.3%	5.5%	5.2%	4.2%	5.2%	4.8%	5.1%	4.7%	5.6%
27-0000 Arts & Ent.	1.5%	1.6%	1.6%	1.8%	2.0%	1.6%	1.9%	2.5%	1.5%	1.7%	1.4%
29-0000 Health (Tech.)	5.2%	4.8%	4.9%	5.9%	5.1%	6.4%	5.8%	6.1%	6.2%	5.1%	6.9%
31-0000 Health (Support)	2.3%	2.3%	2.3%	3.5%	2.5%	2.3%	2.4%	2.5%	2.7%	2.5%	3.2%
33-0000 Protective Svc.	2.2%	2.1%	2.1%	2.1%	1.9%	2.2%	2.1%	2.1%	2.1%	2.5%	2.0%
35-0000 Food Workers	8.9%	8.2%	8.5%	8.4%	8.3%	8.7%	8.3%	8.7%	9.2%	8.7%	8.5%
37-0000 Gen. Maint.	3.4%	3.5%	3.5%	3.6%	3.6%	3.6%	3.1%	3.2%	3.5%	3.6%	3.4%
39-0000 Personal Care	4.0%	3.5%	3.6%	3.1%	4.1%	3.5%	3.9%	3.1%	3.3%	4.1%	4.5%
41-0000 Sales & Related	11.0%	11.2%	11.1%	9.0%	11.0%	10.1%	10.2%	9.8%	10.0%	11.5%	10.2%
43-0000 Office & Admin.	16.0%	17.7%	17.2%	16.9%	14.5%	14.6%	16.5%	16.3%	15.7%	17.0%	16.6%
45-0000 Ag & Forestry	0.2%	0.1%	0.1%	0.2%	0.2%	0.3%	0.2%	0.2%	0.2%	0.4%	0.1%
47-0000 Construct./Mining	5.3%	4.3%	4.6%	3.5%	5.3%	4.1%	4.2%	3.8%	5.7%	4.7%	4.9%
49-0000 Install & Repair	4.7%	3.9%	4.1%	3.5%	3.7%	4.0%	3.7%	4.2%	4.3%	3.8%	3.9%
51-0000 Production	6.5%	4.9%	5.4%	5.5%	3.5%	6.6%	5.5%	7.1%	4.7%	4.1%	5.1%
53-0000 Transportation	8.4%	7.2%	7.5%	7.6%	5.8%	9.2%	6.6%	7.8%	6.1%	6.0%	6.0%

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Formatting rules are applied by row (rather than to the entire chart) to show the relative distribution of the occupational group across the peer regions. Darker shading indicates a higher share of the occupation.

FIGURE 25. CONCENTRATION OF EMPLOYMENT, 2016 (USA=1.00)
AMONG METROPOLITAN DIVISIONS (MD) AND METROPOLITAN AREAS (MSA)

	Fort Worth (MD)	Dallas (MD)	Dallas-Fort Worth (MSA)	Columbus, OH (MSA)	Denver, CO (MSA)	Indianapolis, IN (MSA)	Kansas City, MO (MSA)	Nashville, TN (MSA)	Oklahoma City, OK (MSA)	Phoenix, AZ (MSA)	Pittsburgh, PA (MSA)
11-0000 Mgmt.	0.78	0.86	0.83	0.95	0.94	1.05	1.05	1.24	1.15	1.01	0.77
13-0000 Bus. & Fin.	0.82	1.20	1.09	1.23	1.56	1.08	1.17	0.96	0.99	1.13	1.00
15-0000 Computer & Math	0.81	1.64	1.40	1.36	1.57	0.99	1.37	0.83	0.83	1.31	1.00
17-0000 Arch. & Eng.	0.97	1.10	1.06	0.96	1.46	0.84	0.97	0.81	1.17	1.12	1.13
19-0000 Science	0.53	0.60	0.58	0.95	1.25	1.18	0.87	0.65	0.99	0.67	1.08
21-0000 Social Svc.	0.80	0.67	0.71	0.98	0.85	0.92	0.99	0.88	1.26	1.01	1.24
23-0000 Legal	0.82	1.08	1.00	0.93	1.34	0.98	1.14	0.91	1.38	0.98	1.09
25-0000 Education	1.00	0.90	0.93	0.96	0.91	0.73	0.90	0.83	0.88	0.81	0.98
27-0000 Arts & Ent.	0.81	0.91	0.88	0.99	1.13	0.91	1.03	1.37	0.85	0.95	0.77
29-0000 Health (Tech.)	0.95	0.88	0.90	1.09	0.93	1.18	1.07	1.11	1.13	0.93	1.27
31-0000 Health (Support)	0.83	0.81	0.82	1.26	0.89	0.84	0.86	0.91	0.97	0.91	1.13
33-0000 Protective Svc.	0.96	0.95	0.95	0.93	0.87	0.98	0.92	0.93	0.94	1.11	0.89
35-0000 Food Workers	1.07	0.99	1.01	1.00	1.00	1.04	0.99	1.03	1.09	1.03	1.02
37-0000 Gen. Maint.	0.90	0.92	0.91	0.95	0.94	0.94	0.81	0.84	0.91	0.96	0.90
39-0000 Personal Care	0.97	0.86	0.89	0.75	1.01	0.85	0.94	0.76	0.79	1.00	1.11
41-0000 Sales & Related	1.08	1.10	1.10	0.88	1.08	1.00	1.00	0.96	0.97	1.13	1.00
43-0000 Office & Admin.	1.06	1.17	1.14	1.12	0.96	0.96	1.08	1.08	1.03	1.12	1.10
45-0000 Ag & Forestry	0.26	0.16	0.19	0.32	0.27	0.37	0.31	0.21	0.32	0.52	0.16
47-0000 Construct./Mining	1.19	0.97	1.03	0.78	1.17	0.91	0.93	0.85	1.26	1.06	1.08
49-0000 Install & Repair	1.23	1.03	1.09	0.92	0.96	1.06	0.97	1.10	1.11	1.00	1.03
51-0000 Production	1.10	0.82	0.90	0.92	0.59	1.11	0.92	1.19	0.78	0.69	0.86
53-0000 Transportation	1.28	1.09	1.15	1.15	0.89	1.40	1.00	1.19	0.91	0.91	0.91

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. LQs within +/- 10% of the nation are highlighted. Purple = above-average LQ (1.10 or greater); grey = below-average LQ (less than 0.90).

DISTRIBUTION BY SKILL LEVEL

Federal data on typical education, experience, and training requirements by occupation was used to segment the region's employment base by skill level. Low-skilled occupations are defined as those requiring a high school diploma or less, while occupations requiring a bachelor's degree or above are categorized as high skill. The remaining jobs (those typically requiring more than high school, but less than a four-year degree), are deemed middle-skills jobs. This broad category encompasses a variety of jobs that are essential to a wide range of industries. They include skilled trades, such as plumbers and electricians, as well as production workers, healthcare technicians, and administrative support functions. By this measure, Fort Worth has seen above-average growth in middle-skills positions, but lags the region, state, and nation in high skills employment growth.

FIGURE 26. DISTRIBUTION OF EMPLOYMENT BY SKILL LEVEL, 2016

BASED ON TYPICAL EDUCATION & TRAINING REQUIRED

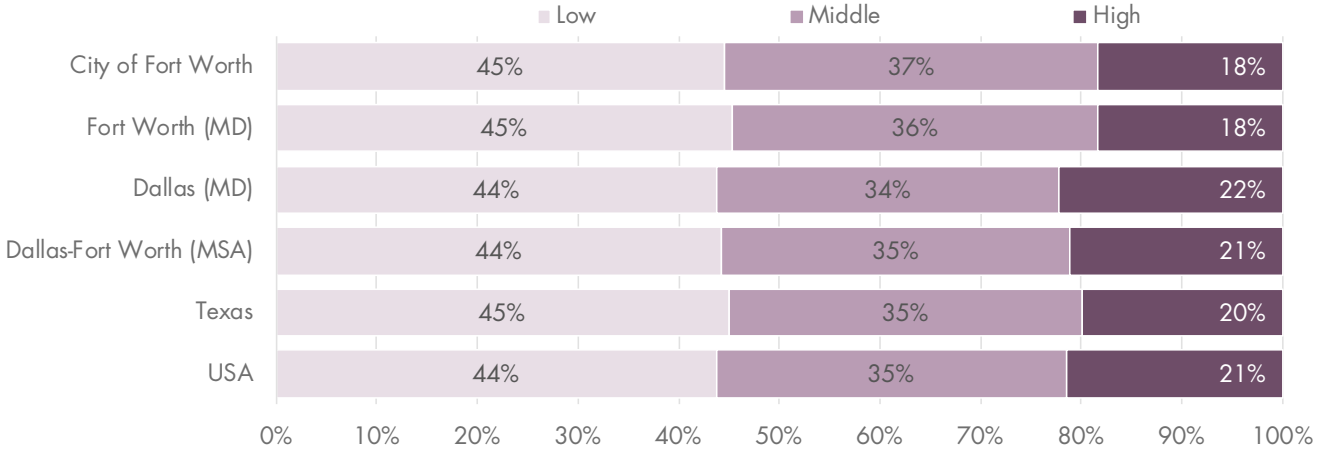
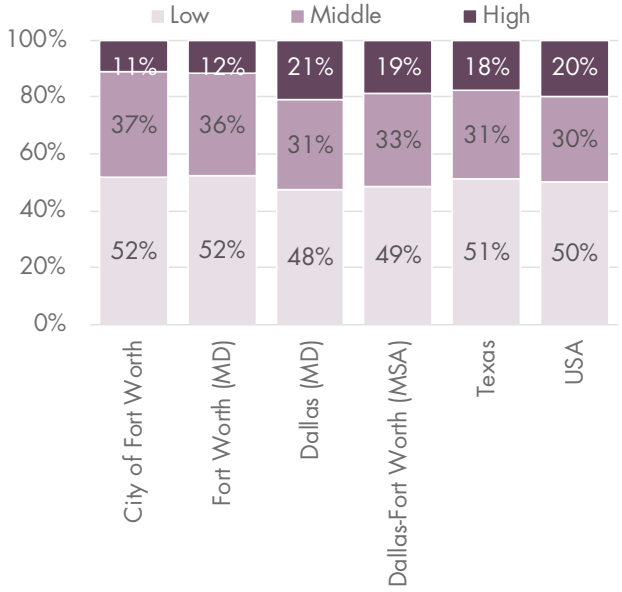
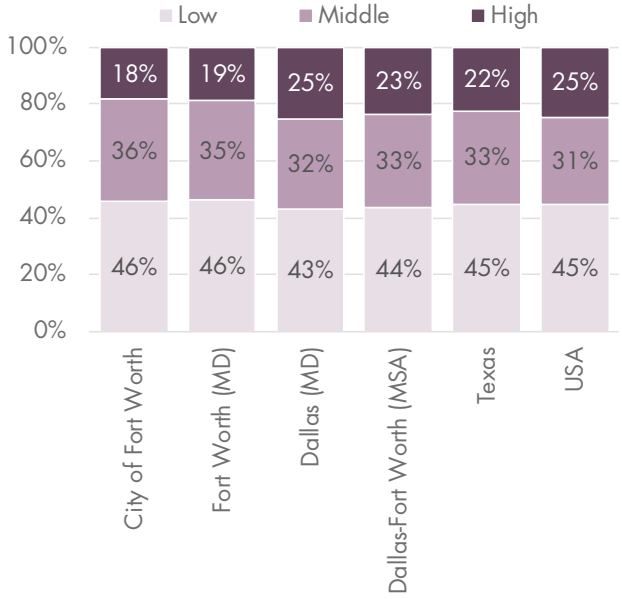


FIGURE 27. DISTRIBUTION OF EMPLOYMENT GROWTH BY SKILL LEVEL

HISTORIC JOB CHANGE, 2010-2016



PROJECTED JOB CHANGE, 2016-2021



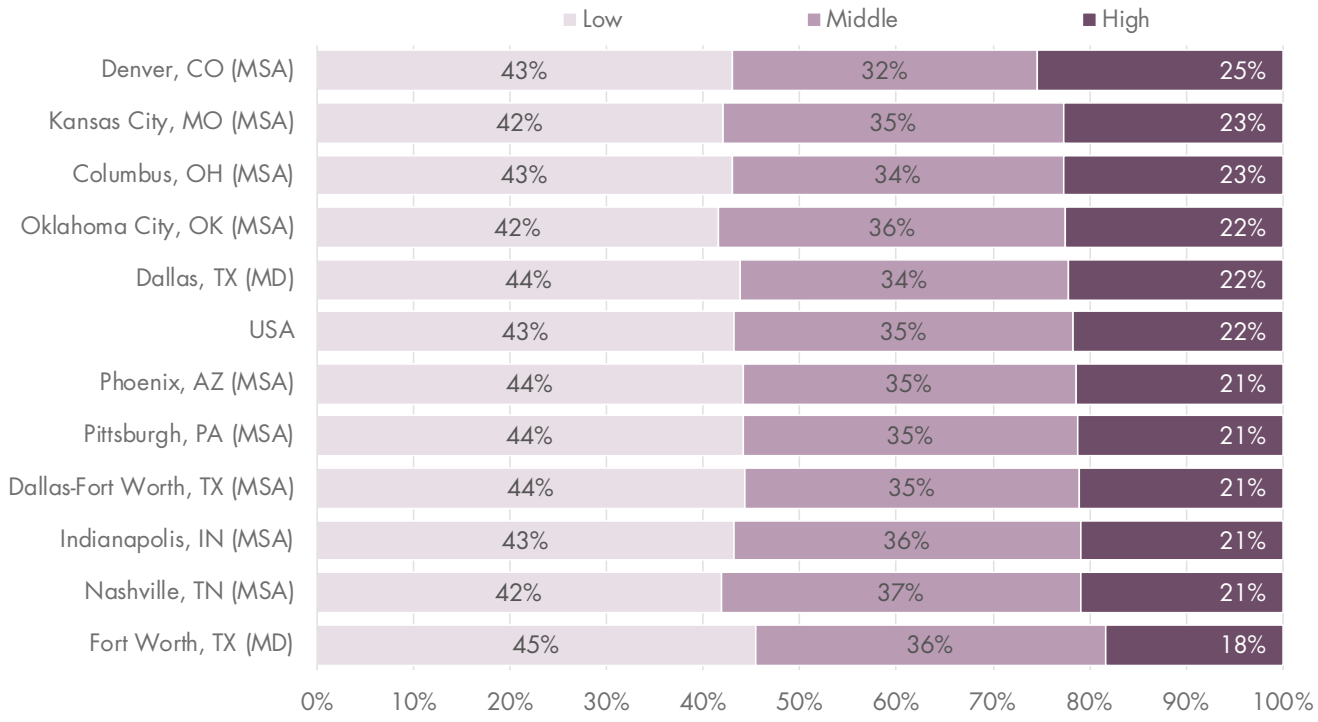
Source (both figures): Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed
Note: Data on typical education and training is used as a proxy for skill level. Low-skilled jobs are those requiring a high school diploma or less. Middle-skilled jobs require some training beyond high school, but less than a four-year degree. High-skilled jobs require a bachelor's degree or higher.

A similar broad look at the skill level of the domestic benchmarks' employment base reinforces the suggestion that Fort Worth has not claimed its share of high skill jobs. According to this method, just 18 percent of jobs in the six-county metropolitan division typically require a four-year degree or higher. By contrast, this group accounts for 21 percent or more of employment among the other metropolitan areas. At the top of the list, one in four jobs in Denver meets this criterion. Denver's high proportion of skilled jobs reflects the draw created by Colorado's strong economic performance, business friendly policies, and high quality of life, which continue to attract businesses and workers to the region. According to *Fortune* magazine's May 2017 ranking (as reported on the MetroDenver website), Denver is home to 10 Fortune 500 companies.

Some of the difference is accounted for by Fort Worth's slightly larger share of middle-skills jobs, a category that has garnered significant attention as a pathway to living-wage employment. However, Fort Worth has a relatively large share of its employment base in low skilled positions. At 45 percent of the total employment base, this figure was the highest among the metropolitan areas analyzed. Furthermore, as shown in the prior figure, low-skill employment has historically grown at a higher rate in the Fort Worth MD than in the Dallas-Fort Worth MSA and this trend is projected to continue going forward.

FIGURE 28. DISTRIBUTION OF EMPLOYMENT BY SKILL LEVEL, 2016: DOMESTIC BENCHMARKS (MSAs)

BASED ON TYPICAL EDUCATION & TRAINING REQUIRED



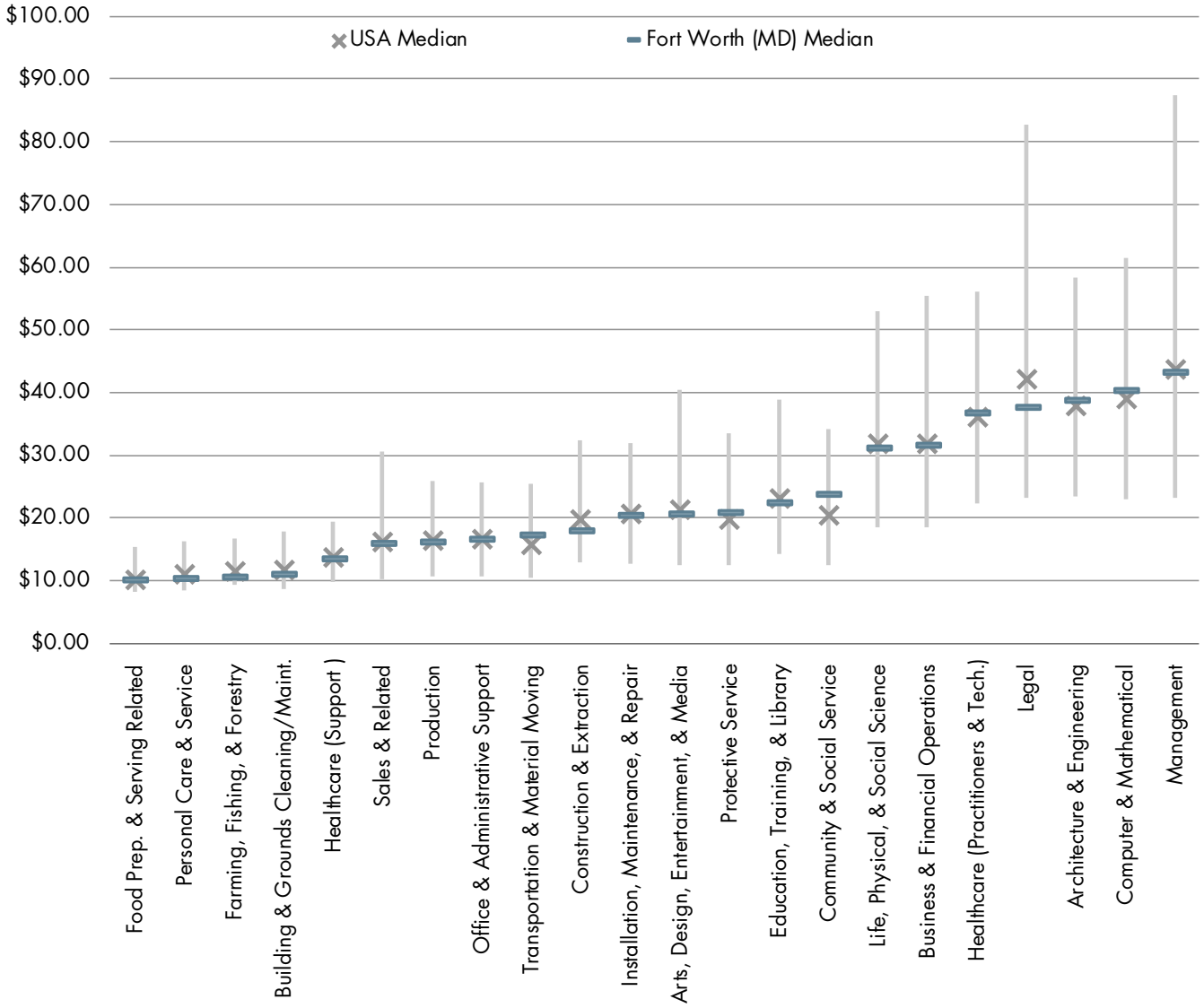
Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Data on typical education and training is used as a proxy for skill level. Low-skilled jobs are those requiring a high school diploma or less. Middle-skilled jobs require some training beyond high school, but less than a four-year degree. High-skilled jobs require a bachelor's degree or higher.

MEDIAN WAGE RATES

Median wage rates in the Fort Worth MD are largely in alignment with national rates. Again, the area's strengths in transportation-related positions can be seen, as median wage rates for this occupational group exceeds the national median. Groups that fall below the national rate include legal occupations and construction and extraction workers.

FIGURE 29. REGIONAL WAGES IN THE CONTEXT OF NATIONAL RATES: FORT WORTH MD

Line = National wage range from the 10th to the 90th percentile
Markers = Median hourly wage rates for US (x) and Fort Worth MD (bar)

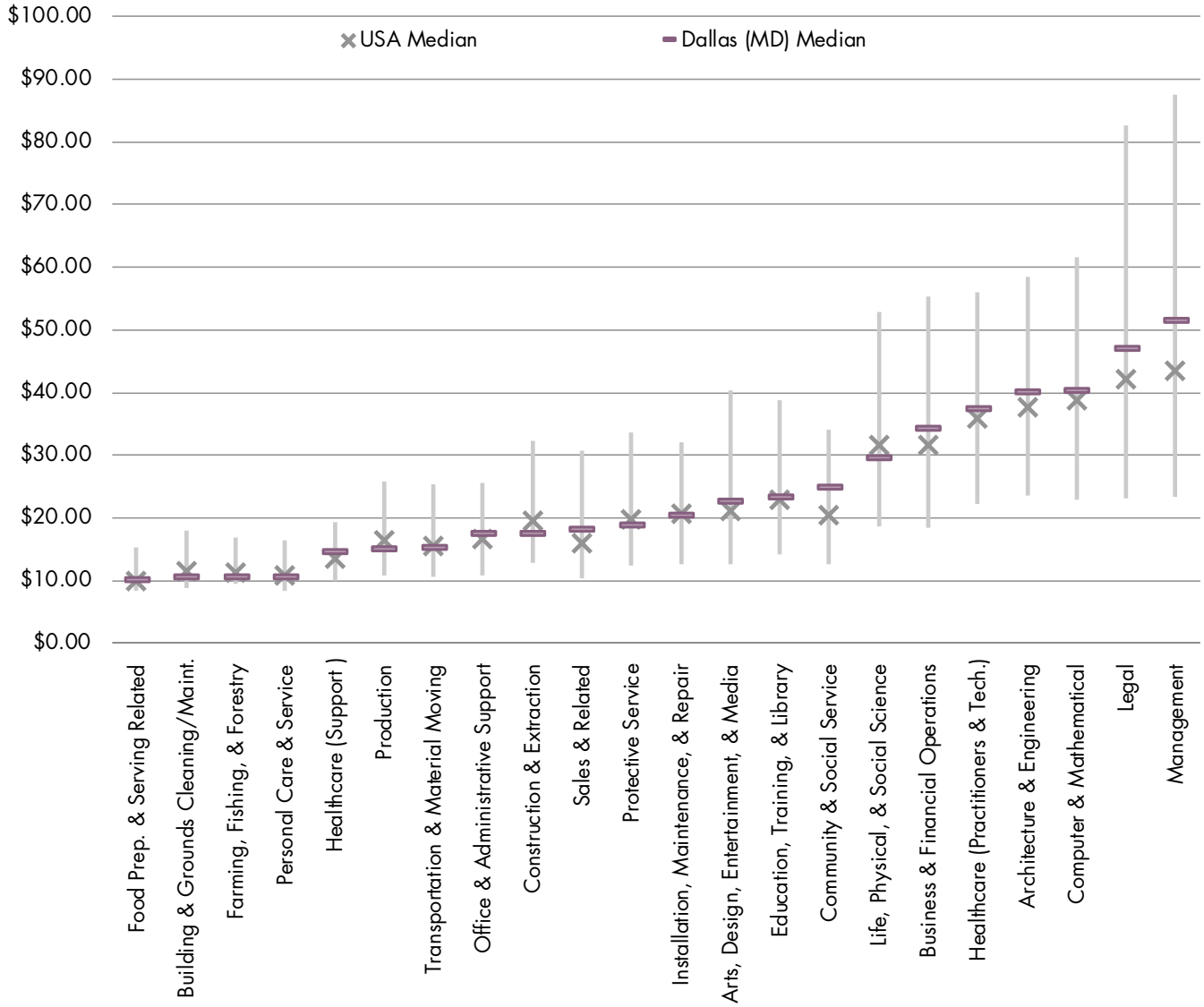


Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Figures are sorted by Fort Worth MD median wage rate (▬) from lowest to highest.

Median wage rates in the Dallas MD do not track the national medians as closely as in the Fort Worth MD. Like Fort Worth, wages for construction and extraction workers as a group fall short of the national median. However, wage rates exceed the US for a number of groups, including management positions, business and financial workers, and legal professionals. Figures for the Dallas-Fort Worth MSA (not shown) are similar to the Dallas MD, reflecting its influence on the region's employment data.

FIGURE 30. REGIONAL WAGES IN THE CONTEXT OF NATIONAL RATES: DALLAS MD

Line = National wage range from the 10th to the 90th percentile
Markers = Median hourly wage rates for US (x) and Dallas MD (bar)

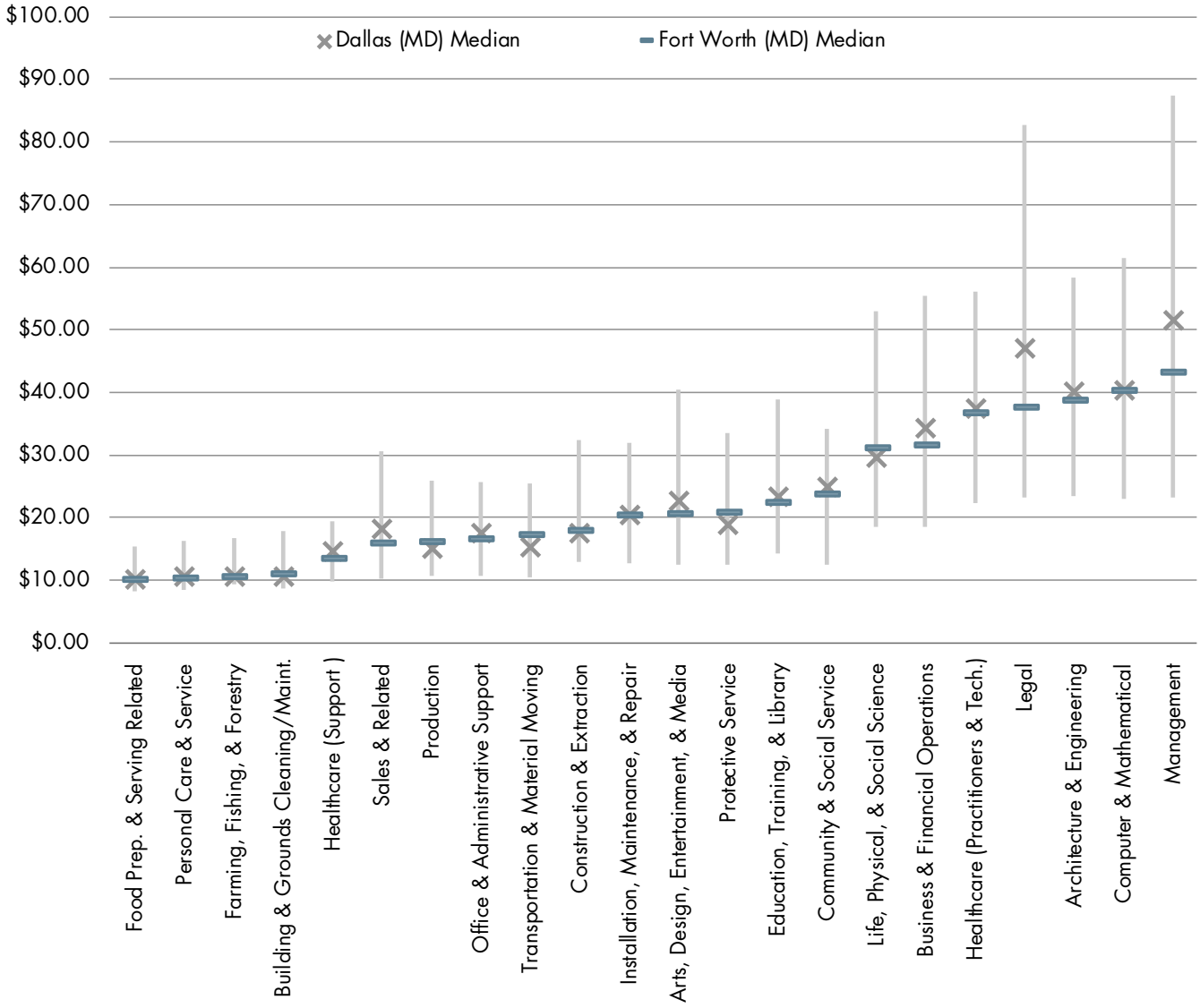


Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Figures are sorted by Dallas MD median wage rate (▬) from lowest to highest.

Unlike the prior charts which compared wage rates in one metropolitan division against the national median, Figure 31 compares the median wage rate in the Fort Worth MD against the Dallas MD. The national context is still shown via the bar marking the US wage range from the 10th and 90th percentile. This view highlights some sharp differences in wage rates between the east and west sides of the metro area, most notably in median wage rates for management and legal occupations.

FIGURE 31. REGIONAL WAGES IN THE CONTEXT OF NATIONAL RATES: FORT WORTH MD COMPARED TO DALLAS MD

Line = National wage range from the 10th to the 90th percentile
Markers = Median hourly wage rates for Fort Worth MD (bar) and Dallas MD (x)



Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Figures are sorted by Fort Worth MD median wage rate (▬) from lowest to highest.

Figure 32 provides a comparison of median hourly wage rates by major occupational group for the domestic benchmarks. The data highlight some stark contrasts among the MSAs. One of the more obvious takeaways is the relatively high wage rates found in the Denver MSA across virtually every occupational group.

FIGURE 32. COMPARISON OF MEDIAN HOURLY WAGE RATES ACROSS DOMESTIC BENCHMARKS (MSAS)

BY MAJOR OCCUPATIONAL GROUP

	Fort Worth (MD)	Dallas (MD)	Dallas-Fort Worth (MSA)	Columbus, OH (MSA)	Denver, CO (MSA)	Indianapolis, IN (MSA)	Kansas City, MO (MSA)	Nashville, TN (MSA)	Oklahoma City, OK (MSA)	Phoenix, AZ (MSA)	Pittsburgh, PA (MSA)
11-0000 Mgmt.	$43.04	$51.48	$49.14	$43.44	$51.38	$39.66	$43.34	$37.79	$37.17	$41.50	$47.02
13-0000 Bus. & Fin.	$31.32	$34.30	$33.63	$30.56	$33.88	$29.06	$30.81	$28.82	$28.34	$28.88	$30.23
15-0000 Computer & Math	$40.09	$40.20	$40.18	$37.67	$42.68	$33.22	$37.04	$33.38	$30.23	$37.48	$33.28
17-0000 Arch. & Eng.	$38.61	$39.95	$39.58	$34.25	$40.35	$34.32	$34.79	$32.95	$36.37	$36.76	$35.15
19-0000 Science	$31.04	$29.55	$29.96	$27.86	$34.20	$27.30	$30.43	$26.25	$28.20	$28.52	$29.28
21-0000 Social Svc.	$23.50	$24.72	$24.31	$19.70	$22.07	$21.32	$19.73	$19.29	$18.10	$19.15	$18.04
23-0000 Legal	$37.53	$46.99	$44.70	$37.23	$44.22	$39.44	$37.97	$41.38	$34.44	$40.07	$42.86
25-0000 Education	$22.28	$23.14	$22.86	$25.48	$23.75	$21.00	$19.63	$21.02	$18.86	$20.17	$24.12
27-0000 Arts & Ent.	$20.44	$22.60	$22.02	$20.37	$20.85	$19.19	$21.44	$20.60	$20.10	$18.18	$20.46
29-0000 Health (Tech.)	$36.63	$37.40	$37.16	$35.39	$38.23	$36.46	$34.86	$33.27	$31.57	$37.36	$33.36
31-0000 Health (Support)	$13.38	$14.57	$14.22	$12.37	$15.39	$13.66	$13.42	$13.25	$13.23	$14.19	$13.82
33-0000 Protective Svc.	$20.68	$18.78	$19.34	$22.57	$21.38	$17.17	$19.03	$15.77	$21.10	$19.89	$17.86
35-0000 Food Workers	$9.87	$10.15	$10.06	$10.21	$10.29	$9.74	$9.77	$9.73	$9.44	$10.00	$9.96
37-0000 Gen. Maint.	$10.84	$10.40	$10.53	$11.34	$11.77	$10.92	$11.65	$11.25	$10.48	$11.17	$11.95
39-0000 Personal Care	$10.19	$10.52	$10.42	$10.59	$11.32	$10.46	$10.58	$11.03	$10.52	$10.97	$10.96
41-0000 Sales & Related	$15.81	$18.19	$17.50	$15.84	$18.56	$16.67	$16.65	$15.76	$14.55	$15.50	$16.54
43-0000 Office & Admin.	$16.52	$17.38	$17.14	$16.45	$18.28	$16.40	$16.85	$16.43	$15.77	$16.50	$16.32
45-0000 Ag & Forestry	$10.28	$10.48	$10.40	$13.64	$12.70	$12.01	$12.98	$11.97	$11.72	$10.55	$11.60
47-0000 Construct./Mining	$17.86	$17.52	$17.64	$19.82	$20.12	$21.93	$22.14	$17.50	$19.01	$18.69	$21.77
49-0000 Install & Repair	$20.18	$20.40	$20.32	$21.04	$22.67	$21.09	$20.34	$20.58	$20.33	$20.01	$20.34
51-0000 Production	$16.06	$15.07	$15.43	$17.28	$16.51	$15.49	$18.13	$16.80	$15.94	$15.89	$18.05
53-0000 Transportation	$17.16	$15.15	$15.82	$14.19	$18.43	$14.98	$16.07	$15.06	$15.36	$16.05	$15.95
ALL GROUPS	$20.02	$22.02	$21.42	$20.97	$23.64	$20.17	$21.16	$19.75	$19.40	$20.35	$20.69

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Formatting rules are applied by row (rather than to the entire chart) to show relative wage rates across the peer regions. Darker shading indicates higher median wage rates.

The figure below compares the median wage of the peer metros to the national median for the occupational group. The figure shown is the difference between the two. The largest variations are found among professional and high-skilled positions, such as management, computer-related positions, and legal occupations.

FIGURE 33. MEDIAN HOURLY WAGE RATE DIFFERENTIAL RELATIVE TO USA MEDIAN
AMOUNT LOCAL WAGE VARIES FROM NATIONAL MEDIAN FOR THE OCCUPATIONAL GROUP

	Fort Worth (MD)	Dallas (MD)	Dallas-Fort Worth (MSA)	Columbus, OH (MSA)	Denver, CO (MSA)	Indianapolis, IN (MSA)	Kansas City, MO (MSA)	Nashville, TN (MSA)	Oklahoma City, OK (MSA)	Phoenix, AZ (MSA)	Pittsburgh, PA (MSA)
11-0000 Mgmt.	-$0.53	+$7.91	+$5.58	-$0.12	+$7.82	-$3.90	-$0.23	-$5.77	-$6.39	-$2.06	+$3.46
13-0000 Bus. & Fin.	-$0.31	+$2.66	+$2.00	-$1.08	+$2.24	-$2.58	-$0.82	-$2.82	-$3.29	-$2.75	-$1.40
15-0000 Computer & Math	+$1.20	+$1.32	+$1.29	-$1.22	+$3.79	-$5.67	-$1.85	-$5.51	-$8.66	-$1.41	-$5.61
17-0000 Arch. & Eng.	+$0.92	+$2.26	+$1.89	-$3.44	+$2.67	-$3.37	-$2.90	-$4.74	-$1.32	-$0.92	-$2.54
19-0000 Science	-$0.65	-$2.15	-$1.73	-$3.84	+$2.50	-$4.39	-$1.26	-$5.45	-$3.50	-$3.17	-$2.42
21-0000 Social Svc.	+$3.06	+$4.28	+$3.88	-$0.74	+$1.64	+$0.88	-$0.71	-$1.14	-$2.34	-$1.29	-$2.40
23-0000 Legal	-$4.51	+$4.95	+$2.66	-$4.81	+$2.18	-$2.60	-$4.07	-$0.66	-$7.60	-$1.97	+$0.82
25-0000 Education	-$0.72	+$0.14	-$0.14	+$2.48	+$0.75	-$2.00	-$3.37	-$1.98	-$4.14	-$2.83	+$1.12
27-0000 Arts & Ent.	-$0.70	+$1.46	+$0.88	-$0.77	-$0.29	-$1.95	+$0.30	-$0.54	-$1.04	-$2.96	-$0.68
29-0000 Health (Tech.)	+$0.66	+$1.44	+$1.20	-$0.58	+$2.26	+$0.49	-$1.11	-$2.69	-$4.39	+$1.39	-$2.61
31-0000 Health (Support)	-$0.17	+$1.03	+$0.67	-$1.18	+$1.85	+$0.11	-$0.13	-$0.30	-$0.31	+$0.65	+$0.28
33-0000 Protective Svc.	+$0.95	-$0.95	-$0.39	+$2.84	+$1.65	-$2.56	-$0.70	-$3.96	+$1.37	+$0.16	-$1.87
35-0000 Food Workers	-$0.14	+$0.14	+$0.05	+$0.20	+$0.28	-$0.27	-$0.24	-$0.27	-$0.57	-$0.01	-$0.05
37-0000 Gen. Maint.	-$0.70	-$1.14	-$1.01	-$0.20	+$0.23	-$0.62	+$0.10	-$0.29	-$1.06	-$0.37	+$0.41
39-0000 Personal Care	-$0.64	-$0.31	-$0.42	-$0.24	+$0.49	-$0.37	-$0.25	+$0.20	-$0.31	+$0.14	+$0.12
41-0000 Sales & Related	-$0.25	+$2.13	+$1.44	-$0.22	+$2.50	+$0.61	+$0.59	-$0.30	-$1.51	-$0.56	+$0.48
43-0000 Office & Admin.	-$0.05	+$0.80	+$0.57	-$0.12	+$1.70	-$0.18	+$0.27	-$0.14	-$0.80	-$0.07	-$0.26
45-0000 Ag & Forestry	-$1.00	-$0.80	-$0.88	+$2.36	+$1.42	+$0.74	+$1.71	+$0.70	+$0.44	-$0.73	+$0.33
47-0000 Construct./Mining	-$1.72	-$2.07	-$1.95	+$0.24	+$0.54	+$2.34	+$2.56	-$2.09	-$0.58	-$0.90	+$2.19
49-0000 Install & Repair	-$0.44	-$0.22	-$0.29	+$0.42	+$2.06	+$0.47	-$0.27	-$0.04	-$0.29	-$0.60	-$0.28
51-0000 Production	-$0.25	-$1.25	-$0.88	+$0.96	+$0.19	-$0.83	+$1.82	+$0.49	-$0.37	-$0.42	+$1.73
53-0000 Transportation	+$1.60	-$0.42	+$0.25	-$1.37	+$2.87	-$0.59	+$0.50	-$0.50	-$0.21	+$0.48	+$0.39
ALL GROUPS	-$0.76	+$1.23	+$0.64	+$0.19	+$2.85	-$0.61	+$0.38	-$1.04	-$1.38	-$0.44	-$0.09

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Wage rates above the national median are shaded in green; those below the national median are shaded in red.

REGIONAL PRICE PARITIES

Regional Price Parities (RPPs), produced by the US Bureau of Economic Analysis, provide a quick measure of the differences in prices of goods and services (including rent) across states and metropolitan areas for a given year. RPPs are expressed as a percentage of the overall national price level, which is equal to 100.0. Data are not provided for the metropolitan divisions, so comparisons are made to the Dallas-Fort Worth metro area.

Using this metric, the metro area's cost of living is consistent with the national average. Of the three components that comprise the measure, the Dallas-Fort Worth metro area compares most favorably on the cost of goods, ranking fourth among the benchmark MSAs, with an RPP of 97.8. The Dallas-Fort Worth metro area compares least favorably to the other MSAs on the cost of services (excluding rent), although costs on this component are only slightly above the national norm.

Among the domestic benchmarks, Denver is the only MSA that has a combined score above the national average. Denver's 106.0 RPP is driven by much higher rents, which are roughly 22 percent above the US average. At the other end of the spectrum, rents in the Pittsburgh MSA are well below the US average (more than 20 percent lower, as evidenced by an RPP of 78.8). Oklahoma City was the lowest cost MSA among the benchmarks, with an RPP on all items of 92.1, meaning overall cost of living in the Oklahoma City metro area is roughly 8 percent lower than the national average.

FIGURE 34. REGIONAL PRICE PARITIES, 2015

SORTED BY "ALL ITEMS," US = 100.0

	GOODS	SERVICES: OTHER	SERVICES: RENTS	ALL ITEMS
Denver, CO (MSA)	1 101.5	2 101.1	1 122.4	1 106.0
Dallas-Fort Worth, TX (MSA)	4 97.8	1 101.8	2 101.6	2 100.0
Phoenix, AZ (MSA)	2 98.1	4 96.4	3 96.7	3 97.2
Pittsburgh, PA (MSA)	2 98.1	3 99.0	9 78.8	4 94.7
Nashville, TN (MSA)	8 97.1	6 94.0	4 87.9	5 93.9
Kansas City, MO-KS (MSA)	9 96.4	5 96.3	6 83.2	6 93.7
Indianapolis, IN (MSA)	5 97.6	8 93.7	6 83.2	7 93.1
Columbus, OH (MSA)	6 97.4	9 93.5	5 83.6	7 93.1
Oklahoma City, OK (MSA)	7 97.2	6 94.0	8 79.4	9 92.1

Source: US Bureau of Economic Analysis.
Note: RPPs are not produced for metropolitan divisions.

DETAILED OCCUPATIONS

The prior figures gave an overview of the regional workforce at the major occupational group level. The remainder of this section presents data on individual occupations. This section uses both traditional and real-time labor market information (LMI) to identify occupations in demand by area employers. Findings from a survey of area residents and business owners also informs this analysis. Relevant survey results are presented in Section 4.

EMPLOYMENT CONCENTRATIONS

A look at LQs again illustrates the dominance of transportation-related occupations in the Fort Worth MD. Of the top 10 occupations shown in Figure 35, eight are related to transportation, including positions associated with the movement of passengers and freight and those associated with aerospace manufacturing. Wage rates in the most specialized occupations (those with the highest LQs) tend to be higher than national medians for the occupation, but are largely in keeping with regional wage rates.

Given their importance to a number of Fort Worth's major industries, Figure 36 (page 47) shows the relative concentration of employment by individual occupations within categories most closely associated with STEM fields: 15-0000 Computer & Mathematical Occupations, 17-0000 Architecture & Engineering Occupations, and 19-0000 Life, Physical, & Social Science Occupations. Comparisons are provided to the domestic peer MSAs.

This analysis suggests that many of these critical occupations are seriously underrepresented in the Fort Worth MD. Among computer-related occupations, only the Fort Worth MD and the Nashville MSA lag the US and the other peer metro areas on every position. Fort Worth performs better with regard to engineering talent, with concentrations of some engineers twice the levels that would be expected in a labor market of similar size based on national patterns. A lack of scientific employment suggests challenges for the growth of some targets, most notably, life sciences.

FIGURE 35. REGIONAL OCCUPATIONAL STRENGTHS, RANKED BY 2016 LOCATION QUOTIENT
LOCATION QUOTIENTS OF 1.25 OR MORE, WITH COMPARISON TO MSA

		FORT WORTH MD			DALLAS-FORT WORTH MSA			RELATIVE WAGES	
SOC	DESCRIPTION	LQ	2016 Jobs	Median Hourly Wage	LQ	2016 Jobs	Median Hourly Wage	MSA	USA
43-5011	Cargo & Freight Agents	7.50	4,311	$21.81	2.79	5,453	$21.53	1.01	1.08
53-2031	Flight Attendants	5.33	4,147	$26.86	2.30	6,090	$27.81	0.97	1.25
43-4181	Reservation/Ticket Agents & Travel Clerks	5.20	5,292	$21.47	2.48	8,604	$18.53	1.16	1.27
49-3011	Aircraft Mechanics & Service Technicians	4.82	4,347	$27.20	2.51	7,695	$29.21	0.93	0.97
47-5071	Roustabouts, Oil & Gas	4.20	1,533	$16.64	1.47	1,830	$17.07	0.97	0.95
47-5013	Service Unit Operators, Oil, Gas, & Mining	3.96	1,203	$24.04	2.00	2,064	$23.42	1.03	1.11
53-2011	Airline Pilots, Copilots, & Flight Engineers	3.92	2,365	$69.36	2.41	4,945	$72.38	0.96	1.23
51-2011	Aircraft Systems Assemblers	3.87	1,129	$22.36	1.62	1,608	$21.68	1.03	0.95
33-9093	Transportation Security Screeners	3.40	1,103	$18.60	1.26	1,393	$18.57	1.00	0.98
17-2011	Aerospace Engineers	3.06	1,455	$58.11	1.75	2,833	$51.23	1.13	1.12
23-2093	Title Examiners, Abstractors, & Searchers	2.40	1,033	$25.69	2.00	2,922	$24.60	1.04	1.20

continued, next page

FIGURE 35. REGIONAL OCCUPATIONAL STRENGTHS, RANKED BY 2016 LOCATION QUOTIENT (CONTINUED)

		FORT WORTH MD			DALLAS-FORT WORTH MSA			RELATIVE WAGES	
SOC	DESCRIPTION	LQ	2016 Jobs	Median Hourly Wage	LQ	2016 Jobs	Median Hourly Wage	MSA	USA
43-6013	Medical Secretaries	1.93	7,395	$15.58	1.97	25,740	$15.47	1.01	0.98
43-5061	Production, Planning, & Expediting Clerks	1.64	3,676	$21.24	1.39	10,670	$21.98	0.97	0.96
47-2081	Drywall & Ceiling Tile Installers	1.57	1,308	$15.83	1.47	4,161	$15.96	0.99	0.90
21-2011	Clergy	1.55	2,901	$21.69	1.23	7,849	$22.15	0.98	1.04
21-2021	Directors, Religious Activities & Education	1.54	1,488	$34.50	1.26	4,143	$35.91	0.96	1.85
29-1021	Dentists, General	1.48	1,355	$84.24	1.30	4,048	$88.66	0.95	1.14
17-2199	Engineers, All Other	1.46	1,453	$46.94	0.85	2,862	$46.59	1.01	1.04
43-5032	Dispatchers, (Except Police, Fire, Ambulance)	1.45	2,081	$18.27	1.17	5,739	$17.63	1.04	1.02
53-1031	First-Line Supvsr., Transp. & Material-Movers	1.44	2,094	$25.53	1.38	6,832	$26.17	0.98	0.95
47-2051	Cement Masons & Concrete Finishers	1.44	1,777	$16.31	1.29	5,423	$15.34	1.06	0.91
53-3032	Heavy & Tractor-Trailer Truck Drivers	1.42	18,692	$18.12	1.22	55,001	$18.43	0.98	0.94
43-4131	Loan Interviewers & Clerks	1.41	2,169	$19.08	2.23	11,680	$20.50	0.93	1.05
51-4121	Welders, Cutters, Solderers, & Brazers	1.41	3,895	$17.53	1.14	10,774	$17.34	1.01	0.96
25-2011	Teachers, Preschool (Except Special Ed.)	1.38	4,476	$24.33	1.01	11,095	$18.59	1.31	1.79
47-1011	First-Line Supvsr., Constr. Trades & Extraction	1.36	5,856	$28.71	1.21	17,756	$28.05	1.02	1.04
11-9021	Construction Managers	1.36	3,432	$31.03	1.22	10,442	$33.33	0.93	0.93
29-2041	Emergency Medical Techs. & Paramedics	1.36	2,248	$16.87	0.89	5,038	$17.95	0.94	1.10
25-2031	Teachers, Secondary (Exc. Special Ed. & CTE)	1.36	8,995	$27.08	1.15	26,076	$26.60	1.02	0.99
43-3011	Bill & Account Collectors	1.35	3,028	$16.41	1.39	10,662	$17.70	0.93	0.99
11-3071	Transp., Storage, & Distribution Mgrs.	1.34	1,094	$43.46	1.22	3,397	$45.60	0.95	1.05
49-9099	Install./Maint./Repair Workers, All Other	1.33	1,727	$15.73	0.90	3,989	$16.43	0.96	0.91
41-1012	First-Line Supvsr., Non-Retail Sales Workers	1.32	3,310	$27.14	1.48	12,606	$29.34	0.93	0.93
51-5112	Printing Press Operators	1.31	1,592	$17.17	1.03	4,241	$18.00	0.95	1.02
51-9061	Inspectors, Testers, Sorters, & Weighers	1.31	4,683	$18.92	1.06	12,954	$17.83	1.06	1.08
53-1021	Supvsr., Helpers/Material Movers, Hand	1.30	1,641	$22.89	1.14	4,940	$22.84	1.00	1.01
49-2022	Telecom. Equip. Install./Repair, Exc. Line	1.28	1,996	$21.79	1.69	9,024	$22.22	0.98	0.83
41-3099	Sales Reps., Services, All Other	1.27	8,541	$23.46	1.52	34,796	$25.28	0.93	0.95
51-4011	CNC Machine Operators, Metal/Plastic	1.26	1,266	$19.27	0.90	3,061	$18.09	1.07	1.08
49-3031	Bus/Truck Mechanics & Diesel Engine Spec.	1.26	2,339	$20.57	1.04	6,611	$21.31	0.97	0.98
29-1126	Respiratory Therapists	1.26	1,072	$28.27	1.08	3,144	$28.38	1.00	1.02

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. The relative wages column compares the median hourly wage for the occupation in the Fort Worth MD against the wage rate for the occupation in the Dallas-Fort Worth MSA (MSA = 1.00) and the USA (USA = 1.00). Wage rates more than 10% higher (greater than 1.10) are shaded purple; those that are more than 10% lower (less than 0.90) are highlighted in grey.

FIGURE 36. EMPLOYMENT CONCENTRATION IN SELECTED STEM-RELATED OCCUPATIONS
COMPARISON ACROSS DOMESTIC BENCHMARKS (USA = 1.00)

	Fort Worth, TX (MD)	Dallas, TX (MD)	Dallas-Fort Worth, TX (MSA)	Columbus, OH (MSA)	Denver, CO (MSA)	Indianapolis, IN (MSA)	Kansas City, MO (MSA)	Nashville, TN (MSA)	Oklahoma City, OK (MSA)	Phoenix, AZ (MSA)	Pittsburgh, PA (MSA)
15-0000 COMPUTER AND MATHEMATICAL OCCUPATIONS											
15-1000 Computer Occupations											
Computer & Info. Research Scientists	0.12	1.18	0.87	0.24	0.46	0.49	0.75	0.21	1.40	0.22	0.39
Computer Systems Analysts	0.81	2.12	1.74	2.25	1.16	0.98	1.41	0.95	0.65	1.70	1.15
Information Security Analysts	0.77	1.95	1.60	1.52	1.25	0.80	1.73	0.69	0.81	1.89	0.75
Computer Programmers	0.70	1.49	1.26	0.79	0.84	0.96	1.54	0.78	0.81	1.07	1.26
Software Developers, Applications	0.80	1.30	1.15	1.69	1.97	0.93	1.23	0.60	0.63	1.13	1.00
Software Developers, Systems	0.95	1.86	1.59	0.52	1.99	0.67	1.22	0.61	0.81	1.42	0.48
Web Developers	0.63	1.34	1.13	1.04	1.25	0.99	1.11	0.93	0.87	1.33	0.82
Database Administrators	0.96	1.60	1.41	1.28	1.36	1.14	1.36	0.81	0.88	1.64	1.18
Network & Computer Systems Admin.	0.78	1.68	1.42	1.14	1.88	1.24	1.68	0.90	0.64	1.11	0.99
Computer Network Architects	0.56	1.93	1.53	1.61	2.04	1.49	1.29	0.84	0.54	1.46	0.84
Computer User Support Specialists	0.96	1.70	1.48	1.11	1.31	1.04	1.50	1.02	1.18	1.26	1.34
Computer Network Support Spec.	0.87	2.10	1.74	1.96	1.30	0.68	1.06	1.14	0.75	1.60	0.99
Computer Occupations, All Other	0.71	1.01	0.92	0.93	2.64	1.04	1.38	0.75	1.30	0.63	0.70
15-2000 Mathematical Science Occupations											
Actuaries	0.63	1.20	1.03	2.58	1.83	1.15	4.20	0.57	0.71	0.82	1.25
Mathematicians	0.79	0.71	0.73	0.22	0.48	0.90	0.94	0.25	1.18	0.54	0.27
Operations Research Analysts	1.10	1.61	1.46	1.33	0.61	1.15	0.90	1.30	1.31	2.20	0.66
Statisticians	0.32	0.55	0.48	0.90	0.98	1.74	1.55	1.22	0.93	0.85	1.71
Mathematical Technicians	0.20	0.32	0.29	0.95	0.57	0.53	0.41	0.33	0.96	0.63	0.82
Mathematical Science, All Other	1.02	1.11	1.08	0.91	0.95	1.39	0.65	0.18	1.01	0.68	0.18
17-0000 ARCHITECTURE AND ENGINEERING OCCUPATIONS											
17-1000 Architects, Surveyors, and Cartographers											
Architects, Except Landscape/Naval	0.63	1.22	1.04	0.85	1.72	0.81	1.60	0.79	0.75	1.12	0.81
Landscape Architects	1.44	0.77	0.96	0.74	1.46	0.72	0.92	0.54	1.70	0.88	0.58
Cartographers & Photogrammetrists	1.08	1.03	1.04	0.36	3.60	0.57	1.30	0.86	0.73	0.90	0.83
Surveyors	1.06	0.70	0.81	0.63	1.48	0.61	0.72	0.93	1.55	0.87	1.28

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FIGURE 36. EMPLOYMENT CONCENTRATION IN SELECTED STEM-RELATED OCCUPATIONS (CONTINUED)

	Fort Worth, TX (MD)	Dallas, TX (MD)	Dallas-Fort Worth, TX (MSA)	Columbus, OH (MSA)	Denver, CO (MSA)	Indianapolis, IN (MSA)	Kansas City, MO (MSA)	Nashville, TN (MSA)	Oklahoma City, OK (MSA)	Phoenix, AZ (MSA)	Pittsburgh, PA (MSA)
17-2000 Engineers											
Aerospace Engineers	3.06	1.20	1.75	0.78	1.88	0.19	0.61	0.10	1.70	0.86	0.34
Agricultural Engineers	1.06	0.25	0.49	2.12	1.17	1.53	1.82	0.55	0.54	0.69	0.45
Biomedical Engineers	0.23	0.38	0.34	0.74	1.09	2.95	0.31	0.26	0.94	1.11	1.17
Chemical Engineers	0.30	0.90	0.73	0.42	1.14	1.45	0.70	0.26	0.49	0.33	1.41
Civil Engineers	0.65	0.85	0.79	0.91	1.84	0.73	0.94	1.00	0.72	1.08	1.49
Computer Hardware Engineers	0.28	1.58	1.20	0.15	2.47	0.38	0.39	0.52	0.27	1.45	0.48
Electrical Engineers	0.74	1.09	0.98	0.82	1.25	0.82	1.62	0.45	0.63	1.23	1.22
Electronics Eng., Except Computer	1.15	2.22	1.91	0.71	2.63	0.56	0.89	0.80	2.17	1.60	0.55
Environmental Engineers	0.59	0.83	0.76	0.40	3.00	0.77	0.95	0.75	0.79	0.68	1.91
Health & Safety Eng., Except Mines	0.64	0.81	0.77	0.43	1.11	0.70	0.91	1.16	2.15	0.88	1.10
Industrial Engineers	0.86	0.94	0.91	1.02	0.67	1.06	0.73	1.43	0.66	1.12	1.02
Marine Engineers & Naval Architects	0.74	0.14	0.31	0.17	0.92	0.47	0.40	0.20	0.39	0.32	0.35
Materials Engineers	0.75	1.51	1.29	1.07	1.47	1.01	0.34	0.52	0.73	1.19	1.52
Mechanical Engineers	0.76	0.82	0.80	2.03	1.42	1.52	1.12	0.49	0.62	0.70	1.25
Mining & Geological Eng., Incl. Mines	1.75	0.71	1.01	0.44	5.21	0.48	0.56	0.84	8.58	1.51	2.90
Nuclear Engineers	1.38	0.16	0.52	0.51	0.96	0.46	0.55	0.58	0.43	0.49	5.65
Petroleum Engineers	2.13	2.43	2.34	0.28	3.92	0.22	0.21	0.07	8.78	0.14	1.60
Engineers, All Other	1.46	0.59	0.85	0.94	0.73	0.95	0.70	0.80	1.12	0.72	0.74
17-3000 Drafters, Engineering Technicians, and Mapping Technicians											
Architectural & Civil Drafters	0.94	1.25	1.16	1.30	1.45	0.53	1.14	1.00	0.89	1.11	1.46
Electrical & Electronics Drafters	0.67	1.57	1.31	0.46	1.60	0.81	1.40	1.20	0.82	1.78	1.01
Mechanical Drafters	0.84	0.83	0.83	0.66	0.90	0.96	1.01	0.76	1.38	0.59	1.57
Drafters, All Other	0.98	1.09	1.06	1.78	1.47	0.99	0.82	0.70	0.77	1.77	1.00
Aerospace Eng. & Operations Techs.	3.07	0.57	1.31	0.47	1.10	0.33	0.68	0.13	0.38	3.06	0.20
Civil Engineering Technicians	1.35	0.89	1.03	0.99	0.83	0.61	1.68	0.87	1.04	0.98	1.08
Electrical/Electronics Eng. Technicians	0.67	1.85	1.50	0.43	0.81	0.60	1.07	0.71	1.22	1.40	1.06
Electro-Mechanical Technicians	1.06	2.06	1.76	0.45	0.53	0.76	0.60	0.88	4.95	1.73	1.51
Environmental Engineering Techs.	0.26	0.69	0.56	0.58	2.55	0.94	0.88	3.38	1.55	0.38	2.06

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FIGURE 36. EMPLOYMENT CONCENTRATION IN SELECTED STEM-RELATED OCCUPATIONS (CONTINUED)

	Fort Worth, TX (MD)	Dallas, TX (MD)	Dallas-Fort Worth, TX (MSA)	Columbus, OH (MSA)	Denver, CO (MSA)	Indianapolis, IN (MSA)	Kansas City, MO (MSA)	Nashville, TN (MSA)	Oklahoma City, OK (MSA)	Phoenix, AZ (MSA)	Pittsburgh, PA (MSA)
Industrial Engineering Technicians	1.00	1.12	1.08	0.90	0.25	0.67	0.64	0.87	1.45	3.67	0.64
Mechanical Engineering Technicians	1.84	1.36	1.50	1.07	0.58	0.75	1.18	1.40	1.41	0.62	0.89
Eng. Techs., Except Drafters, All Other	1.41	0.89	1.05	1.95	1.32	0.65	0.45	0.50	1.42	1.72	1.04
Surveying & Mapping Technicians	1.38	1.28	1.31	0.81	2.76	0.81	0.92	1.49	3.40	1.11	1.09
19-0000 LIFE, PHYSICAL, AND SOCIAL SCIENCE OCCUPATIONS											
19-1000 Life Scientists											
Animal Scientists	0.20	0.13	0.15	2.20	0.23	0.58	1.15	0.18	1.26	0.19	0.20
Food Scientists & Technologists	0.57	0.93	0.83	0.65	1.04	1.85	1.40	0.17	0.48	0.38	0.35
Soil & Plant Scientists	0.37	0.31	0.33	0.39	0.65	0.84	1.51	0.37	0.23	0.75	0.57
Biochemists & Biophysicists	0.10	0.14	0.13	0.59	0.48	2.70	0.67	0.93	0.21	0.20	0.70
Microbiologists	0.14	0.24	0.21	0.92	1.16	3.82	0.44	0.72	0.53	0.43	1.29
Zoologists & Wildlife Biologists	0.25	0.16	0.19	0.33	0.88	0.39	0.65	0.22	0.70	0.67	0.19
Biological Scientists, All Other	0.21	0.29	0.27	0.61	0.49	1.18	0.47	0.54	0.87	0.42	0.35
Conservation Scientists	0.67	0.17	0.32	0.68	1.00	0.32	0.76	0.43	0.39	0.48	0.67
Foresters	0.20	0.22	0.21	0.45	0.62	0.96	0.51	0.67	0.37	0.37	0.56
Epidemiologists	0.34	0.26	0.29	0.87	3.35	1.63	0.60	2.30	1.34	0.80	0.49
Medical Scientists, Except Epidem.	0.34	0.77	0.65	1.08	0.75	1.36	0.69	0.66	0.80	0.68	1.91
Life Scientists, All Other	0.25	0.25	0.25	0.37	0.33	1.54	0.35	0.40	0.32	0.52	0.89
19-2000 Physical Scientists											
Astronomers	0.57	0.41	0.46	0.79	0.85	0.76	0.53	0.52	0.17	0.28	0.26
Physicists	0.31	0.26	0.28	0.32	0.96	0.81	1.00	0.28	0.43	0.23	0.29
Atmospheric & Space Scientists	1.04	1.01	1.02	0.30	1.29	0.61	1.78	0.62	2.99	0.31	0.47
Chemists	0.71	0.48	0.55	0.76	1.08	1.78	1.11	0.52	0.53	0.48	1.55
Materials Scientists	0.28	0.35	0.33	1.09	1.53	0.71	1.24	0.26	0.46	0.68	2.03
Environmental Scientists/Spec., Incl. Health	0.44	0.66	0.60	1.39	1.81	0.56	0.90	0.91	0.47	0.84	0.92
Geoscientists	1.44	0.90	1.06	0.50	5.21	0.71	0.51	0.51	3.64	0.54	1.27
Hydrologists	0.61	0.15	0.28	3.13	3.24	0.44	0.81	1.45	0.46	2.20	0.78
Physical Scientists, All Other	0.32	0.74	0.61	1.07	0.99	2.50	1.19	0.26	0.76	0.60	0.70

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FIGURE 36. EMPLOYMENT CONCENTRATION IN SELECTED STEM-RELATED OCCUPATIONS (CONTINUED)

	Fort Worth, TX (MD)	Dallas, TX (MD)	Dallas-Fort Worth, TX (MSA)	Columbus, OH (MSA)	Denver, CO (MSA)	Indianapolis, IN (MSA)	Kansas City, MO (MSA)	Nashville, TN (MSA)	Oklahoma City, OK (MSA)	Phoenix, AZ (MSA)	Pittsburgh, PA (MSA)
19-4000 Life, Physical, and Social Science Technicians											
Agricultural & Food Science Techs	0.17	0.68	0.53	1.31	0.24	1.04	0.98	0.72	0.83	0.40	0.30
Biological Technicians	0.26	0.27	0.27	2.05	2.77	3.00	1.36	0.21	3.25	0.57	1.84
Chemical Technicians	0.70	0.75	0.73	1.43	0.83	1.52	0.75	0.84	0.36	0.65	1.94
Geological & Petroleum Technicians	1.89	2.23	2.13	0.22	2.58	0.28	0.60	0.22	6.77	0.31	2.07
Nuclear Technicians	1.10	0.11	0.40	0.21	0.38	0.56	0.40	0.31	0.23	0.23	5.62
Social Science Research Assistants	0.35	0.55	0.49	0.60	0.82	0.62	0.61	0.76	0.22	0.33	0.79
Env. Science & Protection Techs	0.71	0.68	0.69	0.94	1.12	1.07	0.57	0.70	1.44	1.39	1.71
Forensic Science Technicians	1.02	0.65	0.76	1.48	1.52	1.71	3.01	2.79	1.51	2.92	0.21
Forest & Conservation Technicians	0.14	0.10	0.11	0.15	0.30	0.30	0.45	0.24	0.44	0.35	0.18
Science Techs., All Other	0.74	1.33	1.16	0.94	0.71	1.22	0.62	1.13	1.44	0.31	0.75

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

DEMAND FACTORS

Employer demand for workers stems from two general sources—new job growth and the replacement of existing workers. Figures 56 through 58 on the following pages show individual occupations with the highest levels of demand grouped by education requirements. The analysis provides an estimate of openings over the next five years, with an estimate of the share due to new job growth versus replacement demand. The analysis is segmented by skill level, using the educational categories introduced previously (see Figure 26, page 37).

Among low-skilled occupations, the largest demand is anticipated for positions in retail sales, food service, transportation and warehousing, and office environments. Demand for these workers is more likely to be driven by the replacement needs of employers, reflecting the high levels of turnover often seen in these entry-level positions. Demand for retail and food service workers is also closely tied to population growth.

Projected openings among middle-skills positions are more evenly divided between new job growth and replacement needs. Growth in these occupations presents an asset for the region. In addition to being in demand nationally, middle-skills jobs tend to pay above-average wages and often require a relatively short period of training beyond high school, making them a good return on investment for students. Furthermore, these mid-level jobs often have more robust career ladders than low-skilled work.

Like low-skilled positions, openings for high skilled jobs are also somewhat more likely to be driven by the replacement needs of employers. However, unlike low-skilled workers, replacement needs for this group tend to be driven more by workers exiting the labor force. A look at the demographics of this group point to a number of occupations facing a wave of retirements in the coming years.

FIGURE 37. TOP 25 OCCUPATION BASED ON OPENINGS THROUGH 2021: LOW SKILL
WITH ESTIMATED DEMAND FACTORS, AGE COHORTS, AND RELATIVE WAGE RATES

			DEMAND FACTORS			AGE		
SOC CODE	DESCRIPTION	2016 JOBS	Projected annual openings through 2021	New jobs	Replacement	% 55-64 years	% 65+ years	Relative wages (US=1.00)
LOW-SKILL *(High school or less)*								
41-2031	Retail Salespersons	35,716	1,938	34%	66%	13%	7%	0.98
35-3021	Combined Food Prep. & Servers, Incl. Fast Food	26,313	1,763	48%	52%	6%	3%	0.96
41-2011	Cashiers	24,721	1,585	30%	70%	10%	4%	0.99
35-3031	Waiters & Waitresses	18,049	1,154	22%	78%	4%	2%	0.96
53-7062	Laborers/Freight, Stock, & Material Movers, Hand	21,104	1,036	37%	63%	13%	3%	0.95
43-9061	Office Clerks, General	27,179	1,015	40%	60%	18%	7%	1.07
43-5081	Stock Clerks & Order Fillers	14,694	779	37%	63%	13%	4%	1.02
43-4051	Customer Service Representatives	18,933	764	37%	63%	12%	3%	0.98
39-9021	Personal Care Aides	12,122	595	82%	18%	20% ◀	10% ◀	0.91
37-2011	Janitors & Cleaners, Exc. Maids & Housekeepers	14,875	572	46%	54%	20% ◀	9%	0.88
47-2061	Construction Laborers	12,437	539	52%	48%	11%	3%	0.91
35-2014	Cooks, Restaurant	8,953	471	47%	53%	7%	2%	0.98
43-6014	Secretaries/Admin. Asst., Exc. Legal, Med., & Exec.	14,441	447	64%	36%	23% ◀	8%	0.88
37-3011	Landscaping & Groundskeeping Workers	10,062	401	53%	47%	13%	6%	0.97
35-3022	Counter Attendants, Cafeteria, & Concession	4,533	400	28%	72%	4%	2%	0.95
31-1011	Home Health Aides	4,208	384	72%	28%	17%	6%	0.92
39-9011	Childcare Workers	9,852	358	18%	82%	14%	6%	0.96
33-9032	Security Guards	7,298	333	67%	33%	16%	9%	0.88
37-2012	Maids & Housekeepers	8,373	318	35%	65%	16%	5%	0.96
35-9031	Hosts & Hostesses	3,568	313	16%	84%	4%	4%	0.99
43-4171	Receptionists & Information Clerks	5,439	312	50%	50%	15%	8%	0.92
53-7061	Cleaners of Vehicles & Equipment	4,191	300	47%	53%	10%	4%	0.90
53-3033	Light Truck or Delivery Services Drivers	7,071	289	56%	44%	18%	8%	1.06
41-3099	Sales Reps., Services, All Other	8,541	261	29%	71%	15%	5%	0.95
35-2021	Food Preparation Workers	4,458	251	47%	53%	9%	4%	1.07

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Wage rates that are 10% or more above the US median are highlighted, as are occupations where a significant share of the workforce is nearing retirement age (%55-64 = 20% or higher; %65+ = 10% or higher).

FIGURE 38. TOP 25 OCCUPATION BASED ON OPENINGS THROUGH 2021: MIDDLE SKILL
WITH ESTIMATED DEMAND FACTORS, AGE COHORTS, AND RELATIVE WAGE RATES

			DEMAND FACTORS			AGE		
SOC CODE	DESCRIPTION	2016 JOBS	Projected annual openings through 2021	New jobs	Replacement	% 55-64 years	% 65+ years	Relative wages (US=1.00)
MIDDLE-SKILL *(More than high school, less than four years)*								
29-1141	Registered Nurses	18,263	1,072	57%	43%	21% ◀	4%	1.08
53-3032	Heavy & Tractor-Trailer Truck Drivers	18,692	935	63%	37%	21% ◀	6%	0.94
31-1014	Nursing Assistants	8,509	513	59%	41%	15%	4%	0.93
41-1011	First-Line Supvsr., Retail Sales Workers	11,450	442	40%	60%	14%	5%	1.09
41-4012	Sales Reps., Whls. & Mfg., Exc. Tech. & Scientific	11,541	441	44%	56%	20% ◀	6%	0.99
49-9071	Maintenance & Repair Workers, General	9,931	439	38%	62%	22% ◀	6%	0.94
35-1012	First-Line Supvsr., Food Prep. & Servers	7,462	435	46%	54%	8%	2%	1.16
43-1011	First-Line Supvsr., Office & Admin. Support	10,081	349	55%	45%	19%	4%	1.02
51-2092	Team Assemblers	8,324	331	44%	56%	16%	3%	1.14
49-3023	Automotive Service Technicians & Mechanics	6,090	330	48%	52%	12%	3%	1.01
25-9041	Teacher Assistants	5,935	312	52%	48%	18%	5%	0.75
29-2061	Licensed Practical/Vocational Nurses	4,968	309	51%	49%	20% ◀	4%	1.10
43-6013	Medical Secretaries	7,395	291	71%	29%	22% ◀	6%	0.98
31-9092	Medical Assistants	4,626	282	63%	37%	8%	2%	0.99
39-5012	Hairdressers, Hairstylists, & Cosmetologists	5,475	276	46%	54%	11%	7%	1.00
33-3051	Police & Sheriff's Patrol Officers	5,588	269	29%	71%	9%	2%	1.16
47-2111	Electricians	4,913	236	66%	34%	14%	3%	0.81
11-9199	Managers, All Other	4,681	191	44%	56%	23% ◀	9%	0.82
43-3031	Bookkeeping, Accounting, & Auditing Clerks	10,763	175	39%	61%	22% ◀	10% ◀	0.99
47-1011	First-Line Supvsr., Constr. Trades & Extraction	5,856	168	71%	29%	19%	4%	1.04
25-2011	Teachers, Preschool (Except Special Ed.)	4,476	166	20%	80%	12%	3%	1.79
51-4121	Welders, Cutters, Solderers, & Brazers	3,895	163	29%	71%	16%	3%	0.96
47-2031	Carpenters	5,501	154	58%	42%	16%	3%	0.84
49-1011	First-Line Supvsr., Mechanics, Install, & Repair	3,811	153	48%	52%	23% ◀	4%	1.04
29-2041	Emergency Medical Techs. & Paramedics	2,248	149	73%	27%	7%	1%	1.10

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Wage rates that are 10% or more above the US median are highlighted, as are occupations where a significant share of the workforce is nearing retirement age (%55-64 = 20% or higher; %65+ = 10% or higher).

FIGURE 39. TOP 25 OCCUPATION BASED ON OPENINGS THROUGH 2021: HIGH SKILL
WITH ESTIMATED DEMAND FACTORS, AGE COHORTS, AND RELATIVE WAGE RATES

			DEMAND FACTORS			AGE		
SOC CODE	DESCRIPTION	2016 JOBS	Projected annual openings through 2021	New jobs	Replacement	% 55-64 years	% 65+ years	Relative wages (US=1.00)
HIGH SKILL *(Four-year degree or above)*								
11-1021	General & Operations Managers	15,293	696	42%	58%	18%	4%	1.08
25-2021	Teachers, Elementary (Except Special Ed.)	10,180	456	48%	52%	18%	4%	1.00
25-2031	Teachers, Secondary (Exc. Special Ed. & CTE)	8,995	396	44%	56%	17%	4%	0.99
13-2011	Accountants & Auditors	8,759	388	37%	63%	17%	7%	1.02
25-3098	Substitute Teachers	7,900	278	45%	55%	16%	9%	0.80
25-1099	Teachers, Postsecondary	7,148	273	52%	48%	19%	13% ◀	0.86
25-2022	Teachers, Middle School (Exc. Special Ed. & CTE)	5,227	228	47%	53%	18%	4%	1.00
21-2011	Clergy	2,901	149	55%	45%	27% ◀	22% ◀	1.04
13-2052	Personal Financial Advisors	1,818	131	62%	38%	16%	7%	0.78
15-1132	Software Developers, Applications	4,382	127	49%	51%	11%	2%	1.07
29-1069	Physicians & Surgeons, All Other	2,096	124	51%	49%	18%	10% ◀	1.13
13-1111	Management Analysts	3,571	123	58%	42%	22% ◀	9%	0.99
13-1071	Human Resources Specialists	3,224	122	34%	66%	15%	3%	1.00
23-1011	Lawyers	4,045	122	50%	50%	22% ◀	11% ◀	0.89
29-1123	Physical Therapists	1,282	116	66%	34%	11%	2%	1.00
15-1121	Computer Systems Analysts	3,314	111	60%	40%	15%	3%	1.04
11-9111	Medical & Health Services Managers	1,710	110	57%	43%	24% ◀	5%	0.96
41-3031	Securities, Commodities, & Financial Srvcs. Sales	2,457	108	59%	41%	12%	4%	0.65
11-3031	Financial Managers	2,130	100	47%	53%	18%	4%	0.94
13-1161	Market Research Analysts & Mktng. Specialists	2,486	98	68%	32%	11%	3%	1.01
13-1051	Cost Estimators	1,907	95	40%	60%	24% ◀	9%	1.01
11-9032	Educ. Administrators, Elem. & Secondary	1,777	92	41%	59%	24% ◀	5%	0.86
29-1051	Pharmacists	2,035	90	45%	55%	16%	6%	1.01
41-4011	Sales Reps., Whls. & Mfg., Tech. & Scientific	2,482	87	39%	61%	19%	5%	0.95
11-2022	Sales Managers	1,822	83	46%	54%	14%	3%	1.03

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: Excludes military and unclassified occupations. Wage rates that are 10% or more above the US median are highlighted, as are occupations where a significant share of the workforce is nearing retirement age (%55-64 = 20% or higher; %65+ = 10% or higher).

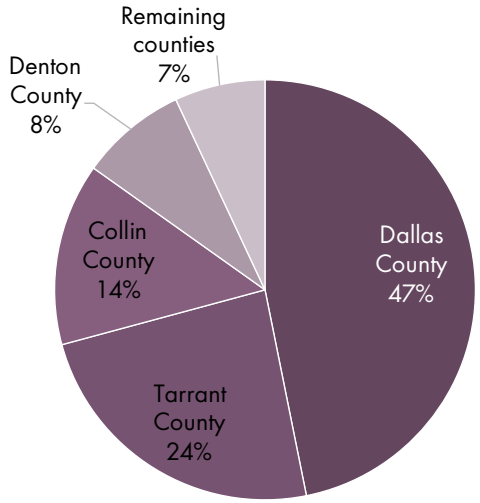
REAL-TIME LABOR MARKET INFORMATION

While traditional LMI remains the best source of data for understanding long-term trends and strategic decision-making, real-time data gleaned from online job postings provides a useful tool for understanding the needs of regional employers. Despite some limitations, most notably the underrepresentation of some occupations (production and skilled trades) and the overrepresentation of others (healthcare and IT), real-time LMI still offers timely insights regarding specific skills and certifications local employers are seeking. In addition, it can highlight occupations that are hard-to-fill in real time, something traditional sources of LMI cannot do.

FIGURE 40. JOB POSTING ANALYTICS
LAST SIX MONTHS

	FORT WORTH (MD)	DALLAS-FORT WORTH (MSA)
Unique postings	318,743	1,159,490
Total postings	2,242,977	7,853,439

DISTRIBUTION OF UNIQUE POSTS BY COUNTY



Source: Emsi based on job postings by regional employers December 2016 through May 2017.

Our analysis of job postings compiled by Emsi aligns with many of the findings from the data analysis presented previously. A look at job postings by occupation over the past six months in Figure 41 (page 55) reveals strong demand for truck drivers and nurses. In addition, the real-time data point to strong demand for a variety of retail positions (as demonstrated in the analysis of estimated openings presented in Figure 37, page 51). These three occupations also top the list of job postings nationally. In the case of truck drivers and nurses, high demand reflects long-standing shortages driven in part by an aging workforce. Demand for retail sales personnel is tied to economic cycles and population growth. Noteworthy among the most requested occupations is the number of IT positions, which accounted for five of the top 25 spots during the period analyzed. As previously stated, Fort Worth lags the region in these key skills.

A look at companies posting positions over the last six months (Figure 42, page 56) is also a direct reflection of the region's established industries, along with some emerging sectors. Nearing the top of the list are transportation innovation companies, Uber and Lyft. And while the top 25 companies are dominated by retail firms, this list also includes employers in other sectors, such as healthcare (HCA Holdings, Texas Health Resources, Baylor Scott & White Health, and others), aerospace (Lockheed Martin), and transportation and logistics (CRST International, Celadon Group, and C.R. England)

Figure 43 and Figure 44 (pages 57-58) show the top certifications and hard skills culled from regional job postings. As with other data presented in this section, the region's key sectors are reflected in the specific job requirements sought by regional employers. Commercial driver's license tops the list of desired certifications. Healthcare-related qualifications are common among both the requested skills and certifications.

FIGURE 41. TOP POSTED OCCUPATIONS, LAST SIX MONTHS
BASED ON SOC CLASSIFICATION SYSTEM

	OCCUPATION (SOC-CODE BASED)	DALLAS-FORT WORTH MSA		FORT WORTH MD	
		# of postings	*% of unique postings*	*# of postings*	*% of unique postings*
1	Heavy and Tractor-Trailer Truck Drivers	155,481	13%	51,405	16%
2	Registered Nurses	55,129	5%	18,959	6%
3	First-Line Supervisors of Retail Sales Workers	32,530	3%	11,755	4%
4	Retail Salespersons	32,663	3%	11,105	3%
5	Customer Service Representatives	23,757	2%	6,662	2%
6	First-Line Supervisors of Food Preparation and Serving Workers	21,018	2%	7,501	2%
7	Stock Clerks and Order Fillers	21,230	2%	6,609	2%
8	First-Line Supervisors of Office and Administrative Support Workers	19,019	2%	5,032	2%
9	Computer Occupations, All Other	21,098	2%	2,623	1%
10	Software Developers, Applications	20,766	2%	2,314	1%
11	Taxi Drivers and Chauffeurs	17,755	2%	2,855	1%
12	Accountants and Auditors	16,808	1%	2,945	1%
13	Combined Food Preparation and Serving Workers, Incl. Fast Food	13,335	1%	4,695	1%
14	Cashiers	12,234	1%	4,413	1%
15	Network and Computer Systems Administrators	13,608	1%	2,334	1%
16	Maintenance and Repair Workers, General	11,782	1%	3,533	1%
17	Sales Representatives, Services, All Other	12,402	1%	2,552	1%
18	Sales Managers	12,980	1%	1,940	1%
19	General and Operations Managers	11,766	1%	2,996	1%
20	Light Truck or Delivery Services Drivers	10,475	1%	3,392	1%
21	Computer User Support Specialists	11,771	1%	1,996	1%
22	Computer Systems Analysts	11,634	1%	1,848	1%
23	Food Service Managers	9,703	1%	3,370	1%
24	Management Analysts	11,109	1%	1,434	0%
25	Managers, All Other	10,104	1%	1,953	1%

Source: Emsi based on job postings by regional employers December 2016 through May 2017.

FIGURE 42. TOP COMPANIES POSTING POSITIONS, LAST SIX MONTHS

	COMPANY	DALLAS-FORT WORTH MSA	FORT WORTH MD	*MD % of MSA*
1	Lyft, Inc.	31,881	6,577	21%
2	HCA Holdings, Inc.	11,677	4,005	34%
3	Uber Technologies, Inc.	10,447	3,455	33%
4	Robert Half International Inc.	9,090	1,716	19%
5	Texas Health Resources	6,828	3,944	58%
6	Sonic Drive-In	7,208	2,517	35%
7	Baylor Scott & White Health	7,736	1,389	18%
8	Lockheed Martin Corporation	5,372	3,713	69%
9	Pizza Hut, Inc.	5,577	2,152	39%
10	CRST International, Inc.	5,712	1,840	32%
11	Petsmart, Inc.	4,922	1,598	32%
12	C.R. England, Inc.	4,729	1,682	36%
13	Scott & White Health Plan	5,380	959	18%
14	Celadon Group, Inc.	4,447	1,753	39%
15	Dollar General Corporation	4,330	1,834	42%
16	CVS Health Corporation	4,586	1,413	31%
17	Chili's, Inc.	4,288	1,411	33%
18	Marriott International, Inc.	4,066	1,442	35%
19	Cook Children's Health Care System	2,811	2,696	96%
20	Lowe's Companies, Inc.	3,853	1,500	39%
21	The Home Depot Inc	3,955	1,335	34%
22	Target Corporation	3,927	1,355	35%
23	Panera Bread Company	3,732	1,360	36%
24	Taco Bell Corp	3,565	1,396	39%
25	Aerotek, Inc.	3,898	1,030	26%

Source: Emsi based on job postings by regional employers December 2016 through May 2017.

FIGURE 43. TOP CERTIFICATIONS REQUESTED BY EMPLOYERS, LAST SIX MONTHS
SHADING SHOWS RELATIVE FREQUENCY OF SKILL AMONG TOTAL POSTINGS IN EACH GEOGRAPHIC AREA

	CERTIFICATIONS	Dallas-Fort Worth MSA	Fort Worth MD
1	Commercial Driver's License (CDL)		
2	Registered Nurse		
3	Licensed Vocational Nurses		
4	Master of Business Administration (MBA)		
5	Nurse Practitioner		
6	Licensed Practical Nurse		
7	Board Certified [unspecified]		
8	Certified Nursing Assistant		
9	Certified Public Accountant		
10	American Registry of Radiologic Technologists (ARRT) Certified		
11	Certified Information Systems Security Professional		
12	Patient Care Technician		
13	Certified Information Security Manager		
14	Certified Medical Assistant		
15	ANCC Certified		
16	Licensed Master Social Worker		
17	Series 7 General Securities Representative License (Stockbroker)		
18	Licensed Clinical Social Worker (LCSW)		
19	Cisco Certified Network Associate		
20	Transportation Worker Identification Credential (TWIC) Card		
21	Cisco Certified Network Professional		
22	Certified Benefits Professional		
23	Certified Emergency Nurse (CEN)		
24	Family Nursing Practitioner		
25	Radiologic Technologist		
26	Critical Care Registered Nurse (CCRN)		
27	Medical Technologist		
28	Advanced Life Support		
29	Advanced Practice Registered Nurse		
30	Licensed Professional Counselor (LPC)		
31	CompTIA A+ Certification		
32	Radiation Oncologist		
33	Certified Financial Planner		
34	Microsoft Certified Systems Engineer		
35	Registered Health Information Technician		

Source: Emsi based on job postings by regional employers December 2016 through May 2017.
Note: Shading shows relative number of postings in the region requesting listed certification. Darkest shading represents items mentioned on 90 percent of postings where certifications were specified; grey-shaded cells reflect certifications that appeared less than 10 percent of the time.

FIGURE 44. TOP HARD & SOFT SKILLS REQUESTED BY EMPLOYERS, LAST SIX MONTHS
SHADING SHOWS RELATIVE FREQUENCY OF SKILL AMONG TOTAL POSTINGS IN EACH GEOGRAPHIC AREA

	HARD SKILLS	Dallas-Fort Worth MSA	Fort Worth MD
1	Management		
2	Sales		
3	Training		
4	Customer Service		
5	Communications		
6	Recruitment		
7	Retailing		
8	Operations		
9	Insurance		
10	Finance		
11	Health Care		
12	Administration		
13	Marketing		
14	Information Security		
15	Maintenance		
16	Driving		
17	Innovation		
18	Restaurant Operation		
19	Problem Solving		
20	Testing		
21	Merchandising		
22	Appointment Scheduling		
23	Analysis		
24	Reports		
25	Selling Techniques		
26	Nursing		
27	Lifting		
28	Cleaning		
29	Engineering		
30	Presentations		
31	Cargos		
32	Life Insurance		
33	Written Communication		
34	Staffing		
35	Hospitalization		

	SOFT SKILLS	Dallas-Fort Worth MSA	Fort Worth MD
1	Scheduling (Project Management)		
2	Leadership		
3	Learning		
4	Coordinating		
5	Listening		
6	Cleanliness		
7	Ethics		
8	Creativity		
9	Critical Thinking		
10	Telephone Skills		
11	Career Development		
12	Team Building		
13	Depth Perception		
14	Literacy		
15	Mental Health		
16	Cooperation		
17	Persuasive Communication		
18	Team Leading		
19	Listening Skills		
20	Leadership Development		
21	Reliability		
22	Active Listening		
23	Speech		
24	Creative Problem-Solving		
25	Assertiveness		
26	Conversation		
27	Public Speaking		
28	Tenacity		
29	Perception		
30	Persistence		
31	Creative Thinking		
32	Team Management		
33	Imagination		
34	Humility		
35	Fine Motor Skills		

Source: Emsi based on job postings by regional employers December 2016 through May 2017.
Note: Shading shows relative number of postings in the region requesting listed skill. Darkest shading represents items mentioned on 90 percent of postings where skills were specified; grey-shaded cells reflect skills that appeared less than 10 percent of the time.

POSTSECONDARY COMPLETIONS

To document the region's postsecondary offerings, we reviewed published data for colleges and universities in the Dallas-Fort Worth MSA. Under the Higher Education Act of 1965, every college, university, and vocational or technical institution that participates in federal financial student aid programs (such as Pell grants or federally backed student loans) is required to report annually to the US Department of Education on a range of indicators. Data are collected through a system of interrelated surveys and are made available through the Integrated Postsecondary Education Data System (IPEDS).

Each fall, institutions report on the number of awards conferred for credit by field of study (as defined by Classification of Instructional Programs or CIP code). These data are referred to as "completions." This section presents average annual completions for regional institutions based on the three most recent academic years available (2012-2013, 2013-2014, and 2014-2015). A total of 121 colleges were included in the analysis, however, more than one-half of all awards granted for credit in the region are produced by six institutions.

In examining the relationship between training programs and employer needs, it is important to consider the fact that education and workforce training is not a closed system. Workers may attend college outside the region and those who attend college locally may take a job elsewhere. Postsecondary education systems are also not closed in terms of time. While data collection efforts are designed to measure completion within a set period, the path to graduation for individual students often does not fit these norms. This is particularly true of community colleges which are sometimes used to sample courses and "try out" career choices prior to making a larger investment.

FIGURE 45. TOP 30 DALLAS-FORT WORTH MSA INSTITUTIONS

BASED ON AWARDS GRANTED FOR CREDIT, 2014-2015

	INSTITUTION	2015 AWARDS	% of total awards
1	The University of Texas at Arlington	10,472	13%
2	University of North Texas	8,598	11%
3	Tarrant County College District	7,759	10%
4	The University of Texas at Dallas	6,948	9%
5	Southern Methodist University	3,889	5%
6	Texas Woman's University	3,828	5%
7	Texas A & M University-Commerce	2,973	4%
8	Collin County Community College District	2,899	4%
9	Texas Christian University	2,796	3%
10	Richland College	2,248	3%
11	Eastfield College	1,625	2%
12	El Centro College	1,487	2%
13	Dallas Baptist University	1,447	2%
14	Cedar Valley College	1,444	2%
15	Brookhaven College	1,275	2%
16	North Lake College	1,242	2%
17	Mountain View College	1,104	1%
18	University of Dallas	929	1%
19	Weatherford College	908	1%
20	DeVry University-Texas	812	1%
21	Univ. of North Texas Health Science Center	663	1%
22	Lincoln College of Tech.-Grand Prairie	591	1%
23	Universal Technical Inst. - Dallas Fort Worth	585	1%
24	Southwestern Assemblies of God University	572	1%
25	Concorde Career College-Grand Prairie	501	1%
26	Dallas Theological Seminary	482	1%
27	University of North Texas at Dallas	481	1%
28	Texas Wesleyan University	480	1%
29	Univ. of Texas Southwestern Medical Center	476	1%
30	Remington College-Dallas Campus	476	1%

Sources: Emsi 2017.2 compiled from the Integrated Postsecondary Data System (IPEDS) maintained by the National Center for Education Statistics
Note: IPEDS data include only schools eligible to participate in federal financial aid programs.

In terms of field of study (CIP Code), healthcare-related degrees top the list, accounting for nearly one in five completions in the region on average (Figure 47, page 61). Together with degrees in business-related fields and general studies, the top three fields of study represent slightly more than half of for-credit awards.

Figure 46 breaks out healthcare degrees awarded for credit by institutions in the Fort Worth MD during the 2014-2015 academic year. UT-Arlington was the largest provider of degrees in this area, accounting for more than 3,100 of the roughly 6,800 degrees awarded by Fort Worth MD institutions. Bachelor's degrees were the most frequently awarded level, accounting for 46 percent of the total. Taken together, institutions in the Fort Worth MD awarded nearly 2,000 awards of less than two years.

Figure 48 (page 62) presents completions data by detailed CIP-Code. At this level of detail, general studies degrees emerge as the most commonly awarded degree accounting for 1 in 10 awards. Within healthcare, nursing degrees are most common, with nearly 4,000 awards granted in 2015.

FIGURE 46. HEALTH PROFESSIONS AND RELATED PROGRAMS (CIP 51): FORT WORTH MD
AWARDS GRANTED FOR CREDIT BY INSTITUTIONS AND LEVEL, 2015

	AWARD LEVEL						
INSTITUTION	*Award of < 1 academic year*	*Award of at least 1, but < 2 years*	*Associate degree*	*Bachelor's degree*	*Master's (1)*	*Doctorate (2)*	**TOTAL**
Health Professions and Related Programs (CIP 51)							
The University of Texas at Arlington				2,750	334	89	3,173
Tarrant County College District	342	58	392				792
UNT Health Science Center					173	269	442
Texas Christian University				307	53	58	418
Weatherford College	11	67	225				303
Everest College-Fort Worth South		263	14				277
Brightwood College-Arlington		224					224
College of Health Care Profs.-Ft. Worth	49	125	13				187
Everest College-Arlington		181					181
Brightwood College-Fort Worth		176					176
Remington College-Fort Worth Campus	94	82					176
Texas Wesleyan University				6	104	22	132
Remaining Fort Worth MD institutions	*224*	*26*	*36*	*44*	*0*	*0*	*330*
TOTAL (CIP 51)	**720**	**1,202**	**680**	**3,107**	**664**	**438**	**6,811**

Sources: Emsi 2017.2 compiled from the Integrated Postsecondary Data System (IPEDS) maintained by the National Center for Education Statistics.
Notes: IPEDS data include only schools eligible to participate in federal financial aid programs. (1) Figure includes small number of awards of at least 2, but less than 4, academic years; (2) Includes post baccalaureate certificates; (3) Includes post-masters' certificates.

FIGURE 47. AWARDS BY DALLAS-FORT WORTH MSA INSTITUTIONS, BY BROAD FIELD OF STUDY
THREE-YEAR AVERAGE OF DEGREES & AWARDS GRANTED FOR CREDIT, BY 2-DIGIT CIP CODE

CIP CODE	PROGRAM	3-YEAR AVERAGE *Awards granted (with % of total & trend)*		
51.0000	Health Professions And Related Programs	14,384	18.5%	▲
52.0000	Business, Management, Marketing, And Related Support Services	14,223	18.3%	▲
24.0000	Liberal Arts And Sciences, General Studies And Humanities	11,677	15.0%	▲
12.0000	Personal And Culinary Services	3,214	4.1%	▼
11.0000	Computer And Information Sciences And Support Services	2,922	3.8%	▲
13.0000	Education	2,914	3.7%	▼
30.0000	Multi/interdisciplinary Studies	2,867	3.7%	▼
50.0000	Visual And Performing Arts	2,552	3.3%	▲
14.0000	Engineering	2,156	2.8%	▲
26.0000	Biological And Biomedical Sciences	1,901	2.4%	▲
45.0000	Social Sciences	1,874	2.4%	▼
42.0000	Psychology	1,823	2.3%	▼
47.0000	Mechanic And Repair Technologies/Technicians	1,807	2.3%	▲
43.0000	Homeland Security, Law Enforcement, Firefighting And Related	1,730	2.2%	▲
09.0000	Communication, Journalism, And Related Programs	1,447	1.9%	▲
39.0000	Theology And Religious Vocations	1,336	1.7%	▲
44.0000	Public Administration And Social Service Professions	1,067	1.4%	▲
15.0000	Engineering Technologies And Engineering-related Fields	1,039	1.3%	▼
31.0000	Parks, Recreation, Leisure, And Fitness Studies	976	1.3%	▲
22.0000	Legal Professions And Studies	822	1.1%	▼
23.0000	English Language And Literature/letters	754	1.0%	▼
16.0000	Foreign Languages, Literatures, And Linguistics	574	0.7%	▲
25.0000	Library Science	537	0.7%	▼
54.0000	History	527	0.7%	▼
40.0000	Physical Sciences	442	0.6%	▲
19.0000	Family And Consumer Sciences/Human Sciences	417	0.5%	▲
27.0000	Mathematics And Statistics	414	0.5%	▲
48.0000	Precision Production	344	0.4%	▲
10.0000	Communications Technologies/Technicians And Support Services	282	0.4%	▲
04.0000	Architecture And Related Services	177	0.2%	▼
38.0000	Philosophy And Religious Studies	144	0.2%	▼
01.0000	Agriculture, Agriculture Operations, And Related Sciences	118	0.2%	▲
49.0000	Transportation And Materials Moving	104	0.1%	▼
46.0000	Construction Trades	96	0.1%	▲
03.0000	Natural Resources And Conservation	80	0.1%	▲
05.0000	Area, Ethnic, Cultural, Gender, And Group Studies	28	0.0%	▲
	TOTAL, ALL FIELDS OF STUDY (3-YEAR AVERAGE)	77,777	100.0%	▲

Sources: Emsi 2017.2 compiled from the Integrated Postsecondary Data System (IPEDS) maintained by the National Center for Education Statistics.
Note: IPEDS data include only schools eligible to participate in federal financial aid programs.

FIGURE 48. AWARDS BY DALLAS-FORT WORTH MSA INSTITUTIONS, BY DETAILED FIELD OF STUDY
THREE-YEAR AVERAGE OF DEGREES & AWARDS GRANTED FOR CREDIT, BY 6-DIGIT CIP CODE

CIP CODE	PROGRAM	3-YEAR AVERAGE *Awards granted (with % of total & trend)*		
24.0102	General Studies	8,092	10.4%	▲
52.0201	Business Administration and Management, General	5,661	7.3%	▲
51.3801	Registered Nursing/Registered Nurse	3,990	5.1%	▲
24.0101	Liberal Arts and Sciences/Liberal Studies	3,466	4.5%	▼
51.0801	Medical/Clinical Assistant	2,535	3.3%	▼
30.9999	Multi-/Interdisciplinary Studies, Other	2,359	3.0%	▼
52.0301	Accounting	2,203	2.8%	▲
12.0401	Cosmetology/Cosmetologist, General	1,495	1.9%	▼
52.0801	Finance, General	1,295	1.7%	▲
42.0101	Psychology, General	1,215	1.6%	▼
26.0101	Biology/Biological Sciences, General	1,149	1.5%	▲
43.0104	Criminal Justice/Safety Studies	1,093	1.4%	▲
11.0101	Computer and Information Sciences, General	1,059	1.4%	▲
47.0604	Automobile/Automotive Mechanics Technology/Technician	951	1.2%	▲
52.1401	Marketing/Marketing Management, General	800	1.0%	▲
52.0101	Business/Commerce, General	799	1.0%	▲
44.0701	Social Work	776	1.0%	▲
31.0505	Kinesiology and Exercise Science	706	0.9%	▲
13.0401	Educational Leadership and Administration, General	705	0.9%	▲
12.0503	Culinary Arts/Chef Training	695	0.9%	▼
14.1001	Electrical and Electronics Engineering	637	0.8%	▲
51.0601	Dental Assisting/Assistant	633	0.8%	▼
23.0101	English Language and Literature, General	543	0.7%	▼
54.0101	History, General	526	0.7%	▼
25.0101	Library and Information Science	517	0.7%	▼
13.0301	Curriculum and Instruction	508	0.7%	▼
11.0401	Information Science/Studies	498	0.6%	▲
45.1001	Political Science and Government, General	463	0.6%	▼
45.0601	Economics, General	456	0.6%	▲
45.1101	Sociology	444	0.6%	▼
14.1901	Mechanical Engineering	416	0.5%	▲
11.0901	Computer Systems Networking and Telecommunications	393	0.5%	▼
12.0409	Aesthetician/Esthetician and Skin Care Specialist	390	0.5%	▲
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	368	0.5%	▲
27.0101	Mathematics, General	367	0.5%	▲

continued, next page

FIGURE 48. AWARDS BY DALLAS-FORT WORTH MSA INSTITUTIONS, BY DETAILED FIELD OF STUDY (CONTINUED)

CIP CODE	PROGRAM	3-YEAR AVERAGE *Awards granted (with % of total & trend)*		
22.0302	Legal Assistant/Paralegal	357	0.5%	▼
51.3805	Family Practice Nurse/Nursing	355	0.5%	▲
51.3999	Practical Nursing, Vocational Nursing and Nursing Assistants, Other	351	0.5%	▼
50.0702	Fine/Studio Arts, General	342	0.4%	▼
52.1201	Management Information Systems, General	316	0.4%	▼
52.0299	Business Administration, Management and Operations, Other	313	0.4%	▼
22.0101	Law	309	0.4%	▼
09.0401	Journalism	307	0.4%	▲
09.0701	Radio and Television	306	0.4%	▼
42.2803	Counseling Psychology	306	0.4%	▼
39.0201	Bible/Biblical Studies	303	0.4%	▲
39.0602	Divinity/Ministry	300	0.4%	▲
48.0508	Welding Technology/Welder	296	0.4%	▲
52.1501	Real Estate	291	0.4%	▼
15.0303	Electrical, Electronic and Communications Engineering Technology/Tecl	275	0.4%	▼
13.1210	Early Childhood Education and Teaching	274	0.4%	▼
52.0901	Hospitality Administration/Management, General	272	0.4%	▼
50.0901	Music, General	264	0.3%	▼
52.0203	Logistics, Materials, and Supply Chain Management	260	0.3%	▼
16.0905	Spanish Language and Literature	258	0.3%	▼
51.0701	Health/Health Care Administration/Management	254	0.3%	▼
15.0501	Heating, Ventilation, Air Conditioning and Refrigeration Engineering Te	247	0.3%	▼
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	241	0.3%	▼
50.0903	Music Performance, General	237	0.3%	▼
26.0102	Biomedical Sciences, General	237	0.3%	▼
39.0401	Religious Education	230	0.3%	▼
51.1201	Medicine	228	0.3%	▼
51.0713	Medical Insurance Coding Specialist/Coder	225	0.3%	▼
13.1101	Counselor Education/School Counseling and Guidance Services	221	0.3%	▼
51.0710	Medical Office Assistant/Specialist	220	0.3%	▼
52.0803	Banking and Financial Support Services	220	0.3%	▼
51.0808	Veterinary/Animal Health Technology/Technician and Veterinary Assist	217	0.3%	▼
52.1902	Fashion Merchandising	215	0.3%	▼
51.3501	Massage Therapy/Therapeutic Massage	214	0.3%	▼
09.0101	Speech Communication and Rhetoric	211	0.3%	▼
51.0805	Pharmacy Technician/Assistant	210	0.3%	▼
51.1901	Osteopathic Medicine/Osteopathy	200	0.3%	▼

Sources: Emsi 2017.2 compiled from the Integrated Postsecondary Data System (IPEDS) maintained by the National Center for Education Statistics.
Note: IPEDS data include only schools eligible to participate in federal financial aid programs.

3. EMPLOYMENT NODE DISTRICTS

Eight districts were introduced in Volume 1 as potential drivers of the City's economic development strategy. These districts were emphasized in the planning process in recognition of a variety of factors, including serving as an employment node, visibility outside the city, and potential to serve as an asset for industrial recruitment. In this volume, we explore the relationship of these unique areas to employment as part of the regional labor study.

FIGURE 49. EMPLOYMENT NODE DISTRICTS
GEOGRAPHIC BOUNDARY USED IN THIS REPORT

DISTRICT	DEFINITION (ZIP CODE)
Mature	
Downtown	76102
Stockyards	76164
Cultural District	76107
Established/Emerging	
Near Southside	76104
Alliance	76177, 76244, 76262
Panther Island	*Not addressed*
Walsh Ranch	*Not addressed*
Chisholm Trail Parkway	*Not addressed*

Three of the eight areas are long-term development plays (Panther Island, Walsh Ranch, and Chisholm Trail Parkway). While they merit attention from a strategic standpoint, significant employment data is not yet available in these newly developing and re-developing areas. For the five remaining areas, brief data profiles are provided highlighting population, employment, and commuting patterns. Because of the limitations of the available data sources, each district is defined using ZIP code boundaries. This approach also allows for a uniform presentation of information and avoids duplication since the definition of some areas overlaps. However, use of ZIP code boundaries means some of the data presented in this section may differ from figures presented in other publications about these areas.

KEY FINDINGS

While the districts vary in their focus, all have experienced strong employment growth since 2010. Except for the Stockyards, each of the five districts profiled in this section have also added residents. Collectively, the five districts account for more than 170,000 jobs as of 2016, about 35 percent of the city's total employment of 483,000. However, the five districts have led the city's employment growth, adding a total of nearly 58,000 jobs from 2010 to 2016, accounting for 41 percent of the city's total job growth during the period.

These districts provide economic opportunities to a wide range of residents in Fort Worth and Tarrant County. Commuting data underscores the importance of Fort Worth's major districts, especially those located in the urban core.

Employment in Fort Worth's urban core generates citywide and countywide economic benefits. The four nodes located in Fort Worth's urban core—Downtown, Near Southside, Cultural District, and Stockyards—all have a laborshed with at least one-third of workers residing in Fort Worth and roughly two-thirds of workers residing within Tarrant County. Alliance primarily draws workers from outside the area. Only 15 percent of Alliance workers live in Fort Worth and 40 percent of the Alliance workforce resides in Tarrant County. The five major employment nodes combined account for 35 percent of the city's total employment as of 2016, but represent 41 percent of citywide employment growth from 2010 to 2016.

DOWNTOWN (ZIP CODE 76102)

FIGURE 50. DISTRICT SNAPSHOT, 2016

INDICATOR	VALUE
Population, 2016	8,576
Change since 2010 (#)	+465
Change since 2010 (%)	+6%
Age, 2016 (% of total population)	
Less than 25 years old	27.4%
25 to 64 years	62.6%
65 years and older	10.1%
Jobs, 2016	45,454
Change since 2010 (#)	+4,395
Change since 2010 (%)	+11%

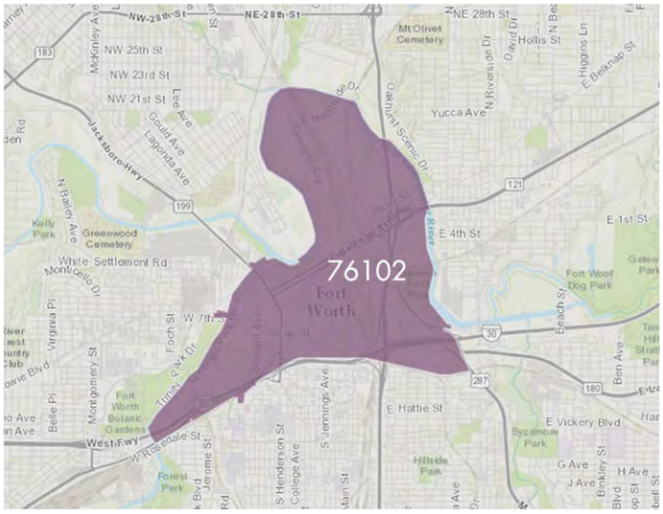


FIGURE 51. EMPLOYMENT BY MAJOR SECTOR, 2010 TO 2016

NAICS	Description	2010 Jobs	2016 Jobs	Change 2010-2016	2016 Location Quotient	Avg. Earnings Per Job
52	Finance & insurance	5,360	5,873	+513	3.33	$101,557
90	Government (all branches)	5,032	5,589	+557	0.80	$58,014
21	Mining (incl. oil & gas)	4,595	4,366	-229	23.24	$132,863
54	Professional services	3,668	4,026	+358	1.39	$88,007
72	Lodging, restaurants, & bars	3,230	3,593	+363	0.93	$24,695
56	Administrative & support services	2,940	3,515	+575	1.24	$48,229
48	Transportation & warehousing	2,719	3,320	+601	2.14	$42,634
62	Healthcare & social assistance	2,126	2,756	+630	0.48	$54,047
23	Construction	1,351	1,786	+435	0.73	$66,119
51	Information	2,296	1,677	-619	1.98	$88,842
42	Wholesale trade	1,205	1,484	+279	0.86	$62,343
81	Personal & other services	1,307	1,393	+86	0.64	$34,948
55	Corporate & regional offices	1,040	1,284	+244	2.01	$102,199
31	Manufacturing	1,000	1,130	+130	0.31	$67,999
71	Arts, entertainment, & recreation	840	1,110	+270	1.44	$21,884
53	Property sales & leasing	843	908	+65	1.22	$53,363
44	Retail trade	663	655	-8	0.14	$38,097
22	Utilities	341	439	+98	2.72	$187,108
61	Educational services (private)	262	286	+24	0.25	$59,781
11	Agriculture & forestry	232	250	+18	0.44	$30,320
99	Unclassified Industry	<10	15		0.18	$35,850
	TOTAL	41,059	45,454	+4,395		$70,953

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition.

DOWNTOWN (76102) CONTINUED

FIGURE 52. COMMUTING PATTERNS

WHERE DOWNTOWN WORKERS LIVE

	ZIP Code	Count	Share
1	76028	1,370	2.8%
2	76179	1,315	2.7%
3	76133	1,269	2.6%
4	76107	1,217	2.5%
5	76116	1,213	2.5%
6	76137	1,153	2.4%
7	76108	1,032	2.1%
8	76063	927	1.9%
9	76123	852	1.8%
#	76109	844	1.7%
	All Other Locations	31,224	64.4%
	Total	**48,451**	**100.0%**
	Fort Worth	16,344	33.7%
	Tarrant County	31,234	64.5%

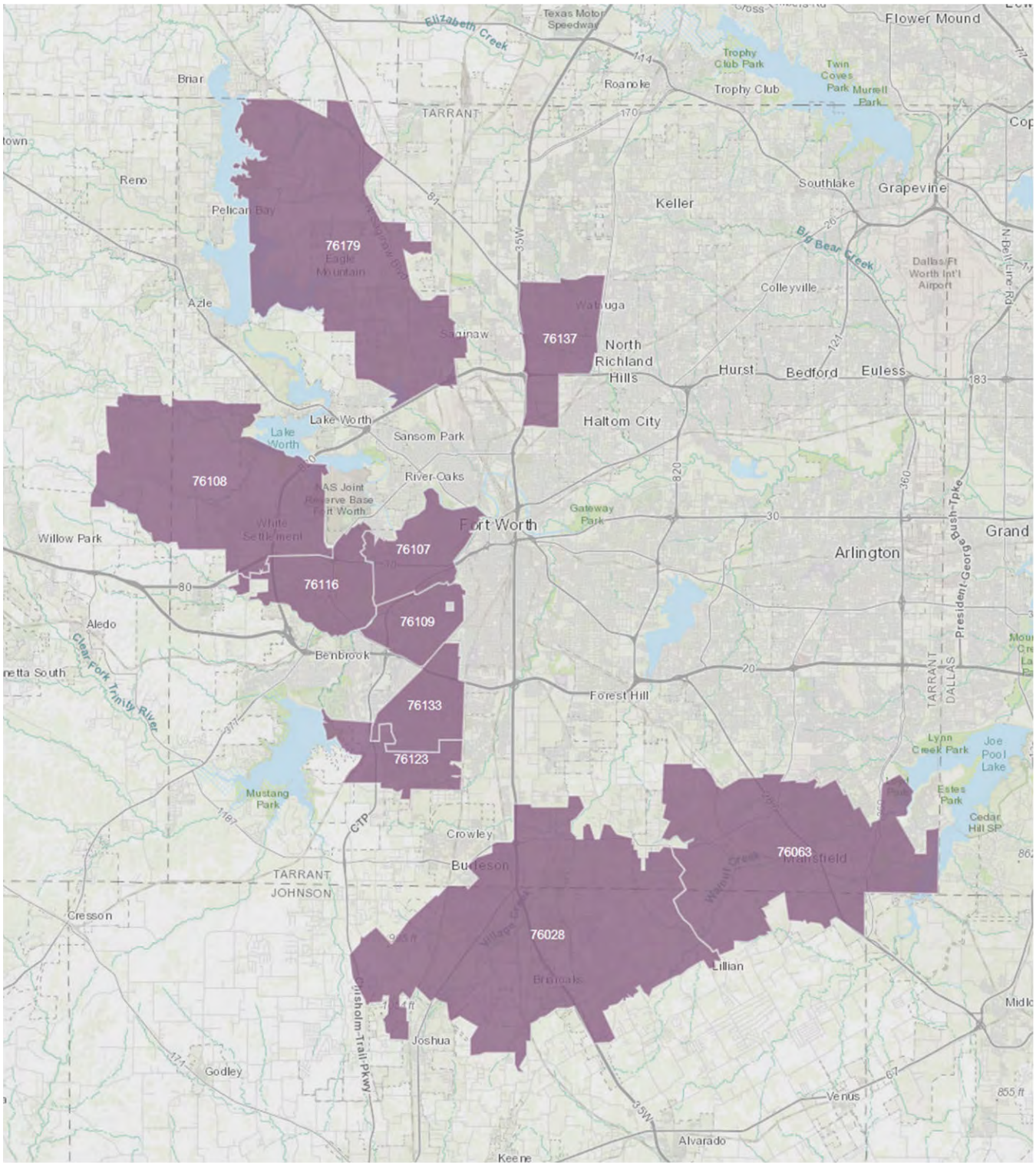
WHERE EMPLOYED DOWNTOWN RESIDENTS WORK

	ZIP Code	Count	Share
1	76102	438	14.1%
2	76107	179	5.8%
3	76104	117	3.8%
4	76108	95	3.1%
5	76011	54	1.7%
6	76116	53	1.7%
7	76117	49	1.6%
8	76051	45	1.5%
9	76109	44	1.4%
#	76111	43	1.4%
	All Other Locations	1,982	64.0%
	Total	**3,099**	**100.0%**
	Fort Worth	861	27.8%
	Tarrant County	1,540	49.7%

Source: On the Map.
Notes: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition. Overlay arrows are for illustrative purposes and do not indicate directionality of worker flow between home and employment locations.

DOWNTOWN (76102) CONTINUED

FIGURE 53. WHERE DOWNTOWN WORKERS LIVE
TOP 10 ZIP CODES

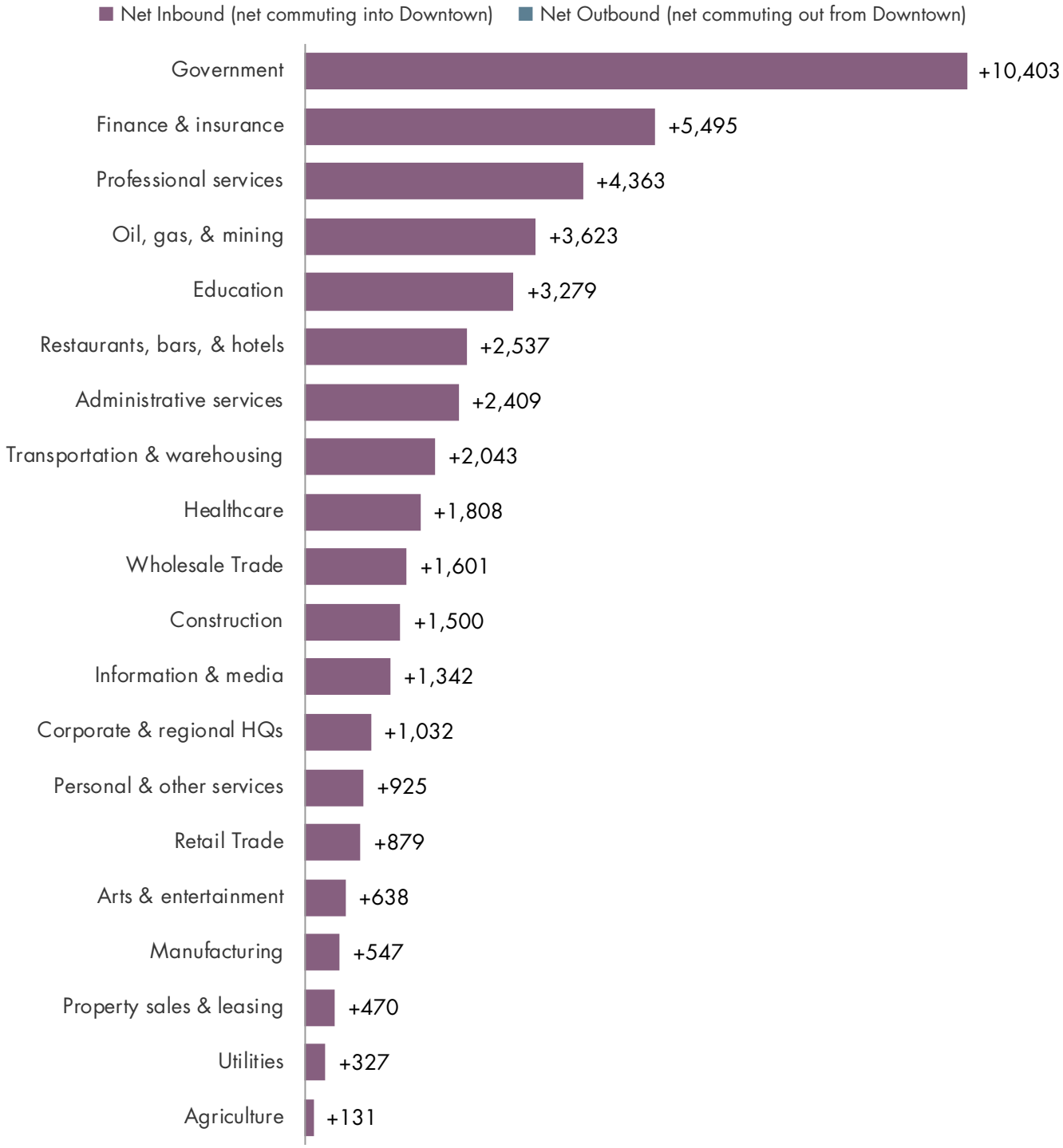


Source: On the Map.

DOWNTOWN (76102) CONTINUED

FIGURE 54. NET COMMUTING FLOWS BY MAJOR INDUSTRY SECTOR

NET FLOWS = INBOUND - OUTBOUND FLOWS



Source: On the Map.
Notes: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition. Overlay arrows are for illustrative purposes and do not indicate directionality of worker flow between home and employment locations.

NEAR SOUTHSIDE (ZIP CODE 76104)

FIGURE 55. DISTRICT SNAPSHOT, 2016

INDICATOR	VALUE
Population, 2016	20,753
Change since 2010 (#)	+1,735
Change since 2010 (%)	+9%
Age, 2016 (% of total population)	
Less than 25 years old	37.8%
25 to 64 years	49.8%
65 years and older	12.5%
Jobs, 2016	28,771
Change since 2010 (#)	+4,484
Change since 2010 (%)	+18%

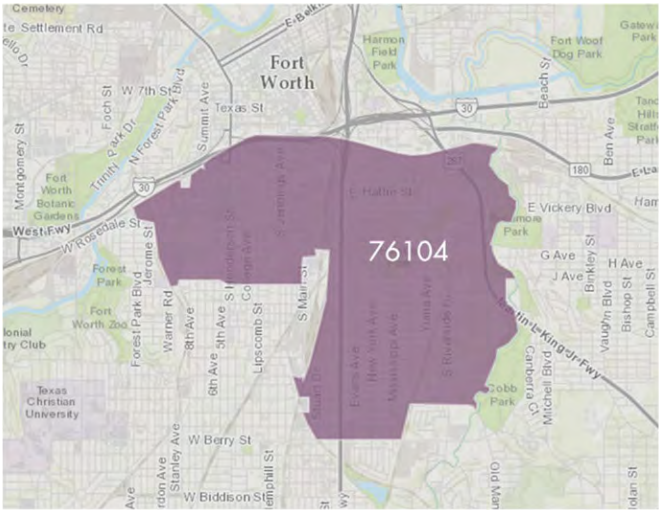


FIGURE 56. EMPLOYMENT BY MAJOR SECTOR, 2010 TO 2016

NAICS	Description	2010 Jobs	2016 Jobs	Change 2010-2016	2016 Location Quotient	Avg. Earnings Per Job
62	Healthcare & social assistance	15,113	18,202	+3,089	5.05	$78,716
90	Government (all branches)	1,923	2,293	+370	0.52	$86,041
31	Manufacturing	1,342	1,338	-4	0.59	$72,078
72	Lodging, restaurants, & bars	1,128	1,326	+198	0.54	$24,362
56	Administrative & support services	760	985	+225	0.55	$45,227
44	Retail trade	747	852	+105	0.28	$45,480
54	Professional services	601	682	+81	0.37	$82,795
81	Personal & other services	581	613	+32	0.44	$36,502
23	Construction	477	581	+104	0.38	$60,151
42	Wholesale trade	521	531	+10	0.48	$70,813
55	Corporate & regional offices	366	514	+148	1.27	$104,934
53	Property sales & leasing	236	260	+24	0.55	$53,577
48	Transportation & warehousing	129	221	+92	0.22	$58,434
52	Finance & insurance	157	152	-5	0.14	$88,059
61	Educational services (private)	74	88	+14	0.12	$32,617
71	Arts, entertainment, & recreation	45	51	+6	0.10	$25,707
51	Information	61	49	-12	0.09	$76,017
21	Mining (incl. oil & gas)	14	19	+5	0.16	$91,544
11	Agriculture & forestry	<10	<10	—	—	—
22	Utilities	<10	<10	—	—	—
99	Unclassified	<10	12	—	—	—
	TOTAL	24,287	28,771	+4,484		$72,919

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition.

NEAR SOUTHSIDE (ZIP CODE 76104) CONTINUED

FIGURE 57. COMMUTING PATTERNS

WHERE NEAR SOUTHSIDE WORKERS LIVE

	City (Place)	Count	Share
1	76133	1,011	3.4%
2	76028	1,003	3.3%
3	76179	781	2.6%
4	76116	765	2.6%
5	76123	728	2.4%
6	76110	703	2.3%
7	76108	643	2.1%
8	76137	628	2.1%
9	76063	624	2.1%
10	76132	614	2.1%
	All Other Locations	19,872	66.3%
	Total	**29,951**	**100.0%**
	Fort Worth	11,123	37.1%
	Tarrant County	20,148	67.3%

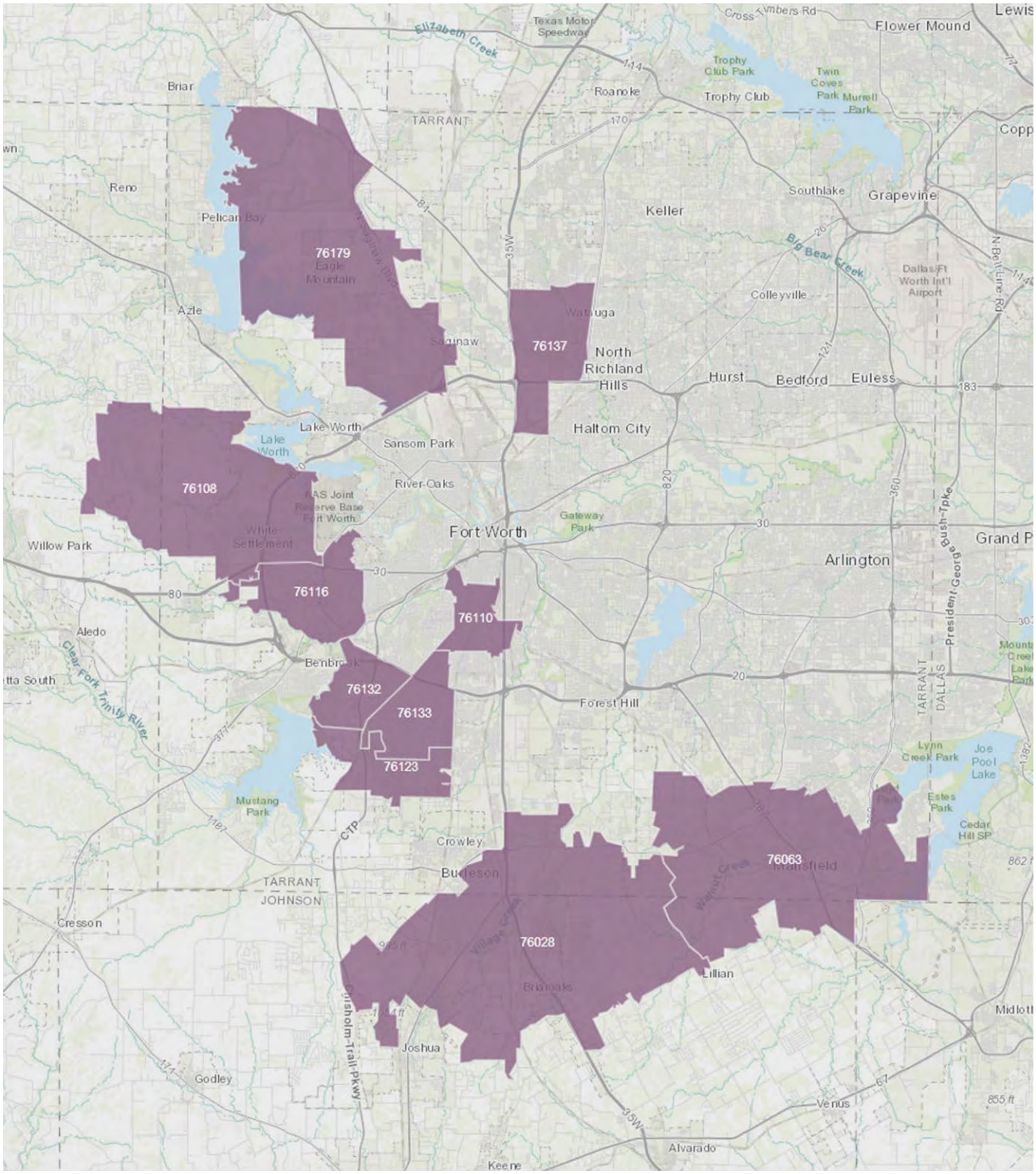
WHERE EMPLOYED NEAR SOUTHSIDE RESIDENTS WORK

	City (Place)	Count	Share
1	76104	415	7.6%
2	76102	376	6.8%
3	76107	373	6.8%
4	76011	132	2.4%
5	76110	124	2.3%
6	76119	112	2.0%
7	76109	106	1.9%
8	76106	85	1.5%
9	76116	84	1.5%
10	76010	80	1.5%
	All Other Locations	3,279	59.7%
	Total	**5,496**	**100.0%**
	Fort Worth	2,052	37.3%
	Tarrant County	3,293	59.9%

Source: On the Map.
Notes: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition. Overlay arrows are for illustrative purposes and do not indicate directionality of worker flow between home and employment locations.

NEAR SOUTHSIDE (ZIP CODE 76104) CONTINUED

FIGURE 58. WHERE NEAR SOUTHSIDE WORKERS LIVE
TOP 10 ZIP CODES

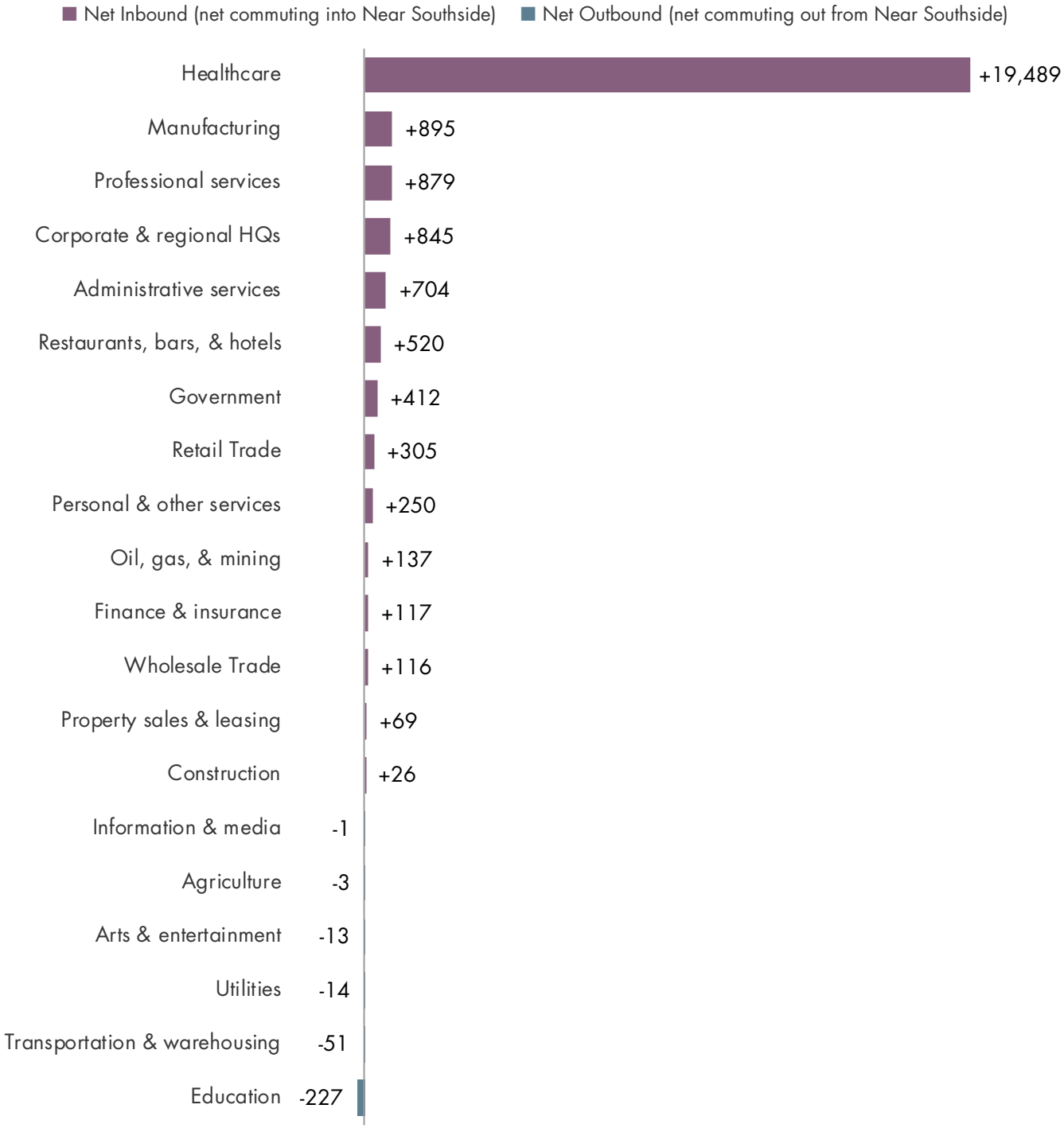


Source: On the Map.

NEAR SOUTHSIDE (ZIP CODE 76104) CONTINUED

FIGURE 59. NET COMMUTING FLOWS BY MAJOR INDUSTRY SECTOR

NET FLOWS = INBOUND - OUTBOUND FLOWS



Source: On the Map.
Notes: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition. Overlay arrows are for illustrative purposes and do not indicate directionality of worker flow between home and employment locations.

CULTURAL DISTRICT (ZIP CODE 76107)

FIGURE 60. DISTRICT SNAPSHOT, 2016

INDICATOR	VALUE
Population, 2016	29,104
Change since 2010 (#)	+2,026
Change since 2010 (%)	+7%
Age, 2016 (% of total population)	
Less than 25 years old	27.8%
25 to 64 years	57.3%
65 years and older	14.8%
Jobs, 2016	44,363
Change since 2010 (#)	+4,862
Change since 2010 (%)	+12%

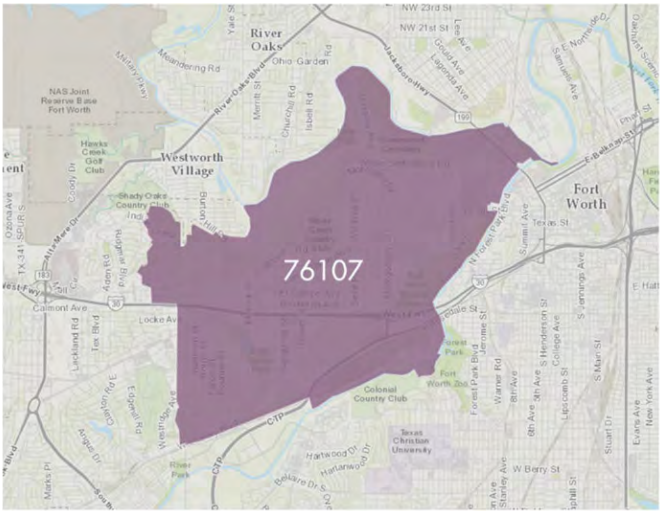


FIGURE 61. EMPLOYMENT BY MAJOR SECTOR, 2010 TO 2016

NAICS	Description	2010 Jobs	2016 Jobs	Change 2010-2016	2016 Location Quotient	Avg. Earnings Per Job
90	Government (all branches)	14,557	15,297	+740	2.25	$60,209
72	Lodging, restaurants, & bars	3,424	4,197	+773	1.11	$21,535
54	Professional services	3,510	3,729	+219	1.32	$78,445
62	Healthcare & social assistance	2,343	3,247	+904	0.58	$50,007
44	Retail trade	2,957	3,125	+168	0.68	$36,968
81	Personal & other services	2,474	2,882	+408	1.35	$28,661
71	Arts, entertainment, & recreation	2,373	2,855	+482	3.79	$21,916
56	Administrative & support services	1,195	1,449	+254	0.52	$47,579
52	Finance & insurance	1,349	1,368	+19	0.79	$97,940
23	Construction	1,202	1,363	+161	0.57	$70,935
31	Manufacturing	1,106	1,343	+237	0.38	$59,974
42	Wholesale trade	866	1,046	+180	0.62	$80,022
53	Property sales & leasing	885	1,041	+156	1.43	$53,599
21	Mining (incl. oil & gas)	316	395	+79	2.15	$107,871
61	Educational services (private)	260	288	+28	0.26	$29,388
51	Information	290	243	-47	0.29	$53,297
55	Corporate & regional offices	167	229	+62	0.37	$104,343
48	Transportation & warehousing	156	186	+30	0.12	$70,209
22	Utilities	48	51	+3	0.32	$174,325
11	Agriculture & forestry	17	21	+4	0.04	$33,805
99	Unclassified	<10	<10	—	—	—
	TOTAL	39,501	44,363	+4,862		$53,141

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition.

CULTURAL DISTRICT (ZIP CODE 76107) CONTINUED

FIGURE 62. COMMUTING PATTERNS

WHERE CULTURAL DISTRICT WORKERS LIVE

	City (Place)	Count	Share
1	76133	1,945	4.7%
2	76107	1,847	4.5%
3	76116	1,820	4.4%
4	76112	1,048	2.5%
5	76108	1,045	2.5%
6	76123	1,038	2.5%
7	76119	1,000	2.4%
8	76109	993	2.4%
9	76132	962	2.3%
10	76110	950	2.3%
	All Other Locations	24,454	59.1%
	Total	**41,371**	**100.0%**
	Fort Worth	17,399	42.1%
	Tarrant County	28,466	68.8%

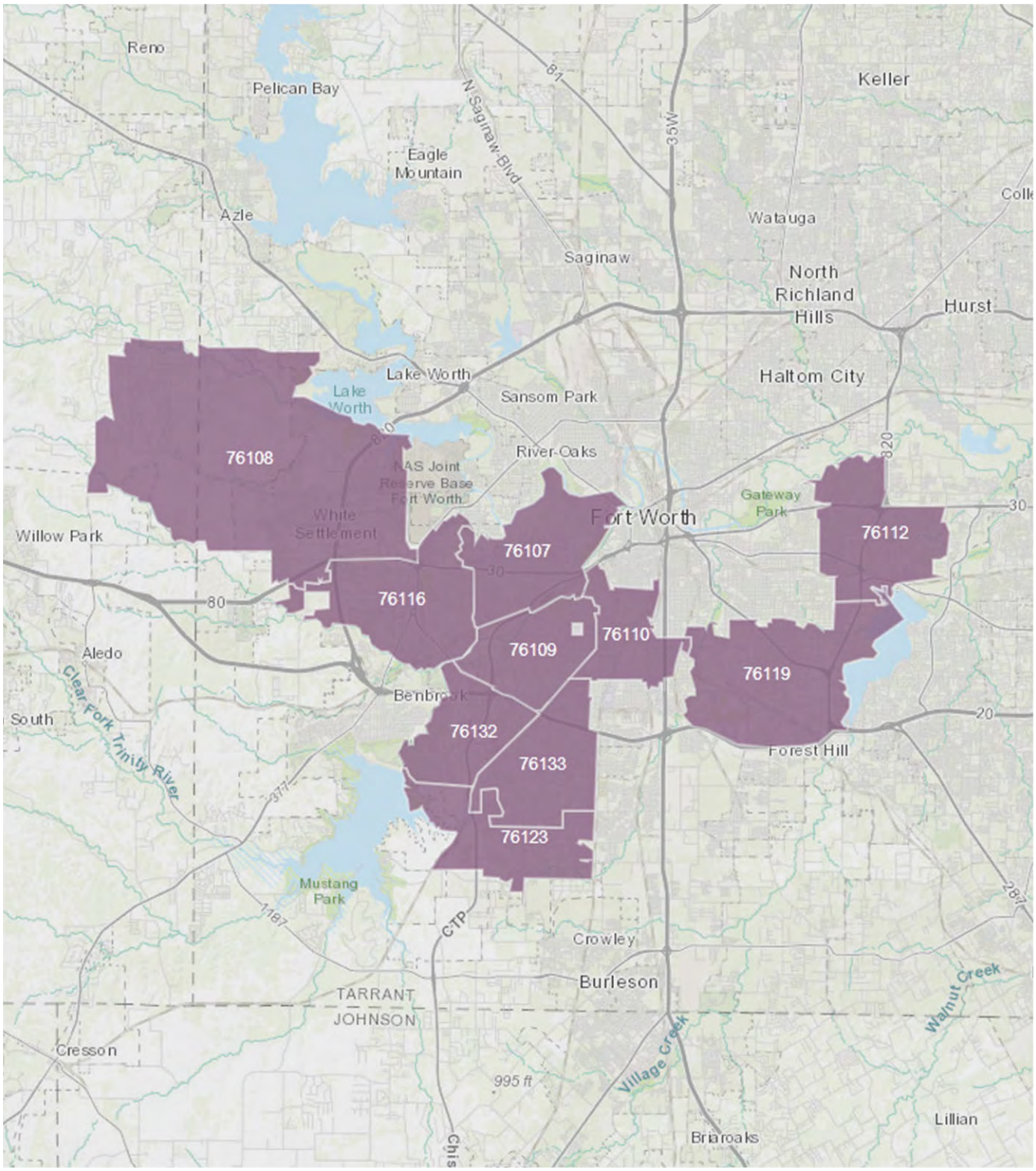
WHERE EMPLOYED CULTURAL DISTRICT RESIDENTS WORK

	City (Place)	Count	Share
1	76107	1,847	14.9%
2	76102	1,217	9.8%
3	76104	608	4.9%
4	76109	488	3.9%
5	76116	397	3.2%
6	76108	375	3.0%
7	76106	184	1.5%
8	76132	180	1.4%
9	76051	157	1.3%
10	76011	148	1.2%
	All Other Locations	5,769	46.5%
	Total	**12,417**	**100.0%**
	Fort Worth	4,472	36.0%
	Tarrant County	6,743	54.3%

Source: On the Map.
Notes: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition. Overlay arrows are for illustrative purposes and do not indicate directionality of worker flow between home and employment locations.

CULTURAL DISTRICT (ZIP CODE 76107) CONTINUED

FIGURE 63. WHERE CULTURAL DISTRICT WORKERS LIVE
TOP 10 ZIP CODES

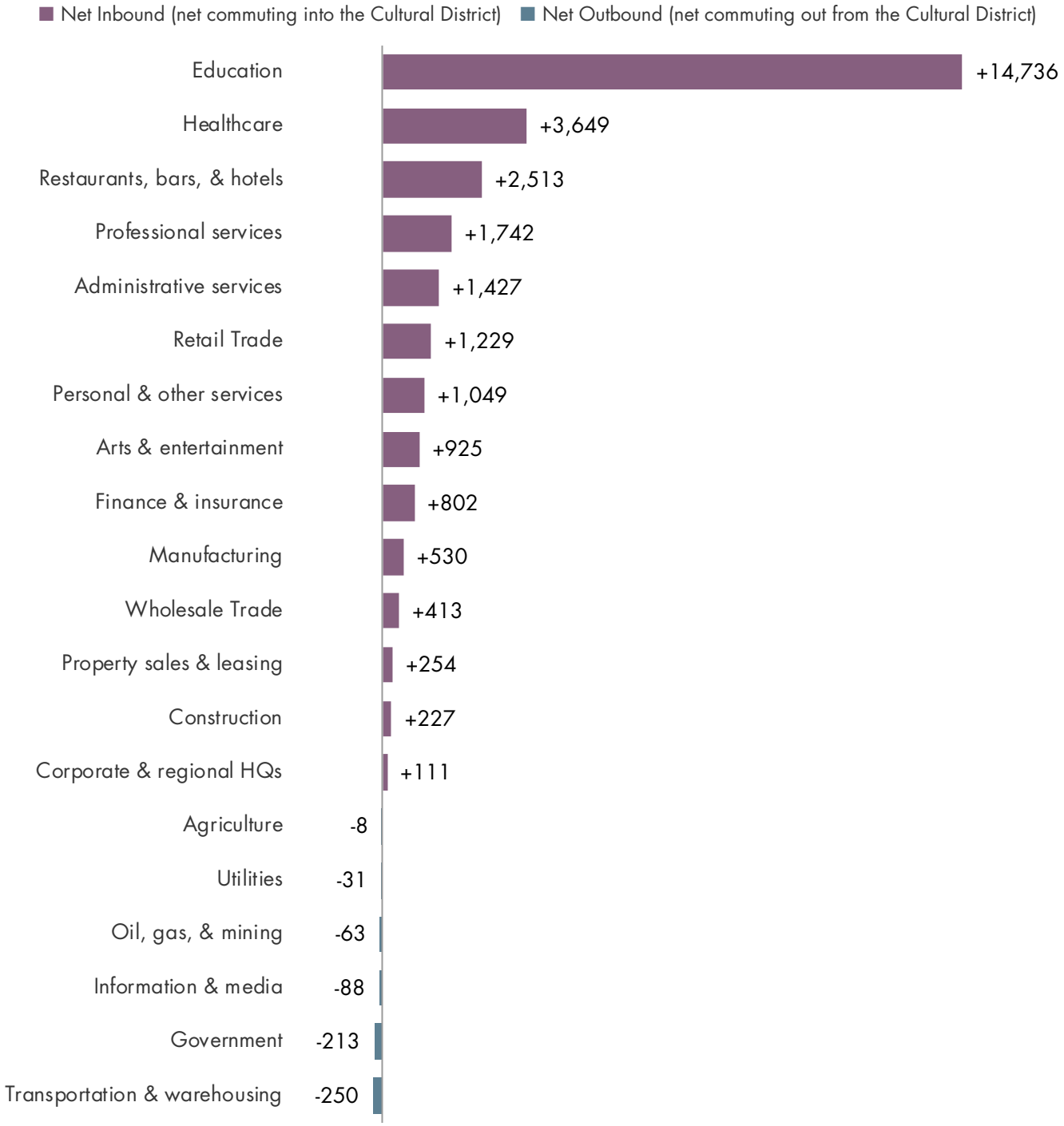


Source: On the Map.

CULTURAL DISTRICT (ZIP CODE 76107) CONTINUED

FIGURE 64. NET COMMUTING FLOWS BY MAJOR INDUSTRY SECTOR

NET FLOWS = INBOUND - OUTBOUND FLOWS



Source: On the Map.
Note: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition.

STOCKYARDS (ZIP CODE 76164)

FIGURE 65. DISTRICT SNAPSHOT, 2016

INDICATOR	VALUE
Population, 2016	17,875
Change since 2010 (#)	-888
Change since 2010 (%)	-5%
Age, 2016 (% of total population)	
Less than 25 years old	39.5%
25 to 64 years	49.3%
65 years and older	11.2%
Jobs, 2016	3,799
Change since 2010 (#)	+305
Change since 2010 (%)	+9%

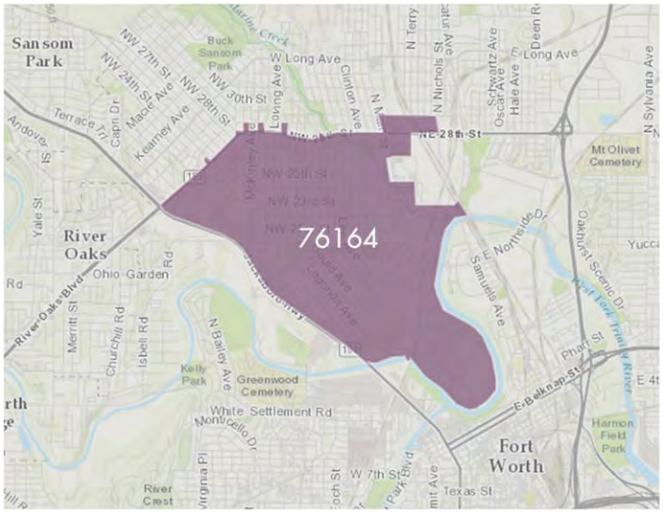


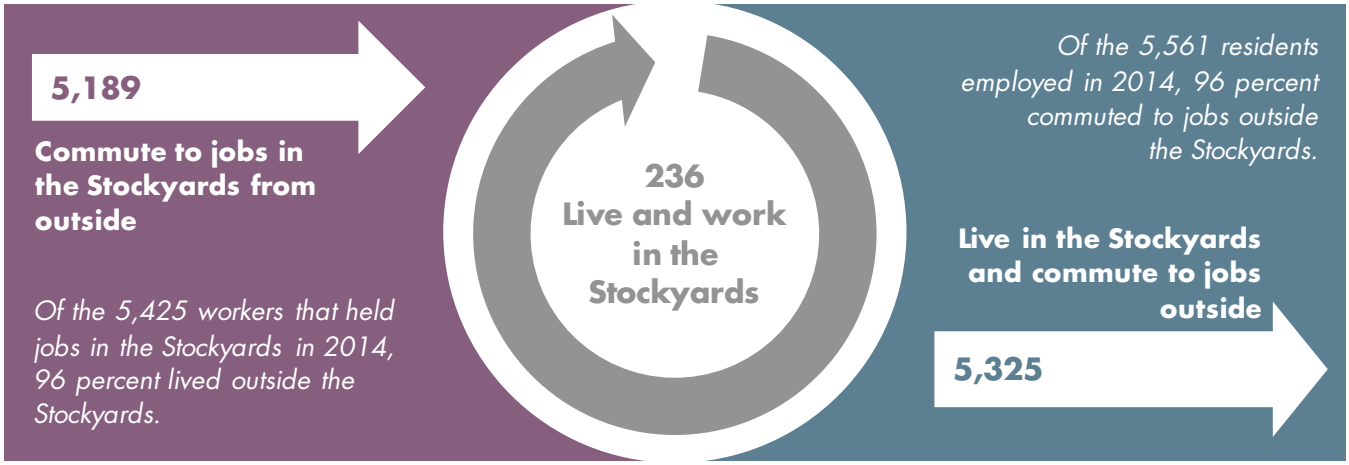
FIGURE 66. EMPLOYMENT BY MAJOR SECTOR, 2010 TO 2016

NAICS	Description	2010 Jobs	2016 Jobs	Change 2010-2016	2016 Location Quotient	Avg. Earnings Per Job
72	Lodging, restaurants, & bars	1,087	1,204	+117	3.72	$22,959
44	Retail trade	423	487	+64	1.23	$32,115
56	Administrative & support services	356	396	+40	1.67	$32,177
31	Manufacturing	364	291	-72	0.97	$62,141
90	Government (all branches)	239	238	-1	0.41	$86,487
81	Personal & other services	214	228	+14	1.25	$38,780
52	Finance & insurance	176	210	+34	1.42	$96,561
54	Professional services	166	172	+6	0.71	$76,053
62	Healthcare & social assistance	122	161	+39	0.34	$54,015
23	Construction	108	136	+28	0.66	$59,342
42	Wholesale trade	97	116	+19	0.80	$70,449
53	Property sales & leasing	62	67	+5	1.07	$54,722
71	Arts, entertainment, & recreation	43	48	+5	0.75	$23,945
48	Transportation & warehousing	28	38	+10	0.29	$60,140
11	Agriculture & forestry	<10	<10	—	—	—
21	Mining (incl. oil & gas)	<10	<10	—	—	—
22	Utilities	<10	<10	—	—	—
51	Information	<10	<10	—	—	—
55	Corporate & regional offices	<10	<10	—	—	—
61	Educational services (private)	<10	<10	—	—	—
99	Unclassified	<10	<10	—	—	—
	TOTAL	3,494	3,799	+305		$44,640

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition.

STOCKYARDS (ZIP CODE 76164) CONTINUED

FIGURE 67. COMMUTING PATTERNS



WHERE STOCKYARDS WORKERS LIVE

	City (Place)	Count	Share
1	76106	306	5.6%
2	76164	236	4.4%
3	76114	148	2.7%
4	76179	137	2.5%
5	76107	133	2.5%
6	76110	127	2.3%
7	76112	127	2.3%
8	76116	123	2.3%
9	76133	122	2.2%
#	76137	116	2.1%
	All Other Locations	3,850	71.0%
	Total	**5,425**	**100.0%**
	Fort Worth	2,093	38.6%
	Tarrant County	3,541	65.3%

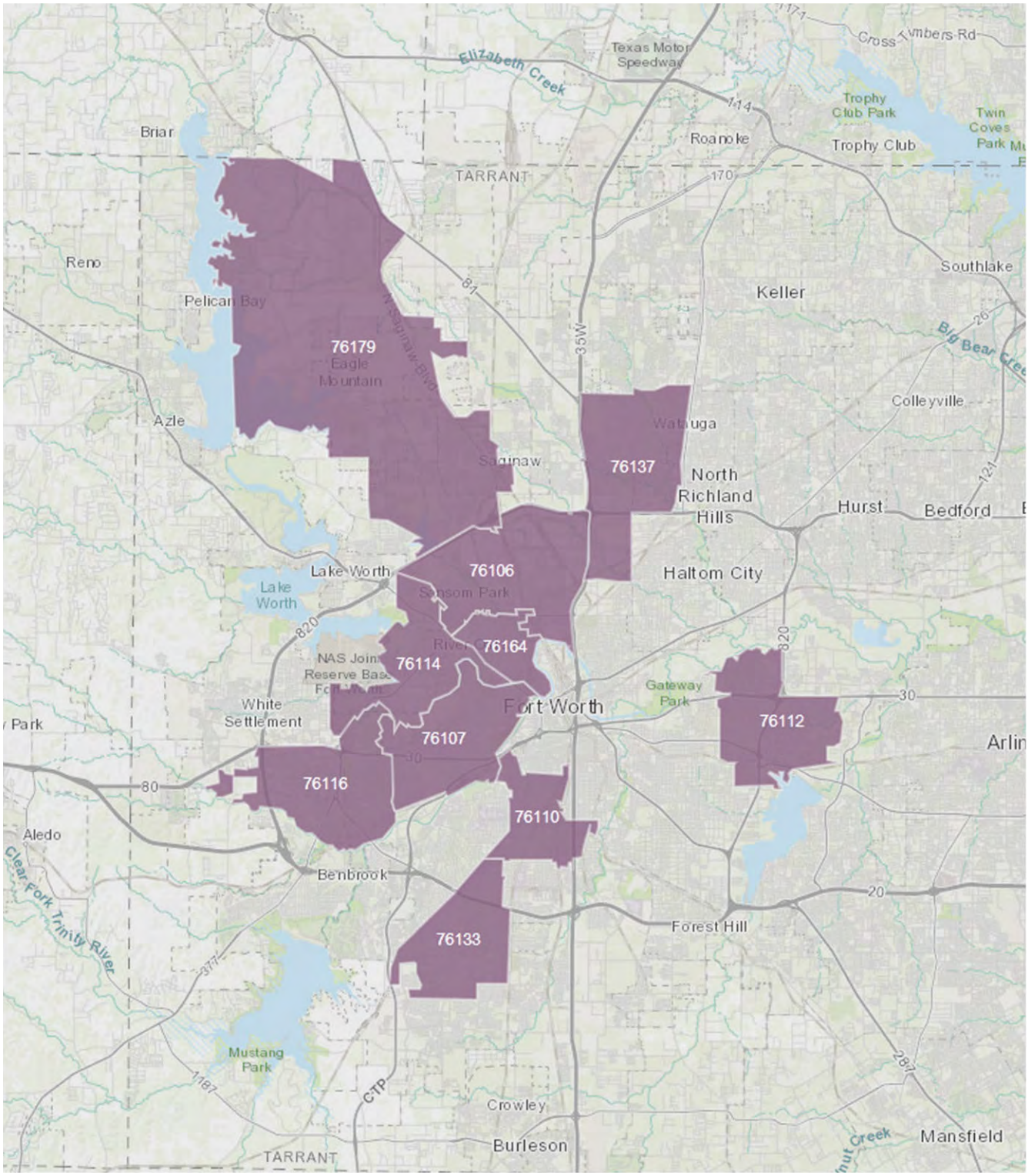
WHERE EMPLOYED STOCKYARDS RESIDENTS WORK

	City (Place)	Count	Share
1	76107	457	8.2%
2	76102	348	6.3%
3	76106	277	5.0%
4	76164	236	4.2%
5	76104	152	2.7%
6	76117	141	2.5%
7	76111	137	2.5%
8	76137	111	2.0%
9	76179	109	2.0%
#	76011	98	1.8%
	All Other Locations	3,113	56.0%
	Total	**5,561**	**100.0%**
	Fort Worth	2,351	42.3%
	Tarrant County	3,516	63.2%

Source: On the Map.
Notes: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition. Overlay arrows are for illustrative purposes and do not indicate directionality of worker flow between home and employment locations.

STOCKYARDS (ZIP CODE 76164) CONTINUED

FIGURE 68. WHERE STOCKYARD WORKERS LIVE
TOP 10 ZIP CODES

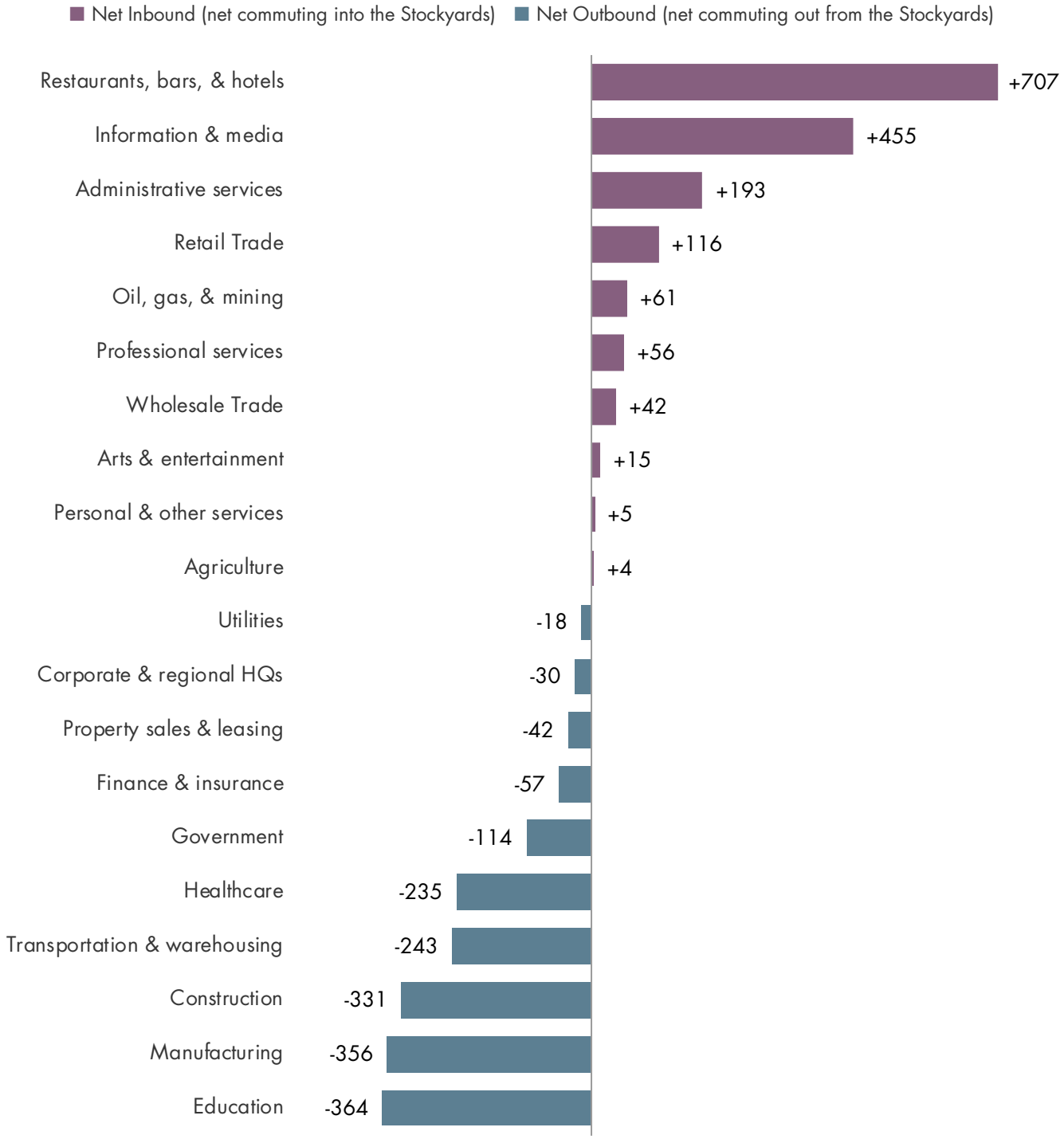


Source: On the Map.

STOCKYARDS (ZIP CODE 76164) CONTINUED

FIGURE 69. NET COMMUTING FLOWS BY MAJOR INDUSTRY SECTOR

NET FLOWS = INBOUND - OUTBOUND FLOWS



Source: On the Map.
Note: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition.

ALLIANCE (ZIP CODES 76177, 76244, & 76262)

FIGURE 70. DISTRICT SNAPSHOT, 2016

INDICATOR	VALUE
Population, 2016	111,289
Change since 2010 (#)	+30,327
Change since 2010 (%)	+37%
Age, 2016 (% of total population)	
Less than 25 years old	39.8%
25 to 64 years	54.1%
65 years and older	6.0%
Jobs, 2016	47,914
Change since 2010 (#)	+9,661
Change since 2010 (%)	+25%

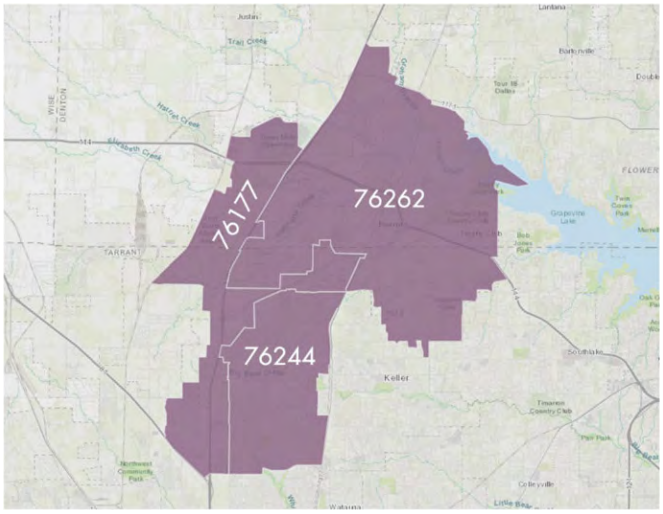


FIGURE 71. EMPLOYMENT BY MAJOR SECTOR, 2010 TO 2016

NAICS	Description	2010 Jobs	2016 Jobs	Change 2010-2016	2016 Location Quotient	Avg. Earnings Per Job
48	Transportation & warehousing	6,536	9,394	+2,859	5.74	$51,855
56	Administrative & support services	4,432	5,471	+1,039	1.83	$41,083
52	Finance & insurance	2,278	3,314	+1,036	1.78	$95,509
72	Lodging, restaurants, & bars	2,791	3,787	+996	0.93	$20,903
23	Construction	3,137	3,928	+790	1.52	$63,047
42	Wholesale trade	1,869	2,600	+731	1.43	$79,999
44	Retail trade	3,598	4,183	+585	0.84	$34,357
31	Manufacturing	1,962	2,394	+432	0.63	$69,788
62	Healthcare & social assistance	1,761	2,134	+373	0.36	$59,848
54	Professional services	2,152	2,418	+266	0.79	$81,427
81	Personal & other services	1,687	1,904	+217	0.83	$29,171
55	Corporate & regional offices	332	549	+217	0.81	$96,013
53	Property sales & leasing	695	876	+181	1.11	$50,829
71	Arts, entertainment, & recreation	655	749	+94	0.92	$22,888
90	Government (all branches)	3,004	3,032	+28	0.41	$83,841
21	Mining (incl. oil & gas)	37	43	+6	0.22	$104,490
11	Agriculture & forestry	13	15	+2	0.03	$27,319
22	Utilities	19	12	-7	0.07	$132,824
51	Information	880	815	-66	0.91	$90,240
61	Educational services (private)	397	270	-127	0.22	$34,933
99	Unclassified	18	26	+8	0.30	$53,279
	TOTAL	38,253	47,914	+9,661		$56,634

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Note: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition.

ALLIANCE (ZIP CODES 76177, 76244, & 76262) CONTINUED

FIGURE 72. COMMUTING PATTERNS

WHERE ALLIANCE WORKERS LIVE

	City (Place)	Count	Share
1	76244	2,228	6.5%
2	76137	1,426	4.2%
3	76262	1,273	3.7%
4	76131	815	2.4%
5	76179	788	2.3%
6	76248	766	2.2%
7	76148	581	1.7%
8	76052	534	1.6%
9	76247	510	1.5%
#	76051	484	1.4%
	All Other Locations	20,825	60.7%
	Total	**34,310**	**100.0%**
	Fort Worth	5,289	15.4%
	Tarrant County	13,679	39.9%

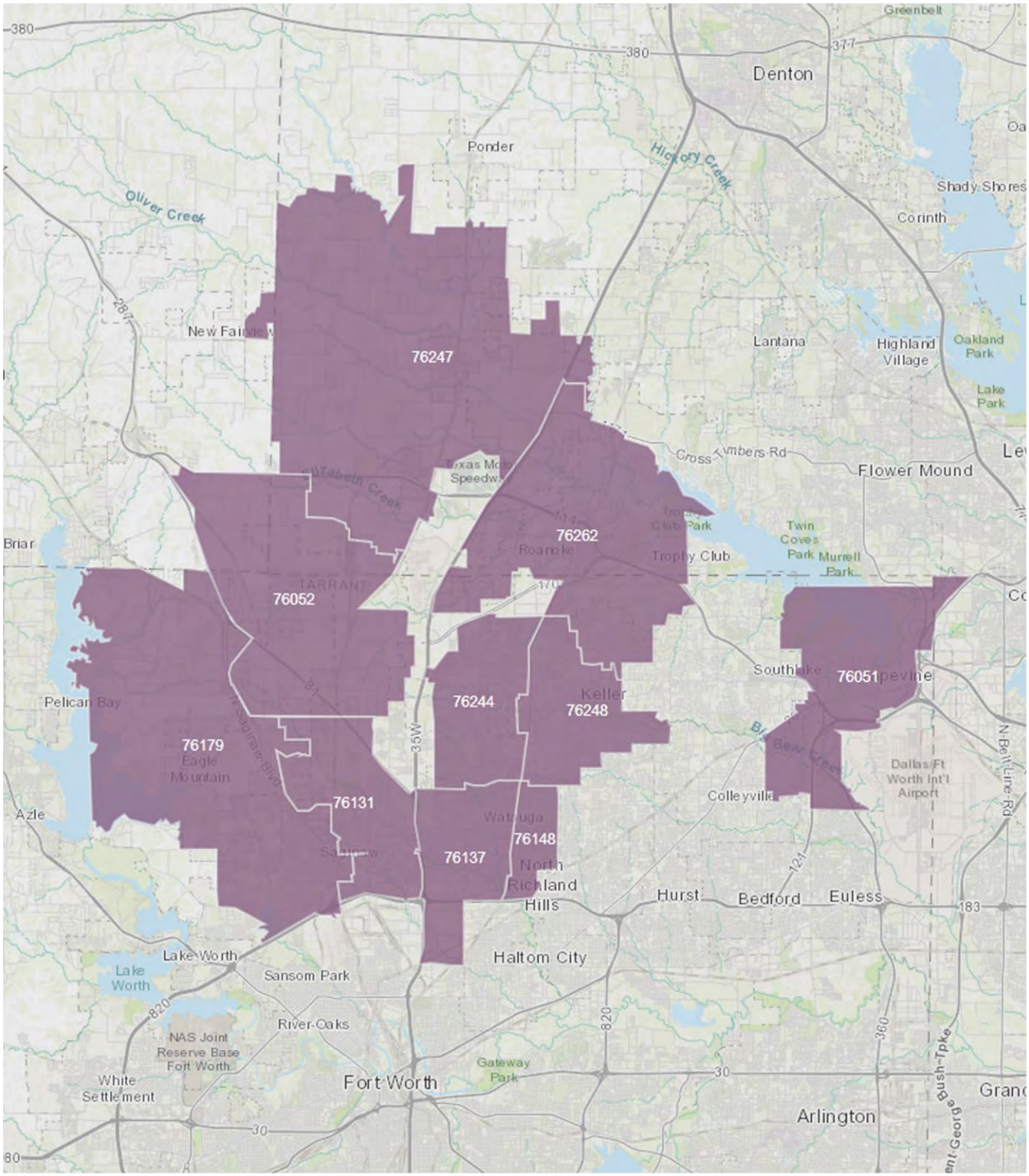
WHERE EMPLOYED ALLIANCE RESIDENTS WORK

	City (Place)	Count	Share
1	76051	2,616	5.8%
2	76262	2,119	4.7%
3	76248	1,863	4.2%
4	76092	1,781	4.0%
5	75063	1,370	3.1%
6	75039	1,226	2.7%
7	76244	1,097	2.4%
8	76102	1,062	2.4%
9	76247	850	1.9%
#	75038	802	1.8%
	All Other Locations	26,167	58.3%
	Total	**44,845**	**100.0%**
	Fort Worth	5,903	13.2%
	Tarrant County	18,351	40.9%

Source: On the Map.
Notes: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition. Overlay arrows are for illustrative purposes and do not indicate directionality of worker flow between home and employment locations.

ALLIANCE (ZIP CODES 76177, 76244, & 76262) CONTINUED

FIGURE 73. WHERE ALLIANCE WORKERS LIVE
TOP 10 ZIP CODES

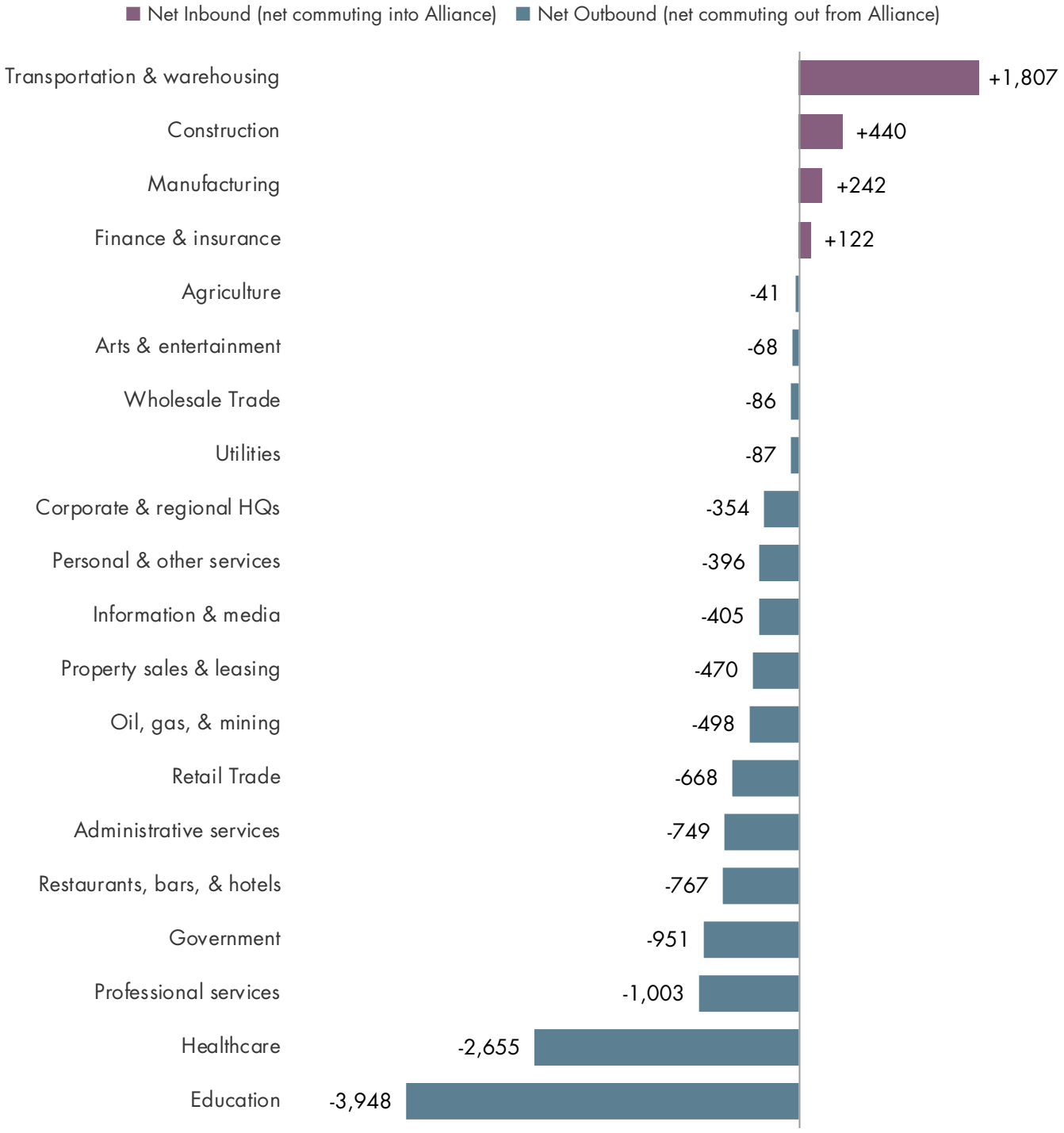


Source: On the Map.

ALLIANCE (ZIP CODES 76177, 76244, & 76262) CONTINUED

FIGURE 74. NET COMMUTING FLOWS BY MAJOR INDUSTRY SECTOR

NET FLOWS = INBOUND - OUTBOUND FLOWS



Source: On the Map.
Note: The figures shown may not align with other published data for this district due to differences in the data source, timeframe, and/or geographic definition.

4. EMPLOYER SURVEY

As part of the planning process, an online survey was conducted to solicit views of both residents and employers. Aspects of the survey related to living in Fort Worth, along with a profile of respondents, was presented in Volume 1. This section outlines the survey findings on questions relating to hiring, training, and retraining workers.

Responses in this section are based on the 26 percent of survey participants that indicated they owned a business or managed a large organization or department in Fort Worth. The results are not scientific; rather, they are intended to help validate the quantitative data presented elsewhere in this report, including information about occupations and skills sought by local employers.

FIGURE 75. DO YOU OWN OR MANAGE A BUSINESS IN FORT WORTH?
INCLUDING GOV'T DEPARTMENTS & NONPROFITS

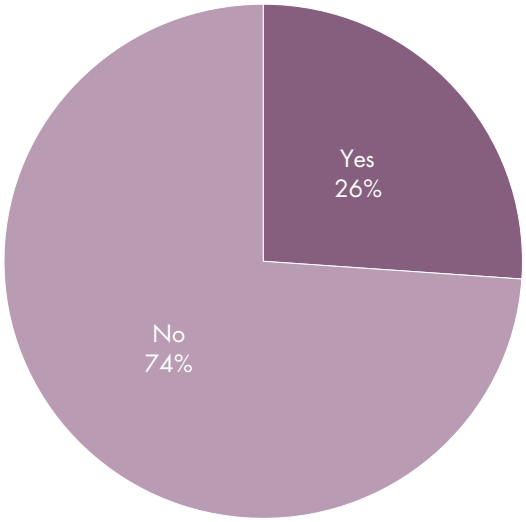
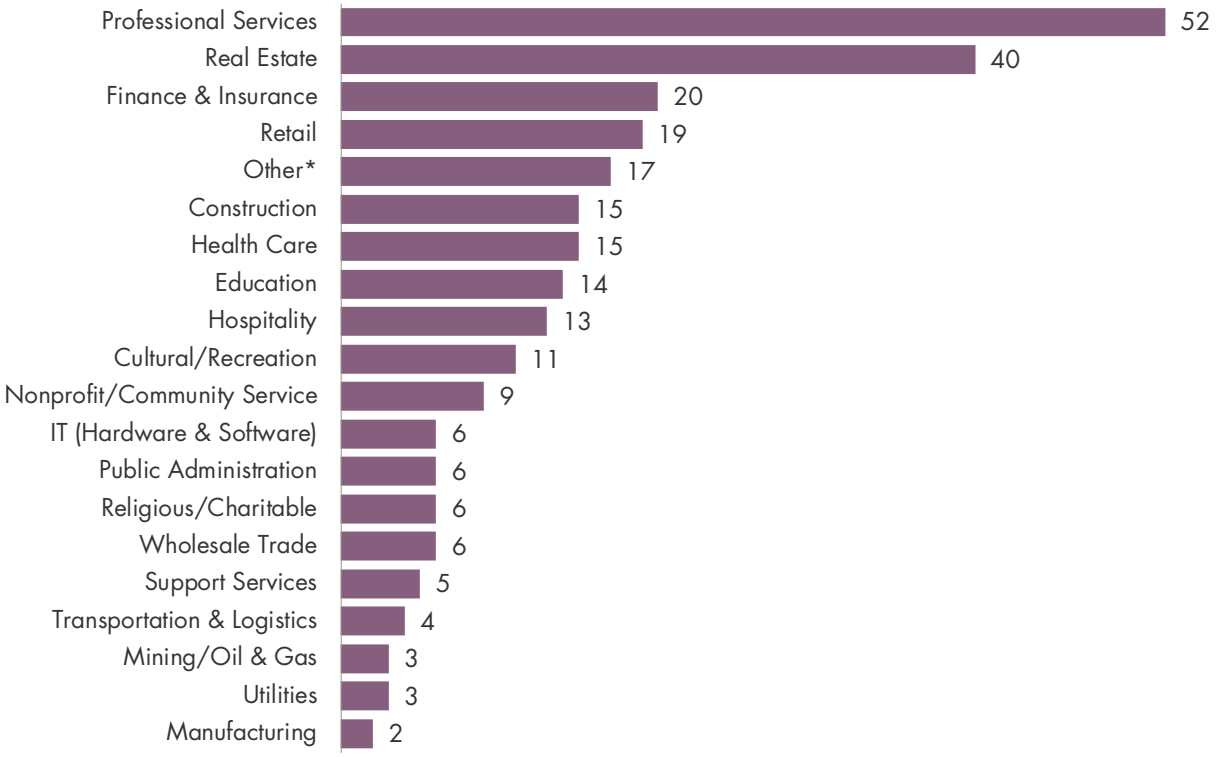


FIGURE 76. WHICH BEST DESCRIBES THE PRIMARY INDUSTRY FOCUS OF YOUR ORGANIZATION?



*Other responses included: [not specified]; Art photographer; Aviation; Aviation; Corporate Training; Economic Development; Irrigation; Landscaping; Massage therapy, landscaping; medical economics; Music; Neighborhood Association; Pet Industry; Printing; Promotional Products; Real Estate License Education; and Video production

Of the roughly 300 survey respondents that reported owning or managing a business or similar organization in the area, 93 percent were located in Fort Worth, with the remainder located in other Tarrant County communities including Hurst, Haltom City, Mansfield, and White Settlement. Professional services encompassed the largest industry focus among respondents, followed by real estate and finance & insurance (Figure 64).

The majority of respondents (71.3 percent) employed 10 or fewer workers. Only about 1 in 10 respondents (10.9 percent) employed 100 people or more. Most who responded to this aspect of the survey indicated that their organization had been in the area for an extended period, with more than one-half (52.3 percent) having been located in the area for 10 years or more. The majority of respondents (85 percent) reported that their organization was headquartered in the city.

FIGURE 77. HOW MANY FULL-TIME WORKERS DOES YOUR ORG. EMPLOY IN FORT WORTH?

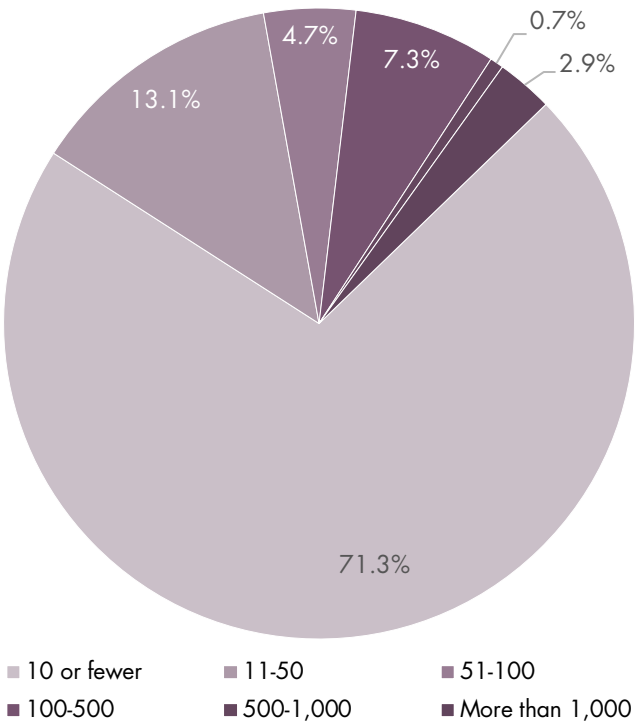


FIGURE 78. HOW LONG HAS YOUR ORG. BEEN LOCATED IN FORT WORTH?

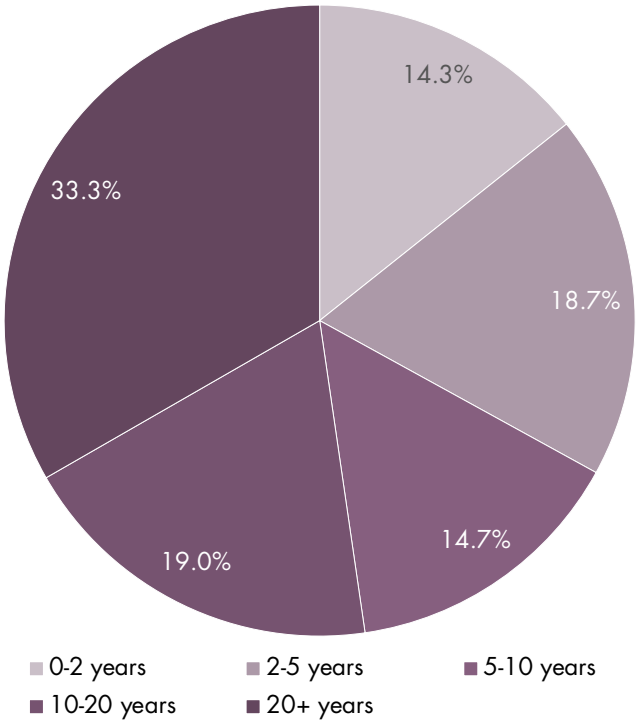
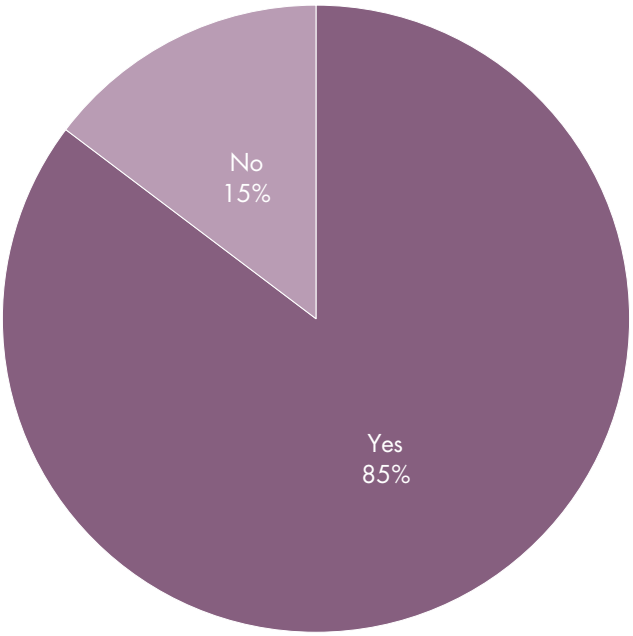


FIGURE 79. IS YOUR ORGANIZATION HEADQUARTERED IN FORT WORTH?



Management positions were the most commonly reported position, a reflection of the large number of small firms that responded to the survey. Unskilled labor was the least common category, which is not surprising given the mix of respondents, which included a large number of organizations in industries such as professional services, real estate, and finance & insurance (Figure 76, page 85)

At least one-third of respondents are planning to look towards international markets in the next two years. Of the choices offered, one-third of respondents are planning to sell to markets outside the US and/or work with suppliers and partners located outside of the country during this period. One in five (21 percent) are considering opening or acquiring facilities in foreign markets.

FIGURE 80. APPROXIMATELY WHAT PERCENTAGE OF YOUR WORKFORCE IS EMPLOYED IN THE FOLLOWING CATEGORIES?

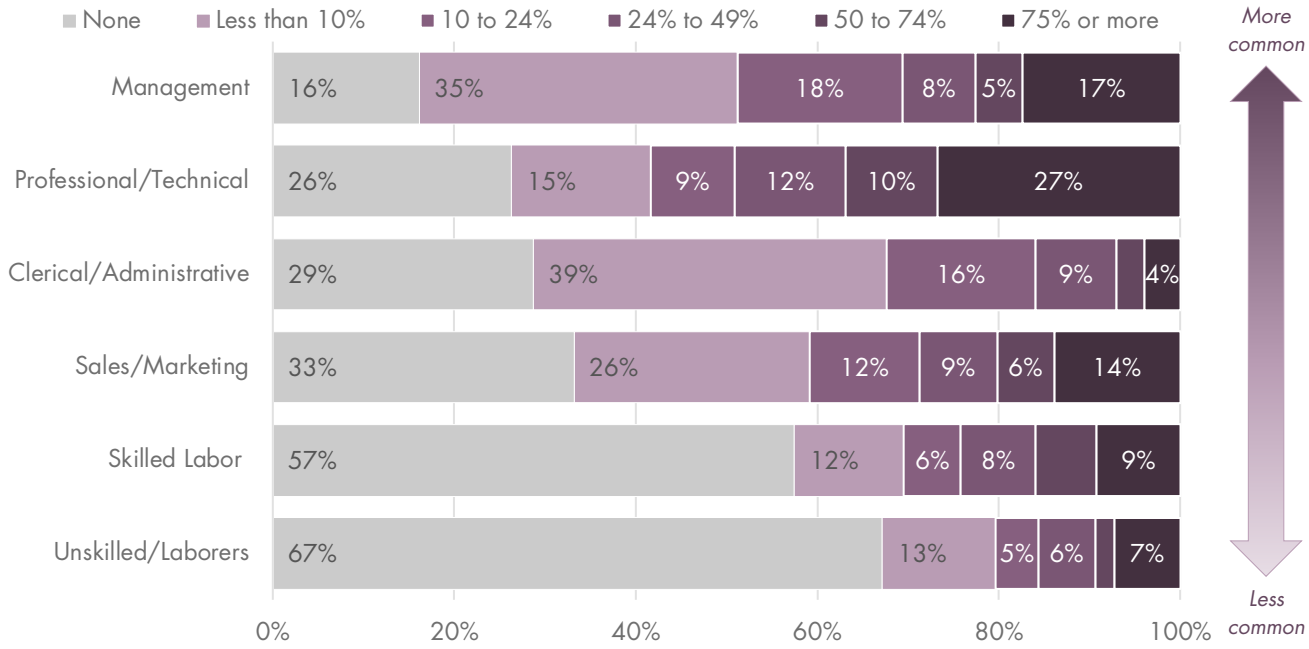
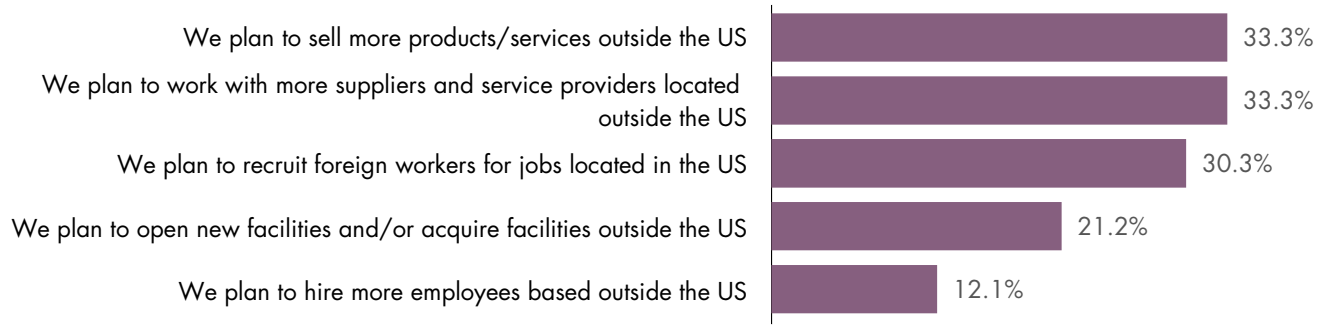


FIGURE 81. OVER THE NEXT TWO YEARS, DOES YOUR COMPANY HAVE INTERNATIONAL EXPANSION PLANS?
(CHECK ALL THAT APPLY)



Note: Percentages do not sum to 100 percent as respondents were permitted to select multiple categories.

When asked about future hiring plans, 58 percent of respondents indicated they planned to add workers over the next two years. Collectively, these planned hires would amount to more than 2,000 additional workers. The majority of planned hires (39 percent) are expected to be in professional or technical positions, with a similar percentage split relatively evenly among skilled labor, clerical, management, and unskilled jobs.

In addition to being the most commonly expected area for hiring, professional positions are also among the hardest to find, with roughly one in four respondents (26 percent) indicating that vacancies take four months or more to fill. By contrast, 85 percent of unskilled positions are filled in a matter of weeks.

A summary of hard-to-find occupations (Figure 85) and skills needs (Figure 86) are provided on page 89.

FIGURE 82. OVER THE NEXT TWO YEARS, DO YOU PLAN TO HIRE ADDITIONAL EMPLOYEES IN FORT WORTH?

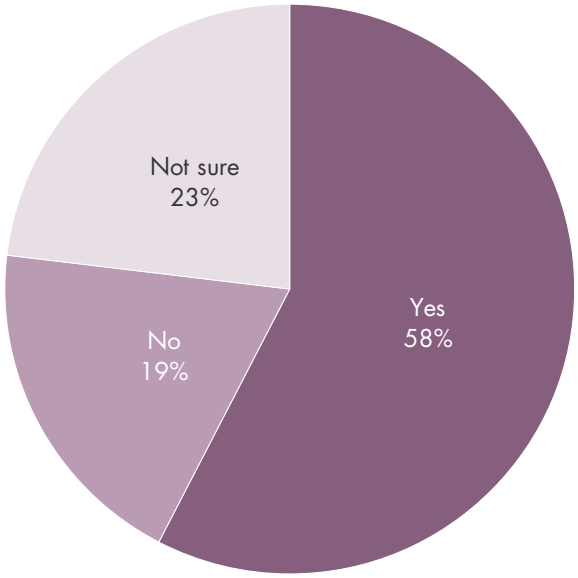


FIGURE 83. DISTRIBUTION OF HIRING PLANS BY MAJOR CATEGORY
AMONG THOSE PLANNING TO HIRE

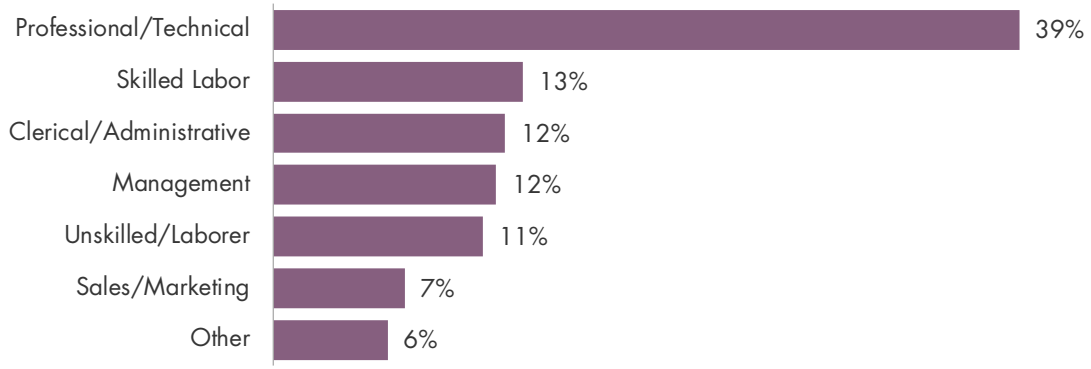


FIGURE 84. APPROXIMATELY HOW LONG DOES IT TYPICALLY TAKE TO FILL A VACANCY FOR EACH OF THE FOLLOWING CLASSIFICATIONS OF WORKERS?

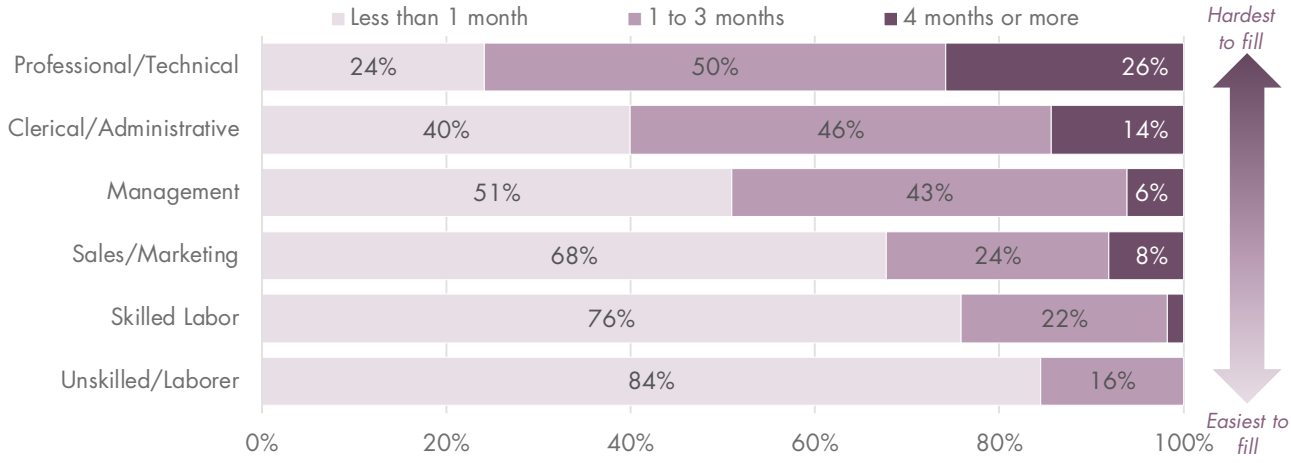


FIGURE 85. WHICH OCCUPATIONS ARE DIFFICULT TO RECRUIT IN YOUR INDUSTRY?

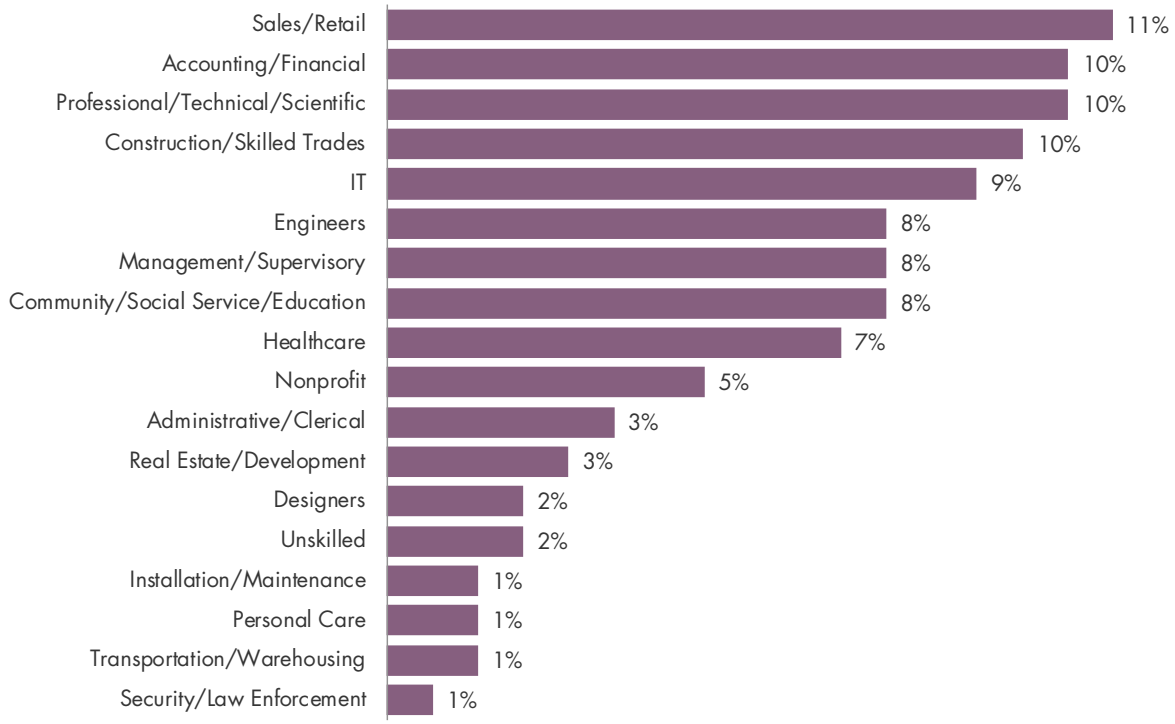
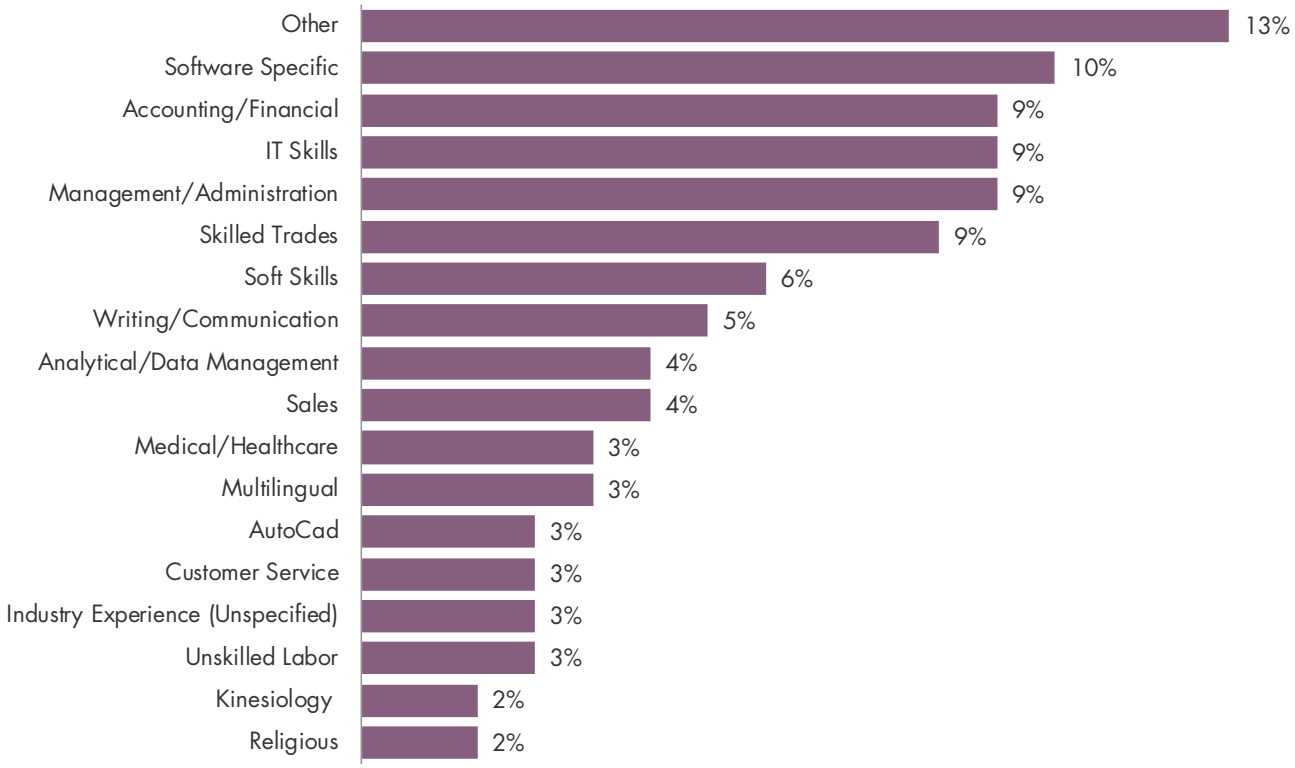


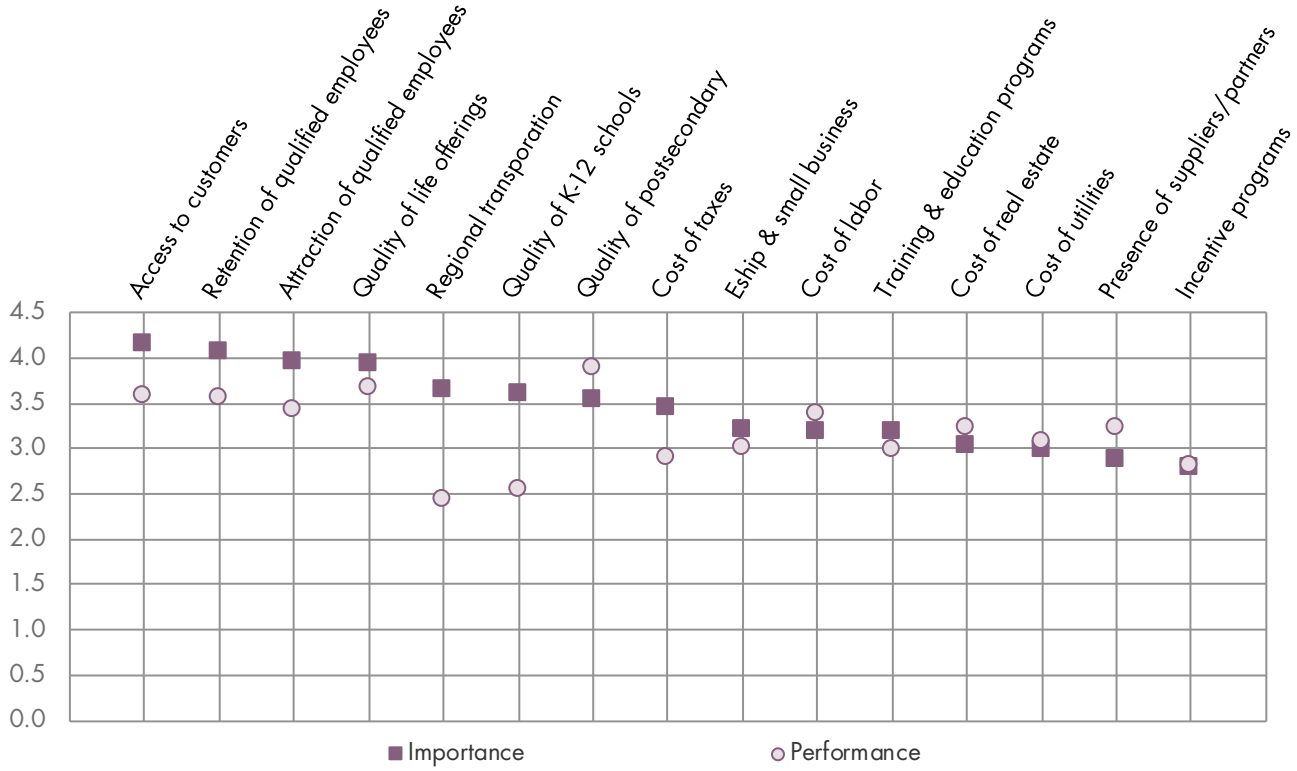
FIGURE 86. WHICH SKILLS ARE DIFFICULT TO FIND IN YOUR INDUSTRY?



Note: Respondents were allowed to write in up to 10 occupations or skills which were compiled by TIP Strategies.

Respondents were asked to rate the importance of a set of business success factors, including such things as access to customers, business-related costs, and quality of life factors. They were then asked to rate Fort Worth's performance on each factor. These two questions were then compared to identify areas where respondents' view of the factor's importance does not align well with their perceptions of the city's performance. The two largest discrepancies can be seen in the areas of transportation and the quality of the K-12 school system. In both cases, respondents rated these items as being of high importance, while rating the city's performance on these same factors as below average. Views of the workforce, presented in Figure 76, where far more favorable.

FIGURE 87. BUSINESS SUCCESS FACTORS: RESPONDENTS' RATING OF IMPORTANCE VS. PERCEPTION OF FORT WORTH'S PERFORMANCE
BASED ON A SCALE OF 1 TO 5*



*Respondents were asked to rate the importance of select factors on a scale of 1 (Not important) to 5 (Extremely important). The rating of Fort Worth's performance was based on a scale of 1(Extremely Poor) to 5 (Excellent).

FIGURE 88. RESPONDENTS' OVERALL PERCEPTION OF THE WORKFORCE IN FORT WORTH?

A more detailed probing of employers' views of the Fort Worth workforce reveals relatively high levels of satisfaction with areas that generally correspond to the concept of "work ethic." This includes characteristics such as "trainability," productivity, and professionalism. Respondents' views were more critical of the local workforce with regard to a number of basic skills, including math, overall job readiness, and computer skills. When asked about training gaps, the largest share of respondents (42 percent) indicated that they conduct training in-house. Only 1 in 10 indicated critical gaps in training. Related comments for Figure 90 are presented on the following page.

FIGURE 89. RESPONDENTS' RATING OF THE FORT WORTH AREA WORKFORCE ON SELECT CHARACTERISTICS

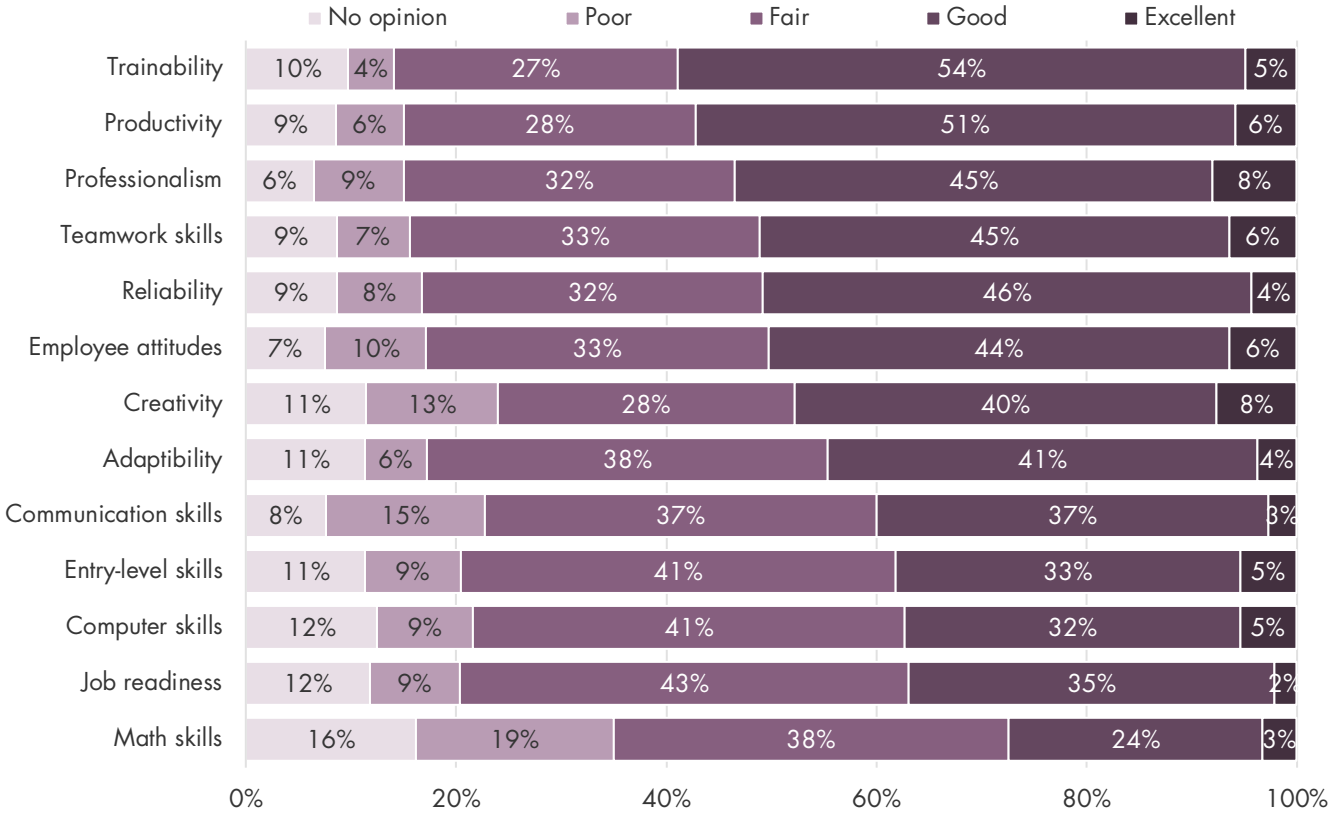


FIGURE 90. ARE FORT WORTH'S EXISTING TRAINING PROGRAMS LACKING IN ANY AREAS THAT ARE CRITICAL TO THE RESPONDENT'S TRAINING NEEDS?

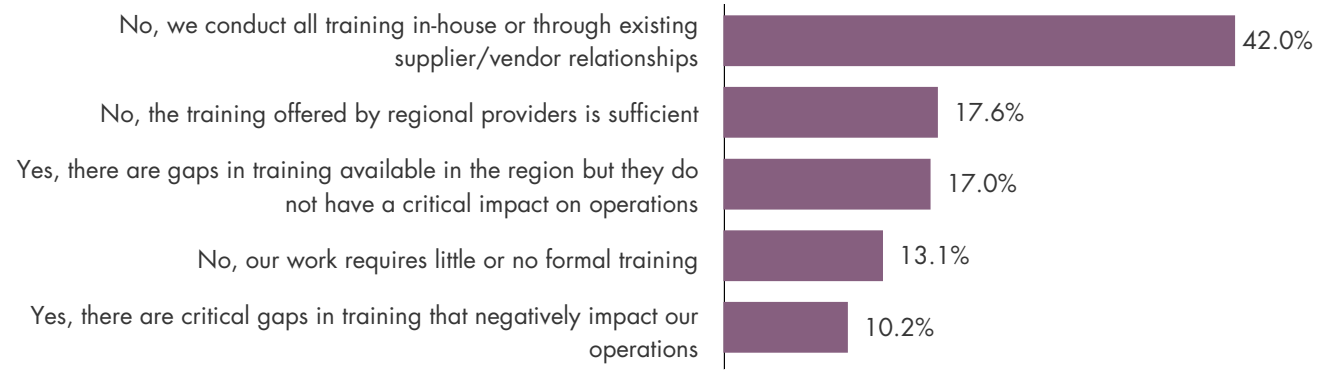


FIGURE 90. ARE FORT WORTH'S EXISTING TRAINING PROGRAMS LACKING IN ANY AREAS THAT ARE CRITICAL TO THE RESPONDENT'S TRAINING NEEDS? (CONTINUED)
OPEN-ENDED RESPONSES REQUESTED IF RESPONDENT ANSWERED "YES."

Respondents were asked to describe the specific training needed and which organization they think would be best suited to providing it.

- Commercial Diver training is going to be limited to coastal areas in most cases. Emergency rescue, potable water tank maintenance, marina operations, dredging, etc.
- These questions are very subjective based on the age of the employee we hire. The new and younger employees usually do not have a good work ethic and do not show up on time or care about the product of their work.
- All video production training and continuing education courses tend to be in Dallas.
- Training is not an issue. All personnel must have 15 years' experience.
- Computer skills related to maintenance functions.
- Tarrant County College has the structure and the staff to handle.
- Business skills and training for small businesses is hard to find
- TCC, FWISD
- High school graduates with poor verbal and written communication skills.
- We have training programs but we need a more strategic emphasis on getting people into these programs incorporating all education and workforce partners.
- Productive and creative multilingual scientific efficiency and speediness
- There need to be more technical training programs that aren't necessarily professional but are skilled
- I need more paralegal options and the educational programs for that skill is very limited in this area.
- TCU is great, but there are no large public institutions here for a 4-year degree and so our young adults leave.
- There is a great medical school here, but no residency opportunities and so those students and their families have to leave.
- Critical thinking is a gap we have identified in both educated and undereducated workforce. This is an overall detriment as creativity is critical to progress. All community stakeholders, including educational institutions, are best suited to provide a more creativity supported environment. Schools should look into increasing case study type of assignments, students generally provide minimal value in their work when they cannot think critically. Critical thinkers have beat university graduates in our organization and have been successful.
- Real experience in the medical field that can allow an employee to start work with minimal training and no re-teaching of basic skills that should have been learned in school or externship.
- I am not sure it is or should be the City's job to do anything other than demand a first-rate educational system, K-12. The private sector can do what it needs to do. Public employees need a rigorous orientation and acknowledge who they work for- the taxpayer! We do NOT work for them!
- Creativity, writing and general understanding of how things work, physics and basic math.

- For us, the employee training is primarily career experience. Few firms in investment management in FW makes it likely we'll have to hire from out of town. We're happy to do that but is more labor and time intensive.
- A local architecture school is needed. UTA isn't enough.
- Local colleges and universities do NOT teach hands-on skills necessary for my company. The skill sets lacking for interior designers include the ability to measure and accurately complete drapery work orders and the lack of visualization ability. Even the trade schools such as the Art Institute are NOT teaching the rendering software that is generally used by both the design and the construction industry, such as Google SketchUp or Chief Architect. Somehow the institutions just do not communicate with the business community about THEIR needs.
- Working with Workforce Solutions and other organizations to realize the visions of skillsets that will be needed in the future. Technology will change all industries and it is coming faster than what people think. We need to get ahead of the curve to ensure a quality workforce.
- Tax and accounting for entrepreneurs - TX Wes or TCC
- 1 training class in our industry costs $8,000 per employee - that's impossible for a small business to keep up with... it'd be ideal for each employee to have 5 of these classes each.... that's $800,000 every 3 years.
- Licensed irrigation repair can be a valid skilled trade with great potential for future growth and value. Technical retraining programs through TWC targeting veterans with applicable skills would be ideal.

Note: Minor corrections were made to spelling and capitalization to improve readability.

5. TARGET INDUSTRY ANALYSIS

Target industries are a reflection of which industries are important to a local or regional economy, now and in the future. The identification of target industries matters less than what a community does to actually "target" an industry. Specific strategies to grow the Fort Worth economy through marketing and recruitment initiatives, incentives, and policies to support growth, and talent and workforce initiatives are detailed in the Volume 3: Strategy report as part of this planning process. Nonetheless, a successful target industry recruitment initiative must begin with a solid framework that employs quantitative, qualitative, and strategic methods. Our analysis is divided into two components: established sectors and emerging opportunities.

FIGURE 91. TARGETING FRAMEWORK

Five established sectors play a key role in the Fort Worth economy (i.e., employment, visibility, part of the city's culture).

- Healthcare
- Hospitality & Tourism
- Manufacturing
- Transportation & Warehousing
- Oil & Gas

For each established sector, we have provided a snapshot of its characteristics in Fort Worth, with comparisons to the larger region, the state, and the US. The analysis shows the sector's role in the economy, employment trends, demographic characteristics, staffing patterns, and leading metro areas nationally for each sector. To allow for easy comparisons, our analysis follows the federal North American Classification System (NAICS) as closely as possible in most cases. For example, Transportation & Warehousing and Manufacturing represent the entire NAICS sectors (48-49 and 31-33, respectively). In other cases, groupings are modified slightly. For example, Healthcare excludes the 624 industry group, which is focused on industries that provide social services (e.g., food pantries, homeless shelters, childcare), and includes employment in publicly owned hospitals (903622 local government and 902622 state government).

Eight emerging opportunities have been identified as viable targets for new business creation, expansion, and relocation in Fort Worth.

- Aerospace Manufacturing & Design
- Transportation Innovation
- Life Sciences Delivery & Innovation
- Geotechnical Engineering
- International Business
- Corporate & Regional HQs
- Professional Services
- Financial Services

These emerging opportunities are areas that are either new or have not fully matured in Fort Worth. Many of these opportunities are not captured in the NAICS classification system. Thus, our analysis is focused on defining each opportunity and describing why it is an appropriate target for Fort Worth's economic development efforts. This approach allows the opportunity to identify targets that are not bound by traditional industry definitions, especially areas focused on innovation and emerging technologies.

ESTABLISHED SECTORS

This section provides a snapshot of employment in the established sectors. Information is provided for the city of Fort Worth throughout, with comparison to other relevant geographies (including the Dallas-Fort Worth metropolitan area, the state, and the US). The one exception is the "Industry Detail" section, which is presented for a single geography: the Fort Worth MD. This geography level was used to give a fuller view of regional strengths within the established sectors and to account for the way employment was distributed in Tarrant County by the data provider (Emsi).

DISTRIBUTION & CONCENTRATION

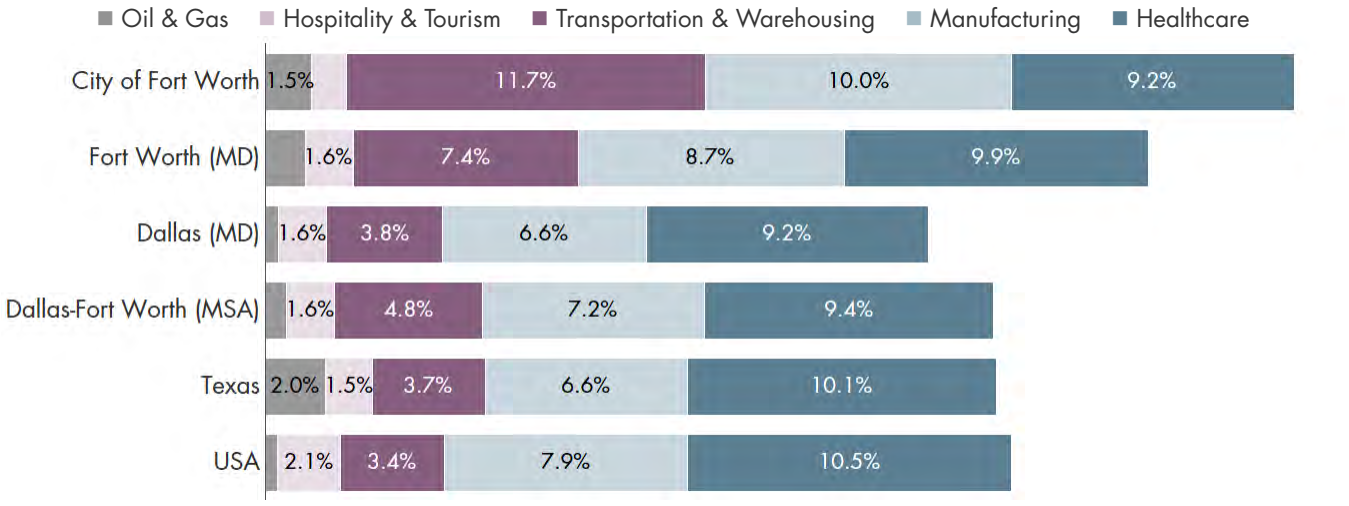
The five established sectors profiled in this section comprise a significant share of total employment across all geographies. However, they comprise a distinctly large share of jobs in located within the city of Fort Worth. As a group, the established sectors account for one-third of employment in Fort Worth (33.5 percent), compared with less than one-quarter of the job base at the regional (Dallas-Fort Worth MSA), state, or national level.

FIGURE 92. 2016 EMPLOYMENT LEVEL IN ESTABLISHED SECTORS BY GEOGRAPHY

	CITY OF FORT WORTH	FORT WORTH (MD)	DALLAS (MD)	DALLAS-FORT WORTH (MSA)	TEXAS	USA
TOTAL	483,517	1,084,691	2,610,528	3,695,088	13,189,982	157,926,564
Rest of economy	321,372	772,362	2,046,006	2,818,358	10,047,964	119,540,721
Transportation & warehousing	56,473	79,751	99,215	178,958	485,760	5,343,262
Manufacturing	48,350	93,896	173,485	267,283	867,686	12,525,242
Healthcare	44,506	107,571	240,071	347,642	1,329,396	16,658,807
Oil & gas	7,181	13,990	11,001	24,988	258,871	603,843
Hospitality & tourism	5,635	17,121	40,750	57,859	200,305	3,254,689

Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.

FIGURE 93. 2016 PERCENT OF TOTAL EMPLOYMENT IN ESTABLISHED SECTORS BY GEOGRAPHY



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Labels for values below 1.5% were omitted for visual clarity.

Figure 94 shows the relative concentration of employment in each sector based on location quotient (LQ) analysis (see box on page 3 for details). Fort Worth's relative strengths in Transportation & Warehousing are noteworthy, as are the city's relative concentration of oil & gas employment.

FIGURE 94. 2016 COMPARATIVE LOCATION QUOTIENTS BY ESTABLISHED SECTOR

	Oil & gas	Hospitality & tourism	Transportation & warehousing	Manufacturing	Healthcare
City of Fort Worth	3.88	0.57	3.45	1.26	0.87
Fort Worth (MD)	3.37	0.77	2.17	1.09	0.94
Dallas-Fort Worth (MSA)	1.77	0.76	1.43	0.91	0.89
Dallas (MD)	1.10	0.76	1.12	0.84	0.87
Texas	5.13	0.74	1.09	0.83	0.96
USA	1.00	1.00	1.00	1.00	1.00

Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.

EMPLOYMENT TRENDS

Total employment in Fort Worth is projected to continue growing about 50 percent faster than the US economy, but is also projected to lag the Dallas MD.

FIGURE 95. TOTAL EMPLOYMENT INDEXED TO 2010 BY GEOGRAPHY

EMPLOYMENT INDEXED TO 2010 BY GEOGRAPHY

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
USA	100	101	103	104	106	108	110	111	113	114	115	116
Texas	100	102	105	107	111	113	114	117	120	122	124	126
Dallas-Fort Worth (MSA)	100	102	105	108	112	115	118	121	124	126	128	130
Dallas (MD)	100	102	105	108	112	116	119	123	126	128	130	132
Fort Worth (MD)	100	103	106	108	111	113	114	117	119	121	123	124
City of Fort Worth	100	102	105	108	110	112	114	116	118	120	122	123

Healthcare employment in Fort Worth has expanded rapidly since 2010 and is projected to continue strong growth over the next five years. Projections show a 50 percent increase in healthcare jobs across the metro area by 2021.

FIGURE 96. ESTABLISHED SECTOR: HEALTHCARE

EMPLOYMENT INDEXED TO 2010 BY GEOGRAPHY

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
USA	100	102	103	105	106	108	110	114	117	119	122	124
Texas	100	103	105	107	109	113	115	120	124	128	132	135
Dallas-Fort Worth (MSA)	100	104	108	112	116	122	124	131	137	142	146	150
Dallas (MD)	100	104	108	110	116	122	124	130	136	141	146	150
Fort Worth (MD)	100	104	109	115	117	122	126	132	138	143	147	151
City of Fort Worth	100	104	108	115	117	122	126	132	137	142	147	150

Hospitality & tourism employment has declined by 3 percent since 2010 in the Fort Worth MD and fell 11 percent in the city of Fort Worth. At the same time, the sector grew by 22 percent in the Dallas MD.

FIGURE 97. ESTABLISHED SECTOR: HOSPITALITY & TOURISM

EMPLOYMENT INDEXED TO 2010 BY GEOGRAPHY

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
USA	100	102	104	106	108	111	113	115	117	119	120	121
Texas	100	102	106	110	116	118	121	125	129	132	134	136
Dallas-Fort Worth (MSA)	100	101	105	105	109	111	113	116	118	120	121	122
Dallas (MD)	100	100	106	109	115	119	122	125	128	131	133	134
Fort Worth (MD)	100	101	102	97	98	95	97	98	98	99	100	100
City of Fort Worth	100	99	101	95	93	89	89	89	89	90	90	90

Sources (all figures this page): US Bureau of Labor Statistics, Emsi, TIP Strategies.

Manufacturing employment growth in the Dallas-Fort Worth metro area has taken place almost exclusively in the Fort Worth MD since 2010. Regional strengths in manufacturing are weighted toward Fort Worth.

FIGURE 98. ESTABLISHED SECTOR: MANUFACTURING
EMPLOYMENT INDEXED TO 2010 BY GEOGRAPHY

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
USA	100	102	104	104	106	107	107	108	108	108	108	108
Texas	100	103	106	107	109	108	105	105	106	106	107	107
Dallas-Fort Worth (MSA)	100	102	103	104	104	104	104	104	104	104	104	103
Dallas (MD)	100	101	101	100	100	101	103	103	102	102	101	101
Fort Worth (MD)	100	103	106	111	113	111	107	108	108	108	109	108
City of Fort Worth	100	101	103	109	110	108	105	106	106	106	106	106

Oil & gas is among the most volatile segments of the US economy. The sector grew by 34 percent nationally from 2010 to 2014 and nearly doubled that pace (62 percent) in the Fort Worth MD, only to shed nearly all those jobs from 2014 to 2016. Future regional job growth is projected to happen mostly in the Fort Worth MD.

FIGURE 99. ESTABLISHED TARGET SECTOR: OIL & GAS
EMPLOYMENT INDEXED TO 2010 BY GEOGRAPHY

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
USA	100	111	122	127	134	120	103	105	107	109	110	111
Texas	100	114	130	138	146	131	112	115	118	120	122	124
Dallas-Fort Worth (MSA)	100	113	133	130	140	122	104	106	108	110	112	113
Dallas (MD)	100	109	124	110	114	109	102	103	104	104	105	106
Fort Worth (MD)	100	116	140	147	162	133	105	109	112	114	117	119
City of Fort Worth	100	104	120	118	128	120	104	108	111	114	116	118

Transportation & warehousing employment has grown rapidly across all geographies since 2010. The Dallas MD experienced more steady growth in the sector than the Fort Worth MD, but the pace of job growth in Fort Worth accelerated rapidly from 2013 through 2016.

FIGURE 100. ESTABLISHED SECTOR: TRANSPORTATION & WAREHOUSING
EMPLOYMENT INDEXED TO 2010 BY GEOGRAPHY

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
USA	100	103	105	107	111	116	119	121	123	125	126	126
Texas	100	103	108	111	115	120	124	127	130	132	134	135
Dallas-Fort Worth (MSA)	100	103	106	109	113	123	132	136	140	143	145	146
Dallas (MD)	100	102	107	112	115	126	139	144	148	151	154	155
Fort Worth (MD)	100	103	105	106	111	120	124	128	131	133	135	136
City of Fort Worth	100	102	102	101	105	116	122	125	127	129	131	132

Sources (all figures this page): US Bureau of Labor Statistics, Emsi, TIP Strategies.

DALLAS-FORT WORTH MSA

Healthcare, the largest of the established sectors, steadily added jobs in the MSA in each year following the recession that ended in 2009. The next largest sector, transportation & warehousing, has followed suit from 2011 forward. Manufacturing lost more than 11,000 jobs in 2010, but by the end of 2016 had recovered nearly all that one-year loss.

FIGURE 101. 2016 EMPLOYMENT LEVEL
ESTABLISHED SECTORS IN THE DALLAS-FORT WORTH MSA

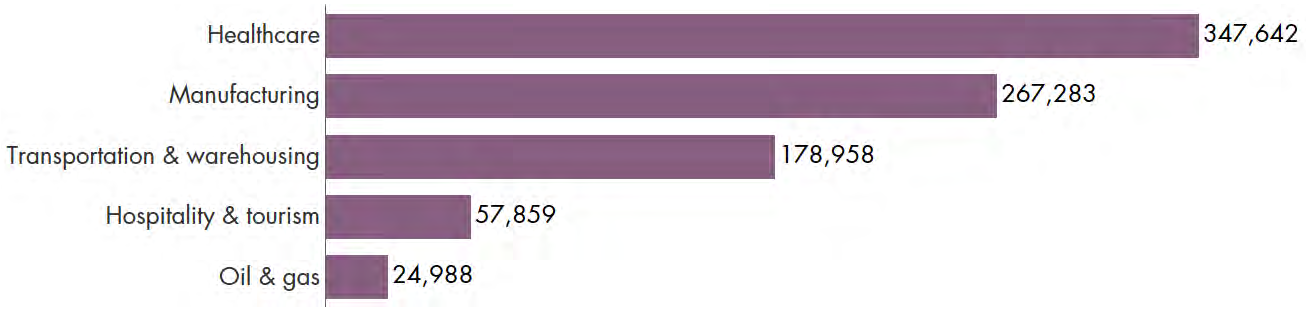


FIGURE 102. NET CHANGE (BY YEAR) IN POST-RECESSION EMPLOYMENT*
ESTABLISHED SECTORS IN THE DALLAS-FORT WORTH MSA

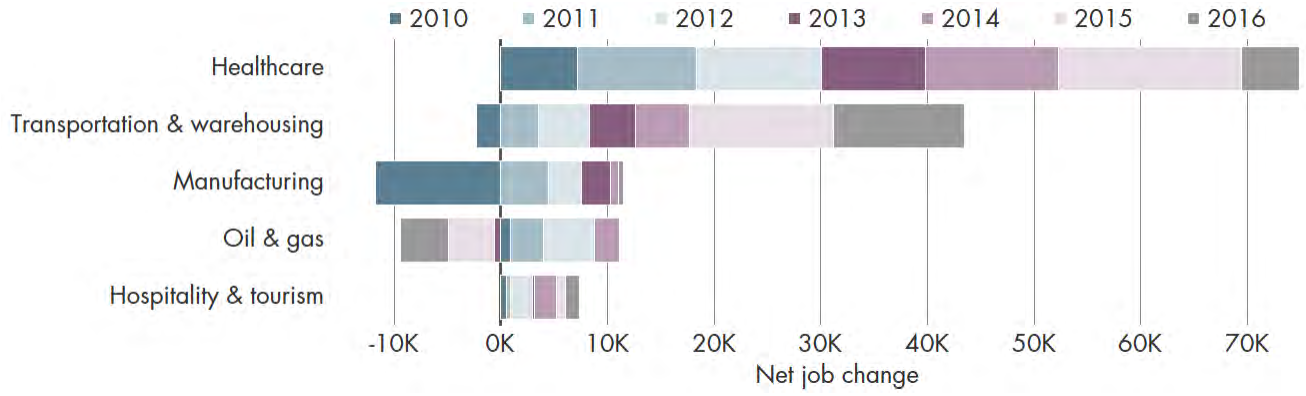
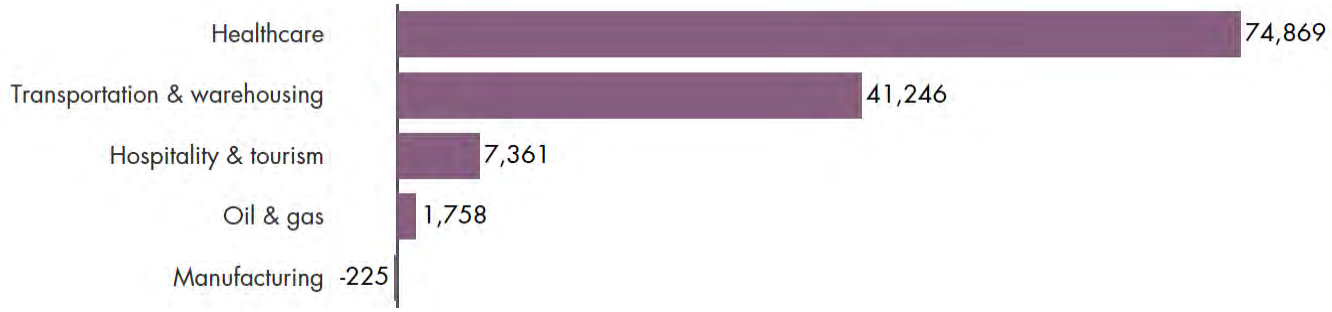


FIGURE 103. NET CHANGE (TOTAL) IN POST-RECESSION EMPLOYMENT*
ESTABLISHED SECTORS IN THE DALLAS-FORT WORTH MSA



*The National Bureau of Economic Research (NBER) dates the end of the last recession as June 2009, thus full-year net changes in employment are shown for all years after 2009.
Sources (all figures this page): US Bureau of Labor Statistics, Emsi, TIP Strategies, NBER.

FORT WORTH MD

Manufacturing ranks more prominently among the established sectors in the Fort Worth MD than in the MSA overall. Through the seven full years since the recession, however, manufacturing, oil & gas, and hospitality & tourism have shown more volatility from year to year than have the steadier growth sectors (healthcare and transportation & warehousing).

FIGURE 104. 2016 EMPLOYMENT LEVEL
ESTABLISHED SECTORS IN THE FORT WORTH (MD)

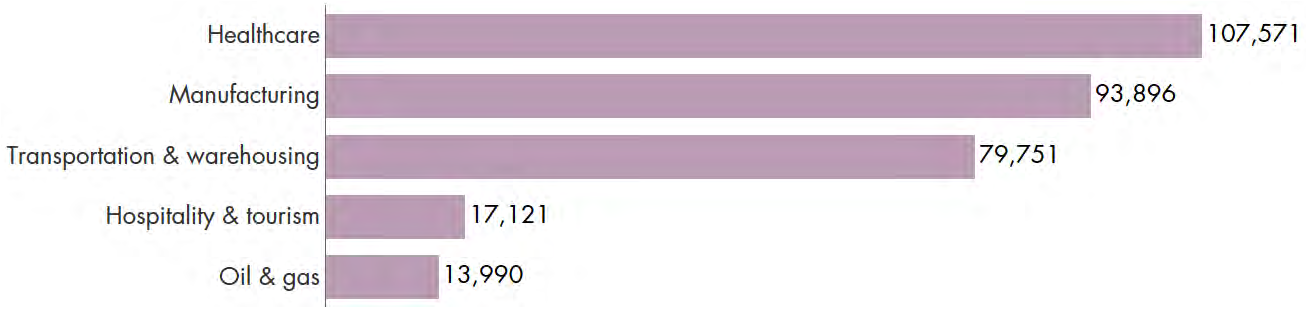


FIGURE 105. NET CHANGE (BY YEAR) IN POST-RECESSION EMPLOYMENT*
ESTABLISHED SECTORS IN THE FORT WORTH (MD)

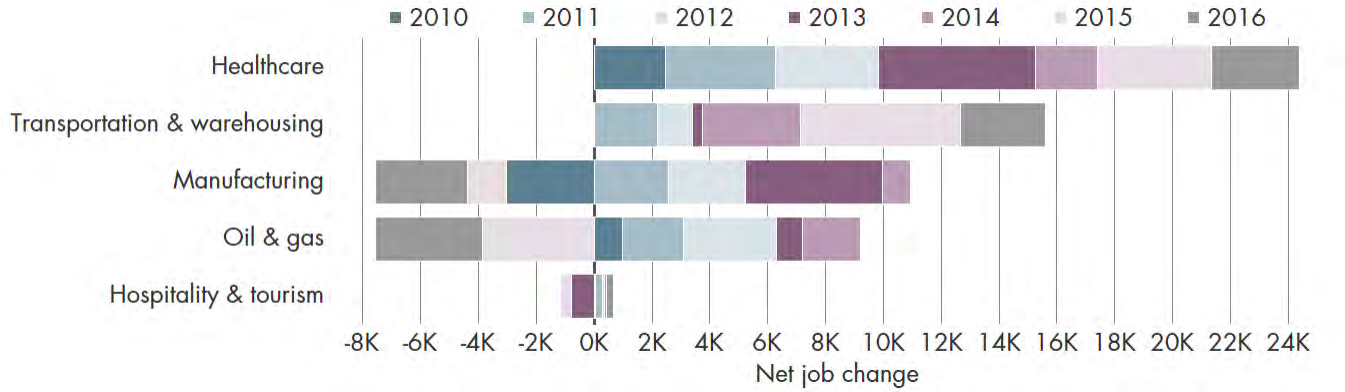
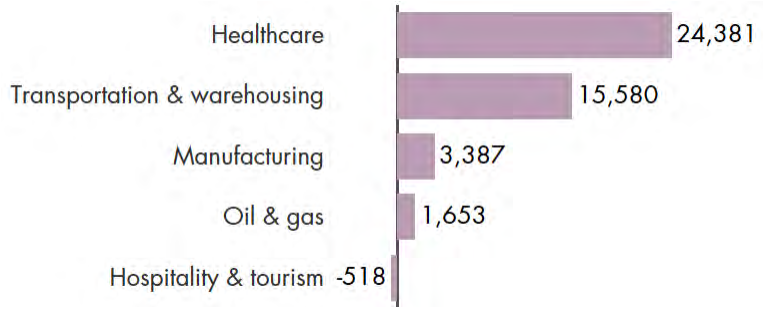


FIGURE 106. NET CHANGE (TOTAL) IN POST-RECESSION EMPLOYMENT*
ESTABLISHED SECTORS IN THE FORT WORTH (MD)



*The NBER dates the end of the last recession as June 2009, thus full-year net changes in employment are shown for all years after 2009.
Sources (all figures this page): US Bureau of Labor Statistics, Emsi, TIP Strategies, NBER.

CITY OF FORT WORTH

The city's strengths in the transportation & warehousing sector—led by American Airlines, Alliance Airport, and BNSF—become obvious when compared to the other established sectors. This sector leads in total employment and in net job growth since the recession. Healthcare employment grew by nearly as much as transportation & warehousing since the recession, adding about 10,000 new jobs in the city.

FIGURE 107. 2016 EMPLOYMENT LEVEL
ESTABLISHED SECTORS IN THE CITY OF FORT WORTH

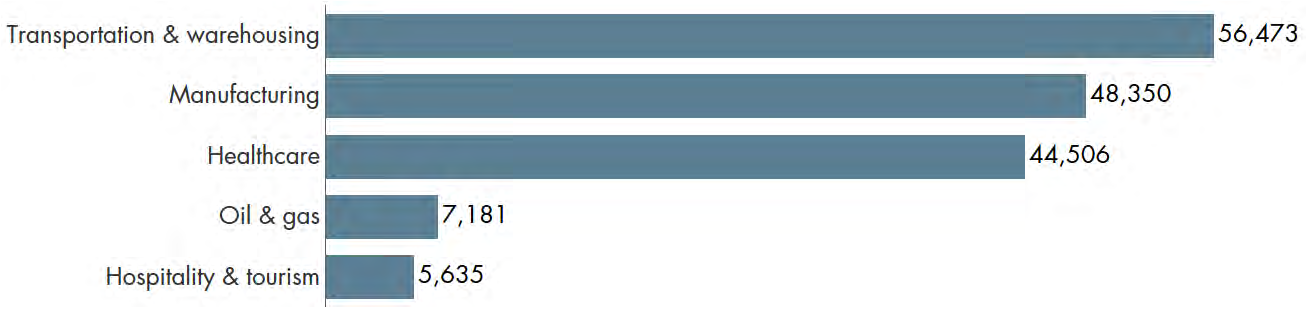


FIGURE 108. NET CHANGE (BY YEAR) IN POST-RECESSION EMPLOYMENT*
ESTABLISHED SECTORS IN THE CITY OF FORT WORTH

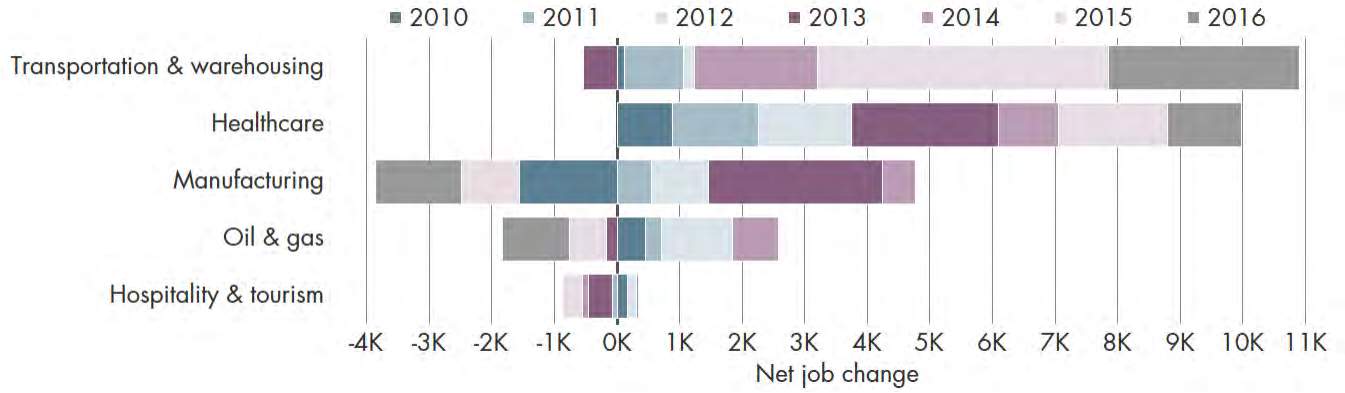
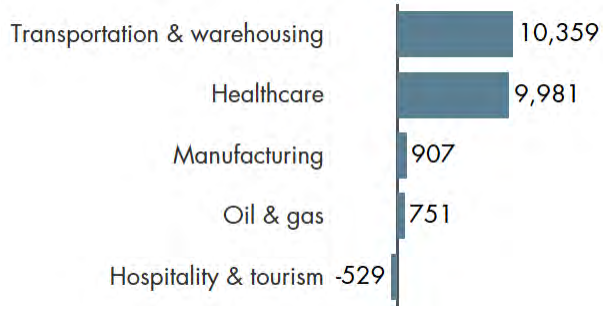


FIGURE 109. NET CHANGE (TOTAL) IN POST-RECESSION EMPLOYMENT*
ESTABLISHED SECTORS IN THE CITY OF FORT WORTH

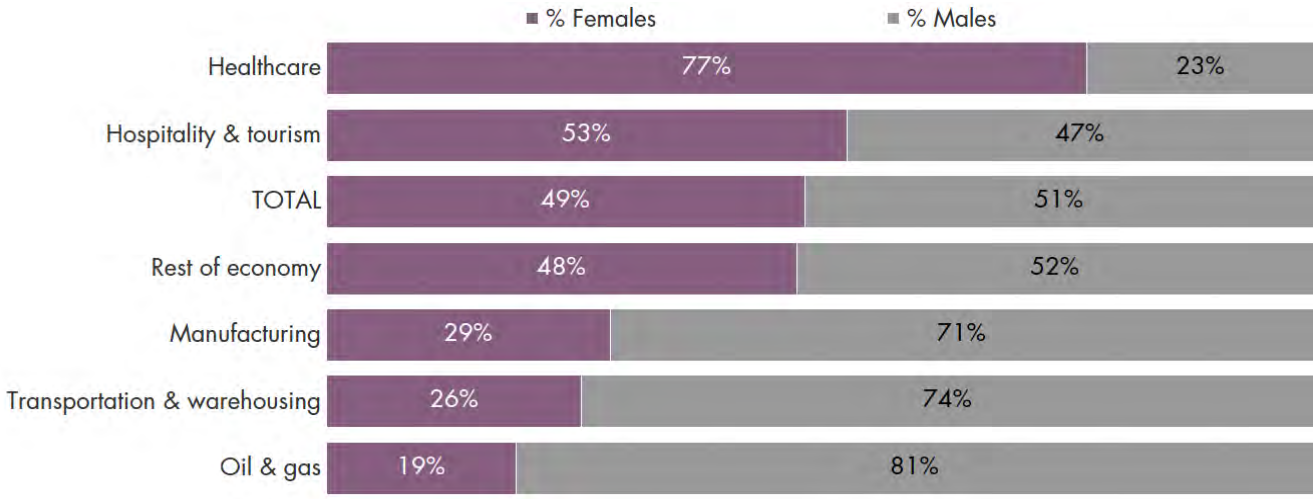


*The NBER dates the end of the last recession as June 2009, thus full-year net changes in employment are shown for all years after 2009.
Sources (all figures this page): US Bureau of Labor Statistics, Emsi, TIP Strategies, NBER.

DEMOGRAPHIC CHARACTERISTICS

The US economy has a nearly identical share of male and female workers, but major differences exist across sectors. The healthcare sector is dominated by females, who represent 77 percent of all workers. Oil & gas is highly dependent on male workers, who account for 81 percent of all employees.[1] Transportation & warehousing and manufacturing are also heavily skewed toward male employment with females representing less than 30 percent of workers for both sectors. Hospitality & tourism employment is relatively balanced between genders.

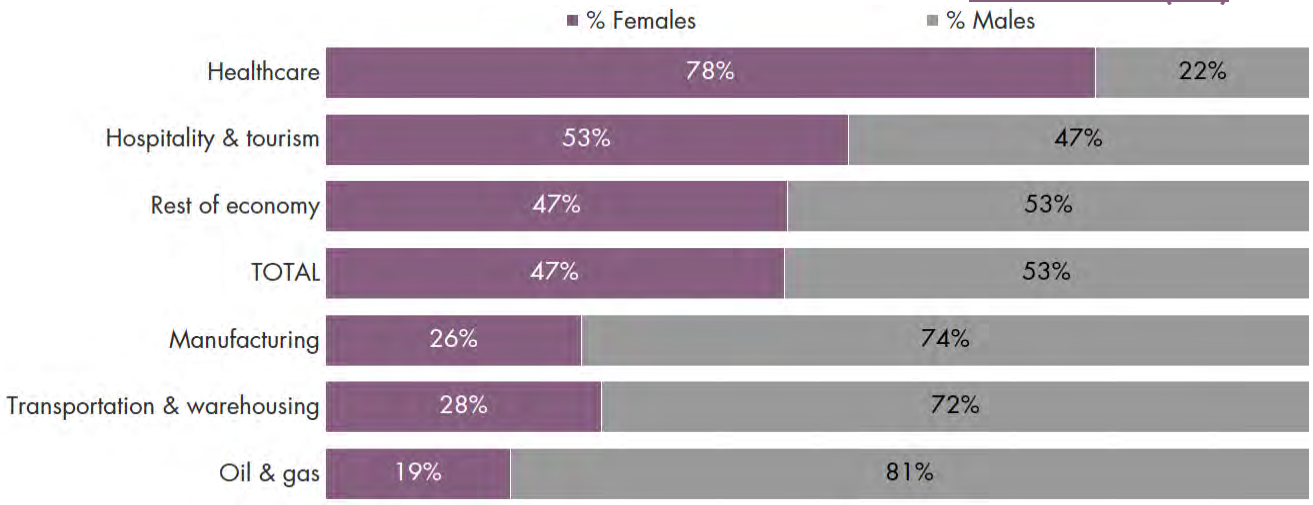
FIGURE 110. 2016 GENDER DISTRIBUTION OF EMPLOYMENT BY SECTOR: US



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.

The Fort Worth MD has a slightly larger share of its workforce that is male than does the US economy, but the gender distribution of employment within the established sectors closely mirrors national patterns.

FIGURE 111. 2016 GENDER DISTRIBUTION OF EMPLOYMENT BY SECTOR: FORT WORTH (MD)

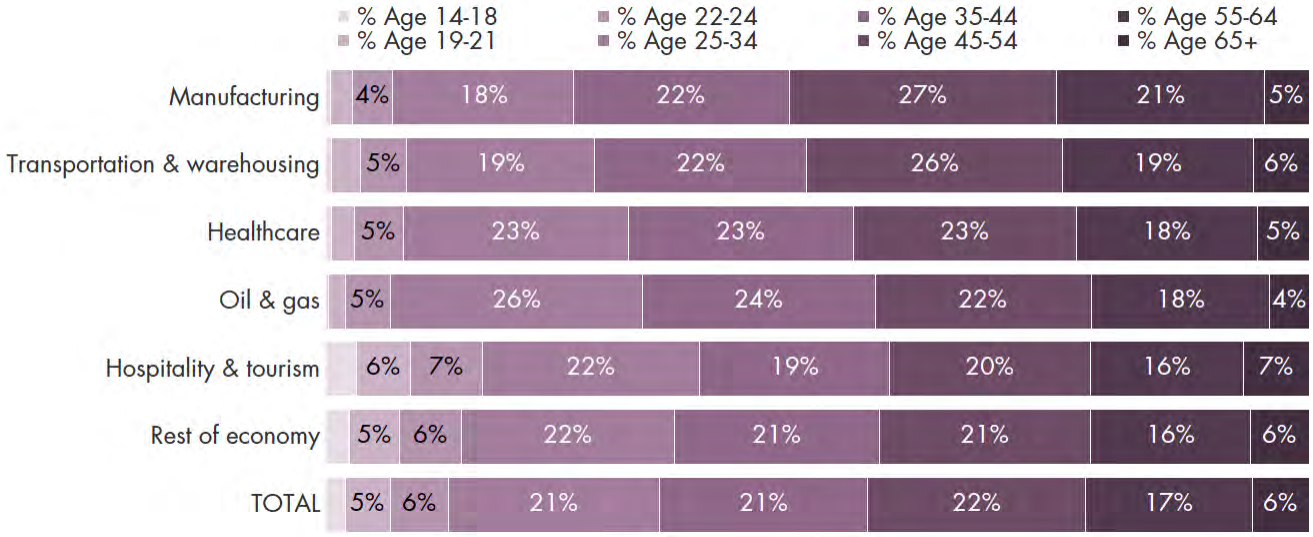


Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.

[1] This skewing of gender balance in oil & gas employment has not gone unnoticed by the industry. See, for example: World Petroleum Council and Boston Consulting Group, Untapped Reserves: Promoting Gender Balance in Oil and Gas, July 12, 2017. [www.bcg.com/publications/2017/energy-environment-people-organization-untapped-reserves.aspx]

Nearly two-thirds of the US workforce is between the ages of 25 and 55. Hospitality & tourism depends more on young workers than any other sector, with nearly 17 percent of workers under age 25. Manufacturing and transportation & warehousing have the oldest workforce among the established sectors, with 26 percent of workers over age 55 and more than 50 percent of workers above age 45.

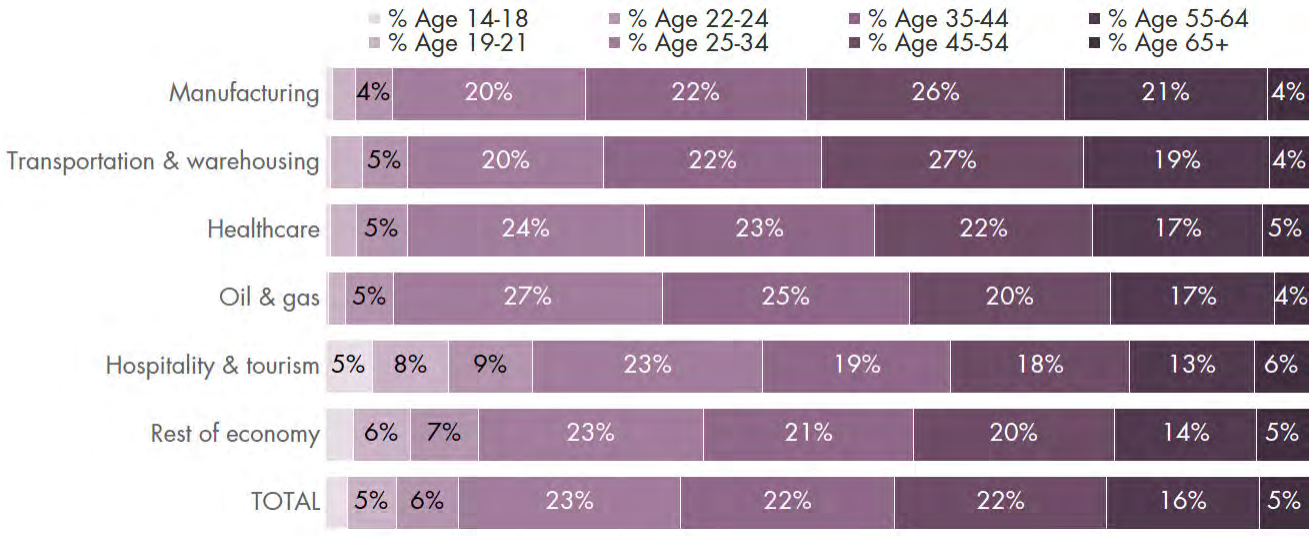
FIGURE 112. 2016 AGE DISTRIBUTION OF EMPLOYMENT BY ESTABLISHED SECTOR: US



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies. Note: Labels for values below 4% were omitted for visual clarity.

The Fort Worth MD workforce is slightly younger than the US workforce, with only 21 percent of workers above age 55, compared to 23 percent for the US. Within each established sector, the Fort Worth MD workforce is younger than the US workforce as a whole. Twenty-two percent of the region's hospitality & tourism sector workforce is under the age of 25. Similar to the US, the region's oil & gas sector has the highest share of workers in the age 25-44 group.

FIGURE 113. 2016 AGE DISTRIBUTION OF EMPLOYMENT BY ESTABLISHED SECTOR: FORT WORTH (MD)

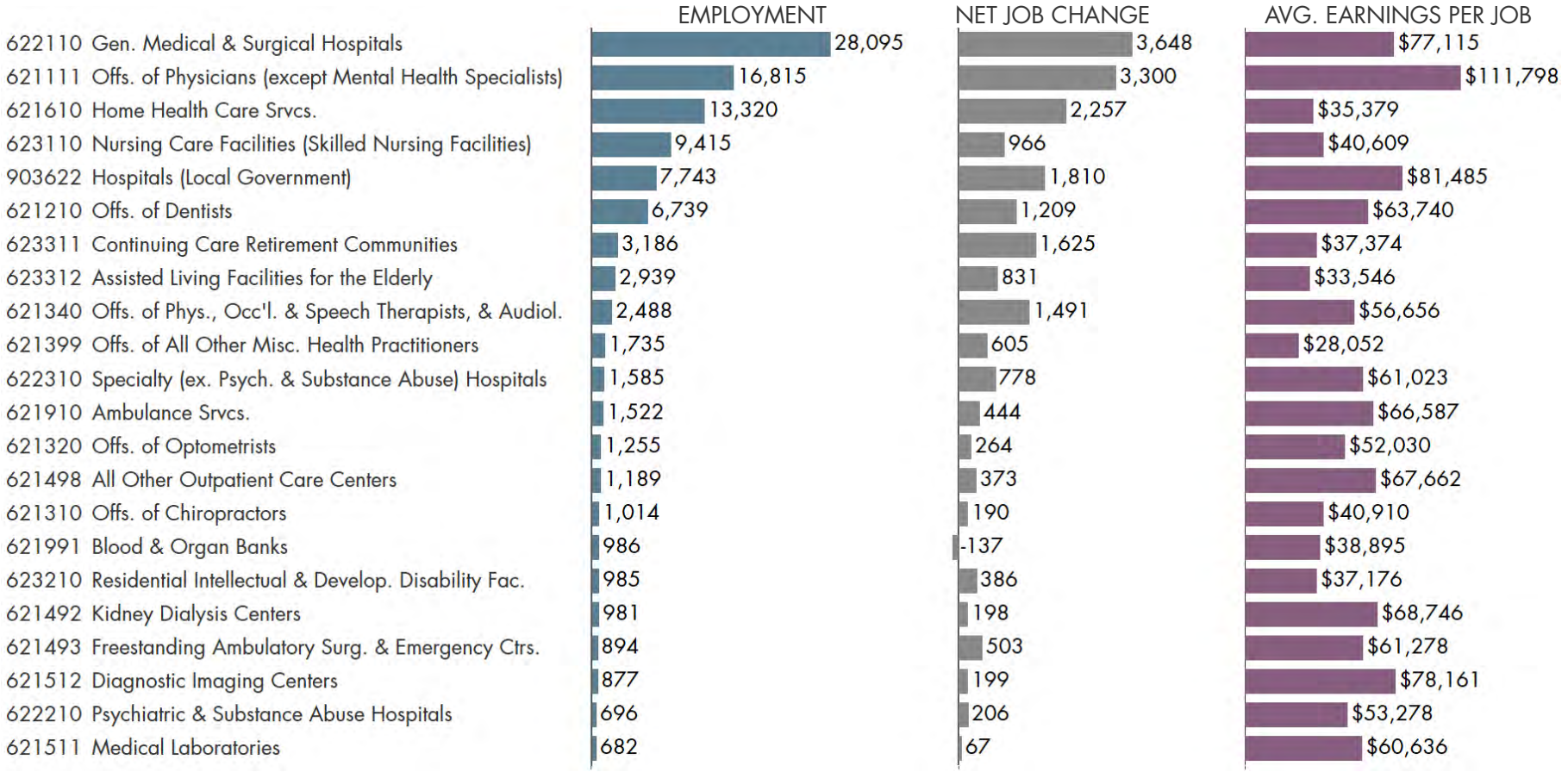


Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies. Note: Labels for values below 4% were omitted for visual clarity.

INDUSTRY DETAIL: HEALTHCARE

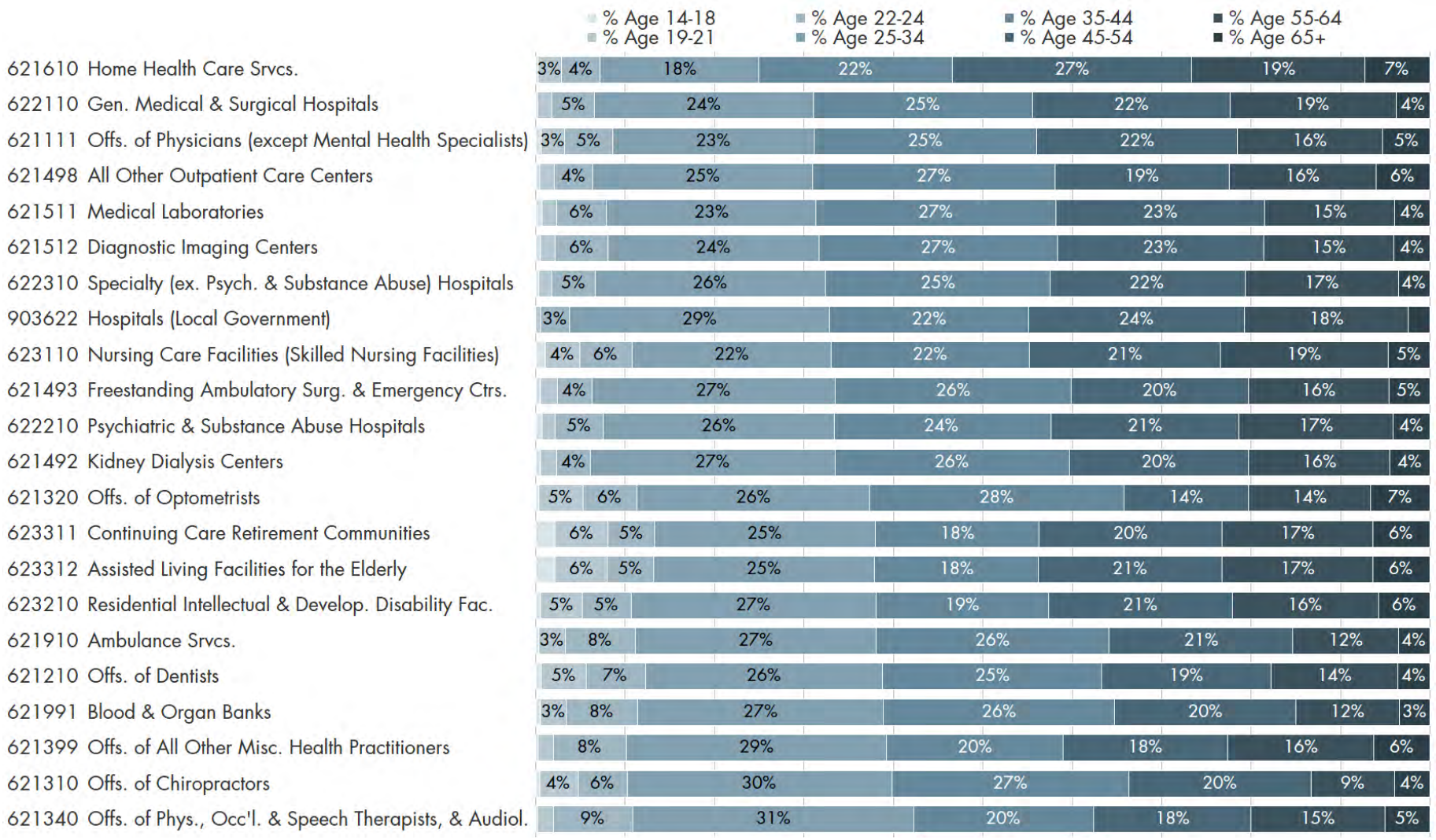
Of the more than 107,000 healthcare jobs in the Fort Worth MD, roughly 40 percent (about 43,000 jobs) are in hospitals. However, job growth in the sector since 2010 has been more broadly distributed. Only 27 percent (about 6,400 jobs) of the more than 24,000 new healthcare jobs in the region were added in hospitals. Physician's offices, the subsector with the highest total earnings per worker ($111,798), grew by 3,300 jobs from 2010 to 2016.

FIGURE 114. ESTABLISHED SECTOR: HEALTHCARE, FORT WORTH (MD)
SNAPSHOT OF 2016 EMPLOYMENT, 2010-2016 JOB GROWTH, & 2016 AVERAGE EARNINGS



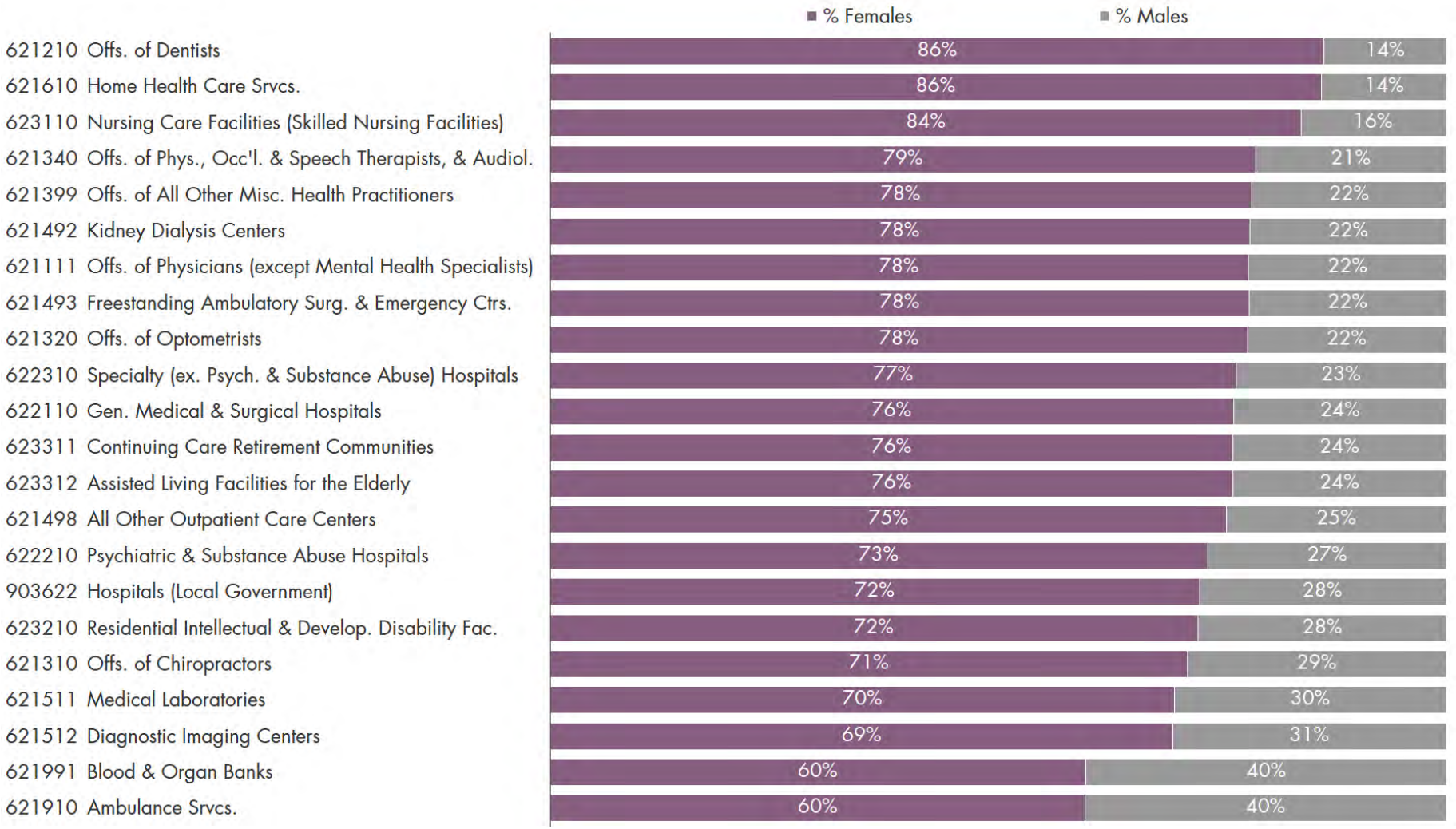
Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.

FIGURE 115. ESTABLISHED SECTOR: HEALTHCARE, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY AGE COHORT



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016. Labels for values below 3% were omitted for visual clarity.

FIGURE 116. ESTABLISHED SECTOR: HEALTHCARE, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY GENDER

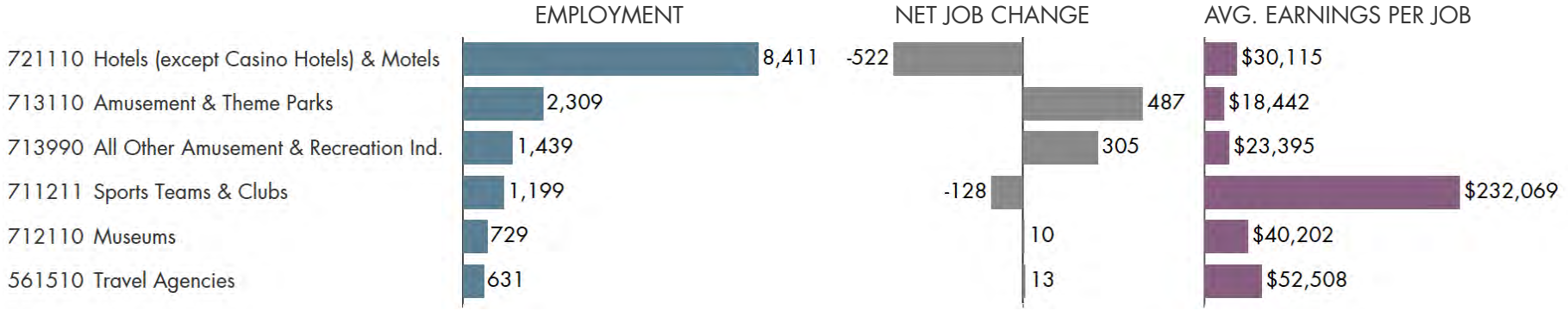


Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.

INDUSTRY DETAIL: HOSPITALITY & TOURISM

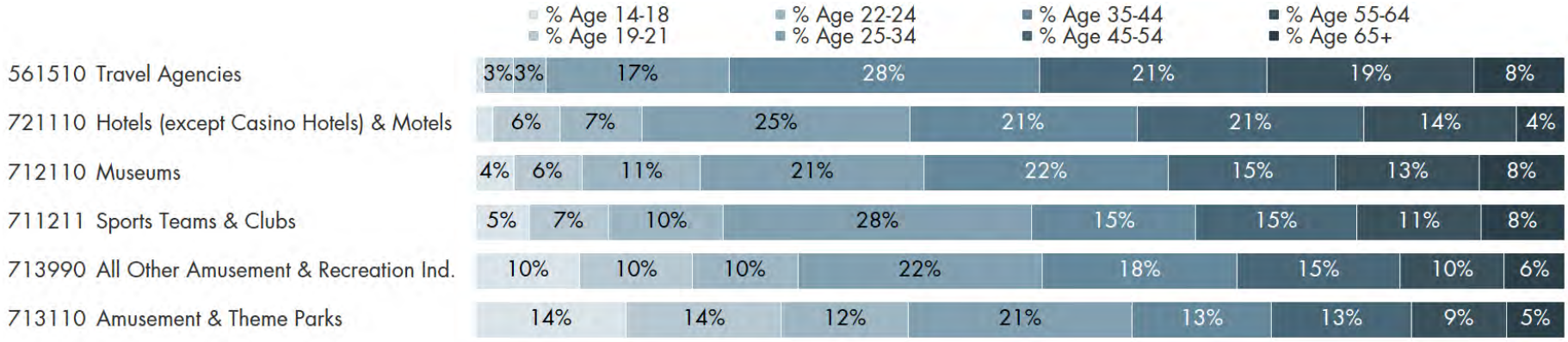
Hotels & motels account for roughly half of the 17,000 total jobs in hospitality & tourism in the Fort Worth MD, but the industry experienced a decline of more than 500 jobs from 2010 to 2016. Amusement & theme parks and other amusement & recreation industries gained 800 jobs during the same period.

FIGURE 117. ESTABLISHED SECTOR: HOSPITALITY & TOURISM, FORT WORTH (MD)
SNAPSHOT OF 2016 EMPLOYMENT, 2010-2016 JOB GROWTH, & 2016 AVERAGE EARNINGS



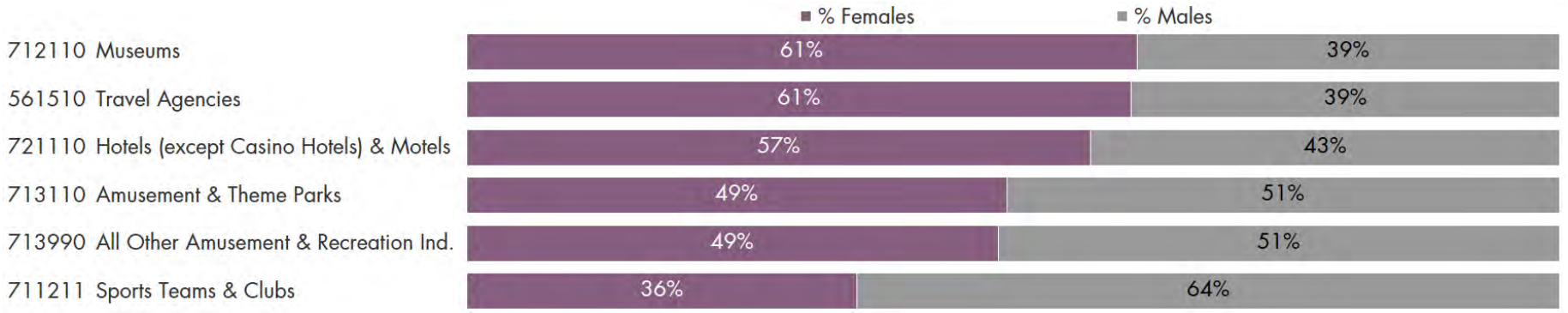
Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.

FIGURE 118. ESTABLISHED SECTOR: HOSPITALITY & TOURISM, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY AGE COHORT



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies. Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016. Labels for values below 3% were omitted for visual clarity.

FIGURE 119. ESTABLISHED SECTOR: HOSPITALITY & TOURISM, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY GENDER



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.

INDUSTRY DETAIL: MANUFACTURING

It is worth noting here that, while our analysis in this section is based on standard industry definitions, there are numerous examples of cross-industry linkages. For example, 5 of the top 10 manufacturing sectors (at the NAICS 6-digit level) have strong ties to other established sectors. Aircraft, automobile, motor vehicle electrical & electronic equipment, and other motor vehicle parts manufacturing are closely related to transportation & warehousing, and oil & gas field machinery & equipment is closely related to oil & gas.

FIGURE 120. ESTABLISHED SECTOR: MANUFACTURING, FORT WORTH (MD)
SNAPSHOT OF 2016 EMPLOYMENT, 2010-2016 JOB GROWTH, & 2016 AVERAGE EARNINGS

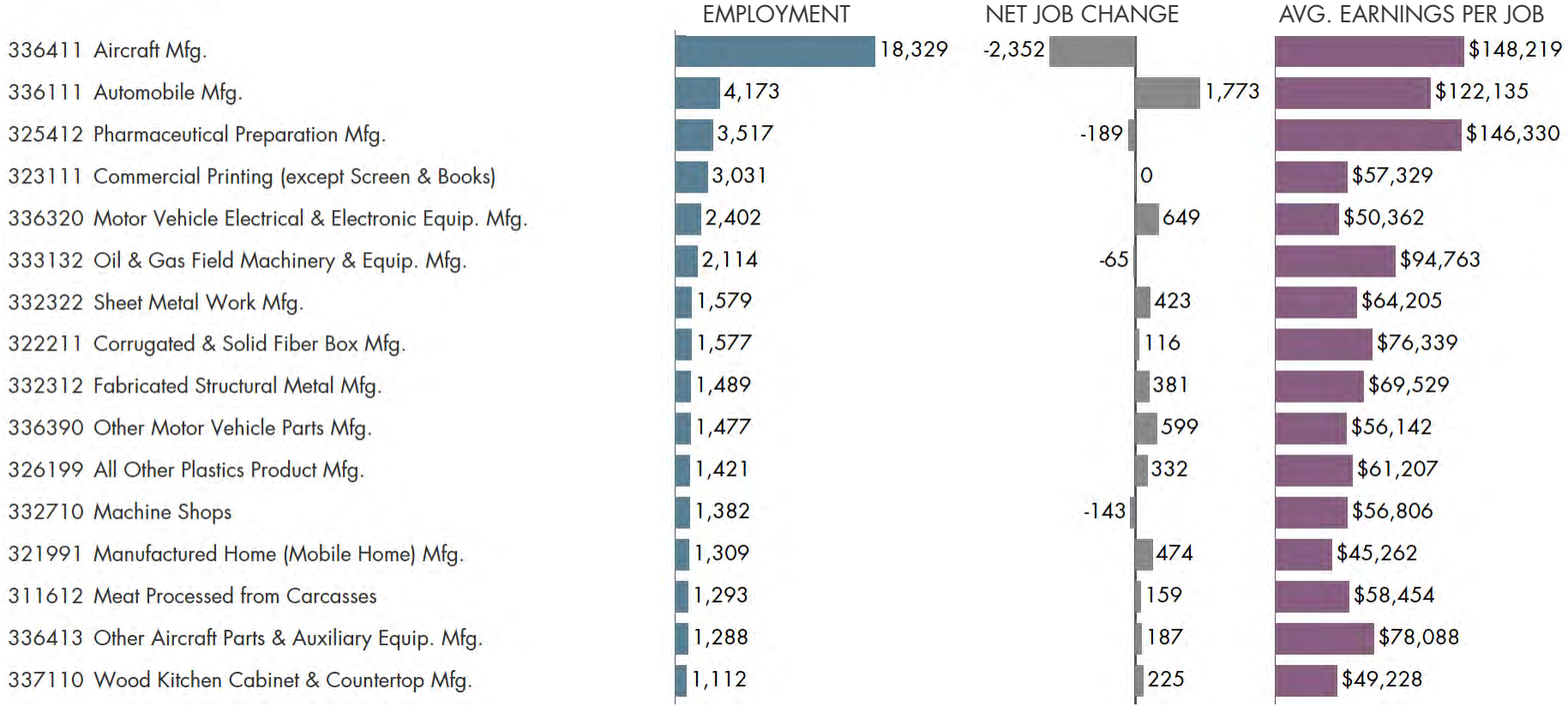


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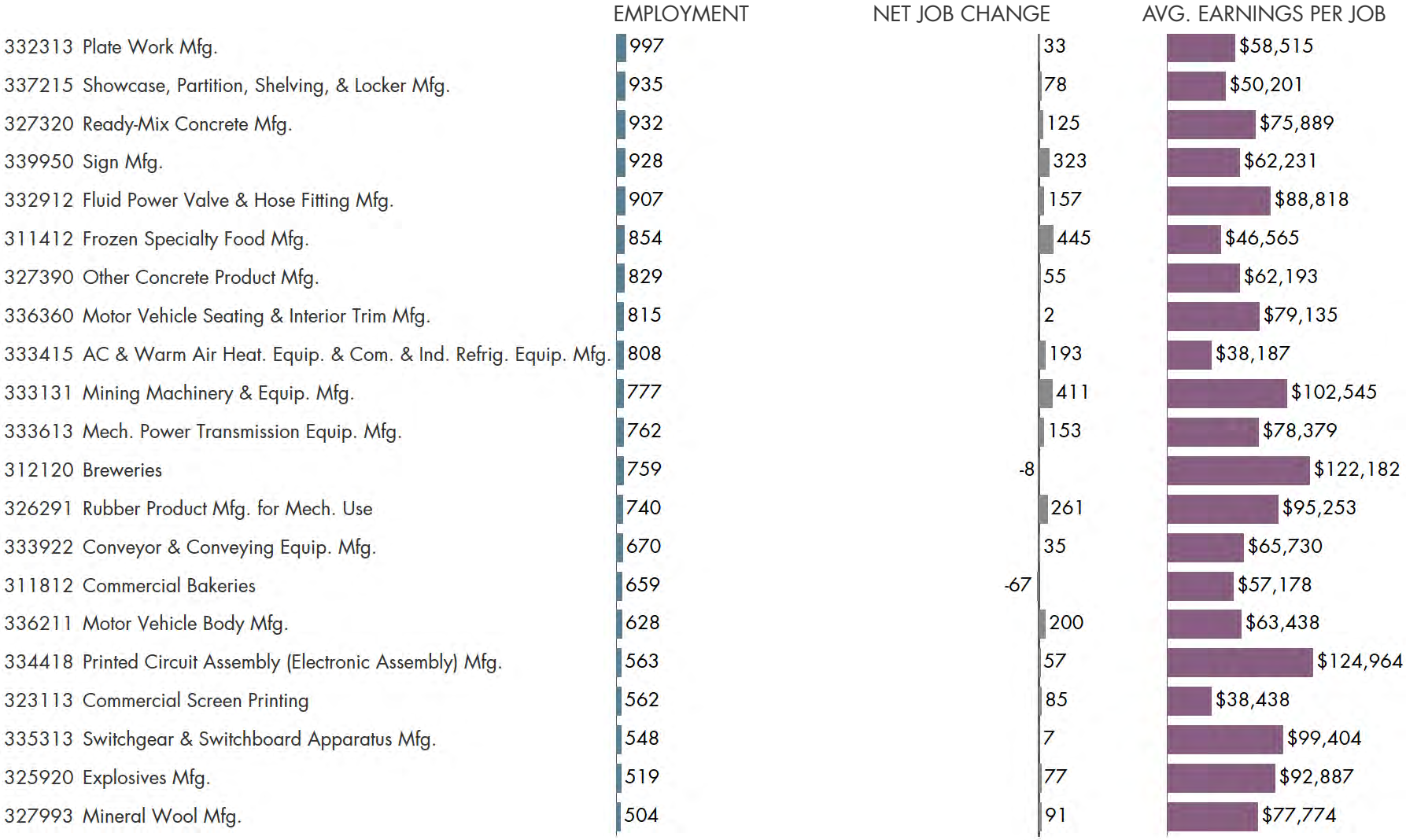
FIGURE 121. ESTABLISHED SECTOR: MANUFACTURING, FORT WORTH (MD) (CONTINUED)
SNAPSHOT OF 2016 EMPLOYMENT, 2010-2016 JOB GROWTH, & 2016 AVERAGE EARNINGS



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.

FIGURE 122. ESTABLISHED SECTOR: MANUFACTURING, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY AGE COHORT

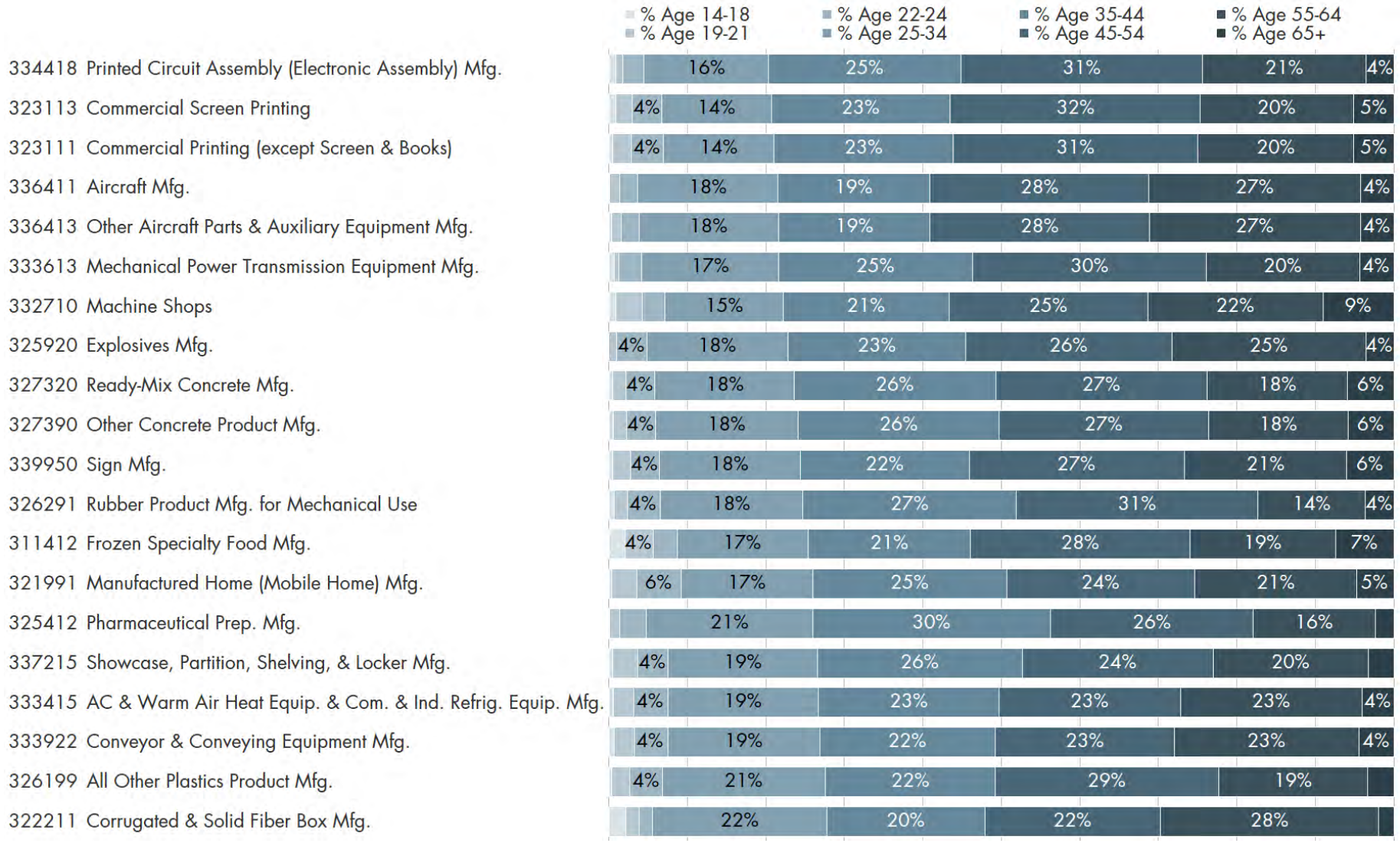


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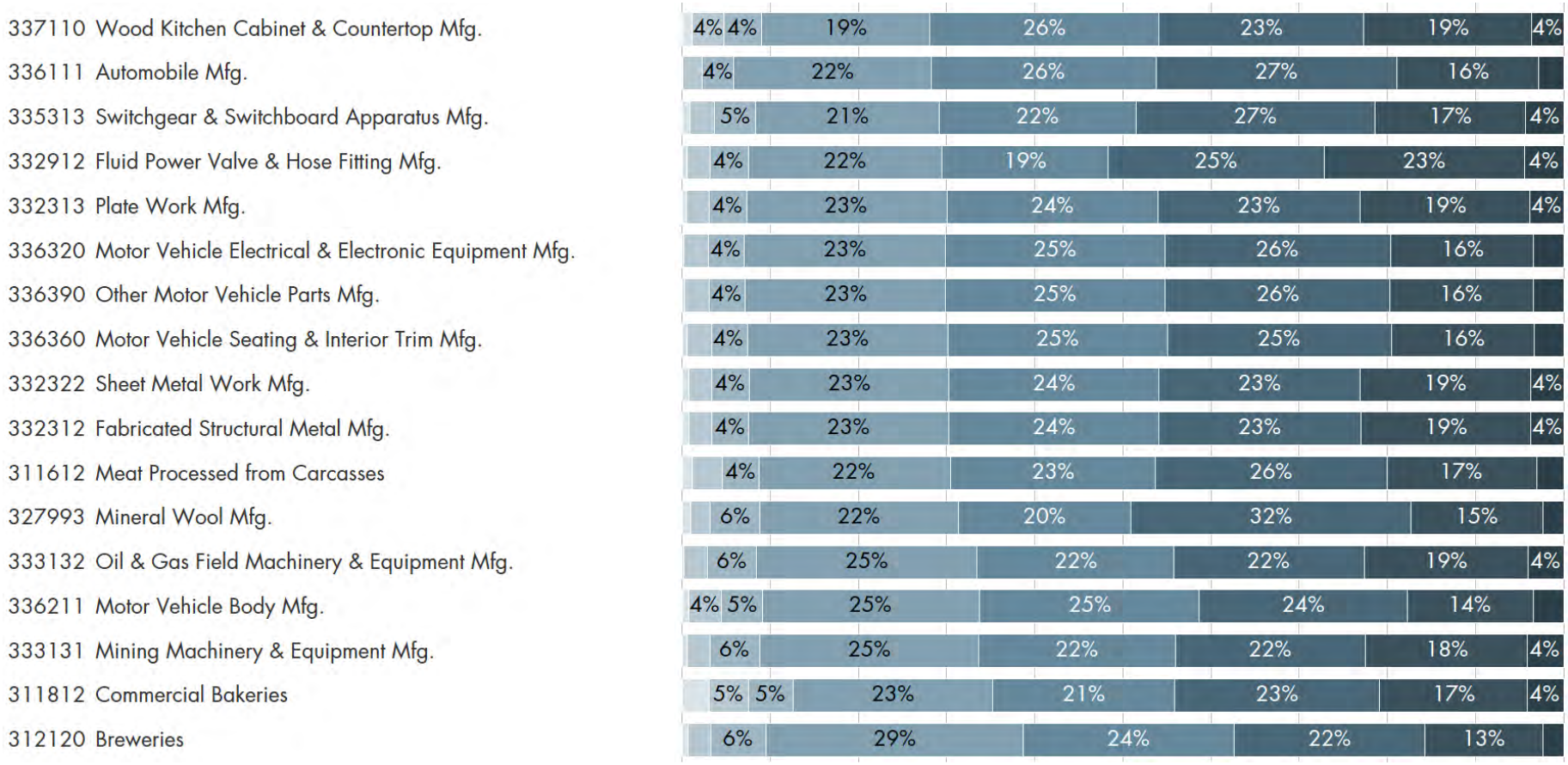
FIGURE 122. ESTABLISHED SECTOR: MANUFACTURING, FORT WORTH (MD) (CONTINUED)
COMPOSITION OF 2016 EMPLOYMENT BY AGE COHORT



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016. Labels for values below 4% were omitted for visual clarity.

FIGURE 123. ESTABLISHED SECTOR: MANUFACTURING, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY GENDER

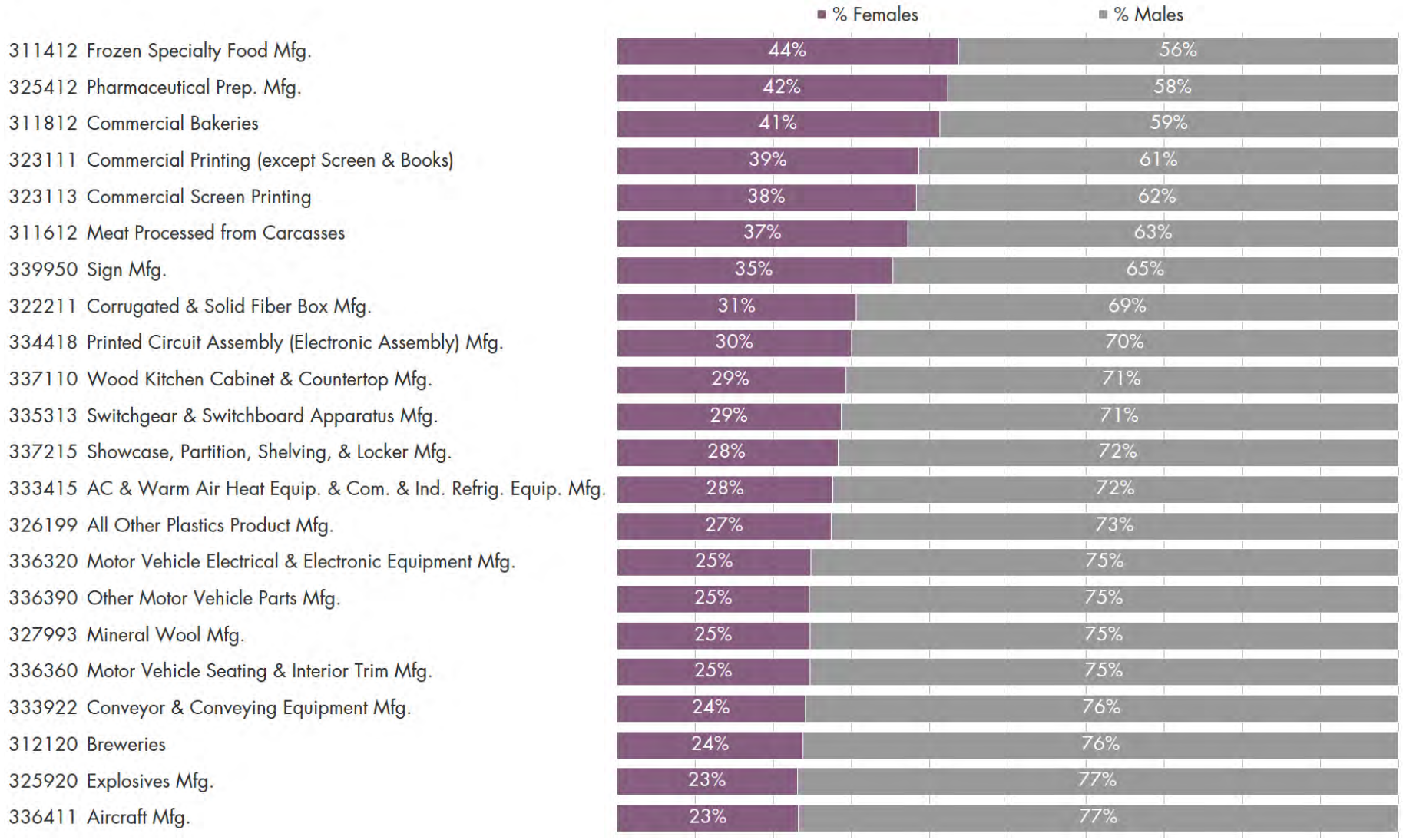


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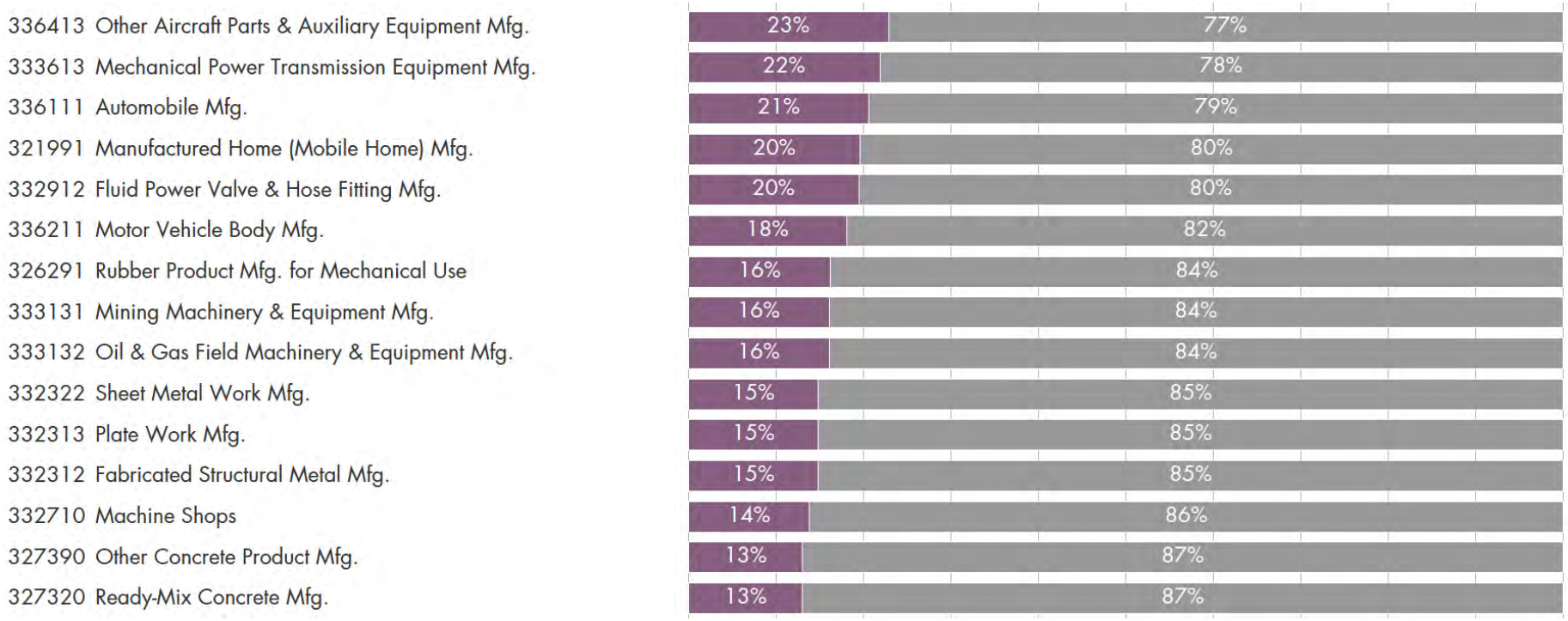
FIGURE 123. ESTABLISHED SECTOR: MANUFACTURING, FORT WORTH (MD) (CONTINUED)
COMPOSITION OF 2016 EMPLOYMENT BY GENDER

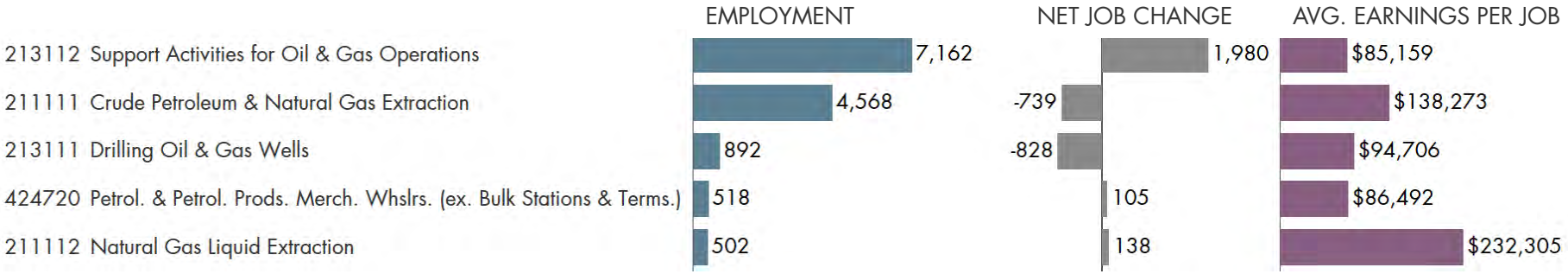


Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.

INDUSTRY DETAIL: OIL & GAS

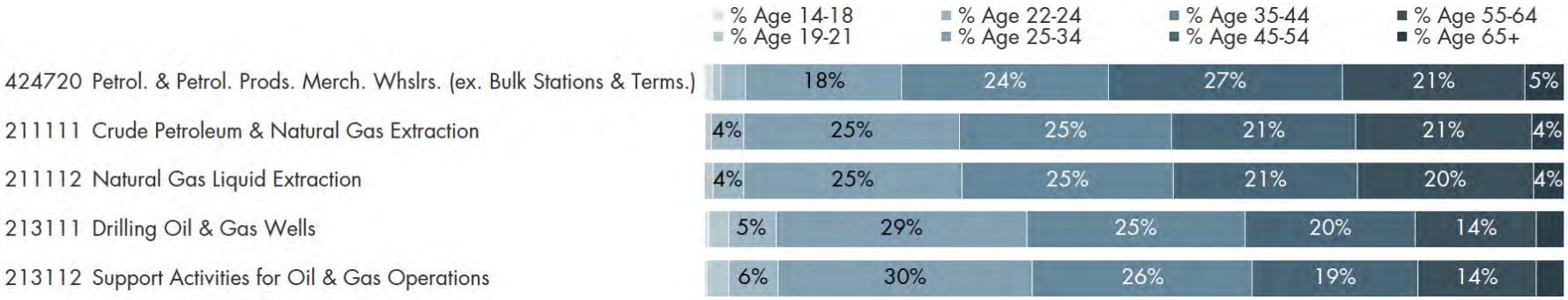
Employment in support activities for oil & gas grew by nearly 2,000 jobs in the Fort Worth MD from 2010 to 2016. At the same time, employment declined by more than 1,500 in crude petroleum & natural gas extraction and drilling oil & gas wells.

FIGURE 124. ESTABLISHED SECTOR: OIL & GAS, FORT WORTH (MD)
SNAPSHOT OF 2016 EMPLOYMENT, 2010-2016 JOB GROWTH, & 2016 AVERAGE EARNINGS



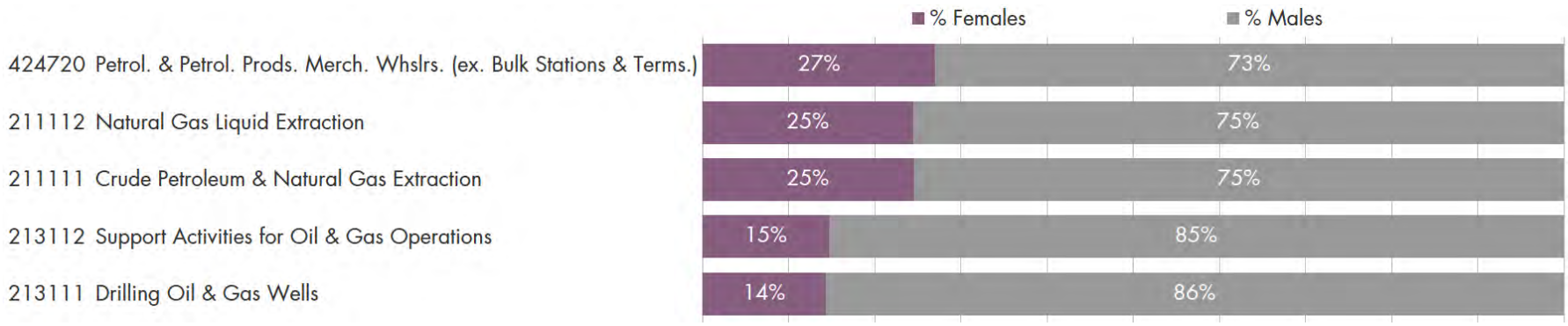
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.
Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies

FIGURE 125. ESTABLISHED SECTOR: OIL & GAS, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY AGE COHORT



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016. Labels for values below 4% were omitted for visual clarity.

FIGURE 126. ESTABLISHED SECTOR: OIL & GAS, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY GENDER

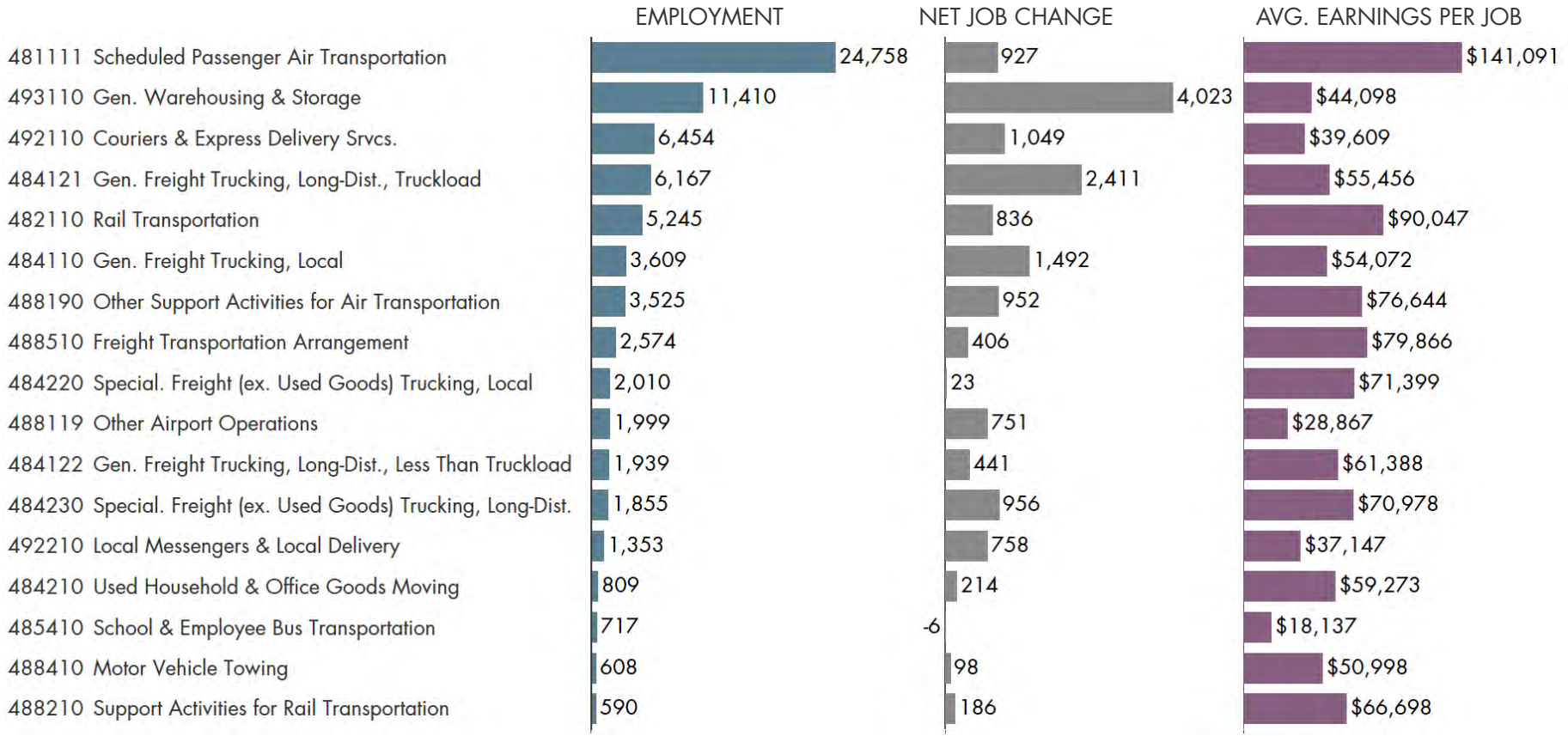


Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.
Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies

INDUSTRY DETAIL: TRANSPORTATION & WAREHOUSING

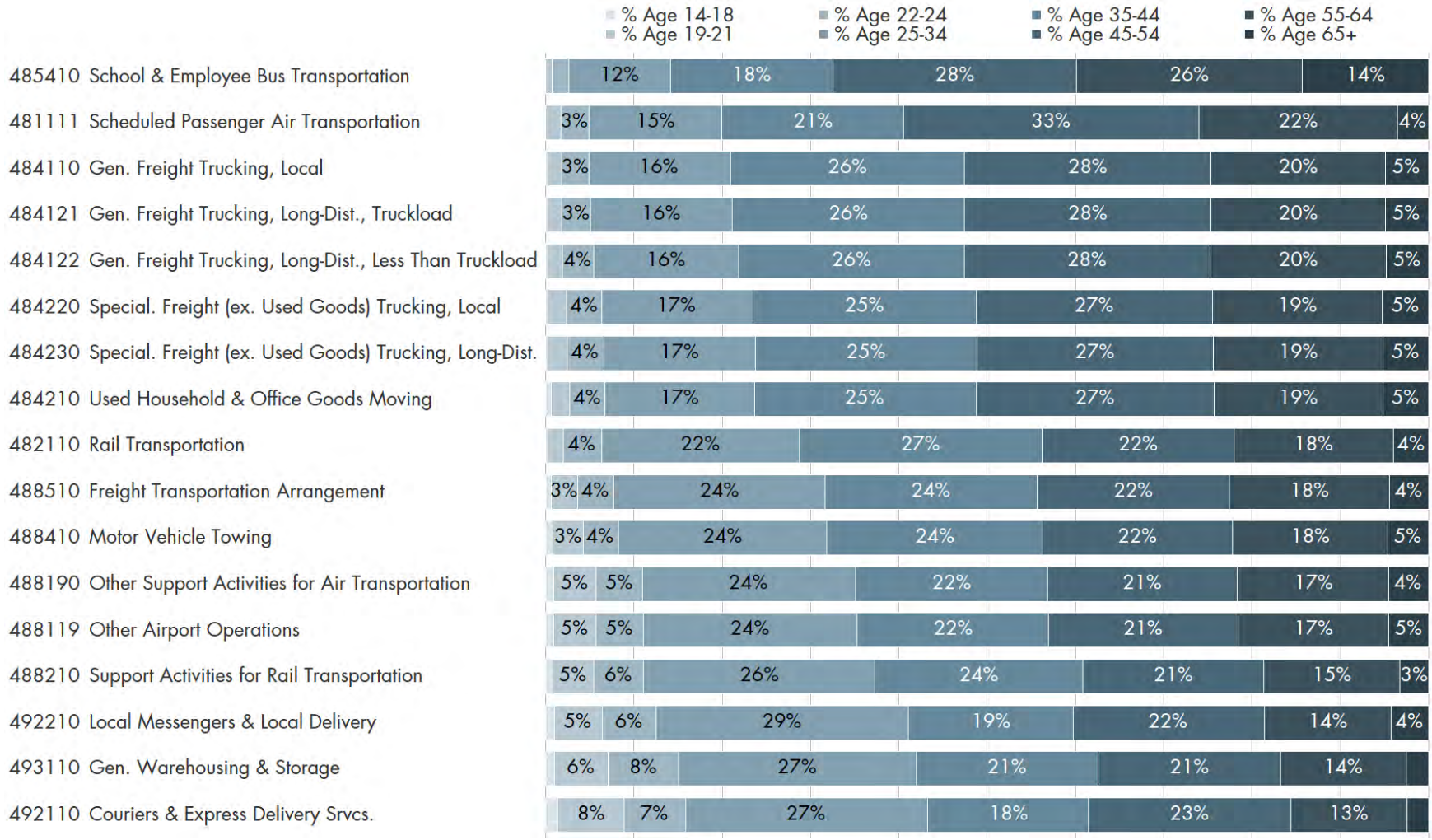
Scheduled passenger air transportation is the largest source of employment in the Fort Worth MD's transportation & warehousing sector (accounting for 30 percent of the sector's 80,000 total jobs), but it only represented 6 percent of job growth in the sector from 2010 to 2016. Three other subsectors—general warehousing & storage, long-distance general freight trucking, and local general freight trucking—gained a total of 8,000 new jobs, representing more than 50 percent of total job growth in the sector.

FIGURE 127. ESTABLISHED SECTOR: TRANSPORTATION & WAREHOUSING, FORT WORTH (MD)
SNAPSHOT OF 2016 EMPLOYMENT, 2010-2016 JOB GROWTH, & 2016 AVERAGE EARNINGS



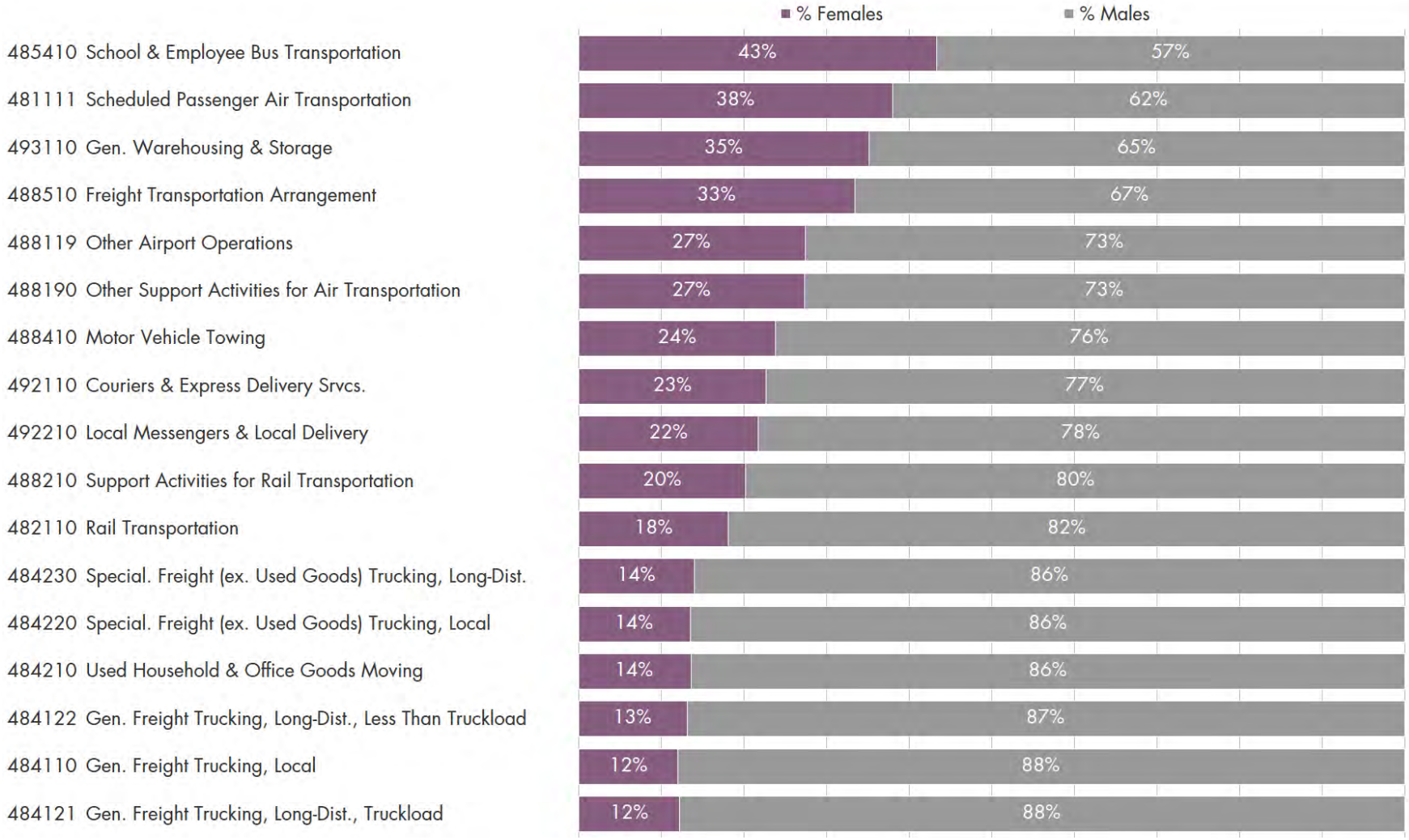
Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.

FIGURE 128. ESTABLISHED SECTOR: TRANSPORTATION & WAREHOUSING, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY AGE COHORT



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016. Labels for values below 4% were omitted for visual clarity.

FIGURE 129. ESTABLISHED SECTOR: TRANSPORTATION & WAREHOUSING, FORT WORTH (MD)
COMPOSITION OF 2016 EMPLOYMENT BY GENDER



Sources: US Bureau of Labor Statistics, Emsi, TIP Strategies.
Note: Data shown include only those 6-digit NAICS industries within the target sector that had employment levels in the Fort Worth MD of 500 or more in 2016.

STAFFING PATTERNS

One aspect that is frequently overlooked is the alignment of target sectors with the available workforce. Using national staffing patterns, we identified key occupations for each sector based on shares of total employment. The following tables provide a snap shot of each occupation, including the share it represents of employment in the sector and the number of awards conferred for credit in related fields of study by regional institutions in 2015.

FIGURE 130. LEADING OCCUPATIONS: HEALTHCARE, FORT WORTH (MD)

SOC Code	Description	Share of Industry Employment	Jobs	LQ (US= 1.00)	Median Hourly Earnings	Relative to US (US=1.00)
29-1141	Registered Nurses	14.9%	18,263	0.93	$34.98	1.08
31-1014	Nursing Assistants	7.8%	8,509	0.84	$11.54	0.93
39-9021	Personal Care Aides	4.3%	12,122	0.92	$9.14	0.91
31-1011	Home Health Aides	4.1%	4,208	0.63	$9.72	0.92
29-2061	Licensed Practical/Vocational Nurses	3.6%	4,968	0.98	$22.75	1.10
31-9092	Medical Assistants	3.5%	4,626	1.08	$14.67	0.99
43-6013	Medical Secretaries	3.1%	7,395	1.93	$15.58	0.98
43-4171	Receptionists & Information Clerks	2.7%	5,439	0.75	$12.15	0.92
43-9061	Office Clerks, General	1.9%	27,179	1.19	$15.20	1.07
31-9091	Dental Assistants	1.9%	2,035	0.88	$17.38	0.98
29-1069	Physicians & Surgeons, All Other	1.8%	2,096	0.85	$100.16	1.13 ●
11-9111	Medical & Health Services Managers	1.6%	1,710	0.74	$43.10	0.96
37-2012	Maids & Housekeepers	1.5%	8,373	0.81	$9.46	0.96
43-6014	Secretaries/Admin. Asst., Exc. Legal, Med., & Exec	1.3%	14,441	0.77	$14.29	0.88
43-3021	Billing & Posting Clerks	1.2%	3,586	1.00	$16.56	0.98
29-1123	Physical Therapists	1.2%	1,282	0.82	$40.05	1.00
29-2021	Dental Hygienists	1.2%	1,226	0.86	$36.79	1.05
43-1011	First-Line Supvsr., Office & Admin. Support	1.2%	10,081	0.98	$25.86	1.02
29-2034	Radiologic Technologists	1.2%	1,197	0.86	$29.85	1.09
29-2041	Emergency Medical Techs. & Paramedics	1.0%	2,248	1.36	$16.87	1.10
29-2011	Medical & Clinical Laboratory Technologists	0.9%	1,170	1.01	$28.44	0.98
29-2071	Medical Records & Health Info. Technicians	0.9%	1,245	0.90	$18.21	1.02
29-2012	Medical & Clinical Laboratory Technicians	0.8%	1,033	0.92	$17.09	0.91
35-3041	Food Servers, Nonrestaurant	0.8%	1,101	0.61	$8.81	0.90
29-1171	Nurse Practitioners	0.8%	1,000	1.00	$49.72	1.05

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FIGURE 130. LEADING OCCUPATIONS: HEALTHCARE, FORT WORTH (MD) (CONTINUED)

SOC Code	Description	Jobs	Proj. Annual Openings (thru 2021)	Completions, 2015		Median Hourly Wage
				Fort Worth MD	Dallas-Fort Worth MSA	
29-1141	Registered Nurses	18,263	1,072	3,563	5,258	$34.98
31-1014	Nursing Assistants	8,509	513	1	214	$11.54
39-9021	Personal Care Aides	12,122	595	0	21	$9.14
31-1011	Home Health Aides	4,208	384	1	71	$9.72
29-2061	Licensed Practical/Vocational Nurses	4,968	309	38	171	$22.75
31-9092	Medical Assistants	4,626	282	911	2,936	$14.67
43-6013	Medical Secretaries	7,395	291	88	455	$15.58
43-4171	Receptionists & Information Clerks	5,439	312	0	39	$12.15
43-9061	Office Clerks, General	27,179	1,015	0	2	$15.20
31-9091	Dental Assistants	2,035	135	205	644	$17.38
29-1069	Physicians & Surgeons, All Other	2,096	124	223	535	$100.16
11-9111	Medical & Health Services Managers	1,710	110	351	593	$43.10
37-2012	Maids & Housekeepers	8,373	318	0	0	$9.46
43-6014	Secretaries/Admin. Asst., Exc. Legal, Med., & Exec	14,441	447	15	63	$14.29
43-3021	Billing & Posting Clerks	3,586	179	113	127	$16.56
29-1123	Physical Therapists	1,282	116	41	269	$40.05
29-2021	Dental Hygienists	1,226	71	22	219	$36.79
43-1011	First-Line Supvsr., Office & Admin. Support	10,081	349	0	30	$25.86
29-2034	Radiologic Technologists	1,197	58	86	305	$29.85
29-2041	Emergency Medical Techs. & Paramedics	2,248	149	168	449	$16.87
29-2011	Medical & Clinical Laboratory Technologists	1,170	62	8	90	$28.44
29-2071	Medical Records & Health Info. Technicians	1,245	71	209	481	$18.21
29-2012	Medical & Clinical Laboratory Technicians	1,033	58	1	87	$17.09
35-3041	Food Servers, Nonrestaurant	1,101	71	0	0	$8.81
29-1171	Nurse Practitioners	1,000	75	226	450	$49.72

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Notes: Median wages that exceed the regional median of $20.02 per hour are highlighted. LQs above 1.25 are highlighted. Markers indicate occupations where median wage rates exceed (●) or lag (×) the nation by 10 percent or more.

FIGURE 131. LEADING OCCUPATIONS: TRANSPORTATION & WAREHOUSING, FORT WORTH (MD)

SOC Code	Description	Share of Industry Employmen	Jobs	LQ (US= 1.00)	Median Hourly Earnings	Relative to US (US=1.00)	
53-3032	Heavy & Tractor-Trailer Truck Drivers	21.9%	18,692	1.42	$18.12	0.94	
53-7062	Laborers/Freight, Stock, & Material Movers, Hand	12.8%	21,104	1.18	$11.50	0.95	
53-3033	Light Truck or Delivery Services Drivers	5.4%	7,071	1.15	$15.25	1.06	
53-3022	Bus Drivers, School or Special Client	3.6%	2,550	0.74	$11.33	0.80	×
53-3041	Taxi Drivers & Chauffeurs	3.5%	1,334	0.65	$11.40	1.04	
53-7051	Industrial Truck & Tractor Operators	3.0%	4,813	1.24	$14.21	0.92	
53-2031	Flight Attendants	2.1%	4,147	5.33	$26.86	1.25	●
43-4181	Reservation & Transp. Ticket Agents & Travel Clerks	1.9%	5,292	5.20	$21.47	1.27	●
43-5032	Dispatchers, Except Police, Fire, & Ambulance	1.8%	2,081	1.45	$18.27	1.02	
43-9061	Office Clerks, General	1.6%	27,179	1.19	$15.20	1.07	
53-1031	First-Line Supvsr., Transp. & Material-Moving Ops.	1.5%	2,094	1.44	$25.53	0.95	
53-2011	Airline Pilots, Copilots, & Flight Engineers	1.5%	2,365	3.92	$69.36	1.23	●
43-5081	Stock Clerks & Order Fillers	1.5%	14,694	1.09	$11.37	1.02	
53-7064	Packers & Packagers, Hand	1.5%	4,716	0.93	$9.56	0.94	
49-3031	Bus/Truck Mechanics & Diesel Engine Specialists	1.5%	2,339	1.26	$20.57	0.98	
43-4051	Customer Service Representatives	1.5%	18,933	1.03	$14.95	0.98	
49-3011	Aircraft Mechanics & Service Technicians	1.4%	4,347	4.82	$27.20	0.97	
43-5011	Cargo & Freight Agents	1.4%	4,311	7.50	$21.81	1.08	
53-3021	Bus Drivers, Transit & Intercity	1.4%	615	0.51	$14.36	0.78	×
43-5071	Shipping, Receiving, & Traffic Clerks	1.3%	6,638	1.40	$13.81	0.94	
11-1021	General & Operations Managers	1.3%	15,293	1.00	$50.42	1.08	
53-1021	First-Line Supvsr., Helpers & Material Movers, Hand	1.1%	1,641	1.30	$22.89	1.01	
43-1011	First-Line Supvsr., Office & Admin. Support	1.0%	10,081	0.98	$25.86	1.02	
41-3099	Sales Reps., Services, All Other	0.9%	8,541	1.27	$23.46	0.95	
53-4031	Railroad Conductors & Yardmasters	0.8%	948	2.76	$27.79	1.03	

continued, next page

FIGURE 131. LEADING OCCUPATIONS: TRANSPORTATION & WAREHOUSING, FORT WORTH (MD) (CONTINUED)

SOC Code	Description	Jobs	Proj. Annual Openings (thru 2021)	Completions, 2015		Median Hourly Wage
				Fort Worth MD	Dallas-Fort Worth MSA	
53-3032	Heavy & Tractor-Trailer Truck Drivers	18,692	935	0	69	$18.12
53-7062	Laborers/Freight, Stock, & Material Movers, Hand	21,104	1,036	0	0	$11.50
53-3033	Light Truck or Delivery Services Drivers	7,071	289	0	69	$15.25
53-3022	Bus Drivers, School or Special Client	2,550	82	0	69	$11.33
53-3041	Taxi Drivers & Chauffeurs	1,334	68	0	69	$11.40
53-7051	Industrial Truck & Tractor Operators	4,813	223	0	0	$14.21
53-2031	Flight Attendants	4,147	86	0	0	$26.86
43-4181	Reservation & Transp. Ticket Agents & Travel Clerks	5,292	69	0	18	$21.47
43-5032	Dispatchers, Except Police, Fire, & Ambulance	2,081	103	0	0	$18.27
43-9061	Office Clerks, General	27,179	1,015	0	2	$15.20
53-1031	First-Line Supvsr., Transp. & Material-Moving Ops.	2,094	115	31	60	$25.53
53-2011	Airline Pilots, Copilots, & Flight Engineers	2,365	66	0	1	$69.36
43-5081	Stock Clerks & Order Fillers	14,694	779	0	0	$11.37
53-7064	Packers & Packagers, Hand	4,716	195	0	0	$9.56
49-3031	Bus/Truck Mechanics & Diesel Engine Specialists	2,339	113	0	298	$20.57
43-4051	Customer Service Representatives	18,933	764	0	37	$14.95
49-3011	Aircraft Mechanics & Service Technicians	4,347	119	84	209	$27.20
43-5011	Cargo & Freight Agents	4,311	184	0	2	$21.81
53-3021	Bus Drivers, Transit & Intercity	615	16	0	69	$14.36
43-5071	Shipping, Receiving, & Traffic Clerks	6,638	209	0	2	$13.81
11-1021	General & Operations Managers	15,293	696	1,958	7,099	$50.42
53-1021	First-Line Supvsr., Helpers & Material Movers, Hand	1,641	94	16	45	$22.89
43-1011	First-Line Supvsr., Office & Admin. Support	10,081	349	0	30	$25.86
41-3099	Sales Reps., Services, All Other	8,541	261	18	86	$23.46
53-4031	Railroad Conductors & Yardmasters	948	57	0	69	$27.79

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Notes: Median wages that exceed the regional median of $20.02 per hour are highlighted. LQs above 1.25 are highlighted. Markers indicate occupations where median wage rates exceed (●) or lag (×) the nation by 10 percent or more.

FIGURE 132. LEADING OCCUPATIONS: MANUFACTURING, FORT WORTH (MD)

SOC Code	Description	Share of Industry Employmen	Jobs	LQ (US= 1.00)	Median Hourly Earnings	Relative to US (US=1.00)
51-2092	Team Assemblers	6.9%	8,324	1.07	$15.93	1.14
51-1011	First-Line Supvsr., Production & Operating Workers	3.5%	4,603	1.09	$27.86	1.04
51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	2.6%	4,683	1.31	$18.92	1.08
51-4041	Machinists	2.6%	3,354	1.22	$18.32	0.94
53-7062	Laborers/Freight, Stock, & Material Movers, Hand	2.3%	21,104	1.18	$11.50	0.95
51-9198	Helpers–Production Workers	2.0%	6,613	2.21	$10.01	0.87
51-9111	Packaging & Filling Machine Workers	2.0%	2,263	0.85	$12.02	0.92
51-4121	Welders, Cutters, Solderers, & Brazers	1.9%	3,895	1.41	$17.53	0.96
41-4012	Sales Reps., Whls. & Mfg., Exc. Tech. & Scientific	1.9%	11,541	1.13	$26.32	0.99
11-1021	General & Operations Managers	1.8%	15,293	1.00	$50.42	1.08
49-9071	Maintenance & Repair Workers, General	1.5%	9,931	0.99	$16.47	0.94
43-5071	Shipping, Receiving, & Traffic Clerks	1.5%	6,638	1.40	$13.81	0.94
49-9041	Industrial Machinery Mechanics	1.5%	2,026	0.88	$23.08	0.97
17-2112	Industrial Engineers	1.4%	1,470	0.86	$40.89	1.02
51-2022	Electrical & Electronic Equip. Assemblers	1.4%	2,271	1.57	$13.19	0.89
53-7064	Packers & Packagers, Hand	1.3%	4,716	0.93	$9.56	0.94
53-7051	Industrial Truck & Tractor Operators	1.3%	4,813	1.24	$14.21	0.92
51-4031	Cutting, Punching, & Press Machine, Metal/Plastic	1.3%	1,709	1.31	$13.31	0.88
43-9061	Office Clerks, General	1.2%	27,179	1.19	$15.20	1.07
43-4051	Customer Service Representatives	1.2%	18,933	1.03	$14.95	0.98
51-4011	CNC Machine Operators, Metal/Plastic	1.1%	1,266	1.26	$19.27	1.08
11-3051	Industrial Production Managers	1.1%	1,211	1.01	$44.62	1.00
17-2141	Mechanical Engineers	1.1%	1,481	0.76	$39.74	0.99
53-3032	Heavy & Tractor-Trailer Truck Drivers	1.1%	18,692	1.42	$18.12	0.94
51-5112	Printing Press Operators	1.0%	1,592	1.31	$17.17	1.02

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FIGURE 132. LEADING OCCUPATIONS: MANUFACTURING, FORT WORTH (MD) (CONTINUED)

SOC Code	Description	Jobs	Proj. Annual Openings (thru 2021)	Completions, 2015		Median Hourly Wage
				Fort Worth MD	Dallas-Fort Worth MSA	
51-2092	Team Assemblers	8,324	331	0	0	$15.93
51-1011	First-Line Supvsr., Production & Operating Workers	4,603	109	16	45	$27.86
51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	4,683	142	0	0	$18.92
51-4041	Machinists	3,354	131	0	0	$18.32
53-7062	Laborers/Freight, Stock, & Material Movers, Hand	21,104	1,036	0	0	$11.50
51-9198	Helpers–Production Workers	6,613	232	0	0	$10.01
51-9111	Packaging & Filling Machine Workers	2,263	101	0	0	$12.02
51-4121	Welders, Cutters, Solderers, & Brazers	3,895	163	55	396	$17.53
41-4012	Sales Reps., Whls. & Mfg., Exc. Tech. & Scientific	11,541	441	61	441	$26.32
11-1021	General & Operations Managers	15,293	696	1,958	7,099	$50.42
49-9071	Maintenance & Repair Workers, General	9,931	439	0	0	$16.47
43-5071	Shipping, Receiving, & Traffic Clerks	6,638	209	0	2	$13.81
49-9041	Industrial Machinery Mechanics	2,026	122	0	0	$23.08
17-2112	Industrial Engineers	1,470	55	112	121	$40.89
51-2022	Electrical & Electronic Equip. Assemblers	2,271	34	0	0	$13.19
53-7064	Packers & Packagers, Hand	4,716	195	0	0	$9.56
53-7051	Industrial Truck & Tractor Operators	4,813	223	0	0	$14.21
51-4031	Cutting, Punching, & Press Machine, Metal/Plastic	1,709	25	0	0	$13.31
43-9061	Office Clerks, General	27,179	1,015	0	2	$15.20
43-4051	Customer Service Representatives	18,933	764	0	37	$14.95
51-4011	CNC Machine Operators, Metal/Plastic	1,266	55	0	103	$19.27
11-3051	Industrial Production Managers	1,211	43	1,863	6,591	$44.62
17-2141	Mechanical Engineers	1,481	61	195	507	$39.74
53-3032	Heavy & Tractor-Trailer Truck Drivers	18,692	935	0	69	$18.12
51-5112	Printing Press Operators	1,592	24	0	0	$17.17

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Notes: Median wages that exceed the regional median of $20.02 per hour are highlighted. LQs above 1.25 are highlighted. Markers indicate occupations where median wage rates exceed (●) or lag (×) the nation by 10 percent or more.

FIGURE 133. LEADING OCCUPATIONS: HOSPITALITY & TOURISM, FORT WORTH (MD)

SOC Code	Description	Share of Industry Employment	Jobs	LQ (US= 1.00)	Median Hourly Earnings	Relative to US (US=1.00)
37-2012	Maids & Housekeepers	14.3%	8,373	0.81	$9.46	0.96
43-4081	Hotel, Motel, & Resort Desk Clerks	7.4%	1,119	0.66	$9.91	0.98
35-3031	Waiters & Waitresses	5.5%	18,049	1.01	$8.90	0.96
49-9071	Maintenance & Repair Workers, General	3.3%	9,931	0.99	$16.47	0.94
39-3091	Amusement & Recreation Attendants	3.2%	2,442	1.20	$9.12	0.98
35-2014	Cooks, Restaurant	2.6%	8,953	1.07	$10.89	0.98
41-3041	Travel Agents	2.4%	438	0.77	$18.14	1.10
37-2011	Janitors & Cleaners, Exc. Maids & Housekeepers	2.1%	14,875	0.84	$9.97	0.88
39-3011	Gaming Dealers	2.0%	74	0.11	$20.30	2.16 ●
35-9011	Attendants & Bartender Helpers	1.9%	3,083	1.04	$8.91	0.96
37-3011	Landscaping & Groundskeeping Workers	1.9%	10,062	1.14	$11.29	0.97
41-2011	Cashiers	1.8%	24,721	1.01	$9.17	0.99
33-9032	Security Guards	1.7%	7,298	0.89	$10.48	0.88
35-3011	Bartenders	1.7%	3,317	0.79	$8.91	0.95
11-1021	General & Operations Managers	1.4%	15,293	1.00	$50.42	1.08
11-9081	Lodging Managers	1.3%	288	0.90	$21.47	0.95
43-4051	Customer Service Representatives	1.2%	18,933	1.03	$14.95	0.98
35-9021	Dishwashers	1.2%	3,428	0.96	$9.43	1.01
43-1011	First-Line Supvsr., Office & Admin. Support	1.2%	10,081	0.98	$25.86	1.02
41-3099	Sales Reps., Services, All Other	1.2%	8,541	1.27	$23.46	0.95
43-4181	Reservation & Transp. Ticket Agents & Travel Clerks	1.2%	5,292	5.20	$21.47	1.27 ●
41-2031	Retail Salespersons	1.1%	35,716	1.09	$10.36	0.98
37-1011	First-Line Supvsr., Housekeeping & Janitorial	1.1%	1,194	0.81	$15.16	0.90
35-3041	Food Servers, Nonrestaurant	1.1%	1,101	0.61	$8.81	0.90
43-3031	Bookkeeping, Accounting, & Auditing Clerks	1.1%	10,763	0.89	$17.77	0.99

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FIGURE 133. LEADING OCCUPATIONS: HOSPITALITY & TOURISM, FORT WORTH (MD) (CONTINUED)

SOC Code	Description	Jobs	Proj. Annual Openings (thru 2021)	Completions, 2015		Median Hourly Wage
				Fort Worth MD	Dallas-Fort Worth MSA	
37-2012	Maids & Housekeepers	8,373	318	0	0	$9.46
43-4081	Hotel, Motel, & Resort Desk Clerks	1,119	63	0	0	$9.91
35-3031	Waiters & Waitresses	18,049	1,154	0	0	$8.90
49-9071	Maintenance & Repair Workers, General	9,931	439	0	0	$16.47
39-3091	Amusement & Recreation Attendants	2,442	161	0	0	$9.12
35-2014	Cooks, Restaurant	8,953	471	93	600	$10.89
41-3041	Travel Agents	438	12	0	18	$18.14
37-2011	Janitors & Cleaners, Exc. Maids & Housekeepers	14,875	572	0	0	$9.97
39-3011	Gaming Dealers	74	4	0	0	$20.30
35-9011	Attendants & Bartender Helpers	3,083	212	0	0	$8.91
37-3011	Landscaping & Groundskeeping Workers	10,062	401	0	0	$11.29
41-2011	Cashiers	24,721	1,585	0	0	$9.17
33-9032	Security Guards	7,298	333	21	46	$10.48
35-3011	Bartenders	3,317	189	0	0	$8.91
11-1021	General & Operations Managers	15,293	696	1,958	7,099	$50.42
11-9081	Lodging Managers	288	7	34	284	$21.47
43-4051	Customer Service Representatives	18,933	764	0	37	$14.95
35-9021	Dishwashers	3,428	181	0	0	$9.43
43-1011	First-Line Supvsr., Office & Admin. Support	10,081	349	0	30	$25.86
41-3099	Sales Reps., Services, All Other	8,541	261	18	86	$23.46
43-4181	Reservation & Transp. Ticket Agents & Travel Clerks	5,292	69	0	18	$21.47
41-2031	Retail Salespersons	35,716	1,938	0	0	$10.36
37-1011	First-Line Supvsr., Housekeeping & Janitorial	1,194	38	1,707	5,984	$15.16
35-3041	Food Servers, Nonrestaurant	1,101	71	0	0	$8.81
43-3031	Bookkeeping, Accounting, & Auditing Clerks	10,763	175	113	127	$17.77

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Notes: Median wages that exceed the regional median of $20.02 per hour are highlighted. LQs above 1.25 are highlighted. Markers indicate occupations where median wage rates exceed (●) or lag (×) the nation by 10 percent or more.

FIGURE 134. LEADING OCCUPATIONS: OIL & GAS, FORT WORTH (MD)

SOC Code	Description	Share of Industry Employmen	Jobs	LQ (US= 1.00)	Median Hourly Earnings	Relative to US (US=1.00	
53-3032	Heavy & Tractor-Trailer Truck Drivers	7.2%	18,692	1.42	$18.12	0.94	
47-5071	Roustabouts, Oil & Gas	6.7%	1,533	4.20	$16.64	0.95	
47-5013	Service Unit Operators, Oil, Gas, & Mining	6.3%	1,203	3.96	$24.04	1.11	●
47-1011	First-Line Supvsr., Constr. Trades & Extraction	3.4%	5,856	1.36	$28.71	1.04	
17-2171	Petroleum Engineers	3.2%	485	2.13	$66.09	1.06	
11-1021	General & Operations Managers	3.0%	15,293	1.00	$50.42	1.08	
47-5012	Rotary Drill Operators, Oil & Gas	2.7%	352	2.86	$28.94	1.11	●
51-8093	Petroleum Refinery Operators & Gaugers	2.7%	310	1.10	$20.11	0.64	×
43-9061	Office Clerks, General	2.6%	27,179	1.19	$15.20	1.07	
13-2011	Accountants & Auditors	2.2%	8,759	0.91	$32.41	1.02	
47-5011	Derrick Operators, Oil & Gas	2.2%	399	4.27	$22.48	0.98	
49-9041	Industrial Machinery Mechanics	2.1%	2,026	0.88	$23.08	0.97	
41-4012	Sales Reps., Whls. & Mfg., Exc. Tech. & Scientific	1.9%	11,541	1.13	$26.32	0.99	
43-6014	Secretaries/Admin. Asst., Exc. Legal, Med., & Exec.	1.8%	14,441	0.77	$14.29	0.88	
43-3031	Bookkeeping, Accounting, & Auditing Clerks	1.8%	10,763	0.89	$17.77	0.99	
53-7073	Wellhead Pumpers	1.8%	257	3.30	$26.50	1.16	●
47-5081	Helpers–Extraction Workers	1.7%	240	1.88	$17.99	1.03	
53-7072	Pump Operators, Except Wellhead Pumpers	1.3%	220	2.53	$18.62	0.90	
53-7062	Laborers/Freight, Stock, & Material Movers, Hand	1.2%	21,104	1.18	$11.50	0.95	
19-2042	Geoscientists, Except Hydrologists & Geographers	1.2%	330	1.44	$29.02	0.67	×
19-4041	Geological & Petroleum Technicians	1.2%	198	1.89	$30.86	1.15	●
13-1199	Business Operations Specialists, All Other	1.2%	5,259	0.78	$35.85	1.09	
51-8092	Gas Plant Operators	1.1%	52	0.47	$27.70	0.87	
47-2073	Operating Eng. & Other Constr. Equip. Operators	1.1%	2,417	0.94	$17.29	0.81	
49-9071	Maintenance & Repair Workers, General	1.1%	9,931	0.99	$16.47	0.94	

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FIGURE 134. LEADING OCCUPATIONS: OIL & GAS, FORT WORTH (MD) (CONTINUED)

SOC Code	Description	Jobs	Proj. Annual Openings (thru 2021)	Completions, 2015		Median Hourly Wage
				Fort Worth MD	Dallas-Fort Worth MSA	
51-8093	Petroleum Refinery Operators & Gaugers	310	17	16	45	$20.11
51-8092	Gas Plant Operators	52	3	16	45	$27.70
49-9041	Industrial Machinery Mechanics	2,026	122	0	0	$23.08
17-2171	Petroleum Engineers	485	22	0	0	$66.09
53-7071	Gas Compressor/Pumping Station Operators	22	Insf. Data	0	0	$27.94
53-3032	Heavy & Tractor-Trailer Truck Drivers	18,692	935	0	69	$18.12
51-1011	First-Line Supvsr., Production & Operating Workers	4,603	109	16	45	$27.86
47-2152	Plumbers, Pipefitters, & Steamfitters	3,083	111	0	0	$21.98
49-9012	Control/Valve Install. & Repair, Except Mech.Door	501	27	0	0	$19.46
11-1021	General & Operations Managers	15,293	696	1,958	7,099	$50.42
13-2011	Accountants & Auditors	8,759	388	400	2,405	$32.41
51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	4,683	142	0	0	$18.92
53-7072	Pump Operators, Except Wellhead Pumpers	220	18	0	0	$18.62
13-1199	Business Operations Specialists, All Other	5,259	131	18	86	$35.85
43-6014	Secretaries/Admin. Asst., Exc. Legal, Med., & Exec	14,441	447	15	63	$14.29
17-2112	Industrial Engineers	1,470	55	112	121	$40.89
17-3023	Electrical & Electronics Eng. Technicians	664	21	117	431	$29.02
43-9061	Office Clerks, General	27,179	1,015	0	2	$15.20
19-2041	Environmental Scientists & Specialists, Incl. Health	276	14	55	82	$41.64
43-4051	Customer Service Representatives	18,933	764	0	37	$14.95
49-9071	Maintenance & Repair Workers, General	9,931	439	0	0	$16.47
49-1011	First-Line Supvsr., Mechanics, Install, & Repair	3,811	153	16	45	$31.49
17-2141	Mechanical Engineers	1,481	61	195	507	$39.74
17-2051	Civil Engineers	1,294	48	132	157	$40.86
15-1142	Network & Computer Systems Admin.	2,078	55	535	1,458	$37.93

Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.
Notes: Median wages that exceed the regional median of $20.02 per hour are highlighted. LQs above 1.25 are highlighted. Markers indicate occupations where median wage rates exceed (●) or lag (×) the nation by 10 percent or more.

LEADING METRO AREAS

For each of the five established industries, four factors were used to rank the five leading MSAs: 1) total employment; 2) numerical job growth from 2010-2016; 3) percentage growth in jobs from 2010-2016; and 4) LQ (location quotient). Only metro areas with at least 5,000 jobs in each sector as of 2016 are included in this analysis, with the exception of oil & gas, where the threshold was lowered to 1,000 jobs.

The Dallas-Fort Worth metro area is not among the five largest healthcare markets in the US, despite being the fourth largest metro area ranked by total employment and population. With an LQ of 0.89, the metro lags the US economy in healthcare jobs. However, the metro area's 24 percent growth rate of healthcare employment from 2010 to 2016 was the highest among large metros (tied with Atlanta), a strong sign of the region's growth potential in this industry. Fort Worth, with its high concentration of medical institutions in the Near Southside, can (and should) play a leading role in further growing the region's healthcare sector.

FIGURE 135. LEADING METROPOLITAN STATISTICAL AREAS: HEALTHCARE
RANKED BY SELECTED FACTORS

		JOBS		CHANGE 2010 - 2016		2016 LOCATION QUOTIENT (US=1.00)	AVG. EARNINGS PER JOB
		2010	2016	#	%		
	LARGEST (EMPLOYMENT IN 2016)						
1	New York-Newark-Jersey City, NY-NJ-PA	1,084,329	1,211,328	+126,999	+12%	1.15	$73,043
2	Los Angeles-Long Beach-Anaheim, CA	535,403	604,998	+69,595	+13%	0.86	$74,569
3	Chicago-Naperville-Elgin, IL-IN-WI	446,281	483,672	+37,391	+8%	0.95	$67,916
4	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	363,712	397,698	+33,986	+9%	1.26	$70,249
5	Boston-Cambridge-Newton, MA-NH	320,067	357,581	+37,514	+12%	1.18	$78,680
	CHANGE 2010-2016 (#)						
1	New York-Newark-Jersey City, NY-NJ-PA	1,084,329	1,211,328	+126,999	+12%	1.15	$73,043
2	Los Angeles-Long Beach-Anaheim, CA	535,403	604,998	+69,595	+13%	0.86	$74,569
3	Dallas-Fort Worth-Arlington, TX	279,977	347,641	+67,664	+24%	0.89	$70,580
4	Houston-The Woodlands-Sugar Land, TX	255,514	301,491	+45,977	+18%	0.89	$70,664
5	Atlanta-Sandy Springs-Roswell, GA	185,420	229,742	+44,322	+24%	0.79	$69,013
	CHANGE 2010-2016 (%)*						
1	Cookeville, TN	3,791	5,126	+1,335	+35%	1.04	$62,050
2	State College, PA	5,938	7,657	+1,719	+29%	0.87	$68,139
3	Gainesville, GA	8,845	11,380	+2,535	+29%	1.20	$67,276
4	Bend-Redmond, OR	7,955	10,209	+2,254	+28%	1.12	$73,034
5	Colorado Springs, CO	24,569	31,314	+6,745	+27%	0.86	$60,126
	CONCENTRATION (LQ)*						
1	Rochester, MN	37,389	41,319	+3,930	+11%	3.15	$92,072
2	Portsmouth, OH	6,098	7,160	+1,062	+17%	2.54	$49,683
3	Bloomsburg-Berwick, PA	9,072	10,871	+1,799	+20%	2.37	$87,055
4	Pinehurst-Southern Pines, NC	6,631	7,770	+1,139	+17%	1.93	$67,615
5	Wisconsin Rapids-Marshfield, WI	12,426	8,162	-4,264	-34%	1.86	$68,747

*Includes metro areas with at least 5,000 jobs in the sector in 2016.
Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

The Dallas-Fort Worth metro area leads the nation in transportation & warehousing employment growth, adding more than 43,000 jobs from 2010-2016. Historically, large coastal cities dominated the transportation & distribution industry. That dynamic is changing as inland transport hubs continue to grow. Among the top five metros ranked by numerical job change in transportation & warehousing from 2010-2016, the two inland locations—Dallas-Fort Worth and Riverside—experienced growth rates that far outpaced the three coastal metros. When ranked by percentage, the top five metros were all inland locations.

Most importantly, transportation & warehousing is highly concentrated in Fort Worth. The city has a much higher concentration of jobs in the industry compared to the rest of the metro area. The city benefits from major assets (Alliance, DFW International Airport, Meacham, and Spinks Airports) and from large employers (American Airlines, BNSF). Fort Worth is well-positioned to attract additional investment and innovation from transportation firms.

FIGURE 136. LEADING METROPOLITAN STATISTICAL AREAS: TRANSPORTATION & WAREHOUSING
RANKED BY SELECTED FACTORS

		JOBS		CHANGE 2010 - 2016		2016 LOCATION QUOTIENT (US=1.00)	AVG. EARNINGS PER JOB
		2010	2016	#	%		
	LARGEST (EMPLOYMENT IN 2016)						
1	New York-Newark-Jersey City, NY-NJ-PA	323,016	365,376	+42,360	+13%	1.07	$63,608
2	Chicago-Naperville-Elgin, IL-IN-WI	184,615	223,347	+38,732	+21%	1.36	$66,101
3	Los Angeles-Long Beach-Anaheim, CA	176,240	209,933	+33,693	+19%	0.92	$66,717
4	Dallas-Fort Worth-Arlington, TX	135,946	179,509	+43,563	+32%	1.42	$69,750
5	Atlanta-Sandy Springs-Roswell, GA	116,627	140,857	+24,230	+21%	1.50	$78,378
	CHANGE 2010-2016 (#)						
1	Dallas-Fort Worth-Arlington, TX	135,946	179,509	+43,563	+32%	1.42	$69,750
2	New York-Newark-Jersey City, NY-NJ-PA	323,016	365,376	+42,360	+13%	1.07	$63,608
3	Chicago-Naperville-Elgin, IL-IN-WI	184,615	223,347	+38,732	+21%	1.36	$66,101
4	Riverside-San Bernardino-Ontario, CA	66,644	105,196	+38,552	+58%	1.93	$51,634
5	Los Angeles-Long Beach-Anaheim, CA	176,240	209,933	+33,693	+19%	0.92	$66,717
	CHANGE 2010-2016 (%)*						
1	Trenton, NJ	4,793	9,715	+4,922	+103%	1.09	$48,469
2	Spartanburg, SC	4,578	8,248	+3,670	+80%	1.59	$50,662
3	Hagerstown-Martinsburg, MD-WV	4,221	7,507	+3,286	+78%	2.03	$42,931
4	Columbia, SC	7,019	12,356	+5,337	+76%	0.87	$44,778
5	Allentown-Bethlehem-Easton, PA-NJ	14,479	24,322	+9,843	+68%	1.87	$54,739
	CONCENTRATION (LQ)*						
1	Laredo, TX	12,143	16,003	+3,860	+32%	4.25	$45,664
2	Houma-Thibodaux, LA	10,515	10,874	+359	+3%	3.30	$94,427
3	Chambersburg-Waynesboro, PA	4,926	6,604	+1,678	+34%	2.98	$51,480
4	Pottsville, PA	5,210	5,499	+289	+6%	2.96	$47,248
5	Memphis, TN-MS-AR	62,733	68,369	+5,636	+9%	2.95	$70,730

*Includes metro areas with at least 5,000 jobs in the sector in 2016.
Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

Dallas-Fort Worth ranks fourth in the US in total manufacturing employment, but only ranks 15th in the country in manufacturing employment growth. However, the metro area statistics mask significant dynamics in the Fort Worth manufacturing sector. The Fort Worth MD has a 50 percent higher concentration of manufacturing jobs than the Dallas MD. And the Fort Worth portion of the metro area has experienced significant job growth in manufacturing since 2010, while the Dallas MD lost manufacturing jobs.

FIGURE 137. LEADING METROPOLITAN STATISTICAL AREAS: MANUFACTURING
RANKED BY SELECTED FACTORS

		JOBS		CHANGE 2010 - 2016		2016 LOCATION QUOTIENT (US=1.00)	AVG. EARNINGS PER JOB
		2010	2016	#	%		
	LARGEST (EMPLOYMENT IN 2016)						
1	Los Angeles-Long Beach-Anaheim, CA	539,365	527,095	-12,270	-2%	0.99	$84,154
2	New York-Newark-Jersey City, NY-NJ-PA	393,831	373,218	-20,613	-5%	0.47	$91,546
3	Chicago-Naperville-Elgin, IL-IN-WI	406,283	415,273	+8,990	+2%	1.09	$89,956
4	Dallas-Fort Worth-Arlington, TX	255,735	267,264	+11,529	+5%	0.91	$93,072
5	Detroit-Warren-Dearborn, MI	190,244	242,432	+52,188	+27%	1.51	$90,126
	CHANGE 2010-2016 (#)						
1	Detroit-Warren-Dearborn, MI	190,244	242,432	+52,188	+27%	1.51	$90,126
2	Grand Rapids-Wyoming, MI	84,413	112,431	+28,018	+33%	2.43	$72,513
3	Minneapolis-St. Paul-Bloomington, MN-WI	178,975	199,859	+20,884	+12%	1.23	$87,733
4	Seattle-Tacoma-Bellevue, WA	168,050	188,581	+20,531	+12%	1.12	$105,933
5	Louisville/Jefferson County, KY-IN	61,480	81,005	+19,525	+32%	1.49	$77,877
	CHANGE 2010-2016 (%)*						
1	Kinston, NC	3,471	6,888	+3,417	98%	2.88	$50,992
2	Marshall, TX	3,453	5,741	+2,288	66%	2.72	$74,930
3	Elizabethtown-Fort Knox, KY	5,316	8,282	+2,966	56%	1.60	$70,471
4	LaGrange, GA	7,471	11,412	+3,941	53%	3.42	$69,401
5	Athens, TN	4,092	6,161	+2,069	51%	3.89	$71,250
	CONCENTRATION (LQ)*						
1	Kendallville, IN	7,393	9,257	+1,864	+25%	5.90	$55,178
2	Elkhart-Goshen, IN	44,544	62,557	+18,013	+40%	5.87	$62,238
3	Sidney, OH	10,088	12,340	+2,252	+22%	5.41	$74,815
4	St. Marys, PA	5,743	6,698	+955	+17%	5.32	$64,666
5	Auburn, IN	6,842	9,104	+2,262	+33%	4.98	$68,789

*Includes metro areas with at least 5,000 jobs in the sector in 2016.
Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

Las Vegas and Orlando stand out as the most successful major metro areas with economies driven largely by tourism. Las Vegas has a larger tourism sector in absolute size (ranked by total employment) than even New York and Los Angeles, with an LQ of 8.72, nearly nine times higher than the US average. Orlando's LQ of 5.46 also reflects a highly-concentrated tourism sector. Two metro areas that have seen major recent job growth in tourism, despite not historically being driven by the sector, are Austin and Grand Rapids, which respectively ranked second and third in the US in percentage growth of tourism jobs. Each of these communities has benefited substantially from the rise of internationally-recognized events: SXSW and F1 in Austin and ArtPrize in Grand Rapids. Not only does Fort Worth's Main Street Arts Festival rank among the largest artist events in the US, the city also boasts a multitude of tourism assets (arguably more than either Austin or Grand Rapids), such as the Stockyards, Cultural District, Sundance Square, and the Texas Motor Speedway. Yet these assets have not been fully capitalized on for economic development. More emphasis should be placed on the potential for tourism to drive economic growth in Fort Worth.

FIGURE 138. LEADING METROPOLITAN STATISTICAL AREAS: HOSPITALITY & TOURISM
RANKED BY SELECTED FACTORS

		JOBS		CHANGE 2010 - 2016		2016 LOCATION QUOTIENT (US=1.00)	AVG. EARNINGS PER JOB
		2010	2016	#	%		
	LARGEST (EMPLOYMENT IN 2016)						
1	Las Vegas-Henderson-Paradise, NV	175,795	181,995	+6,200	+4%	8.72	$46,666
2	New York-Newark-Jersey City, NY-NJ-PA	138,774	163,071	+24,297	+18%	0.79	$65,079
3	Los Angeles-Long Beach-Anaheim, CA	131,457	154,999	+23,542	+18%	1.12	$48,431
4	Orlando-Kissimmee-Sanford, FL	113,398	140,925	+27,527	+24%	5.46	$40,934
5	Chicago-Naperville-Elgin, IL-IN-WI	73,274	81,586	+8,312	+11%	0.82	$56,095
	CHANGE 2010-2016 (#)						
1	New York-Newark-Jersey City, NY-NJ-PA	138,774	163,071	+24,297	+18%	0.79	$65,079
2	Los Angeles-Long Beach-Anaheim, CA	131,457	154,999	+23,542	+18%	1.12	$48,431
3	Orlando-Kissimmee-Sanford, FL	113,398	140,925	+27,527	+24%	5.46	$40,934
4	Miami-Fort Lauderdale-West Palm Beach, FL	72,772	87,856	+15,084	+21%	1.54	$47,724
5	Houston-The Woodlands-Sugar Land, TX	35,394	45,356	+9,962	+28%	0.69	$46,630
	CHANGE 2010-2016 (%)*						
1	Napa, CA	3,739	5,688	+1,949	+52%	3.27	$42,466
2	Austin-Round Rock, TX	13,165	18,947	+5,782	+44%	0.88	$34,151
3	Grand Rapids-Wyoming, MI	5,130	7,318	+2,188	+43%	0.61	$30,083
4	Key West, FL	6,452	8,997	+2,545	+39%	9.20	$39,638
5	Lake Charles, LA	5,181	7,193	+2,012	+39%	3.09	$37,142
	CONCENTRATION (LQ)*						
1	Breckenridge, CO	4,471	5,199	+728	+16%	11.03	$34,654
2	Branson, MO	7,044	8,565	+1,521	+22%	10.75	$34,534
3	Jackson, WY-ID	5,037	5,720	+683	+14%	10.61	$37,461
4	Sevierville, TN	8,336	10,403	+2,067	+25%	10.21	$30,420
5	Summit Park, UT	4,541	5,584	+1,043	+23%	9.41	$41,078

*Includes metro areas with at least 5,000 jobs in the sector in 2016.
Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

The greater Houston area has solidified its status as the "energy capital" of the world in recent years, adding more than 11,000 oil & gas jobs from 2010 to 2016. The June 2017 announcement of XTO Energy's relocation of 1,600 jobs from Fort Worth to the new Exxon campus in The Woodlands is the latest indicator of Houston's continued dominance, even in a prolonged period of low oil prices. Nonetheless, the Dallas-Fort Worth metro area, and Fort Worth in particular, remains one of the nation's leading centers for the oil & gas industry. Fort Worth is the metro area's center of gravity for oil & gas employment. While the Fort Worth MD only accounts for about 30 percent of the metro area's total employment, it is home to the majority of oil & gas jobs in the metro area (56 percent in the Fort Worth MD compared with 44 percent in the Dallas MD).

FIGURE 139. LEADING METROPOLITAN STATISTICAL AREAS: OIL & GAS
RANKED BY SELECTED FACTORS

		JOBS		CHANGE 2010 - 2016		2016 LOCATION QUOTIENT (US=1.00)	AVG. EARNINGS PER JOB
		2010	2016	#	%		
	LARGEST (EMPLOYMENT IN 2016)						
1	Houston-The Woodlands-Sugar Land, TX	95,429	106,822	+11,393	+12%	8.55	$209,801
2	Dallas-Fort Worth-Arlington, TX	24,363	25,041	+678	+3%	1.74	$161,568
3	Midland, TX	13,000	20,504	+7,504	+58%	55.33	$122,944
4	Oklahoma City, OK	15,901	17,932	+2,031	+13%	6.87	$141,758
5	Lafayette, LA	20,682	15,912	-4,770	-23%	18.35	$99,740
	CHANGE 2010-2016 (#)						
1	Houston-The Woodlands-Sugar Land, TX	95,429	106,822	+11,393	+12%	8.55	$209,801
2	Midland, TX	13,000	20,504	+7,504	+58%	55.33	$122,944
3	San Antonio-New Braunfels, TX	3,912	8,385	+4,473	+114%	1.95	$128,006
4	Pittsburgh, PA	4,732	7,934	+3,202	+68%	1.68	$122,498
5	Greeley, CO	3,182	6,064	+2,882	+91%	13.46	$93,215
	CHANGE 2010-2016 (%)*						
1	Wheeling, WV-OH	421	1,319	+898	+213%	4.99	$104,180
2	San Antonio-New Braunfels, TX	3,912	8,385	+4,473	+114%	1.95	$128,006
3	Dickinson, ND	1,293	2,473	+1,180	+91%	30.26	$122,168
4	Greeley, CO	3,182	6,064	+2,882	+91%	13.46	$93,215
5	Enid, OK	1,122	1,981	+859	+77%	16.56	$129,926
	CONCENTRATION (LQ)						
1	Williston, ND	4,929	7,694	+2,765	+56%	66.77	$115,599
2	Snyder, TX	1,485	2,000	+515	+35%	63.72	$79,974
3	Midland, TX	13,000	20,504	+7,504	+58%	55.33	$122,944
4	Andrews, TX	1,393	1,638	+245	+18%	54.93	$81,882
5	Hobbs, NM	6,223	6,048	-175	-3%	50.39	$80,042

*Includes metro areas with at least 1,000 jobs in the sector in 2016.
Source: Emsi 2017.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

EMERGING OPPORTUNITIES

This section provides a combination of qualitative and quantitative information describing opportunities for new investment and job growth in Fort Worth within specific industries and market segments. For each emerging opportunity, there is a summary of the market opportunities (regional/national trends and strategic considerations impacting future growth in the industry) and Fort Worth's advantage (local assets and strengths that position the city for growth). Following each summary is a longer discussion of the opportunities for business recruitment and investment within the sector.

AEROSPACE MANUFACTURING & DESIGN

Aerospace manufacturing (NAICS 3364) includes establishments that manufacture complete aircraft, missiles, or space vehicles, and/or associated parts and equipment.

MARKET OPPORTUNITIES

- Commercial & military aircraft markets show strong near- and mid-term demands for new vehicles
- The F-35 development program has solidified and is generating increasing interest from international partners
- Lockheed Martin plans to add over 1,000 employees over the next couple of years
- Bell Helicopter Textron is a strong contender to win the US Army's Future Vertical Lift program
- Attracting additional aerospace suppliers and air service companies to Alliance Airport
- US DoD is emphasizing disruptive "third-offset" technologies such as robotics and automation, miniaturization, big data, artificial intelligence, and advanced manufacturing into its R&D and procurement programs
- Major investments in space exploration (e.g., Jeff Bezos's Blue Origin, Elon Musk's SpaceX) leading to future demand for design & production of commercial space vehicles
- Texas is home to development and test sites of multiple commercial space firms, including Boeing, SpaceX, Blue Origin, ULA, and XCOR

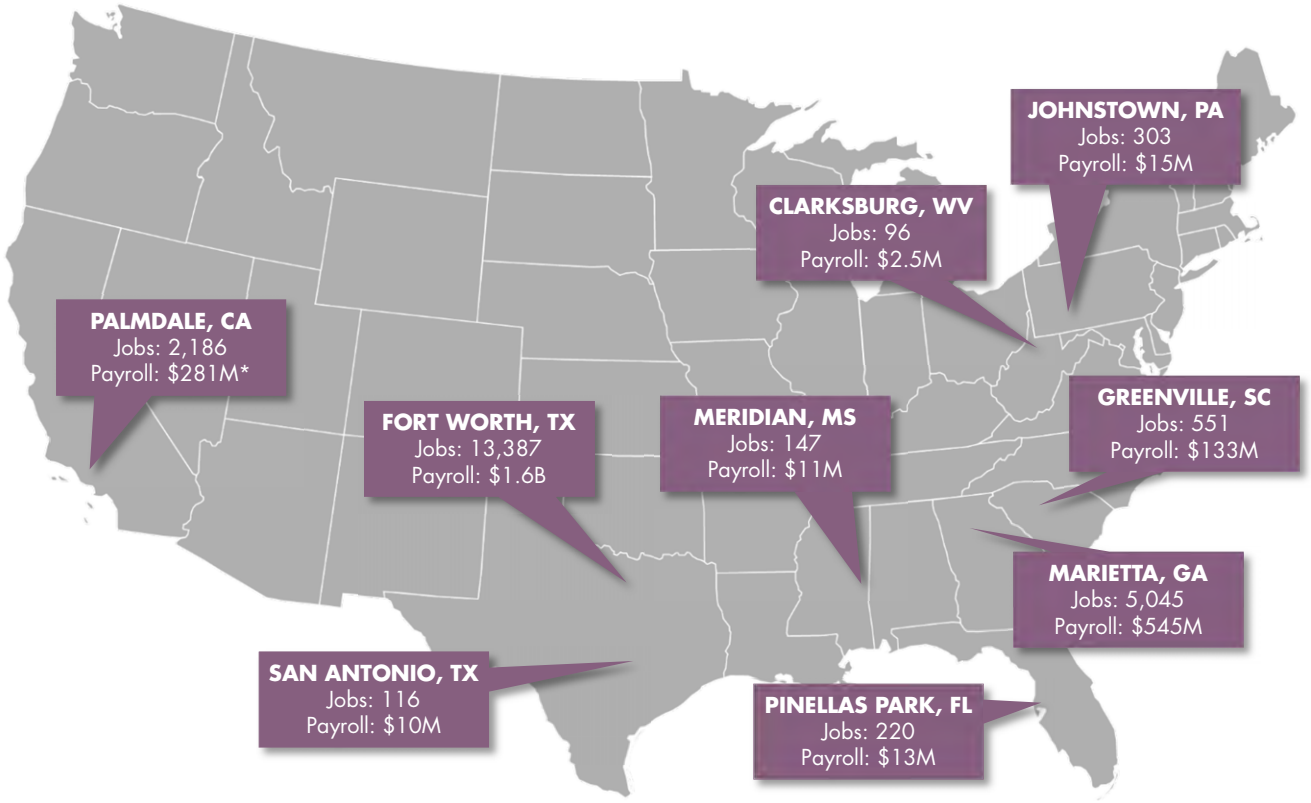
FORT WORTH'S ADVANTAGES

- Strong base of employment, including globally recognized firms such as Lockheed Martin, Bell Helicopter Textron, and Elbit Systems.
- The Dallas-Fort Worth metro area is one of the most highly concentrated regions of aircraft and aircraft parts production in the US
- The percentage of the workforce employed in aircraft manufacturing in the Dallas-Fort Worth metro area is nearly five times the national average
- A High concentration of key occupations (Aerospace Engineers, Aircraft Systems Assemblers, Aircraft Mechanics & Service Technicians, Avionics Technicians)
- More than 50 percent of Lockheed Martin's global workforce is located in Fort Worth
- The Dallas-Fort Worth metro area is home to the headquarters of two international airlines
- Multi-modal transportation network (Interstate highways, international air service, Class I rail access
- NAS Joint Reserve Base Fort Worth
- TCC Erma C. Johnson Hadley Northwest Center of Excellence for Aviation, Transportation, and Logistics

Fort Worth is one of the leading aerospace manufacturing centers in North America. The Dallas-Fort Worth metro area has numerous aerospace manufacturers, but the lion's share of employment resides in Fort Worth. Between Lockheed Martin Aeronautics' facility located at NAS Joint Reserve Base Fort Worth (where the F-35 and F-16 are manufactured) and Bell Helicopter Textron, there are nearly 20,000 workers in Fort Worth. Other companies, like Elbit Systems of America, play an important role in this sector as well.

As part of this planning process, a group of 40 commercial real estate professionals (brokers and site selectors) completed an online questionnaire about their perceptions of Fort Worth. When asked the question, "Which of the following industries do you associate with Fort Worth," aerospace ranked number one among 12 industries listed, with 76 percent of respondents associating it with the city.

FIGURE 140. LOCKHEED MARTIN LOCATIONS
WITH EMPLOYMENT AND PAYROLL (2016)



*Palmdale payroll figure is for 2015.
Source: Lockheed Martin website.
Note: Map locations are approximate and are for illustrative purposes only.

The commercial aviation industry has experienced record growth in recent years due to demand for fleet replacement, passenger growth in emerging markets, and the introduction of new products and manufacturers to the market. Per the most recent data available from the Aerospace Industries Association (AIA), sales of aerospace products started to rebound in 2015 after stalling out at the end of the last decade. Over the past decade, aircraft manufacturing has made up an increasingly larger share of all aerospace sales, rising from 51 percent of the total in 2004 to an estimated 56 percent in 2015, per AIA's analysis (Figure 141).

However, when aircraft sales are considered by type (civilian versus military) there are substantial differences in performance during the same time (Figure 142). Civilian (commercial) aircraft sales reached record highs in 2014 and 2015, doubling from 2004. By contrast, military-related sales declined after climbing to just over $60 billion (constant 2009 dollars) as the US entered the recession.

Major factors affecting the global outlook for the aerospace manufacturing & design sector include:

CONTINUED HIGH LEVELS OF DEMAND FOR AIRCRAFT: The global aerospace industry saw a decline in profits and revenues in 2015 for the first time in five years, due in large part to the impact of the strong US dollar and restructuring charges taken by two major companies (Bombardier and UTC). Despite the declines, prospects for commercial aircraft remain strong, driven by the replacement of aging fleet in established markets, new passenger growth in emerging markets (driving fleet expansion), and increasing fuel efficiency standards in North America and Europe.

Net orders for Boeing and Airbus flattened slightly in 2015, dropping below 2,000 aircraft for the first time in four years. However, the firms continue to have record-breaking backlogs, calculated at 12,626 units as of December 31, 2015. At current production rates, PricewaterhouseCoopers (PwC) estimates the backlog of orders is sufficient to keep manufacturers busy for the next nine years.

FIGURE 141. AEROSPACE SALES
BY PRODUCT GROUP

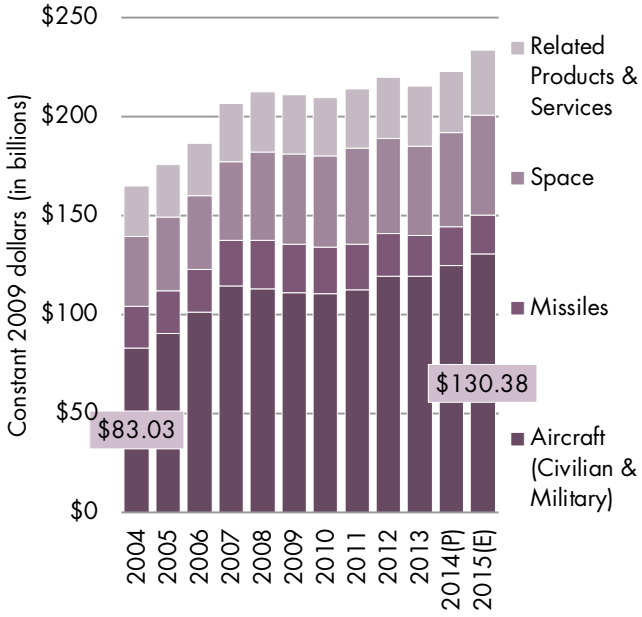
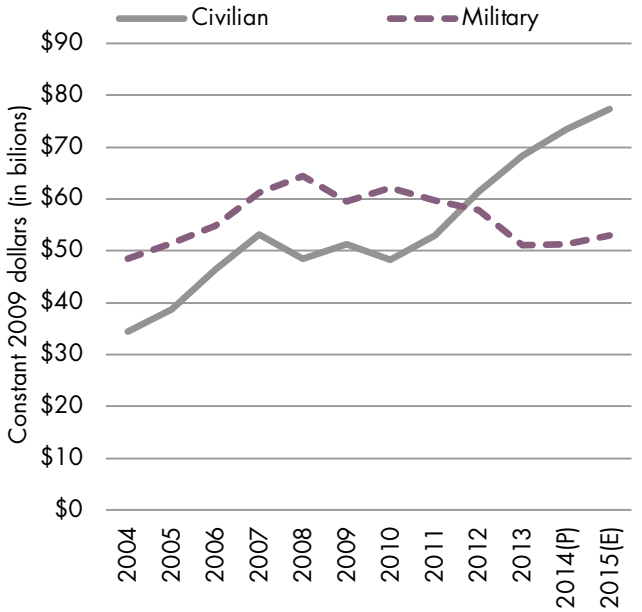


FIGURE 142. AIRCRAFT SALES BY TYPE



Sources: Aerospace Industries Association, *2014 Year-End Review and Forecast* (based on company reports; *The Budget of the United States Government,* National Aeronautics and Space Administration, US Department of Commerce, and Department of Defense); TIP Strategies. Note: Government purchases reflected as appropriated funding. (P = preliminary, E = estimate)

The long-term reauthorization of the US Export-Import Bank (Ex-Im) through 2019 was good news for domestic producers, who often rely on the bank to supplement traditional funding sources. The program is opposed by US

carriers who view the program as a subsidy provided to foreign firms purchasing US aircraft, an option not available to domestic airlines.

The future is dimmer for defense contractors. Although passage of the Bipartisan Budget Act of 2015 extends relief from the full impacts of sequestration through 2017, uncertainty about the federal budget continues. However, PwC cites "rapidly changing US defense priorities" (including global threats from ISIS, the Russia-Ukraine conflict, and growing modernization of the militaries of North Korea and China) as a force that is likely to help drive compromise in future budget deals.

DEPARTMENT OF DEFENSE PRIORITIES: In addition to continued uncertainty over global military spending, the sector has experienced a shift towards vendors that "aren't part of the core defense industry," according to PwC's review of trends affecting aerospace and defense in 2016. The analysis highlights the unusual position traditional defense contractors find themselves in, stating that the "combination of unexpected competitive pressures and a more frugal customer base is a one-two punch that the defense industry has never quite faced before."

This shift towards technology-oriented vendors can be seen in the Defense Innovation Initiative announced in November 2014 by former Secretary of Defense, Chuck Hagel. This initiative is commonly referred to as the "third-offset strategy," because it marks the third evolution of DoD's thinking on how the US can maintain strategic advantage over potential adversaries into the future. Priority areas outlined in the Defense Innovation Initiative are designed to accelerate innovation and emphasize the application of breakthrough technologies. These priority areas include the following:

- *Robotics & Autonomous Systems:* unmanned machines that assess situations and make decisions on their own
- *Miniaturization:* making components of weapons systems smaller, including warheads, sensors, and electronics
- *Big Data:* utilizing commercial techniques for analyzing large volumes of intelligence data
- *Advanced Manufacturing:* using technologies such as 3-D printing that allow for ongoing, rapid changes for the testing of new technologies and the customization of existing technologies

ROBOTICS AND AUTONOMOUS SYSTEMS: The convergence of unmanned air systems (UAS), drones, and in-demand electric vertical-takeoff-and-landing (e-VTOL) has the potential to create new technology and employment opportunities in the region. UBER has announced a plan to launch in-demand e-VTOL air-taxi service in Dallas in 2020. Bell Helicopter is part of the team Uber has assembled to develop the technology and infrastructure. Uber is also partnering with the City of Dallas and Hillwood to launch its UberAIR service and develop vertiports. One such vertiport is planned for downtown Fort Worth. Alliance Airport has been mentioned as a potential site for manufacturing and training center support for UberAIR.

A growing number of systems are being designed to operate autonomously, including aerial, ground, and underwater vehicles. Interest in unmanned aerial vehicles (UAVs) for civilian use and among foreign militaries is expected to help push the market to $93 billion in sales over the next decade, per the Teal Group. The group's 2015 study estimates that military uses will account for nearly three-quarters (72 percent) of the market, with consumer and civil uses capturing 23 percent and 5 percent, respectively. Though a much smaller market, growth in unmanned underwater vehicles (UUVs) is also expected to climb, driven primarily by DoD investments. Increasingly sophisticated sensors will be an important element to the growth of both aerial and underwater systems. Likewise, artificial intelligence (AI) also plays a key role in autonomous systems by allowing machines to place feedback generated by the sensors into context and learn to respond.

TALENT PIPELINE: Technological innovations in the aerospace industry are affecting the occupations and skills required by employers, especially original equipment manufacturers (OEM) such as Lockheed Martin and Bell Helicopter. The traditional emphasis on "drill and fill" assembly workers dominating the production floor is shifting. New technologies and products like fly-by-wire flight controls and unmanned systems are increasing the demand for IT specialists (e.g., software developers and computer engineers). Likewise, the growing use of composites and utilization of additive manufacturing (3D printing) and robotics is also driving demand for production workers with advanced technical skillsets. Other occupations and positions projected to grow in the coming years include logistics and supply chain management position and repair and maintenance technicians (especially for composite materials).

To meet the growing demand for aerospace workers with advanced skillsets will require a greater emphasis on STEM education and training at the local level. At the same time demand for these workers is increasing, Fort Worth's aerospace employers are facing the challenge of an aging workforce (see again Figure 122, page 111). According to the forthcoming *North Texas Aerospace and Aviation Talent Pipeline Study*, regional aerospace employers are concerned about a coming wave of retirements, especially among workers in key occupations. To fill many of the critical positions, employers must do a better job of attracting women and under-represented populations.

The air transportation companies in the Dallas-Fort Worth metro area are also facing talent pipeline challenges. Like aerospace manufacturers, air transportation employers report difficulty in identifying and attracting IT specialists and software developers. In addition, there is a concern about meeting the future demand for pilot positions. Airlines report a significant portion of their pilots are approaching the mandatory retirement age of 65. American Airlines is also in the process of transitioning in newer aircraft into its fleet, which will require hiring additional commercial pilots with training and experience operating the new aircraft.

In order to meet the talent pipeline needs of regional aerospace and air transportation employers, the (unpublished) *North Texas Aerospace and Aviation Talent Pipeline Study* recommends the development of a demand-driven career pathways system to connect residents to jobs in the aerospace and aviation industries. This is especially true for building a long-term supply (within existing K-12 population) to meet many of the critical skills needs, especially in advanced manufacturing, information technology, and systems engineering.

FIGURE 143. 2016 AEROSPACE MANUFACTURING ATTRACTIVENESS RANKINGS
50-STATE ANALYSIS PREPARED BY PWC (TOP 10 SHOWN)

STATE	OVERALL RANK	INDEX COMPONENT RANKINGS			
		Tax	*Operating costs*	*Industry size*	*Education*
Arizona	**1**	**8**	12	**6**	20
Florida	**2**	**4**	29	**5**	13
Georgia	**3**	19	19	**10**	14
Utah	**4**	**3**	**10**	24	25
Missouri	**5**	**2**	12	29	21
Indiana	**6**	**6**	17	15	28
Texas	**7**	38	18	**2**	**10**
Michigan	**8**	26	25	**2**	17
Ohio	**9**	16	33	**4**	17
Washington	**10**	29	24	13	11

Source: 2016 Aerospace Manufacturing Attractiveness Rankings (July 2016), PwC.
Note: PwC analyzed the relative 'aerospace industry attractiveness' of the US in a state-by state comparison. The study produced an overall 'attractiveness ranking index' using a weighted average of the following major elements: taxes, operating costs (industry and overall wage rates, business climate, and energy costs), industry size (existing suppliers and supply/growth of workforce including available aerospace technicians, engineers, mechanics), and educational attainment.

FIGURE 144. INDUSTRY INTELLIGENCE & NETWORKING, AEROSPACE MANUFACTURING & DESIGN

AEROSPACE MANUFACTURING & DESIGN		
TRADE ASSOCIATIONS		
Aerospace Industries Association		www.aia-aerospace.org/
Aerospace Components Manufacturers		www.aerospacecomponents.org
National Aeronautic Association		www.naa.aero/
Aviation Distributors and Manufacturers Association (ADMA)		www.members.adma.org/adma
General Aviation Manufacturers Association		www.gama.aero/
American Institute of Aeronautics and Astronautics (AIAA)		www.aerospacecomponents.org
Aircraft Electronics Association (AEA)		www.aea.net
Aviation Suppliers Association		www.aviationsuppliers.org/
Aviation Technician Education Council (ATEC)		www.atec-amt.org/
Experimental Aircraft Association (EAA)		www.eaa.org/eaa
IEEE Aerospace and Electronic Systems Society		www.ieee-aess.org
Association for Unmanned Vehicle Systems International		www.auvsi.org
Chinese Society of Aeronautics and Astronautics (CSAA)		www.csaa.org.cn/a/english/ABOUT_US/CSAA_Profile
AeroSpace and Defence Industries Association of Europe (ASD)		www.asd-europe.org
Royal Aeronautical Society		www.aerosociety.com
Air and Space Academy (AAE)		www.academie-air-espace.com/newIndex_test.php
RELEVANT CONFERENCES/EVENTS		
AEA Central Connect Conference		
26-27 October 2017	*Kansas City, MO*	www.aea.net/connect/Central
Aero India		
TBD 2018	*Bengaluru, Karnataka, IN*	www.aeroindia.in/Default.aspx
Aerospace Manufacturing Conference		
TBD May 2018	*TBD*	www.speednews.com/aerospace-manufacturing-conference
ADMA 2017 Annual Conference		
5-9 November 2017	*La Quinta, CA*	www.members.adma.org/adma/ADMA/
AIAA SPACE and Astronautics Forum and Exposition		
12-14 September 2017	*Orlando, FL*	www.aiaa-space.org
ATEC Annual Conference		
17-20 March 2018	*Washington, DC*	www.atec-amt.org/annual-conference.html
China International Aviation & Aerospace Exhibition		
6-11 November 2018	*Zhuhai, Guangdong, CN*	www.airshow.com.cn/en
Dubai Airshow		
12-16 November 2017	*Jebel Ali, UAE*	www.dubaiairshow.aero

AEROSPACE MANUFACTURING & DESIGN		
EAA Airventure Oshkosh		
23-28 July 2018	*Oshkosh, WI*	www.eaa.org/en/airventure
Farnborough Airshow		
16-22 July 2018	*Farnborough, UK*	www.farnboroughairshow.com
International IEEE Aerospace Conference		
3-10 March 2018	*Big Sky, MT*	www.aeroconf.org
Paris Airshow		
17-23 June 2019	*Paris, FR*	www.siae.fr/en
Singapore Airshow		
6-11 February 2018	*Singapore, MY*	www.singaporeairshow.com/trade
TRADE PUBLICATIONS		
AIAA Journal		www.arc.aiaa.org/loi/aiaaj
Avionics News		www.aea.net/avionicsnews
Aerospace America		www.aerospaceamerica.aiaa.org
Aerospace Testing International Magazine		www.aerospacetestinginternational.com/
Aerospace Manufacturing Magazine		www.aero-mag.com/
Aviation International News		www.ainonline.com
International Journal of Aviation, Aeronautics, and Aerospace (IJAAA)		www.commons.erau.edu/ijaaa

TRANSPORTATION INNOVATION

This opportunity recognizes the dramatic technological advances that have occurred within the transportation industry, including the many disruptive technologies, like autonomous vehicles, and the move towards transportation as a service (e.g., ride-sharing models, such as Uber).

MARKET OPPORTUNITIES

- The transportation industry is undergoing massive disruption and rapid change, leading to new business models and growth sectors
- The biggest changes include development of autonomous vehicles (e.g., passenger cars, trucks, helicopters), ride-sharing, car-sharing, bike-sharing, e-bikes
- Focus areas are autonomous vehicle testing, Smart City investments (e.g., traffic signals), transit system innovation, logistics & distribution
- Projected job growth in the Dallas-Fort Worth metro area is 11 percent over the next five years in transportation & warehousing
- Dallas-Fort Worth is the largest and fastest-growing inland transportation hub for goods movement

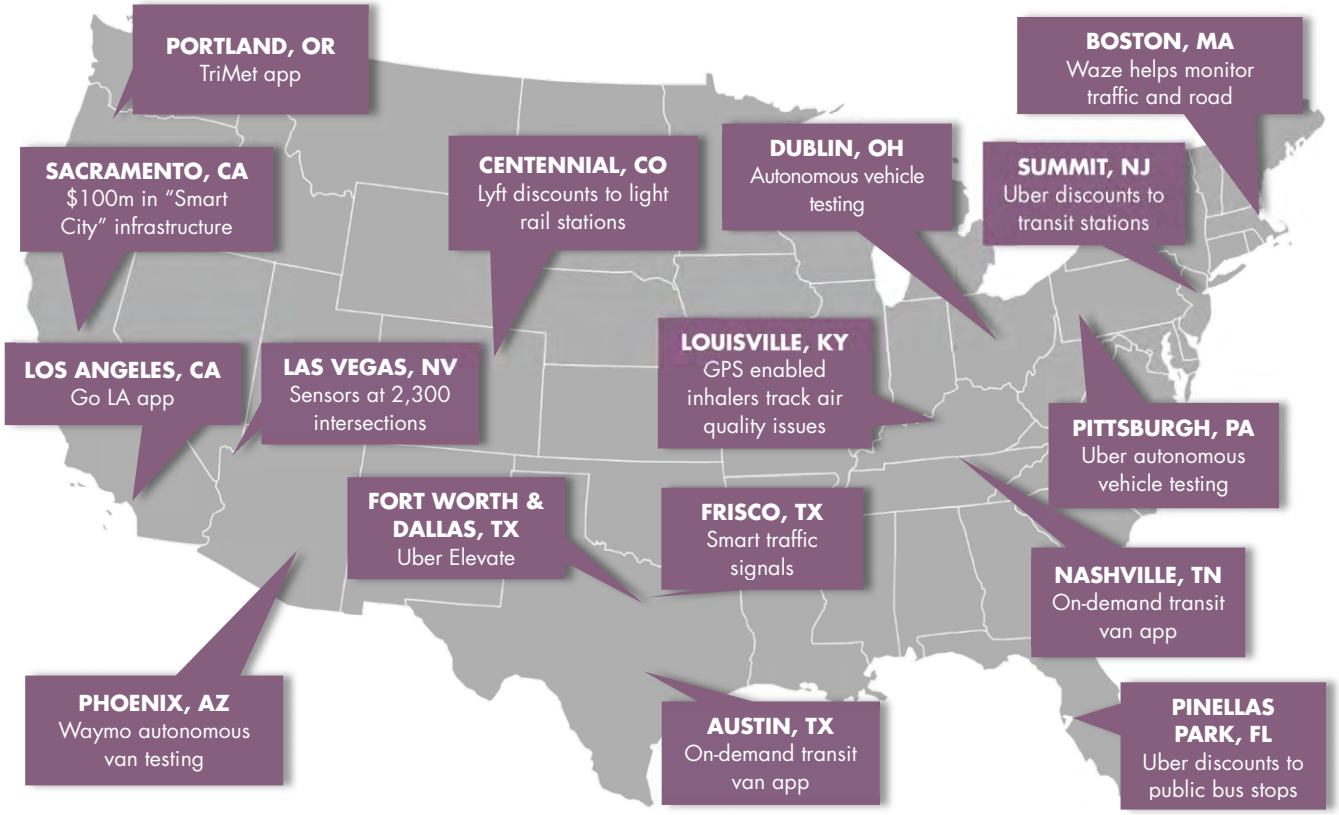
FORT WORTH'S ADVANTAGES

- Industry-leading companies (BNSF, American Airlines, Lockheed Martin, Bell Helicopter Textron, Epic Helicopters)
- Highly concentrated Transportation & warehousing sector (LQ of 3.16 in the city of Fort Worth and 2.04 in the Fort Worth MD)
- Three Class I rail lines (BNSF, UP, KCS)
- Interstate Highway access (IH-35W, IH-20, IH-30)
- Airport access (DFW International Airport, Alliance Airport, Meacham & Spinks Airports)
- Federal Aviation Administration (FAA) Southwest US regional HQ
- TCC Erma C. Johnson Hadley Northwest Center of Excellence for Aviation, Transportation & Logistics
- Regional higher education expertise in transportation (UNT Logistics, UT-A)

Few cities have as many strategic advantages as Fort Worth for attracting investment in transportation innovation. The city's economic roots can be traced to investments and new innovations in transportation, starting with stagecoaches and cattle drives, then transitioning to railroads and highways, and eventually air travel. Fort Worth's infrastructure assets (e.g., DFW International Airport, Alliance Airport) and its business leadership (e.g., American Airlines, BNSF, Lockheed Martin, Bell Helicopter Textron, Epic Helicopters) position the city to become a test bed for the evaluation and deployment of new transportation solutions.

The opportunities for business growth tied to transportation innovation have increased dramatically in recent years. The world's most valuable startup, Uber Technologies (valued at $60 billion as of this writing) and other ride-sharing companies are a case in point. Major tech firms ranging from Google to Apple are aggressively investing in autonomous vehicle technology. These innovations are not limited to passenger vehicles, nor are they limited to the design and production of transportation equipment. The goods movement sector will soon depend on autonomous trucks, drones, and other new technologies. "Smart City" infrastructure investments by the public sector are creating new opportunities for innovation. The shift towards transportation as a service will lead to changes in vehicle ownership models that promise to disrupt entire industries. Auto insurance will take on different dimensions when fewer people own their own vehicles. New opportunities will arise for real estate development and construction thanks to significantly decreased parking requirements.

FIGURE 145. MAJOR TRANSPORTATION INNOVATION & OTHER "SMART CITY" PROJECTS



Sources: Wall Street Journal, TIP Strategies research.

The opportunity for Fort Worth to become a leader in transportation innovation should not be underestimated. The city should play a lead role in the Uber Elevate demonstration project, which aims to make North Texas one of the world's first testing grounds for intra-urban flying vehicles (along with a similar test in Dubai). Uber has selected Fort Worth's Bell Helicopter Textron to develop vehicles and Hillwood Properties to develop pick-up and drop-off sites for electric vehicles that would take off and land vertically.

Other opportunities for innovation in Fort Worth include development of navigational and aerial controls, communications between airborne vehicles and ground vehicles, and coordination of autonomous vehicles and control technologies.

FIGURE 146. INDUSTRY INTELLIGENCE & NETWORKING, TRANSPORTATION INNOVATION

TRANSPORTATION INNOVATION		
TRADE ASSOCIATIONS		
International Warehouse Logistics Association (IWLA)		www.iwla.com
National Association of Wholesaler-Distributors (NAW)		www.naw.org
American Trucking Associations (ATA)		www.trucking.org
Intermodal Association of North America (IANA)		www.intermodal.org
Commercial Vehicle Training Association (CVTA)		www.cvta.org
Truckload Carriers Association (TCA)		www.truckload.org
Association for Unmanned Vehicle Systems International (AUVSI)		www.auvsi.org
Smart Cities Council		www.smartcitiescouncil.com
Living Cities		www.livingcities.org
Transportation Research Board		www.trb.org
RELEVANT CONFERENCES/EVENTS		
CCJ Symposium 2017		
22-24 May 2017	*Asheville, NC*	www.ccjsymposium.com
2017 WorkForce Builders Conference		
12-14 June 2017	*Riverside, MO*	www.truckload.org/WFBCON-HOME
The Great American Trucking Show		
24-26 August 2017	*Dallas, TX*	www.truckshow.com
National Truck Driver Appreciation Week		
10-16 September 2017	*US*	www.trucking.org/Appreciation_Week.aspx
TXTA Annual Conference		
03-05 August 2017	*Austin, TX*	www.texastrucking.com/TXTA/Events/Annual_Conference
AV18 | Autonomous Vehicles Silicon Valley		
26-28 Feb 2018	*Silicon Valley, CA*	www.autonomousvehicles.iqpc.com/
TCA's 80th Annual Convention		
25-28 March 2018	*Kissimmee, FL*	www.truckload.org/TCA17
Smart Cities Connect Conference and Expo - Placing Cities First		
26-29 March 2018	*Kansas City, MO*	www.smartcitiesconnect.com/
TRADE PUBLICATIONS		
3PL Americas		www.www.iwla.com/library/publications/
FleetOwner Magazine		www.fleetowner.com
Truckers News		www.truckersnews.com
Heavy Duty Trucking		www.truckinginfo.com/magazine
Commercial Carrier Journal		www.ccjdigital.com
Truckload Authority		www.truckload.org/TLA

LIFE SCIENCES DELIVERY & INNOVATION

This opportunity focuses on the linkage between healthcare delivery functions and the products, devices, and innovations in the life sciences field. In Fort Worth, an opportunity exists to bring innovation into the delivery of healthcare with partnerships between medical providers in the Near Southside medical district, life sciences firms (e.g., Alcon Laboratories, Galderma, Encore Vision), and educational institutions (e.g., TCU-UNTHSC medical school).

MARKET OPPORTUNITIES

- Ongoing growth trends in medical districts as magnets for talent, innovation, and business growth favor locations with a density of activity in a mixed-use environment, similar to Near Southside
- Projected healthcare job growth in the Dallas-Fort Worth metro area of 20 percent over the next five years
- Demand for innovation in "downstream" portion of life sciences & healthcare field (the delivery systems as opposed to the medical products & devices)
- Demand for more physician residency programs in Fort Worth and in the region
- Potential for clinics & small medical offices in neighborhoods with unmet demand

FORT WORTH'S ADVANTAGE

- Largest medical employment concentration in North Texas (Near Southside)
- Relatively low LQs for healthcare in City of Fort Worth (0.82) and Fort Worth MD (0.89) indicate significant local unmet demand for healthcare
- TECH Fort Worth has a track record of success in facilitating growth of life sciences startups (Encore Vision most recently)
- Major life sciences firms operating in Fort Worth (e.g., Alcon Laboratories, Galderma, Smith & Nephew)
- New TCU-UNTHSC medical school

The distinction between life sciences delivery (healthcare) and life sciences products, devices, and innovation is an important one. Genuine life sciences clusters are few in number. In the US, there are clear strongholds in the Washington/Baltimore corridor, Boston, and the Bay Area, with significant pockets of activity in other regions including Raleigh-Durham, San Diego, Seattle, and the DC metro area.

FIGURE 147. US LIFE SCIENCES CLUSTER RANKINGS

TOP US LIFE SCIENCES MARKETS, RANKED BY JLL'S WEIGHTED CLUSTER INDEX*, 2016

RANK	CLUSTER	WEIGHTED SCORE
1	Greater Boston	87.5
2	San Francisco Bay Area	75.2
3	Raleigh-Durham	60.7
4	San Diego	58.3
5	Seattle-Bellevue	56.3
6	Maryland Suburbs/DC Metro	53.2
7	Philadelphia	49.4
8	Los Angeles/Orange County	44.7

RANK	CLUSTER	WEIGHTED SCORE
9	Westchester County (NY)	41.2
10	New Jersey	40.8
11	New York City	34.7
12	Minneapolis	34.5
13	Denver	34.5
14	Chicago	30.7
15	Central & Southern Florida	30.6
16	Long Island (NY)	30.0

Sources: JLL Research, Life Sciences Outlook 2016.
Note: Weighted cluster index scores are based on the following weights: employment concentration (20%), employment growth (10%), establishment concentration (10%), venture capital funding (15%), National Institutes of Health funding (15%), market occupancy rate (10%), average asking rent (10%), and rentable lab supply (10%).

Research from JLL indicates life sciences real estate vacancy rates remain exceptionally low in top clusters like Boston and the Bay Area, while asking rents continue to rise. Meanwhile, secondary markets like Denver are seeing an uptick in leasing activity, and as vacancy rates slide, these clusters are quickly becoming supply-constrained as well. Firms are adapting their operating strategies to remain competitive by responding to four key industry themes:

1. Tight markets drive new real estate solutions.
2. Prioritizing talent is critical to growth.
3. Strategic hunt for revenue growth.
4. Influx of new sources of capital.

Life sciences operates somewhat "under the radar" in Fort Worth. Part of this is due to the attention within Texas garnered by the Texas Medical Center in Houston, and to a lesser extent the South Texas Medical Center in San Antonio, and now the emerging medical innovation district in Austin (centered on the new UT/Dell Medical School). Nonetheless, Fort Worth has numerous enviable assets in the life sciences delivery field.

Alcon Laboratories operates a major production facility in Fort Worth. The recent acquisition of the Fort Worth startup Encore Vision by Novartis (announced at $465 million) was one of the largest startup acquisitions in Texas over the last several years. Encore Vision was founded in 2007 by Bill Burns, a former Alcon executive, and received funding from the Cowtown Angels investor group, part of TECH Fort Worth. The startup developed an eyedrop treatment for presbyopia. The local successes of Alcon and Encore Vision demonstrate that ophthalmology is a worthwhile focus area for business expansion, creation, and recruitment efforts in Fort Worth.

Beyond ophthalmology and related life sciences firms, the much bigger opportunity for business growth in Fort Worth is within life sciences delivery. The Near Southside medical district is a major regional center of gravity for the delivery side of life sciences. The new TCU-UNTHSC medical school adds another dimension to the potential for innovation and business growth related to healthcare delivery in Fort Worth. An important focus area for the community should be to create a favorable environment for the deployment of clinical trials.

Clinical trials in the field of life sciences delivery include research studies that explore whether a medical strategy, treatment, or device is safe and effective for humans. These studies also may show which medical approaches work best for certain illnesses or groups of people. The earlier "upstream" part of the process begins with basic R&D that typically starts in laboratory settings where scientists first develop and test new concepts. Clinical trials are part of the "downstream" innovation in the area of life sciences, since they typically take place with patient groups in partnership with healthcare institutions. Fort Worth's asset base lends itself to innovation in the downstream delivery side of life sciences.

FIGURE 148. INDUSTRY INTELLIGENCE & NETWORKING, LIFE SCIENCES DELIVERY & INNOVATION

LIFE SCIENCES DELIVERY & INNOVATION		
TRADE ASSOCIATIONS		
International Society for Pharmaceutical Engineering (ISPE)		www.ispe.org/
Pharmaceutical Research and Manufacturers of America (PhRMA)		www.phrma.org
American Health Care Association		www.ahcancal.org
American Medical Association		www.ama-assn.org
Texas Health Care Association		www.txhca.org
Texas Healthcare & Bioscience Institute		www.thbi.com
The Association for Research in Vision and Ophthalmology (ARVO)		www.arvo.org
American Association of Ophthalmic Oncologists and Pathologists (AAOOP)		www.aaoop.org
Women in Ophthalmology		www.wioonline.org
RELEVANT CONFERENCES/EVENTS		
7th Annual Digital Marketing for Medical Devices		
01-03 August 2017	*Minneapolis, MN*	exlevents.com/digital-marketing-medical-devices
Women in Ophthalmology Summer Symposium 2017		
10-13 August 2017	*San Diego, CA*	www.wioonline.org/register
Stanford Medicine X 2017 Conference		
15-17 September 2017	*Stanford, CA*	www.medicinex.stanford.edu
2017 AAOOP Annual Meeting		
10 November 2017	*New Orleans, LA*	www.aaoop.org/annual-meetings/2017-aaoop-annual-meeting
American Academy of Ophthalmology Annual Meeting 2017		
11-14 November 2017	*New Orleans, LA*	www.aao.org/annual-meeting
36th Annual J.P. Morgan Healthcare Conference		
08-11 January 2018	*San Francisco, CA*	medtechengine.com/event/j-p-morgan-annual-healthcare-conference-2017
BIO International Convention		
04-07 June 2018	*Boston, MA*	www.convention.bio.org/2018/
TRADE PUBLICATIONS		
Ophthalmology		www.aaojournal.org/
The American Journal of Medicine		www.amjmed.com
The American Journal of Medicine		www.amjmed.com
Hospitals & Health Networks		www.hhnmag.com
Pharmaceutical Engineering		www.pharmaceuticalengineering.org

GEOTECHNICAL ENGINEERING

The geotechnical engineering field is concerned with the behavior of earth materials. In addition to its key role in civil engineering, geotechnical engineering has applications in military, mining, petroleum, and other engineering disciplines that focus on construction occurring on the surface or within the ground.

MARKET OPPORTUNITIES

- Global dominance of US oil & gas sector thanks to hydraulic fracturing ("fracking") and other technological innovations
- Horizontal drilling & hydraulic fracturing (fracking) have moved beyond the oil & gas sector and into related industries such as copper mining
- Shared talent requirements for transportation and oil & gas sectors (such as civil engineering and GIS)

FORT WORTH'S ADVANTAGE

- Large, diverse cluster of oil & gas companies in Fort Worth, especially in downtown
- TCC South Campus Center of Excellence for Energy Technology
- Barnett Shale is one of the nation's largest natural gas producing regions and the first to prove the viability of fracking
- Long history of oil & gas business growth and innovation in Fort Worth, including the introduction of horizontal drilling in the early 1990s

As part of this planning process, a group of 40 commercial real estate professionals (brokers and site selectors) completed an online questionnaire about their perceptions of Fort Worth. When asked the question, "Which of the following industries do you associate with Fort Worth," oil & gas ranked second among 12 industries listed (tied with real estate & construction), with 68 percent of respondents associating it with the city.

The June 2017 announcement of XTO Energy's relocation of 1,600 jobs from Fort Worth to the new Exxon campus in Houston at The Woodlands has sparked a robust dialogue about the future of the city's oil & gas sector. The loss of such a major player in the geotechnical engineering/oil & gas field is a legitimate cause for concern; however, XTO's story illustrates the boom and bust nature of Fort Worth's oil & gas sector. In fact, Bob Simpson—XTO's founder and former CEO—has already launched another venture in downtown Fort Worth: MorningStar Partners.

Major research universities and corporations are increasingly focused on the broader applications of fracking technologies beyond the oil & gas sector. In 2014, Texas Tech University created the Unconventional Production Technology and Environmental Consortium (UpTec), formerly the Hydraulic Fracturing Research Group, with the goal of establishing Texas Tech and the Lubbock region as the global leader in "fracking" research.

UpTec started as an internal collaboration across multiple departments at Texas Tech, but now involves researchers from other universities across the state, including the University of Texas at Austin and Texas A&M University. This initiative is also in the early stages of engaging private-sector leaders involved in fracking technology development. As this initiative continues to build expertise and research around hydraulic fracturing, it has the potential to leverage Lubbock in West Texas, the largest on-shore oil & gas production region in North America (also a water-scarce region), to create an industry cluster specializing in technology development and focusing on addressing these opportunities and challenges. Given Fort Worth's cultural ties to West Texas, there may be opportunities for Fort Worth oil & gas companies and area higher education institutions to partner with UpTec and play a lead role in developing/testing new fracking technologies.

The minerals mining sector is another area where fracking technology is being tested. Rio Tinto Minerals is using technologies developed originally for oil & gas extraction to access previously unattainable copper at 7,000 feet below the earth's surface in a mine in Southern Arizona. Fort Worth's workforce strengths in geotechnical engineering position the community to serve as a hub for development of new technologies in related sectors.

FIGURE 149. INDUSTRY INTELLIGENCE & NETWORKING, GEOTECHNICAL ENGINEERING

GEOTECHNICAL ENGINEERING		
TRADE ASSOCIATIONS		
US Oil & Gas Association		www.usoga.org
Texas Oil & Gas Association		www.txoga.org
American Petroleum Institute (API)		www.api.org
American Association of Petroleum Geologists (AAPG)		www.aapg.org
Society of Exploration Geophysicists (SEG)		www.seg.org
Independent Petroleum Association of America (IPAA)		www.ipaa.org
American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME)		www.aimehq.org
Society of Petroleum Engineers (SPE)		www.spe.org
International Association of Drilling Contractors (IADC)		www.iadc.org/
RELEVANT CONFERENCES/EVENTS		
Petrochemical & Refining Summit 2017		
17-19 July 2017	*Irving, TX*	www.petrochemicalrefiningsummit.com
Unconventional Resources Technology Conference		
24-26 July 2017	*Austin, TX*	www.urtec.org/2017
2017 Offshore Wind Executive Summit: The Parallels of Wind, Oil and Gas		
9-10 August 2017	*Houston, TX*	www.offshorewindsummit.com
Operational Excellence in Refining & Petrochemicals		
18-20 September 2017	*Houston, TX*	opexinrefiningandpetrochem.iqpc.com
Future Oil & Gas		
27 September 2017	*London, UK*	www.futureoilgas.com
Pipeline Week		
3-5 October 2017	*Houston, TX*	www.pipelineweek.com
SPE Hydraulic Fracturing Technology Conference and Exhibition		
23-35 January 2018	*The Woodlands, TX*	www.spe.org/events/en/2018/conference/18hftc/homepage.html
IADC/SPE Drilling Conference and Exhibition		
6-8 March 2018	*Fort Worth, TX*	www.spe.org/events/en/2018/conference/18dc/homepage.html
TRADE PUBLICATIONS		
Oil & Gas Technology Magazine		www.oilandgastechnology.net/current-issue
Oil & Gas Journal		www.ogj.com/currentissue.html
Offshore Magazine		www.offshore-mag.com
InDepth Oil and Gas		www.indepthoag.com
Unconventional Oil & Gas Report		www.digital.uogreport.com
Explorer		www.aapg.org/publications/news/explorer
The Leading Edge		www.seg.org/Publications/The-Leading-Edge
Journal of Petroleum Technology		www.spe.org/en/jpt

INTERNATIONAL BUSINESS

This opportunity is aimed at capitalizing on Fort Worth's existing assets—the global connectivity offered by DFW International Airport, the city's diverse population of foreign-born residents, locally based companies doing business abroad, and foreign companies who have already invested in the city of Fort Worth—to strengthen international business and tourism opportunities.

MARKET OPPORTUNITIES	FORT WORTH'S ADVANTAGE
• Rapid increase of international passenger traffic at DFW International Airport • Dallas-Fort Worth metro area ranked first in US for commercial real estate investment by Emerging Trends in Real Estate 2017, Urban Land Institute, & PricewaterhouseCoopers • Chinese foreign direct investment (FDI) in the US grew three-fold from $15 billion in 2015 to $45 billion in 2016	• Access to DFW International Airport, which has the highest growth in international passenger traffic since 2010 among major US airports • Large share of international talent already residing in Fort Worth, including more than 200,000 residents in the Fort Worth MD born in Latin America and nearly 80,000 from Asia • Large roster of multinational corporations in Fort Worth and the surrounding region

International business development is highly concentrated in a small number of global cities. New York, London, Tokyo, Dubai, Paris, and a handful of other major global business hubs are the primary locations where multinational corporations are clustered. Fort Worth is one of the few cities with the potential to emerge onto the global stage at a rapid pace over the next five to 10 years. This global emergence must be done in concert with DFW International Airport's rise as a more significant global transport hub, and must also leverage the entire metro area's growing base of foreign-owned corporations and US companies operating in the global marketplace. Fort Worth's large and growing population of foreign talent is a key advantage for the growth of international business.

There are three pillars upon which an international strategy can be built. The crucial first component is connectivity. Few airports in the US can match the scope and depth of DFW International Airport's non-stop connections. The challenge is how the City of Fort Worth, specifically, can tap into that strength. This may mean working with the airport authority to promote ongoing expansion of service, or perhaps working with individual airlines to promote local tourism options.

The second pillar involves the local business community. Larger firms (and even some institutions) increasingly have a global presence. Fort Worth's ties to the rest of the world are built upon the local businesses that operate on an international scale. Those ties are further strengthened by the foreign companies that have been providing jobs here over the years. An infrastructure of support—consulates, bilateral chambers, cultural exchanges, sister city agreements, etc.—often develops around these cross-border investments, further deepening the relationships.

The third pillar is a diversity of immigrants, a labor pool and cultural resource the city of Fort Worth and the surrounding North Texas area have welcomed. In 2007, after years of research, the scholar AnnaLee Saxenian published a landmark book called *The New Argonauts: Regional Advantage in a Global Economy*, in which she meticulously documented the role that immigrants had played in shaping the Silicon Valley economy through deep bilateral connections with places like Taiwan and India. Saxenian called this "brain circulation." Saxenian's book underscored the unique role that US-educated immigrants can play in developing global business relationships.

FIGURE 150. ESTIMATES OF FOREIGN-BORN POPULATION IN FORT WORTH MD & PEER MSAs
RANKED BY FOREIGN-BORN POPULATION AS SHARE OF TOTAL

RANK BY FOREIGN-BORN SHARE OF TOTAL POP. IN 2015		FOREIGN-BORN POP.		% BY WORLD REGION OF BIRTH*			
		#	% OF TOTAL POP.	EUROPE	ASIA	AFRICA	LATIN AMERICA
1	Dallas, TX (MD)	957,615	20.3%	3.8%	27.7%	6.5%	60.6%
2	Phoenix, AZ (MSA)	653,566	14.3%	9.1%	22.5%	3.3%	60.3%
3	**Fort Worth, TX (MD)**	**336,394**	**14.0%**	**4.7%**	**23.4%**	**9.4%**	**60.2%**
4	Denver, CO (MSA)	346,024	12.3%	11.8%	24.8%	7.2%	53.5%
5	Nashville, TN (MSA)	149,637	8.2%	8.7%	29.9%	16.0%	41.5%
6	Oklahoma City, OK (MSA)	111,787	8.2%	3.9%	30.1%	5.8%	58.6%
7	Columbus, OH (MSA)	155,968	7.7%	10.8%	40.8%	25.7%	20.5%
8	Kansas City, MO (MSA)	135,036	6.5%	9.1%	32.6%	9.4%	46.4%
9	Indianapolis, IN (MSA)	123,730	6.2%	7.1%	34.0%	11.1%	44.8%
10	Pittsburgh, PA (MSA)	92,670	3.9%	28.1%	45.4%	9.8%	13.0%

Source: 2011-2015 American Community Survey 5-year estimates.
Note: Excludes Oceania and Northern America regions which together account for less than three percent of total US foreign-born population.

FIGURE 151. INDUSTRY INTELLIGENCE & NETWORKING, INTERNATIONAL BUSINESS

INTERNATIONAL BUSINESS		
TRADE & PROFESSIONAL ASSOCIATIONS		
US-Mexico Chamber of Commerce		www.usmcoc.org
Texas-Israel Chamber of Commerce		www.texasisrael.org
World Energy Cities Partnership		www.energycities.org
Netherlands American Chamber of Commerce Texas Chp.		www.nacctexas.org
World Affairs Council of Dallas-Fort Worth		www.dfwworld.org
Texas European Chamber of Commerce		www.texaseuchamber.org
DFW International Community Alliance		www.dfwinternational.org
Japan America Society of Dallas-Fort Worth		www.jasdfw.org
Indian Institutes of Technology Alumni Assn of North Texas		www.iitnt.org
RELEVANT CONFERENCES/EVENTS		
SDG Business Forum		
18 July 2017	*New York, NY*	www.sdgbusinessforum.com
Go West Summit		
16-19 January 2018	*Salt Lake City, UT*	www.gowestsummit.com
Chicago Forum on Global Cities		
6-8 June 2018	*Chicago, IL*	www.digital.thechicagocouncil.org/ChicagoForum2017
Biennial World Cities Summit		
8-12 July 2018	*Singapore*	www.worldcitiessummit.com.sg
Smart Cities Connect Conference & Expo		
26-29 March 2018		www.smartcitiesconnect.com
TRADE PUBLICATIONS & INTELLIGENCE GATHERING		
Ink Media's inflight magazines (including American Way)		www.ink-global.com
fDi Intelligence Magazine		www.fdiintelligence.com
Airlines International Magazine		www.airlines.iata.org
NTX Magazine		www.ntc-dfw.org/publications/ntx-magazine
International Economic Update		www.dallasfed.org/institute/update
International Business Magazine		www.uscib.org/international-business-spring-2017-issue
Global Business & Finance Review		www.gbfrjournal.org
Journal of International Business Studies		www.aib.msu.edu/jibs
Journal of World Business		www.journals.elsevier.com/journal-of-world-business
Global Strategy Journal		onlinelibrary.wiley.com/journal/10.1002/(ISSN)2042-5805

CORPORATE & REGIONAL HEADQUARTERS (HQs)

Corporate headquarters are primarily engaged in administering, overseeing, and managing the activities of other business units within a company or enterprise. These private-sector establishments typically achieve economies of scale by performing a strategic or organizational planning and decision-making role across the company. Regional headquarters generally provide some type of concentrated function for an organization and typically locate in an area to take advantage of a customer base, proximity to government agencies, or access to talent.

MARKET OPPORTUNITIES

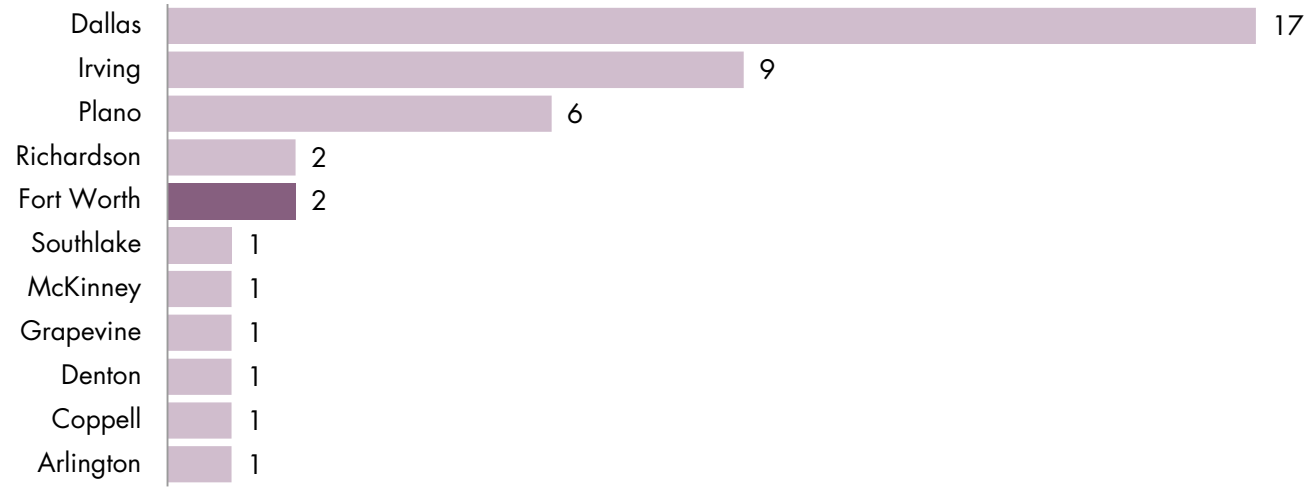
- High level of ongoing corporate relocation & expansion activity
- Corporate and regional HQ location decisions favor sites with access to a large, growing talent base
- Increasing desire among major corporations for urban locations with amenity-rich environments
- Projected job growth in the Dallas-Fort Worth metro area of 22 percent over the next five years
- Focus on: transportation, manufacturing, oil & gas

FORT WORTH'S ADVANTAGE

- Access to DFW International Airport and Alliance Airport
- Access to a large, rapidly expanding workforce with diverse skill sets in demand by HQ operations
- Established districts within Fort Worth with amenities desired by corporate office tenants
- TCU Neeley Business School's nationally ranked entrepreneurship undergraduate program
- Desirable downtown with amenities to attract HQs

While corporate HQs are classified under a single code in the NAICS system (55), corporate and regional HQ operations occur across all industry clusters. In essence, corporate HQs are not really an industry, but they are a legitimate target for business recruitment. The Dallas-Fort Worth metro area is one of the leading corporate centers in America with 22 Fortune 500 HQs and a total of 42 Fortune 1000 HQs. However, Fort Worth has not benefited from the region's status as a corporate hub. The city only claims one Fortune 500 HQ (American Airlines) and one additional Fortune 1000 HQ (Pier 1 Imports). Recruitment of corporate and regional HQ operations into Fort Worth, especially into the urban core, must be a key focus area of the city's economic development program.

FIGURE 152. CITIES IN DALLAS-FORT WORTH MSA BY NUMBER OF FORTUNE 1000 HQs, 2017



Source: *Fortune* Magazine.

FIGURE 153. FORTUNE 1000 FIRMS IN DALLAS-FORT WORTH MSA, 2017

RANK	COMPANY	REVENUE ($M)*	CITY	INDUSTRY	SECTOR
4	Exxon Mobil	$205,004	Irving	Energy	Petroleum Refining
9	AT&T	$163,786	Dallas	Telecommunications	Telecommunications
67	**American Airlines Group**	**$40,180**	**Fort Worth**	**Transportation**	**Airlines**
79	Energy Transfer Equity	$37,504	Dallas	Energy	Pipelines
134	Tenet Healthcare	$21,070	Dallas	Health Care	Health Care: Medical Facilities
138	Southwest Airlines	$20,425	Dallas	Transportation	Airlines
149	Fluor	$19,037	Irving	Engineering & Construction	Engineering, Construction
155	Kimberly-Clark	$18,202	Irving	Household Products	Household and Personal Products
206	Texas Instruments	$13,370	Dallas	Technology	Semicond. & Other Elec. Components
221	J.C. Penney	$12,547	Plano	Retailing	General Merchandisers
232	D.R. Horton	$12,157	Arlington	Engineering & Construction	Homebuilders
259	Jacobs Engineering Group	$10,964	Dallas	Engineering & Construction	Engineering, Construction
274	HollyFrontier	$10,536	Dallas	Energy	Petroleum Refining
321	GameStop	$8,608	Grapevine	Retailing	Specialty Retailers: Other
351	Dean Foods	$7,710	Dallas	Food, Beverages & Tobacco	Food Consumer Products
378	Alliance Data Systems	$7,138	Plano	Business Services	Financial Data Services
399	Yum China Holdings	$6,752	Plano	Hotels, Restaurants & Leisure	Food Services
416	Dr Pepper Snapple Group	$6,440	Plano	Food, Beverages & Tobacco	Beverages
421	Builders FirstSource	$6,367	Dallas	Materials	Building Materials, Glass
484	Celanese	$5,389	Irving	Chemicals	Chemicals
496	Michaels Cos.	$5,197	Irving	Retailing	Specialty Retailers: Other
499	Vistra Energy	$5,164	Dallas	Energy	Energy
515	Neiman Marcus Group	$4,950	Dallas	Retailing	Specialty Retailers: Apparel
535	Commercial Metals	$4,652	Irving	Materials	Metals
539	Trinity Industries	$4,588	Dallas	Transportation	Transportation Equipment
580	Torchmark	$4,158	McKinney	Financials	Insurance: Life, Health (Stock)
589	Flowserve	$3,992	Irving	Industrials	Industrial Machinery
592	Sally Beauty Holdings	$3,953	Denton	Retailing	Specialty Retailers: Other
605	Alon USA Energy	$3,832	Dallas	Energy	Petroleum Refining
606	Pioneer Natural Resources	$3,824	Irving	Energy	Mining, Crude-Oil Production
627	Lennox International	$3,642	Richardson	Industrials	Industrial Machinery
665	Darling Ingredients	$3,398	Irving	Food, Beverages & Tobacco	Food Production
668	Sabre	$3,373	Southlake	Technology	Internet Services and Retailing
670	Atmos Energy	$3,350	Dallas	Energy	Utilities: Gas and Electric
684	Brinker International	$3,258	Dallas	Hotels, Restaurants & Leisure	Food Services
723	Fossil Group	$3,042	Richardson	Apparel	Apparel
735	Rent-A-Center	$2,963	Plano	Retailing	Specialty Retailers: Other
736	Comerica	$2,960	Dallas	Financials	Commercial Banks
744	Cinemark Holdings	$2,919	Plano	Media	Entertainment
852	Nationstar Mortgage Holdings	$2,340	Coppell	Financials	Diversified Financials
938	Primoris Services	$1,997	Dallas	Engineering & Construction	Engineering, Construction
967	**Pier 1 Imports**	**$1,892**	**Fort Worth**	**Retailing**	**Specialty Retailers: Other**

Sources: Fortune; TIP Strategies.
Notes: *Revenues are reported for the most recent fiscal year.

Corporate and regional HQs are a valuable addition to any local economy. Beyond their value as a source of high-wage employment, these facilities are often prized for reasons that go beyond job creation. The announcement of a major corporation's plans to relocate, such as Hertz's recent move to Estero, Florida, can substantially raise the profile of a region. Over time, a corporate office can become indelibly linked in the mind of the public with their home base: automakers and Detroit; Starbucks and Seattle; Wal-Mart and Fayetteville, Arkansas; Whole Foods and Austin. Along with an image boost, corporate locations can also provide other benefits to the local economy. Beyond the direct impact of wages, corporate profits are often invested locally through spending by executives and through philanthropic activities.

Given their strong local ties, however, corporate headquarters are typically not quick to relocate. Factors affecting the move of corporate headquarters are varied. A study by Area Development magazine found that the most commonly cited reasons for relocation of headquarters operations in the US include repositioning in the marketplace, consolidating operations after a merger, and reducing costs. The study, which drew on a database of information about 25,000 headquarters, found that younger firms are more likely to relocate than older, more established firms. In addition, of the roughly five percent of firms that moved each year, the study suggests firms that are sales-oriented, foreign-owned, have a large number of global headquarters operations, or have recently merged are the most likely to relocate. Headquarters tend to be attracted to metro areas with good airport facilities, low corporate taxes, low average wages, high levels of business services, same industry specialization, and agglomeration of headquarters in the same industry. Smaller headquarters tend to locate close to key plants while larger headquarters tend to locate near hubs of business activity.

Focused attention on this sector is justified in light of the movement away from suburban office parks to amenity-rich urban areas. Evidence of this trend can be seen in recent high-profile corporate relocations, such as the relocations of United Continental Holdings and Hillshire Brands to Chicago's city center from suburban towns and GE's relocation from suburban Connecticut to Boston. One of the main factors influencing relocations is the needs of the workforce: access to more services, a greater variety of housing, more job opportunities for partners/spouses, and a more vibrant urban environment.

The relocation and expansion of corporate facilities from high-cost to low-cost environments is another significant trend. Jacobs Engineering Group's move from California to Dallas and Toyota North America's move from California to Plano are two recent examples of this phenomenon.

The availability of Class A office space and high-profile sites has long been an important consideration in site selection for headquarters operations. Although the amount of space allocated for office workers has dropped precipitously in recent years (with some analysts predicting amounts as low as 50 square feet per employee in the future), headquarters facilities are often tied to corporate prestige and may be unaffected by this general trend. Other essential factors for attracting corporate headquarters include a strong pool of management talent and the presence of a major airport with numerous nonstop destinations.

A final consideration when targeting corporate headquarters is the fact that these operations have a tendency to cluster by industry. Los Angeles, for example, has a strong cluster of media-related companies: the Boston–Washington corridor is rich with corporate offices for banking and insurance, especially New York, Philadelphia, Stamford, and Hartford; corporate offices related to energy, power, and raw materials are clustered in cities like Houston, Cleveland, Akron, and Pittsburgh. Matching specific corporate targets with regional clusters can help facilitate success. The most obvious corporate HQ targets for Fort Worth would fall within the city's existing industry strengths in transportation, oil & gas, and manufacturing.

FIGURE 154. INDUSTRY INTELLIGENCE & NETWORKING, CORPORATE & REGIONAL HQS

CORPORATE & REGIONAL HQS		
TRADE ASSOCIATIONS		
National Association of Corporate Directors (NACD)		www.nacdonline.org
Association for Corporate Growth (ACG)		www.acg.org
ANA Business Marketing Association		www.marketing.org
Association for Facilities Engineering (AFE)		www.afe.org
Association for Strategic Planning		www.strategyassociation.org
American Management Association		www.amanet.org
CEO Clubs International		www.ceoclubs.org
Texas Relocation Network (TRN)		www.texasrelocationnetwork.org
RELEVANT CONFERENCES/EVENTS		
US CEO Council Annual Meeting		
13-14 November 2017	*Washington, DC*	www.ceocouncil.wsj.com/annual-meetings/
Texas Relocation Network Conference		
08 March 2018	*TBD*	www.texasrelocationnetwork.org/events.html
INTERGROWTH 2018		
02-04 May 2018	*San Diego, CA*	www.intergrowth.org
Americas Mobility Conference 2018		
16-18 May 2018	*Atlanta, GA*	www.worldwideerc.org/Events/Pages/AMC2018.aspx
TRADE PUBLICATIONS		
Directorship Magazine		www.nacdonline.org/magazine/?navItemNumber=8855
Strategy + Business Magazine		www.strategy-business.com
Corporate Governance		www.emeraldgrouppublishing.com/cg.htm
Strategy & Leadership		www.emeraldgrouppublishing.com/sl.htm
MOBILITY Magazine		www.worldwideerc.org/MOBILITY
AFE Facilities Marketplace		www.afefacilitiesmarketplace.com
Middle Market Growth Magazine		www.acg.org/news-trends/middle-market-growthr-magazine
IEMSA Voice		www.iemsa.net/publications.htm

PROFESSIONAL SERVICES

The professional services sector (NAICS 54) includes a wide range of professional, scientific, and technical activities. Examples include accounting, bookkeeping, and payroll; architectural, engineering, and specialized design services; computer services; consulting; research services; advertising services; and others.

MARKET OPPORTUNITIES

- Projected job growth in the Dallas-Fort Worth metro area of 13 percent over the next five years
- 160 Inc. 5000 firms based in Dallas-Fort Worth metro area (only 11 in Fort Worth)
- Many of the city's existing industries depend on professional service firms to support continued growth

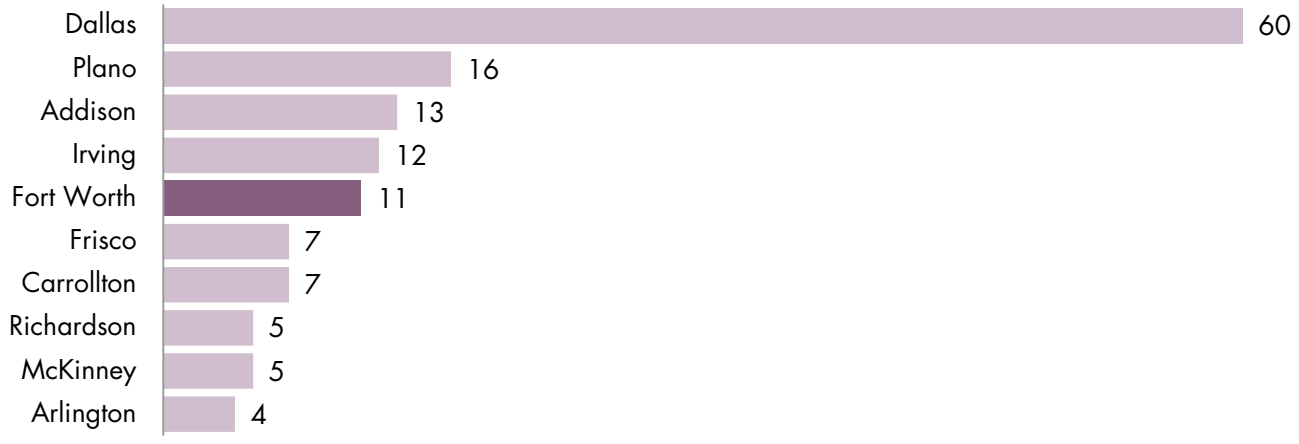
FORT WORTH'S ADVANTAGE

- TCU Neeley Business School's nationally ranked entrepreneurship undergraduate program
- Many of Fort Worth's major industries (manufacturing & transportation) depend on software and professional services as the underlying support structures for innovation and growth
- Desirable quality of life that should facilitate talent attraction in this sector (e.g., vibrant downtown, cultural amenities, entertainment)

As we documented in Volume 1, professional services employment is highly concentrated in the Dallas MD in comparison to the Fort Worth MD. Recent growth trends are even more troubling for Fort Worth. While the Dallas MD experienced rapid growth of professional services employment in the post-recession period, the Fort Worth MD saw essentially no change in its professional services job base. A similar story holds true for high-growth startups.

The Inc. 5000 is a national ranking of the fastest-growing private companies. The ranking is similar to the Fortune 500 (which ranks corporations based on annual revenue) with two exceptions: 1) it ranks firms by year-over-year revenue growth; and 2) it only looks at privately held firms, not publicly held corporations. There are 160 Inc. 5000 firms in the Dallas-Fort Worth metro area across a range of industries. Most of these firms can be defined as "technology companies" given their focus on tech-driven solutions and innovations. Of the 160 firms, 60 are in Dallas and only 11 are based in Fort Worth. Plano, Addison, and Irving each have more than Fort Worth. More than half of these 160 firms are less than a dozen years old, making them an easier target compared with corporations that have long-standing roots in their home base.

FIGURE 155. TOP 10 CITIES IN DALLAS-FORT WORTH MSA BY NUMBER OF INC. 5000 FIRMS, 2016



Source: Inc. 5000.

FIGURE 156. INC. 5000 FIRMS IN DALLAS-FORT WORTH MSA, 2016

RANK	COMPANY	3-YR. REVENUE GROWTH	2015 REVENUE ($M)	INDUSTRY	CITY	YEAR FOUNDED	JOBS
14	S2 Capital	9646%	$28.8	Real Estate	Addison	2012	175*
40	JM Bullion	5907%	$661.3	Financial Services	Dallas	2011	37
138	Netvious	2537%	$4.0	IT Services	Grand Prairie	2012	5
154	CPSG Partners	2346%	$43.4	IT Services	Dallas	2009	225
177	Alliance Family of Companies	2073%	$28.0	Health	Irving	2006	184
210	**Fire Line Services**	**1859%**	**$15.0**	**Construction**	**Fort Worth**	**1992**	**47**
242	Primal Health	1612%	$11.5	Health	Allen	2012	25
244	Fathom Realty	1604%	$29.6	Real Estate	McKinney	2009	20
255	freshbenies	1555%	$5.7	Health	McKinney	2009	11
363	J.W. Logistics	1055%	$107.8	Logistics & Transportation	Frisco	2011	174
406	Koupon Media	948%	$2.2	Retail	Addison	2011	38
411	OrderMyGear	941%	$4.6	Business Products & Svcs.	Dallas	2007	32
422	NextAfter	914%	$2.5	Advertising & Marketing	Frisco	2009	6
450	Revere Capital	849%	$22.6	Financial Services	Dallas	2009	18
501	Akorbi	758%	$23.3	Business Products & Svcs.	Plano	2003	750
548	Saxony Partners	708%	$8.4	IT Services	Dallas	2011	46
577	Sports Marketing Monterrey	677%	$2.6	Advertising & Marketing	Dallas	2010	6
578	TruEnergy	676%	$5.7	Energy	Dallas	2011	85
596	Tachyon Technologies	656%	$6.6	IT Services	Irving	2011	82
677	WorldVentures	581%	$567.4	Travel & Hospitality	Plano	2005	538
720	Metre22	545%	$2.7	Business Products & Svcs.	Dallas	2011	8
733	mortgage financial services	540%	$7.1	Financial Services	Southlake	2001	140
747	**King George**	**534%**	**$4.0**	**Government Services**	**Fort Worth**	**2011**	**110**
778	EnTouch Controls	514%	$3.6	Energy	Richardson	2009	30
789	Salt and Light Energy Equipment	508%	$11.9	Energy	Dallas	2012	52
833	PEG Bandwidth	477%	$76.1	Telecommunications	The Colony	2009	127
841	Landmark Roofing	473%	$3.8	Construction	Bedford	2010	12
847	Daseke	468%	$678.8	Logistics & Transportation	Addison	2008	3000
886	Nerium International	450%	$515.7	Consumer Products & Svcs.	Addison	2011	460
989	**Corvette Mods**	**405%**	**$6.0**	**Retail**	**Fort Worth**	**2010**	**15**
1018	Pinnacle Group	389%	$1,161.5	IT Services	Dallas	1996	1936
1036	See Agency	382%	$2.5	Business Products & Svcs.	Dallas	2009	12
1040	**Simpli.fi**	**379%**	**$51.5**	**Advertising & Marketing**	**Fort Worth**	**2010**	**175***
1078	ValuD Consulting	359%	$6.8	IT Services	Addison	2009	130
1115	Armor	347%	$48.6	Security	Richardson	2009	246
1137	Shop The BOSS	340%	$5.7	Retail	Dallas	2008	12
1158	Cyber Group	336%	$11.5	Engineering	Dallas	1998	51
1177	Alldaybot	330%	$2.2	IT Services	Plano	2010	25
1180	5	329%	$8.6	Energy	Irving	2011	37*
1183	Tasacom Technologies	329%	$5.0	IT Services	Dallas	2007	32
1213	OneSource Virtual	321%	$95.9	Business Products & Svcs.	Irving	2008	750
1257	HomeVestors of America	308%	$48.3	Real Estate	Dallas	1996	31
1266	Commercial Fleet Financing	306%	$6.6	Financial Services	Carrollton	1995	30
1267	Poo~Pourri	306%	$33.1	Consumer Products & Svcs.	Addison	2007	48
1271	Knightvest Capital	304%	$15.8	Real Estate	Dallas	2009	320
1283	MyStartupCFO	301%	$4.2	Business Products & Svcs.	Plano	2008	39

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FIGURE 156. INC. 5000 FIRMS IN DALLAS-FORT WORTH MSA, 2016 (CONTINUED)

RANK	COMPANY	3-YR. REVENUE GROWTH	2015 REVENUE ($M)	INDUSTRY	CITY	YEAR FOUNDED	JOBS
1314	Gadberry Construction Co.	295%	$9.9	Construction	Dallas	2001	10
1333	**StraCon Services Group**	**289%**	**$6.2**	**Government Services**	**Fort Worth**	**2008**	**78**
1366	Motivity Labs	281%	$5.7	IT Services	Irving	2010	175
1371	Schlotzsky's and Dairy Queen	280%	$20.9	Food & Beverage	Irving	2009	845
1399	Trident Components	273%	$7.2	Manufacturing	Granbury	2000	150
1401	Innovative Surveillance Solutions	272%	$14.4	Security	Irving	2006	20
1475	DECA Dental Group	260%	$41.0	Health	Dallas	2008	437
1500	Fruitables Pet Food	254%	$10.0	Food & Beverage	Dallas	2008	5
1520	Dhaliwal Labs	249%	$29.0	Manufacturing	Dallas	2008	200
1582	Nothing Bundt Cakes	239%	$115.1	Food & Beverage	Addison	1997	0
1595	**OpenRoad Lending**	**237%**	**$14.6**	**Financial Services**	**Fort Worth**	**2009**	**91**
1674	Servesys	223%	$7.4	IT Services	Dallas	2011	98
1697	SYNERGEN Health	219%	$5.9	Health	Dallas	2011	202
1705	Popular Ink	218%	$18.0	Manufacturing	McKinney	2011	42
1709	70kft	217%	$4.1	Advertising & Marketing	Dallas	2003	34
1742	AustinCSI	213%	$26.3	IT Services	Plano	2007	148
1776	Venus Construction	210%	$34.7	Construction	Mansfield	1967	220
1809	YourCause	206%	$6.2	Software	Carrollton	2008	84
1837	Paragon Healthcare	203%	$146.7	Health	Dallas	2002	416
1845	Point 2 Point Global Security	202%	$39.9	Security	Addison	2004	1860
1893	Granbury Solutions	197%	$21.3	Food & Beverage	Grapevine	2010	221
1935	Ideal Impact	192%	$10.3	Energy	Grapevine	2009	127
1938	G Systems	192%	$8.1	Engineering	Richardson	1990	20
2055	Purple Land Management	181%	$37.3	Energy	Fort Worth	2010	131
2079	Sage IT	179%	$35.4	IT Services	Frisco	2003	650
2090	Oven Bits	178%	$5.4	Software	Dallas	2010	60
2095	Perfect Tax	177%	$3.2	Financial Services	McKinney	2003	70
2139	VIVA Pediatrics	174%	$17.9	Health	Richardson	2009	620
2169	Webyshops	170%	$17.3	Retail	Arlington	2009	24
2228	NorthStar Anesthesia	164%	$343.2	Health	Irving	2004	1827
2237	Online Rewards	163%	$35.7	Business Products & Svcs.	Dallas	2002	50
2286	Idea Grove	159%	$2.5	Advertising & Marketing	Dallas	2005	23
2305	Standav	158%	$17.9	Software	Dallas	2009	200
2344	Old Pro Roofing	155%	$8.0	Construction	Burleson	2009	31
2383	EST Group	152%	$19.7	IT Services	Arlington	2005	46
2404	Records Solutions	150%	$10.5	Business Products & Svcs.	Dallas	1992	122
2429	EnSite Solutions	148%	$24.3	Business Products & Svcs.	Irving	2009	20
2479	GW Communications	144%	$25.3	Telecommunications	Coppell	2005	150
2513	Namitus Technologies	142%	$4.0	IT Services	Frisco	2006	35
2629	eDataWorld	134%	$6.4	IT Services	Frisco	2005	75
2730	projekt202	128%	$28.5	Software	Addison	2003	157
2741	Supreme Lending	128%	$306.4	Financial Services	Dallas	1999	1336
2757	The Boardroom Salon for Men	127%	$6.8	Consumer Products & Svcs.	Southlake	2004	152
2810	THMED	124%	$28.9	Business Products & Svcs.	Dallas	2009	120
2812	Impiger Technologies	124%	$5.0	Software	Richardson	2004	267
2861	MPACT Financial Group	121%	$3.1	Financial Services	Dallas	2010	12
2924	C-Level Marketing & Sales Consult.	118%	$5.7	Advertising & Marketing	Plano	2001	45

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FIGURE 156. INC. 5000 FIRMS IN DALLAS-FORT WORTH MSA, 2016 (CONTINUED)

RANK	COMPANY	3-YR. REVENUE GROWTH	2015 REVENUE ($M)	INDUSTRY	CITY	YEAR FOUNDED	JOBS
2926	Studio Movie Grill	117%	$161.3	Food & Beverage	Dallas	2000	5000
3007	Faulkner Design Group	114%	$17.8	Business Products & Svcs.	Dallas	1992	65
3030	Solutions by Text	113%	$2.7	Telecommunications	Dallas	1995	22
3060	Garland Heart Mgmt. Group	111%	$2.2	Business Products & Svcs.	Plano	2003	17
3099	Adaptive Medical Partners	110%	$3.0	Health	Irving	2010	12
3105	SRS Distribution	110%	$1,411.0	Consumer Products & Svcs.	McKinney	2008	2137
3162	ExamSoft Worldwide	106%	$15.5	Education	Dallas	1998	100
3172	**Architectural Fabrication**	**106%**	**$5.9**	**Construction**	**Fort Worth**	**1997**	**31**
3206	Service Nation	104%	$10.3	Business Products & Svcs.	Flower Mound	2002	25
3219	UR Holdings	104%	$96.4	Construction	Carrollton	2001	161
3278	Capital Title of Texas	101%	$60.5	Real Estate	Plano	1987	454
3295	Anserteam Workforce Solutions	101%	$30.8	Human Resources	Dallas	2004	8
3310	HumCap	100%	$3.8	Human Resources	Plano	2002	23
3349	Nat'l Assoc. of Expert Advisors	98%	$6.4	Real Estate	Frisco	2006	36
3441	c2mtech	94%	$12.1	Telecommunications	Carrollton	1994	50
3496	GTN Technical Staffing	91%	$33.0	Human Resources	Dallas	2000	115
3508	Homecare Homebase	90%	$108.0	Health	Dallas	2002	373
3520	W&M Environmental Group	90%	$9.1	Environmental Services	Plano	1995	45
3521	ZeOmega	90%	$32.2	IT Services	Plano	2001	477
3552	Staff One HR	89%	$252.5	Human Resources	Dallas	1988	44
3586	Switchplace	87%	$27.5	Travel & Hospitality	Dallas	1998	27
3597	Credera	87%	$47.3	IT Services	Addison	1999	222
3650	Infolob Solutions	85%	$22.5	IT Services	Irving	2009	2000
3807	A1 Security Cameras	80%	$5.0	Security	Addison	2007	9
3816	C1S Group	79%	$11.9	Engineering	Dallas	2009	25
3825	Goldfish Medical Staffing	79%	$20.4	Health	Plano	2007	40
3909	Point of Rental Software	76%	$9.7	Software	Grand Prairie	1982	50
3925	KWA Construction	75%	$71.7	Construction	Addison	2004	46
3934	Improving	75%	$42.5	IT Services	Addison	2007	175*
3942	Viva Railings	75%	$8.5	Construction	Carrollton	2008	36
4101	Oceans Healthcare	69%	$77.7	Health	Plano	2004	1277
4154	Ivie & Associates	67%	$460.5	Advertising & Marketing	Flower Mound	1993	622
4156	Silver Bullet Construction	67%	$3.3	Construction	Arlington	2010	17
4165	HealthMark Group	67%	$2.7	Health	Dallas	2006	22
4215	Vertical Nerve	65%	$3.6	Advertising & Marketing	Dallas	2009	35
4244	Masergy Communications	64%	$254.3	IT Services	Plano	2001	392
4246	RPC	64%	$15.3	Human Resources	Dallas	2002	23
4278	Maxim Management Group	63%	$13.7	Health	Frisco	1997	222
4287	**Sundance Healthcare**	**63%**	**$24.6**	**Health**	**Fort Worth**	**2010**	**474**
4321	M&S Technologies	62%	$44.3	IT Services	Dallas	2004	39
4337	Berrett Pest Control	61%	$6.5	Consumer Products & Svcs.	Garland	1999	45
4379	interRel Consulting	60%	$13.5	Business Products & Svcs.	Arlington	1997	64
4428	MedicOne Medical Response	58%	$12.2	Health	Farmers Branch	1999	215
4444	ZAK Products	58%	$30.6	Business Products & Svcs.	Dallas	2003	19
4452	Viverae	58%	$37.1	Health	Dallas	2003	737
4458	Pariveda Solutions	57%	$83.6	IT Services	Dallas	2003	456
4464	Parkway Construction	57%	$210.1	Construction	Lewisville	1981	165

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FIGURE 156. INC. 5000 FIRMS IN DALLAS-FORT WORTH MSA, 2016 (CONTINUED)

RANK	COMPANY	3-YR. REVENUE GROWTH	2015 REVENUE ($M)	INDUSTRY	CITY	YEAR FOUNDED	JOBS
4484	TSP	57%	$63.6	IT Services	Dallas	2002	617
4555	Synerzip	55%	$16.0	Software	Dallas	2004	434
4563	Town Square Financial	54%	$12.0	Financial Services	Plano	2009	83
4597	**Legacy Housing**	**53%**	**$106.9**	**Manufacturing**	**Fort Worth**	**2005**	**450**
4598	Meyer Dunlap	53%	$5.8	Advertising & Marketing	Dallas	2010	13
4600	The Trade Group	53%	$32.0	Advertising & Marketing	Carrollton	1986	121
4609	WatchGuard Video	53%	$58.2	Government Services	Allen	2002	185
4614	LiquidAgents Healthcare	53%	$36.4	Health	Plano	2003	75*
4623	RealManage	52%	$28.8	Real Estate	Carrollton	2004	350
4624	Thomas, Edwards Group	52%	$4.3	Business Products & Svcs.	Dallas	1997	42
4653	ISNetworld	51%	$124.7	Business Products & Svcs.	Dallas	2000	450
4667	Clearview Energy	51%	$58.4	Energy	Dallas	2006	50
4781	Hiatus Spa + Retreat	48%	$5.3	Consumer Products & Svcs.	Dallas	2007	110
4786	Coffee House Cafe	47%	$2.4	Food & Beverage	Dallas	2011	47
4808	**Forrest Performance Group**	**47%**	**$2.1**	**Business Prods & Svcs.**	**Fort Worth**	**2010**	**12**
4831	Romeo Music	46%	$5.4	Retail	Coppell	2006	14
4941	Sendero	42%	$13.4	Business Products & Svcs.	Dallas	2005	90
4944	Platinum Intelligent Data Solutions	42%	$4.2	Software	Dallas	2001	33
4946	Sharon Young	42%	$48.0	Consumer Products & Svcs.	Dallas	1986	125
4972	US-Analytics Solutions Group	41%	$17.9	Business Products & S Svcs.	Irving	1999	72

Sources: Inc. 5000; TIP Strategies.
Note: *Estimated jobs based on ranges provided: 175 = Medium-Large (100-249); 75 = Medium (50-99); 37 = Small (25-49).

In addition to targeting high-growth & technology-driven firms (like those listed in the Inc. 5000), professional services as a target should be focused more on the occupations than the industries. These types of occupations include architecture & engineering, legal, business & finance, and computer & math workers. These are the types of jobs and workers that would have the biggest positive impact on Fort Worth's economy. Creating an environment that is attractive to these types of workers will eventually lead to companies across many sectors taking note and seeking a location in Fort Worth to access this growing cluster of highly skilled talent.

FIGURE 157. INDUSTRY INTELLIGENCE & NETWORKING, PROFESSIONAL SERVICES

PROFESSIONAL SERVICES	
TRADE ASSOCIATIONS	
Professional Service Association	www.psaworld.com
Association of Management Consulting Firms	www.amcf.org
Institute of Management Consultants USA	www.imcusa.org
Society for Marketing Professional Services	www.smps.org
American Marketing Association	www.ama.org
American Bar Association	www.abanet.org
American Council of Engineering Companies	www.acec.org
American Institute of Architects	www.aia.org
Association for Computing Machinery	www.acm.org
RELEVANT CONFERENCES/EVENTS	
2017 SMPS Build Business Conference	
12-14 July 2017 *Indianapolis, IN*	www.smpsbuildbusiness.org/build-business2017/
AMA Annual Conference	
11-13 September 2017 *Las Vegas, NV*	www.ama.org/events-training/Conferences/Pages/Annual-Conference.aspx
ASCE 2017 Annual Conference	
08-11 October 2017 *New Orleans, LA*	www.2017.asceconvention.org/
The Inc. 5000 Conference	
10-12 October 2017 *Palm Desert, CA*	www.conference.inc.com/
AIA Conference on Architecture 2018	
21-23 June 2018 *New York, NY*	www.onferenceonarchitecture.com/
TRADE PUBLICATIONS	
Marketing Insights	www.ama.org/publications/MarketingInsights/Pages/Current-Issue.aspx
Marketer	www.smps.org/Resources/Marketer
ABA Journal	www.abajournal.com
Engineering News Record	www.enr.construction.com/Default.asp
Journal of the ACM	www.jacm.acm.org
Architectural Record	www.archrecord.construction.com
Consulting	www.consultingmag.com

FINANCIAL SERVICES

In the past, a city like Fort Worth that lacked a traditional regional banking infrastructure might have faced daunting odds if aiming to raise its profile in financial services. Today, the shifting landscape offers multiple opportunities for the City of Fort Worth to become a larger player in the financial services sector. The challenge is to match the market opportunities and the local assets.

MARKET OPPORTUNITIES

- Projected job growth in the Dallas-Fort Worth metro area of 10 percent over the next five years in the finance & insurance industry
- Recent high-profile expansions of financial services companies in the metro area are indicative of this sector's growth potential (e.g., TD Ameritrade, Schwab, JP Morgan Chase, USAA, Liberty Mutual)
- Financial services firms tend to set up their satellite operations near available labor pools and adequate airline connectivity.

FORT WORTH'S ADVANTAGE

- TCU Neeley Business School's nationally ranked entrepreneurship undergraduate program
- The presence of large pools of investment capital (including major private equity and high net worth individuals).
- Multiple generations of successful financial services and private equity firms and their spin-offs
- Supportive ecosystem for the industry that is competitive, different, and well-removed from other centers for the industry across the US

The financial services sector is broadly defined as NAICS 52, a category that includes, among other things, the vast array of bank branches, insurance agents, and personal financial advisors we see tucked away in strip malls and storefronts that line our daily commutes. These are the traditional "retail" interfaces of the financial services sector—the place where consumer transactions have long taken place. But the financial services sector as we thought we knew it is now in the throes of change. As this section describes, corporate functions continue to decentralize away from headquarter offices.

Moreover, the traditional interactions with customers are migrating to a new venue, the internet, a trend that has opened the door for both outsourcing and direct competition and has created a new market for security services that goes well beyond the armored vehicles and safe deposit boxes of yesterday.

Meanwhile, the financial services sector's erstwhile back-seat players—pensions and endowments — have stepped forward to become more vocal front-seat actors in the allocation of investment capital. Pensions and endowments have led industry efforts to screen investments based on environmental, social, and corporate governance (ESG) standards. And private equity firms have emerged to play a vital, high-profile economic role in restructuring under-performing firms and industries.

CONTINUED DECENTRALIZATION OF OPERATIONS: Financial services companies continue to spin various functional departments out of traditional financial centers where real estate and labor costs are high. The list of these functional areas—often including data processing and storage, accounting, procurement, customer services, and human resources—is likely to continue expanding. According to Deloitte, top priorities for IT investments by financial services include cloud-based platforms, robotic process automation, and cognitive technologies. In addition to meeting new demand, many of the sector's largest players are expected to be facing the replacement of aging core systems (Perspectives: Banking and Securities Outlook 2017, Deloitte).

When developing regional centers for functional operations, financial services firms tend to locate in urban areas where labor markets are ample, housing costs are affordable for employees, and the availability of non-stop air service to and from the corporate headquarters is dense. Dallas-Fort Worth's size, its labor market, and its air service capacity fit this profile to a tee. The decentralization of financial services operations is already being captured by other communities in the Dallas-Fort Worth metro area that are in the Fort Worth orbit. Many of the major recent finance and insurance business expansion projects in the region have taken place outside Fort Worth: JP Morgan Chase and USAA in Plano, Fidelity and Charles Schwab in Westlake, and TD Ameritrade in Southlake. Why not Fort Worth, too?

GROWING COMPETITION FROM FINTECH FIRMS: New technologies are emerging in financial services as startups proliferate. Can local the entrepreneurship ecosystem in Fort Worth hitch onto this fast-moving train? PwC identifies the rapid development of financial technology firms—fintech—as a trend the sector can no longer afford to ignore. The term encompasses a growing number of startups offering financial services such as online lending, retail-payment services, and investment advising. In its brief on the topic, the consulting firm cites figures by CB Insights which place industry funding at $11.2 billion in the first three quarters of 2015, nearly double the funding received by fintech companies in all of 2014. CB Insights has been among the firms raising awareness of the increasing role that fintech firms have begun to play in traditional banking. As CB Insights' map of the fintech revolution shows below, this is not a marginal trend. Moreover, these startups are not necessarily linked with traditional global banking centers like New York and London, or even regional financial centers like Charlotte or Dallas. How this industry evolves geographically remains an open question.

FIGURE 158. HOW FINTECH CAN "UNBUNDLE" THE FUNCTIONS OF TRADITIONAL BANKING

Sources: CB Insights, Disrupting Banking: The Fintech Startups That Are Unbundling Wells Fargo, Citi and Bank of America, Nov. 18, 2015.

INCREASED SECURITY DEMANDS: A crucial (and still evolving) component of fintech is cybersecurity. Financial firms are expected to pursue digital strategies more aggressively, as a response to the rise of fintech and a reflection of the rapid growth in the number of digital payment options including wearable technologies (such as smart watches and internet-connected devices), commonly referred to as the "Internet of Things." The growing number of these technologies is expected to continue to ratchet up the sector's cybersecurity needs. Existing technologies like biometrics and encryption are likely to be the near-term response to securing payment transactions. According to Deloitte's 2017 banking outlook, interest in creating "faster, seamless, and secure digital payments" will be a top focus. It is also important to keep in mind that "economic clusters" may be as likely to evolve around *technologies* (like cybersecurity, for example) as they are around traditional *industries* (like financial services). For example, the media outlet Xconomy reported in April 2016 that more than 60 cybersecurity firms were operating within an hour's drive of Boston's financial district.[2]

THE ROLE OF PRIVATE EQUITY: The person on the street has likely heard of private equity, but may not know exactly what it means. No surprise there, as private equity offices—unlike banks and insurance firms—employ few workers and fill only a tiny fraction of the office space in the US. Though few in number, the influence and power of private equity firms is considerable because they manage massive capital investments steered toward struggling companies and industries. Large institutions like endowments and pensions often "outsource" a portion of their investments to private equity firms allowing them to place large, long-term investments in raising the profitability of underperforming companies or industries. Once an acquisition is completed, a private equity firm will then send in a cadre of turnaround experts (often MBAs) who work with management to reboot the company. This is a much different type of work than hedge funds, which make risky, short-term investments hoping for hefty quick wins. Private equity is also different from venture capital where investments are smaller and spread across numerous startup and early stage companies, many of which are likely to fail.

Most people have heard the names of the leading US-based private equity firms like Blackstone, KKR, and Apollo and would not be surprised to learn that these firms call New York City home. But occasionally a twist of history means that a major player grows up in an unexpected location. The Carlyle Group in Washington, DC is one example of this. Fort Worth, too, counts itself in this elite group, thanks in large part to TPG Capital (formerly Texas Pacific Group), which consistently ranks as one of the world's largest private equity firms. Being the hometown of a major global player in private equity carries two unique advantages from an economic development perspective. The first is regenerative potential. TPG itself was founded by financial managers with ties to the Bass family, and Fort Worth would be a logical home for any future spin-offs or breakaways from the talented group of Fort Worth managers TPG has assembled. This is how talent clusters grow. Along with TPG, the city is home to several other private equity firms, including Crescent Real Estate, Luther King Capital Management, and Crestline Investors, Inc.

The second advantage is image. While private equity will never be an extensive job provider for the city like Lockheed or American Airlines, TPG Capital does support a relatively small number of highly trained, highly skilled financial professionals. The underlying advantage for Fort Worth is that TPG is known in investment circles worldwide. But is this global recognition of TPG Capital interchangeable with the city of Fort Worth in the same way that the Dell company name is with the city of Austin? A key challenge for Fort Worth is how to benefit from TPG Capital's global reputation and scope.

[2] Xconomy, "Boston Cybersecurity Map Shows Deep, Diverse Local Sector," April 20, 2016. [http://www.xconomy.com/boston/2016/04/20/boston-cybersecurity-map-shows-deep-diverse-local-sector/]

FIGURE 159. INDUSTRY INTELLIGENCE & NETWORKING

FINANCIAL SERVICES		
TRADE & PROFESSIONAL ASSOCIATIONS		
CFA Institute		www.cfainstitute.org
American Investment Council		www.investmentcouncil.org
Global Fintech Association		www.globalfintechassociation.io
Association for Financial Technology		www.aftweb.com
FinTech Professionals Association		www.fintechpros.org
Chartered Alternative Investment Analyst (CAIA) Association		www.caia.org
RELEVANT CONFERENCES/EVENTS		
FinTech Connect		
31 August 2017	*Cambridge, MA*	www.vencaf.org/fintechconnect
Finovate Fall		
11-14 September 2017	*New York, NY*	www.finance.knect365.com/finovatefall
ATM & Cyber Security 2017		
10-11 October 2017	*London, UK*	www.rbrlondon.com/events/atmsec
Empire Startups Fintech Conference		
14 November 2017	*San Francisco, CA*	www.empirefintechconference.com/pages/sf2017
TRADE PUBLICATIONS		
The Journal of Finance		www.afajof.org/details/landingpage/2866131/About-the-JF.html
ABA Banking Journal		www.bankingjournal.aba.com
Journal of Private Equity		www.iijournals.com/toc/jpe/current
Journal of Alternative Investments		www.iijournals.com/toc/jai/current
EY Journal of Financial Perspectives		www.fsinsights.ey.com/thejournal