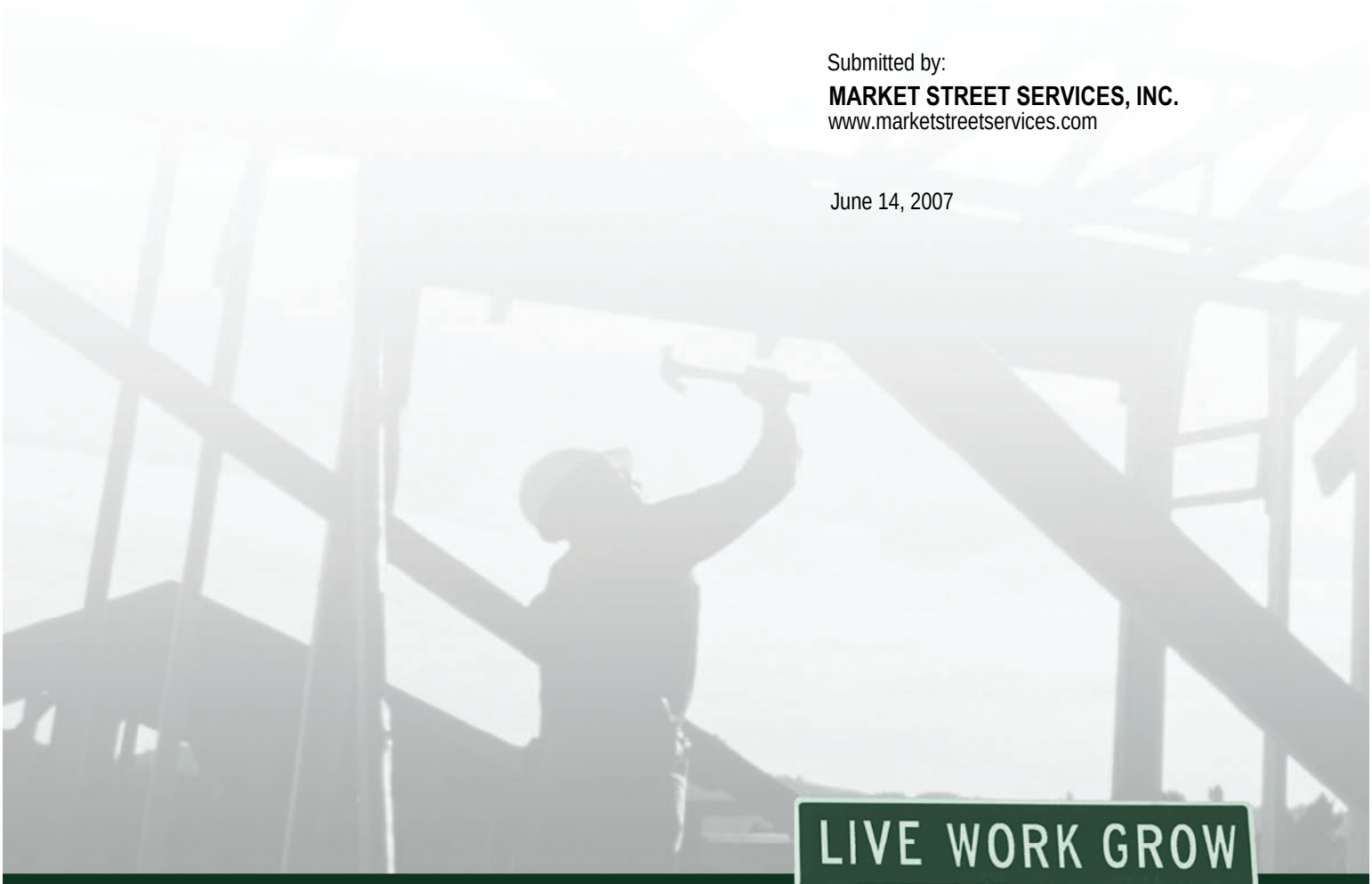
MARKET ST

Greater Austin, Texas
Target Business Review

OPPORTUNITY AUSTIN II

Submitted by:
MARKET STREET SERVICES, INC.
www.marketstreetservices.com

June 14, 2007



730 PEACHTREE STREET SUITE 540 ATLANTA GEORGIA 30308 404 880-7242 FAX 404 880-7246

MARKET ST

LIVE WORK GROW

Market Street brings original insights and clarity to the evaluation and revitalization of the places where people live, work and grow. *Market Street* is an independent firm that focuses solely on community and economic development issues. Through honest and informed assessments, *Market Street* can equip you with the tools to create meaningful change. Our solutions successfully merge our experience and expertise with your economic and social realities.

MARKET ST

Table of Contents

BACKGROUND

In 2003, the Greater Austin Chamber of Commerce retained *Market Street Services,* an Atlanta-based community and economic development consulting firm, to develop a holistic, long-term economic development strategy for the five-county Austin region. The Chamber leveraged the strategy recommendations in the creation of the *Opportunity Austin* initiative, which identified opportunities and challenges the Chamber would need to address in order to put the Austin region on the road to economic recovery after losing thousands of high-wage jobs in 2001 and 2002.

Opportunity Austin rolled out in 2004. Its aim was to rejuvenate the region's economy by creating 72,000 new jobs and adding $2.9 billion to the regional payroll by 2008. After registering solid success in *Opportunity Austin's* implementation, Chamber leaders have once again contracted with *Market Street* to assess Greater Austin's competitiveness and draft an economic development strategy – *Opportunity Austin II* – for the next five years.

The following scope of work is designed to continue metro Austin's strategic *Opportunity Austin* process with a comprehensive understanding of the region's present, past and future economic and demographic trends, and degree of business competitiveness. By initiating *Opportunity Austin II* with consensus regarding the challenges at hand, the eventual development of its strategic components and implementation guidelines will be grounded in defensible data, and agreement on priority strategic directions.

The five components of this strategic process are outlined below:

I. **Competitive Realities:** The report began with a snapshot of the region's economic and demographic trends compared to the state and the nation. Then, the Austin region's business climate was assessed against four peer metro areas: Denver, Colorado; Nashville, Tennessee; Phoenix, Arizona; and Raleigh-Durham, North Carolina. The region's relative competitiveness compared to these metros was evaluated according to the following components: education and workforce development; infrastructure; business costs; innovation and entrepreneurship climate; and quality of life. Finally, stakeholder input gathered from interviews, focus groups, and an online survey helped provide a more holistic analysis of Greater Austin's competitive realities, beyond the numbers. This research report was presented to the Greater Austin Chamber Economic Development Corporation Board in May 2007.

II. **Target Business Review**: This report will analyze how the region's employment structure and wages have changed in recent years. This investigation into Greater Austin's business clusters will inform recommendations to revise the Chambers target business sectors, where necessary. This analysis will help provide clear direction on current and future economic development efforts.

III. **Economic Development Marketing Assessment**: This assessment will examine Greater Austin's multi-faced marketing program against national best practices. A review of the Chamber's website, operations, and international marketing efforts will summarize efforts implemented since *Opportunity Austin's* inception. Lessons from other communities, including three best practice case studies, will provide key findings on how Greater Austin can further improve its marketing effectiveness.

IV. **"Taking it to the Next Level" Strategy**: This economic development strategy will outline goals for the Chamber and its partners to work towards over the five years of *Opportunity Austin II* implementation. Specific policy objectives and action steps will also be recommended. These will directly respond to the key findings of previous deliverables and stakeholder input. Benchmarks and performance measures will also be identified so that the Chamber may track its progress toward achieving the *Strategy's* goals during implementation.

V. **Implementation Plan**: Effective implementation is critical to the success of the *Strategy*. The Steering Committee and *Market Street* will work together to provide program assessments and enhancement recommendations, establish timetables and funding allocations for implementation. *Market Street* will also recommend a communication program for the *Strategy's* public rollout.

INTRODUCTION

Pursuit of target industries and development of clusters that form around burgeoning concentrations of jobs, talent, infrastructure and innovation are grounded in the inexact science of optimizing local competitiveness. The right mix of talent, technology, quality of life and other dynamics that makes or breaks a region's long-term success is a hard-to-quantify critical mass of qualities that companies seek when looking to expand or relocate. Greater Austin has a host of ingredients that contribute to that mix; the challenge will be to determine what additional components should be added, subtracted, combined or redefined to take the region to the next level of employment and wealth creation.

If there is one truism in economic development today, it is that success does not come easy. In fact, competition for new jobs has never been fiercer. Now more than ever, regions must not take anything for granted and cannot assume that past or current dynamism will continue unabated without reasonably increasing levels of investment and effort. Greater Austin's pursuit of priority target industry sectors takes these national and international trends and makes them local. What must realistically be done to ensure that the Austin region puts its best foot forward on the march to long-term prosperity?

This report has identified a list of existing base industries that drive the regional economy and others with the potential to further diversify metro Austin employment and provide a buffer against downturns in any one sector. Within these base and diversification industries are key sub-sectors that serve to advance the prospects of the industry as a whole. The development of these priority target industries will require the effective use of all the tools available in the economic development "toolbox." These include not only "traditional" strategies such as business retention and expansion, entrepreneurship and small business development, and recruitment, but also more creative and outside-the-box tactics that leverage the full breadth of local capacity. This capacity includes everything from the affiliated networks and business relationships of existing private sector leaders, to the tremendous breadth and depth of the University of Texas-Austin's Texas-Exes group.

The *Opportunity Austin II* strategy – "Taking It to the Next Level" – will include specific recommendations related to target-industry development. Many of these strategies will likely constitute a departure from the more traditional means of target development. Indeed, it would do a disservice to Greater Austin's tremendous capacity in workforce quality, existing business leadership, quality of life and other assets not to pursue all viable means to leverage this capacity for target-driven growth.

TALENT BASE EVALUATION

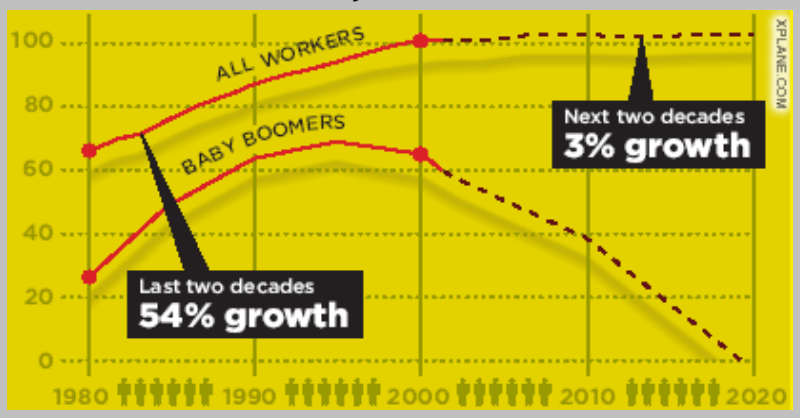
Because economic growth in Greater Austin is largely a function of having qualified, skilled workers to fill local jobs, it is important to consider the region's talent base in relation to the recommended target business sectors. Talent will continue to shape and define economic opportunities for communities – and nations. As such, this section briefly reviews Greater Austin's talent base – represented by its workforce and research capacity – to illuminate connections between the region's talent base and its economic potential.

Workforce Talent

In the past 40 years, the nation's rapidly expanding labor force has helped fuel domestic economic growth. The maturing of the Baby Boomer generation, a rising number of college-educated workers, and greater participation in the labor force among women and minorities provided a robust workforce for U.S. employers. However, demographic shifts are causing these trends to taper off, straining labor force dynamics.

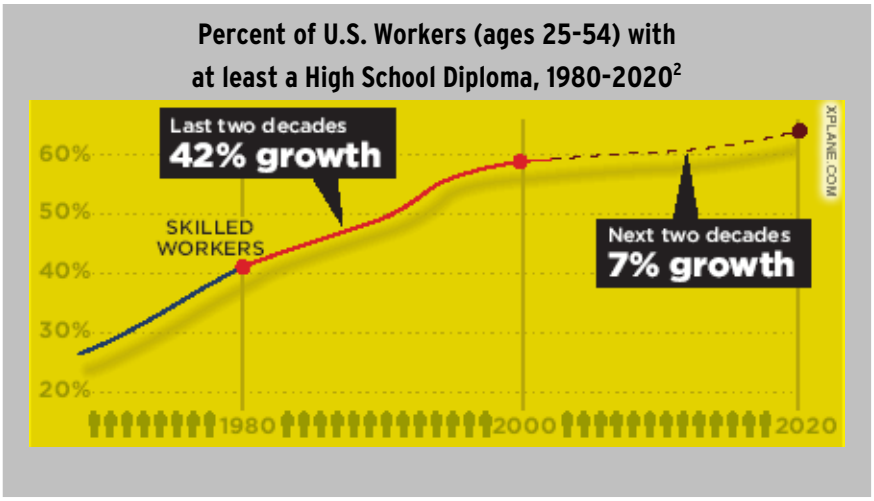
➲ **As Baby Boomers enter retirement, they will be replaced with a numerically smaller generation of workers.**

Number of U.S. Workers (ages 25-54), in millions, 1980-2020[1]

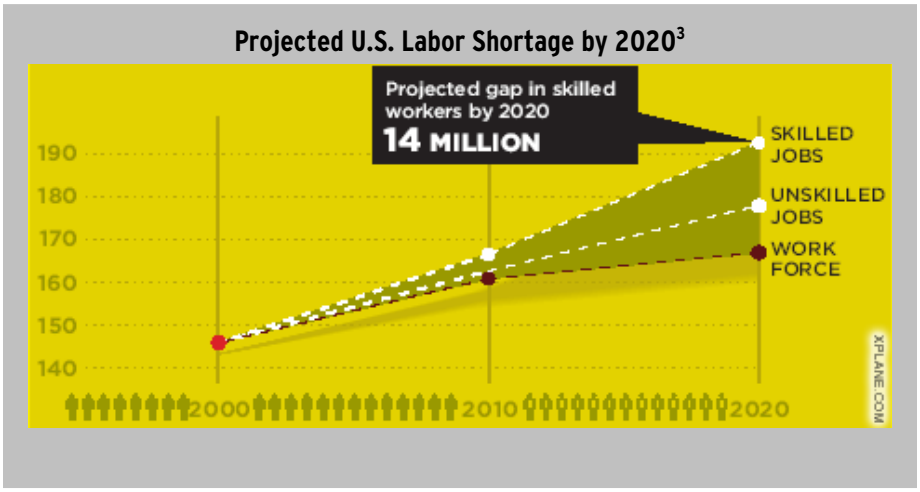


[1] Source: Paul Kaihla. "The Coming Job Boom." *Business 2.0 Magazine*. September 2003. Based on research from David Ellwood/Aspen Institutes Domestic Strategy Group; Anthony P. Carnevale and Donna M. Desrochers, Educational Testing Service.

➲ Educational attainment rates of workers will stagnate.



➲ The predicted result of these changing dynamics is a critical labor shortage of skilled workers in coming years.



Communities will increasingly be in competition for not only new businesses, but also for workers. While businesses in most sectors will feel the squeeze of a tightening labor market, "The shortage will be most acute among two key groups: managers, who tend to be older and closer to retirement, and skilled workers in high-

[2] Ibid.
[3] Ibid.

demand, high-tech jobs."[4] Because competition for talent will continue to sharpen, continued economic growth will increasingly rely on Greater Austin's ability to meet the workforce needs of current and prospective employers. In this regard, building the local talent base will be a critical component of target business sector development.

The implications of changing labor dynamics are significant and merit proactive attention. As such, this section of the *Target Business Review* examines issues associated with Greater Austin's workforce talent base.

Metro Austin Occupations

The following table shows employment, wages, and location quotients (LQ) by occupational group in metro Austin in May 2006. Location quotients are ratios that represent the concentration occupations in Greater Austin relative to the nation. In general, if a location quotient is greater than 1.0, the area has a larger share of employment in that occupation than the nation. The higher the LQ, the more concentrated the level of local employment.[5]

Because Greater Austin has comparatively higher concentrations of occupations in technology-related fields (which are expected to continue to grow nationwide through 2014), the region will feel the affects of a tightening labor market ahead of many other metro areas.

Greater Austin will have to fully leverage its local workforce potential and might need to actively recruit new workers to the area in order to meet employer demand in critical occupations.

[4] Ibid.
[5] More information about location quotients can be found in the Appendix.

Austin MSA Employment and Wages by Occupational Group, May 2006

Occupational Groups	Austin MSA Employment			U.S. Employment	Average Annual Wage	
	Emp.	Percent of Total Emp.	LQ	BLS Projected Growth 2004-2014	Austin MSA	U.S.
All Occupations	*711,080*	*100%*	*1.00*	*13%*	*$39,910*	*$39,190*
Computer and mathematical	35,440	*5.0%*	2.15	31%	$71,570	$69,240
Architecture and engineering	23,620	*3.3%*	1.81	12%	$64,680	$66,190
Life, physical, and social science	11,030	*1.6%*	1.67	16%	$57,530	$59,660
Business and financial operations	44,770	*6.3%*	1.43	19%	$57,790	$60,000
Legal	6,780	*1.0%*	1.29	16%	$76,380	$85,360
Management	34,610	*4.9%*	1.10	11%	$91,900	$91,930
Office and administrative support	131,010	*18.4%*	1.06	6%	$30,940	$30,370
Protective service	17,020	*2.4%*	1.05	14%	$33,830	$37,040
Food preparation and serving related	61,890	*8.7%*	1.05	16%	$17,270	$18,430
Education, training, and library	45,630	*6.4%*	1.04	20%	$41,120	$45,320
Personal care and service	18,050	*2.5%*	1.04	21%	$20,710	$22,920
Arts, design, entertain., sports, and media	9,490	*1.3%*	1.02	15%	$47,150	$46,110
Installation, maintenance, and repair	29,020	*4.1%*	1.01	11%	$36,590	$39,060
Sales and related	76,480	*10.8%*	1.01	10%	$34,300	$34,350
Building, cleaning and maintenance	20,480	*2.9%*	0.87	17%	$19,960	$22,580
Construction and extraction	30,410	*4.3%*	0.85	12%	$30,620	$39,290
Community and social services	7,040	*1.0%*	0.75	21%	$34,460	$39,000
Healthcare support	13,090	*1.8%*	0.70	33%	$24,050	$24,610
Healthcare practitioners and technical	25,210	*3.5%*	0.70	26%	$61,930	$62,030
Transportation and material moving	34,420	*4.8%*	0.67	11%	$25,390	$29,460
Production	35,430	*5.0%*	0.64	-1%	$28,140	$30,480
Farming, fishing, and forestry	ND	-	-	-1%	$18,530	$21,810

Source: U.S. Bureau of Labor Statistics

Note: Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers. ND=Non-disclosed data

Greater Austin's strength in computer, mathematical, engineering and sciences occupations greatly influenced the selection of the region's priority target sectors for growth.

UNDEREMPLOYMENT

The term "underemployment" describes members of the labor force working in jobs that do not fully utilize their skill sets or knowledge base. Underemployment can result from an economic recession, employer discrimination, low demand for workers with certain credentials, and other similar market-entry barriers. Such underutilization of labor force capacity results in economic loss not only for workers and families, but for communities as well.

Many stakeholders who participated in Opportunity Austin II interviews and focus groups reported anecdotal evidence of underemployment in Greater Austin. Because government sources like the Bureau of Labor Statistics and the Texas Workforce Commission do not measure or track underemployment, quantifying it can be a challenge. However, one way to gauge underemployment is to compare the educational attainment of the labor force against the degree requirements of local jobs.

According to U.S. Census estimates (the best and most up-to-date available) for 2005, metro Austin's labor force included 792,728 people (ages 25-64).[6] Forty percent of the metro labor force reported holding at least a Bachelor's degree.

Educational Attainment of Metro Austin's Adults (ages 25-64), 2005

Educational Attainment	Number	Percent of labor force
Less than high school	93,490	12%
High school	159,928	20%
Some college or associate's degree	219,700	28%
Bachelor's degree or higher	319,610	40%
Total 25-64 labor force	*792,728*	100%

Source: U.S. Census Bureau

BLS occupational data from May 2005 were analyzed to determine the number of jobs in metro Austin that show preference for – or require – a Bachelor's degree (or higher), based on national employer data. This analysis found that 274,360 jobs in metro Austin are in occupations where, nationally, employers show a preference for or require workers to have at least a Bachelor's degree. Comparing these two figures reveals an estimated "underemployed" population of 42,250 people, representing approximately 14 percent of Great Austin's 25-64 labor force.

[6] Local population estimates by educational attainment are not available from the Texas Workforce Commission or the Texas State Data Center.

The number of jobs that show preference for or require a Bachelor's degree is based on national BLS occupational classifications that attempt to account for multiple entry paths into an occupation. For example, few occupations exclusively require a Bachelor's degree for employment. Many occupations may consider an applicant with an Associate's degree and relevant work experience with equal weight as an applicant with a Bachelor's degree who lacks work experience. As such, this represents a high-end estimate of jobs that show preference for a 4-year degree, and therefore a conservative estimate of underemployed workers. The number of underemployed people in Greater Austin may potentially be higher in reality.

Underemployment Estimate for Metro Austin, 2005

Estimated labor force members (ages 25-64) with a Bachelor's degree or higher	319,610
Estimated jobs that show preference for or require a Bachelor's degree or higher*	274,360
Estimated "underemployed" population	*45,250*
Percent of total labor force	*14.2%*

Source: U.S. Bureau of Labor Statistics, U.S. Census Bureau

*Estimated jobs that show preference for or require a Bachelor's degree or higher based on BLS' "Educational Attainment Cluster System." This classification system attempts to account for multiple entry paths into an occupation. As such, this figure includes occupations where at least 40 percent of workers ages 25-44 nationwide have completed college. See Appendix for methodology details.

These numbers suggest that Greater Austin has a significant pool of underutilized talent. Input gathered from local university students and recent alumni suggest that Greater Austin's high quality of life incentivizes many graduates to remain locally, even if it means forgoing better employment opportunities elsewhere. The numbers also point to a potential "mismatch" between the skills of the workforce and skill sets demanded by regional employers. While there may be low market demand for workers with certain credentials, input gathered from the leaders within Greater Austin's business community suggest they have great difficulty finding talented, qualified workers for certain occupations in technology and management.

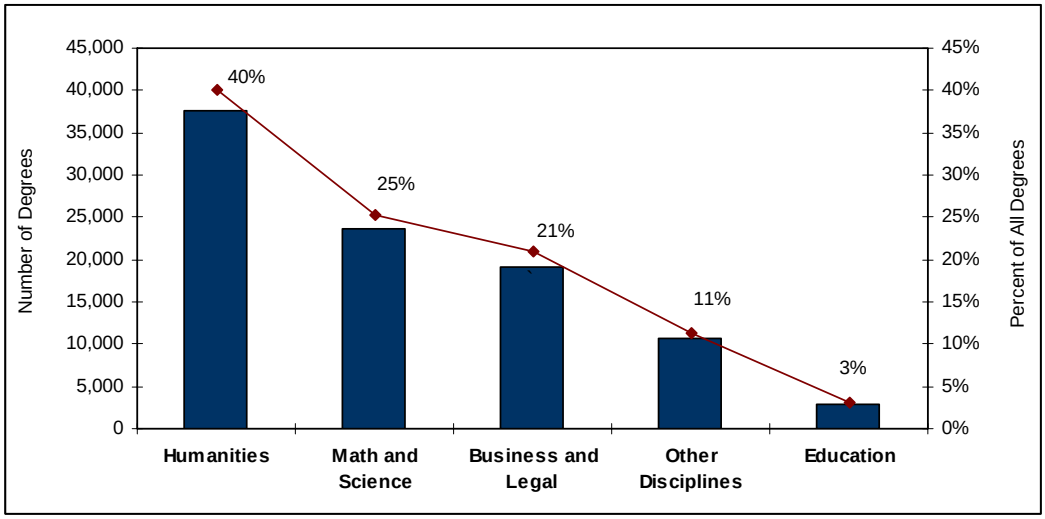
The presence of such a large group of "underemployed" adults informed the prioritization of Greater Austin target industries. Sectors that hold the potential to feature companies with proven needs to absorb many recent business and humanities graduates are included in metro Austin's list of promising "diversification" targets.

Degrees Granted in Metro Austin

Greater Austin's higher education opportunities play a key role in defining the region's workforce capacity. Because the region's economic health is heavily dependent on meeting the labor needs of current and future employers, it is important for community leaders to have a firm understanding of the "talent pipeline" of graduates from local colleges and universities.

The following chart shows the total number of degrees (two-year through doctorate) granted at University of Texas-Austin, Texas State University-San Marcos, and Austin Community College between 2002 and 2006. During this time, 93,759 degrees were granted, about 24,000 of which were granted in math and science-related disciplines. The largest proportion of students (40 percent) in the past five years graduated with a degree in humanities, while considerable numbers also earned degrees in business or law. Input gathered from university students and recent alumni noted that it is often difficult to find entry-level jobs in Greater Austin, particularly with a degree in business administration or humanities.

Total Degrees Granted (by discipline):
UT-Austin, Texas State University, and ACC, 2002-2006



Source: National Center for Education Statistics
These data include Associate's, Bachelor's, Master's, Doctorate, and First-Professional Degrees granted at University of Texas-Austin, Texas State University-San Marcos, and Austin Community College district. Specific information on local Master's and Doctorate degrees granted can be found in the *Competitive Realities* report.

Note: Math and science-related disciplines include architecture, biological sciences, computer sciences, engineering, health professions, math, statistics, physical sciences, and science technologies. Humanities disciplines include social sciences and history, communications, visual and performing arts, English, interdisciplinary studies, psychology, foreign languages, liberal arts and studies, area and cultural studies, and philosophy and religion.

The following table provides a more detailed analysis of degrees awarded at UT-Austin, Texas State, and ACC between 2002 and 2006. Business, management, and administrative services was the most popular discipline area, graduating 16,351 students. Many disciplines in the humanities graduated large numbers of students, including social sciences and history (8,796), communications (7,655), interdisciplinary studies (4,649), visual and performing arts (4,540), English (3,589), and psychology (3,669). Workers with degrees in humanities can typically develop solid critical thinking and communication skills, which are marketable to employers in many occupations.

On the other hand, workers with degrees in scientific or occupational trades develop more focused, technical skill sets. Disciplines areas in math and science posted strong graduate growth numbers in recent years. Between 2002 and 2006, degrees granted in engineering and related technologies grew 20 percent (up 296 from 1,450 graduates in 2002), health professional and related sciences grew 26 percent (up 236 from 921 graduates in 2002), and biological and life sciences grew 39 percent (up 259 from 672 graduates in 2002). While these trends are positive, input gathered from leaders in business and technology suggests they are facing labor shortages in occupations that require a technical degree, an intermediate level of managerial experience, or both.

Top Degrees Granted (by discipline):
UT-Austin, Texas State University, and ACC, 2002-2006

Discipline Area	*Degrees Awarded 2002-2006*		*Degrees Awarded in 2002*	*Degrees Awarded in 2006*	*Change in Total Degrees 2002-2006*	
	5-Year Total	**2-Year Degrees (as percent of total)**	**2002 Total**	**2006 Total**	**Number**	**Percent**
Total of all programs	*93,759*	*5%*	*17,132*	*19,860*	*2,728*	*15.9%*
Business Management and Administrative Services	16,351	4%	3,114	3,168	54	1.7%
Social Sciences and History	8,796	1%	1,661	1,790	129	7.8%
Engineering and Related Technologies	8,038	6%	1,450	1,746	296	20.4%
Communications	7,655	1%	1,356	1,620	264	19.5%
Health Professions and Related Sciences	4,943	25%	921	1,157	236	25.6%
Multi/Interdisciplinary Studies	4,649	-	929	983	54	5.8%
Visual and Performing Arts	4,540	8%	786	977	191	24.3%
Biological Science/Life Sciences	4,096	0%	672	931	259	38.5%
English Language and Literature/Letters	3,689	3%	694	808	114	16.4%
Psychology	3,669	2%	723	794	71	9.8%
Education	3,170	2%	573	653	80	14.0%
Computer and Information Sciences	2,850	10%	558	470	-88	-15.8%
Law and Legal Studies	2,775	2%	542	563	21	3.9%
Public Administration and Services	2,419	1%	425	552	127	29.9%
Foreign Languages and Literatures	2,018	6%	364	439	75	20.6%
Parks, Recreation, Leisure and Fitness Studies	2,007	-	394	439	45	11.4%
Physical Sciences	1,504	2%	285	296	11	3.9%
Home Economics, General	1,480	-	262	371	109	41.6%
Mathematics	1,347	3%	219	302	83	37.9%
Protective Services	1,190	22%	207	272	65	31.4%

Source: National Center for Education Statistics

Note: This list only includes degree areas that graduated more than 1,000 students. Therefore, the sum of these degrees by discipline does not match the total of all programs. These data include: Associate's, Bachelor's, Master's, Doctorate, and First-Professional Degrees granted at University of Texas-Austin, Texas State University-San Marcos, and Austin Community College district. Specific information on local Master's and Doctorate degrees granted can be found in the *Competitive Realities* report.

Current university students and recent graduates said that academic advising does not adequately promote connections between local job opportunities and available degree programs at UT-Austin. Furthermore, members of the business community who participated in focus groups expressed dissatisfaction with UT-Austin's efforts to connect students with small and mid-sized firms needing student interns. Such issues create frustration for both job seekers and regional employers and may compound underemployment and talent shortage dynamics.

Talent Recruitment

In addition to plugging the leaks in the local "talent pipeline," there are great opportunities for Greater Austin to continue to leverage its attractive quality of life in order to attract new workers to the area. As previously discussed in the *Competitive Realities* report, CEOs for Cities recently published workforce talent rankings for the nation's 50 largest metro areas in five sub-areas: college attainment, creative professionals, the young and restless demographic, traded sector talent, and international talent. The results of these rankings are outlined in the following tables.

Austin ranked among the top five metros in college attainment, creative professionals, the "young and restless demographic," and traded sector talent.[7] These rankings not only highlight the competitiveness of the local workforce, they point to Greater Austin's strongest potential competitors for talented workers as labor shortage grow more acute. It is also interesting to note that metro Austin ranked comparatively low in international talent. This suggests potential opportunities for bolstering talent in this regard through international graduate student retention at UT-Austin and recruitment from other research universities.

[7] The term "young and restless" was popularized by a December 2005 CEOS for Cities report entitled *The Young and Restless in a Knowledge Economy*. This report found that in demand 25-34 year old college-educated workers are increasingly mobile, often choosing a community to live in first, and then searching out a job. This dynamic represents a major shift in the way workers look for jobs.

Talented City Indicators (by MSA), City Vitals Rankings, 2006

College Attainment: *Percent of the metro population ages 25+ with at least a four-year college degree*

Rank	Metro Area	Percent
1	Raleigh Durham	41.0%
2	Washington - Baltimore	40.0%
3	**Austin**	**39.7%**
4	Boston	39.3%
5	San Francisco-Oakland-San Jose	38.8%

Creative Professionals: *Percentage of workers employers as mathematicians, scientists, artists, engineers, architects, and designers*

Rank	Metro Area	Percent
1	San Francisco-Oakland-San Jose	13.2%
2	Raleigh Durham	12.8%
3	Washington - Baltimore	12.6%
4	**Austin**	**12.0%**
5	Denver	10.6%

Young and Restless: *Percentage of the metro population that are 25-34 years old who have competed at least a four-year college degree*

Rank	Metro Area	Percent
1	Raleigh Durham	7.9%
2	**Austin**	**7.1%**
3	San Francisco-Oakland-San Jose	6.7%
4	Boston	6.5%
5	Atlanta	6.3%

Traded Sector Talent: *Percent of metro workers who have a college degree and are employed in private sector businesses excluding health care and education*

Rank	Metro Area	Percent
1	San Francisco-Oakland-San Jose	43.0%
2	Raleigh Durham	39.0%
3	Washington - Baltimore	38.6%
4	**Austin**	**38.4%**
5	Boston	38.2%

International Talent: *Percentage of metropolitan population ages 25+ who have competed a college degree and were born outside of the United States*

Rank	Metro Area	Percent
1	Miami-Fort Lauderdale	42.7%
2	Los Angeles	33.3%
3	San Francisco-Oakland-San Jose	27.3%
4	New York	27.2%
5	San Diego	22.8%
17	**Austin**	**13.8%**

Source: CEOs For Cities "City Vitals" report
Note: All calculations were computed at the metropolitan area level using the best and most recent data available. A complete methodology can be found in the report on page 5.

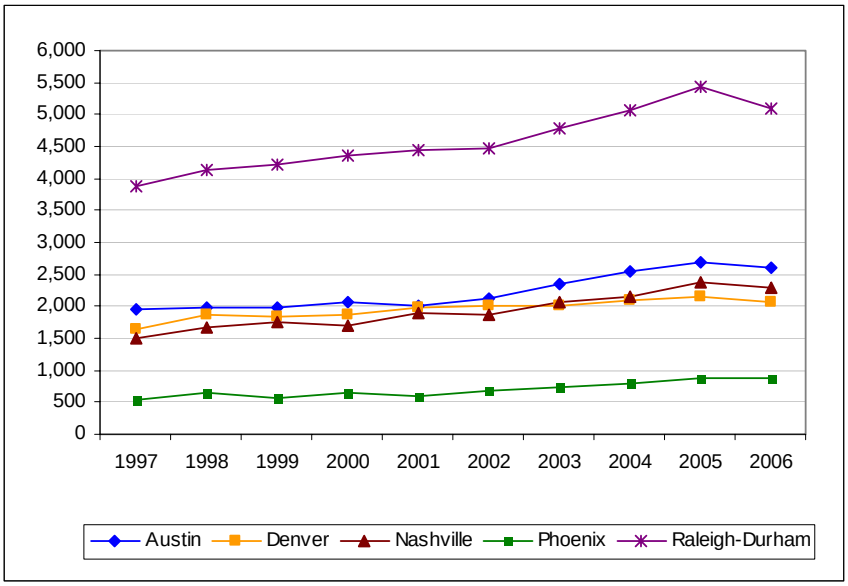
Research Talent

Scientific research has the potential to result in new products and processes with commercial applications. Furthermore, top researchers typically have robust networks of colleagues and industry contacts with whom they collaborate. In these regards, understanding Greater Austin's research talent may clarify future opportunities related to target-driven economic development.

As shown in the following chart, the number of scientific articles published by Austin researchers has increased since 2001, a trend echoed by the region's peer metro areas. Between 1997 and 2006, Austin's number of published scientific articles increased from 1,953 to 2,594 (33 percent), representing a major increase in research capacity and productivity. While Austin publishes more scientific research than Denver, Nashville, and Phoenix, Raleigh-Durham publishes twice as many published

research papers as Austin. Over the last 10 years, the number of scientific articles published by researchers in Raleigh-Durham increased 32 percent, from 3,869 in 1997 to 5,107 in 2006.

Estimated Number of Scientific Articles Published by Researchers (by MSA), 1997-2006



Source: ISI Web of Science Database of Publications
Note: Estimated number includes output from query run on Science Citation Index Expanded Database for the three largest cities in each MSA for research articles published in English.
Cities by MSA include: Austin (Austin, Round Rock, San Marcos), Denver (Denver, Aurora, Lakewood), Nashville (Nashville, Murfreesboro, Franklin), Raleigh-Durham (Raleigh, Durham, Cary), Phoenix (Phoenix, Mesa, Scottsdale). In each case, researchers in the MSA core city published the majority of research articles.

The following chart shows the number of scientific research publications by metro area for the last five years. Between 2002 and 2006, the total number of publications in Austin increased by 461, compared to 426 in Nashville, 209 in Phoenix, and 49 in Denver. While Raleigh-Durham is the most prolific region, Austin's research talent clearly brings a competitive advantage over Phoenix, Nashville, and Denver.

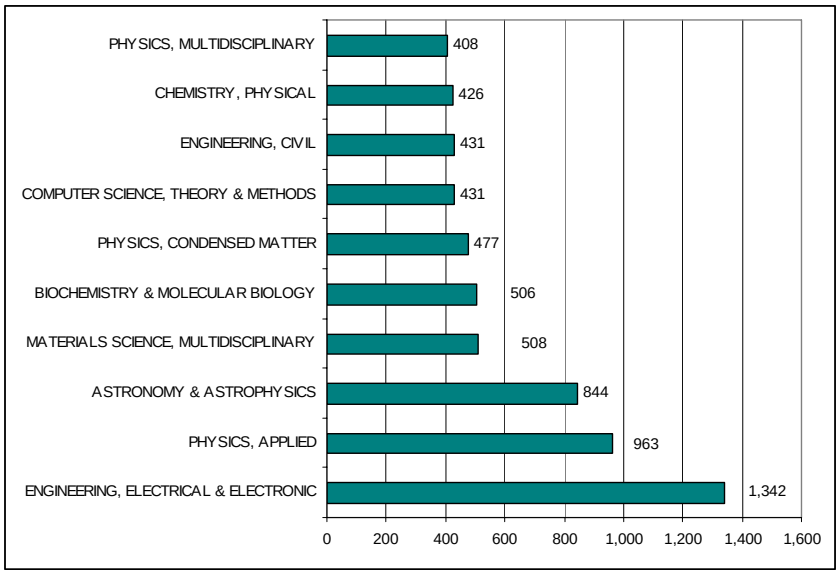
Estimated Number of Scientific Articles Published by Researchers (by MSA), 2002-2006

	2002	2006	Number Change	Percent Change
Austin	2,133	2,594	461	21.6%
Denver	2,018	2,067	49	2.4%
Nashville	1,860	2,286	426	22.9%
Phoenix	669	878	209	31.2%
Raleigh-Durham	4,473	5,107	634	14.2%

Source: ISI Web of Science Database of Publications
Note: See notes from first chart in this section.

Greater Austin researchers authored or co-authored 12,602 scientific articles between 2002 and 2006. Researchers at the University of Texas-Austin published the vast majority of these articles, with Texas State University, IBM, SEMATECH, Motorola, and other organizations contributing important research as well. As shown in the following chart, Greater Austin's key areas of expertise related to scientific research include engineering, physics, biochemistry, and computer science. While this chart only shows the region's top 10 research areas, it is important to note that substantial research in biology and ecology, pharmacology and pharmacy, and nanoscience and nanotechnology[8] have been published as well.

Key Areas of Expertise in Greater Austin:
Published Research Articles by Discipline, 2002 – 2006



Source: ISI Web of Science Database of Publications
Note: See notes from first chart in this section.

What differentiates Austin is its top research discipline areas. The following chart shows the top five research categories by metro area between 2002 and 2006. Nashville, Denver, Phoenix, and Raleigh-Durham's research efforts are all heavily concentrated in the biosciences and medicine, likely bolstered by the presence of medical schools in each of these locations. While an Austin-based medical school might create potential research opportunities, the sheer volume of life-sciences research in the competitor areas shows just how far Greater Austin must come to be competitive in this category.

[8] Note: Articles published on Materials Science, Physics, and Electrical Engineering may also contain research related to nano-scale processes and products.

Top Five Areas of Expertise in Austin and Comparison Metros
Published Research Articles by Discipline, 2002 – 2006

Research Area	Publications
Austin	
Engineering, electical and electronic	1,342
Physics, applied	963
Astronomy and astrophysics	844
Material science	508
Biochemistry and molecular biology	506
Denver	
Biochemistry and molecular biology	899
Immunology	711
Pediatrics	479
Endocrinology and metabolism	411
Surgery	497
Nashville	
Biochemistry and molecular biology	1,301
Oncology	686
Pharmacology and pharmacy	405
Immunology	386
Surgery	459
Phoenix	
Clinical neurology	472
Surgery	398
Neurosciences	168
Medicine (general and internal)	156
Gastroenterology and hepatology	175
Raleigh-Durham	
Biochemistry and molecular biology	1,732
Cardiac and cardiovascular systems	1,222
Oncology	901
Neurosciences	879
Genetics and heredity	812

Source: ISI Web of Science Database of Publications
Note: See notes from first chart in this section.

However, Greater Austin's overwhelming strength in semiconductors/electrical engineering, physics, and materials science/nanotechnology puts the region in a very competitive position for these technologies and factored heavily into the determination of regional target industry sectors.

TARGET BUSINESS SECTORS

The purpose of this *Target Business Review* is to identify industry groups on which to focus economic development efforts in order to grow and diversify Greater Austin's economy. In this document, the terms "target," "cluster," and "target sector" describe the same concept: an industry group focused on for recruitment, retention/ expansion, and entrepreneurship/small business development.

Each target industry group is comprised of sub-sectors that feed the development of the industry as a whole. Developing improved synergies between these sub-components of the target industries will enable Greater Austin to most effectively grow the industry cluster as the optimal sum of its parts.

Market Street considers research presented in previous reports, recent employment and wage trends, and stakeholder input when determining priority local targets. Other criteria are also considered, including:

- Does Greater Austin have a significant presence in this target sector, in terms of employment quantity or concentration?
- Does the target sector have good growth prospects nationally?
- Is there wealth creation potential in the target sector, in terms of high wages and advancement opportunities?
- Is the existing workforce prepared to take jobs in this target sector?
- Do the targets, as a whole, provide opportunities for a broad range of constituents in Greater Austin?
- Does the mix of targets help to bolster *Opportunity Austin* goals, job and wealth creation and economic diversification?
- Are there existing local assets that give Greater Austin a competitive edge in this target area?

Market Street identified the following as the most promising target clusters for the Greater Austin Chamber to pursue as it moves forward with *Opportunity Austin*:

- **Base Targets:** These are business sectors that represent existing strengths of the Austin region.
  - **Convergence Technologies**
  - **Creative Media**

- **Diversification Targets:** These are business sectors that represent opportunities for further economic diversification in Greater Austin.
  - **Green Industries**
  - **Corporate and Professional Operations**
  - **Health Care and Life Sciences**

Sub-sectors contained under these Base and Diversification Targets do not constitute separate and distinct targets. Rather, each sub-sector is seen as a cog in the engine of growth driving target-industry development as a whole.

In recent years, the strategies of the Greater Austin Chamber of Commerce have focused on eight target sectors: Automotive, Headquarters and Back Office, Distribution and Logistics, Data Centers, Clean Energy, Digital Media, Semiconductors, and Wireless Technologies. *Market Street's* recommendations reflect the **reorganization** of some existing targets, addition of select sub-sectors, and **elimination** the Automotive (manufacturing) and Distribution and Logistics targets.

As evidenced by both the location quotients (LQ) and number of jobs, presently the Austin metro has a very limited presence in the three manufacturing sectors that most directly apply to the preexisting automotive target. The Green Industries and Convergence Technologies targets recommended in this report best cover the Austin area's most realistic opportunities related to automotive industries.

Automotive Manufacturing Employment in Metro Austin, Q3 2002 and Q3 2006

NAICS Code	Sector Name	*Jobs Q3 2006*			*Average Annual Wages Q3 2006*		*Establishments Q3 2006*	
		Total	LQ	% Change Since 3Q 02	Austin MSA	U.S.	Total	% Change Since 3Q 02
3361	Motor vehicle manufacturing	n/d	n/d	n/d	n/d	$81,539	n/d	n/d
3363	Motor vehicle parts manufacturing	123	0.04	-67.4%	$33,397	$51,750	10	-9.1%
3369	Other transportation equipment manufacturing	22	0.10	n/d	$25,241	$48,627	6	n/d
	Total, Automotive	**145**	**0.03**	**-61.5%**	**$32,159**	**$59,236**	**16**	**45.5%**

Sources: Texas Workforce Commission, U.S. Bureau of Labor Statistics

The Austin metro area has a limited presence of transportation and warehousing firms, as represented by the location quotient for this sub-sector of 0.51. The other side of this target is wholesale trade, but the metro's high LQ of 1.2 in this area can largely be attributed to Dell, because much of that company's employment base is classified within the wholesale trade sub-sector of commercial equipment merchant wholesalers. Furthermore, Austin's increasing traffic congestion and

underdeveloped transportation infrastructure challenge the future competitiveness of the region in this target sector.

Distribution & Logistics Employment in Metro Austin, Q3 2002 and Q3 2006

NAICS Code	Sector Name	*Jobs Q3 2006*			*Average Annual Wages Q3 2006*		*Establishments Q3 2006*	
		Total	**LQ**	**% Change Since 3Q 02**	**Austin MSA**	**U.S.**	**Total**	**% Change Since 3Q 02**
42	Wholesale trade	37,790	1.20	11.4%	$64,406	$55,262	2,015	12.6%
4234	Commercial equip. merchant wholesalers*	20,763	5.99	14.8%	$74,025	$75,029	257	6.2%
48-49	Transportation and warehousing	14,407	0.51	8.5%	$41,440	$43,566	580	11.1%
	Total, Distribution & Logistics	**52,197**	**0.87**	**10.6%**	**$58,067**	**$49,746**	**2,595**	**12.3%**

Sources: Texas Workforce Commission, U.S. Bureau of Labor Statistics
*Classification of Dell. Dell employs approx. 10,000 in the area (according to Round Rock EDP), so possibly as many as 1 in 4 of the MSA's Wholesale Trade employment works for Dell.

Market Street recognizes the considerable investments of time and effort that have gone into the targeting of the Automotive (manufacturing) and Distribution and Logistics sectors. However, based on the aforementioned data as well as interviews with top regional officials, it is our conclusion that investing additional priority dollars and personnel time is not warranted on these industry groups. If independent opportunities in these sectors arise, of course, they should be pursued to the fullest extent possible.

Ultimately, developing the recommended target clusters requires a multi-pronged approach of traditional recruitment, entrepreneur and small business development, and retention and expansion of existing businesses. Furthermore, the recruitment and retention of talent should also be a component of target development as finding qualified workers is a challenge for many of the region's existing and perspective businesses. Success of each target will require the strengthening of supporting infrastructure, including education programs, research capacity, and cluster networks. Goals and specific action steps for growing the target clusters will be detailed in the *"Taking it to the Next Level" Strategy.*

Strengths, Weaknesses, Opportunities and Challenges

Critical to the pursuit of a target-industry development strategy is the understanding of Greater Austin's competitive capacity in each segment. As such, *Market Street* has assessed each recommended target – and the region as a whole – related to the core strengths, weaknesses, opportunities and challenges (SWOC) the Greater Austin region faces when growing employment in these categories.

Rather than repeat overriding regional SWOC issues in each matrix, *Market Street* has prepared a **Master Matrix** that includes issues applicable to regional competitiveness as a whole. The specific target-industry matrices will then only include issues related to the dynamics of that particular sector.

Master SWOC Matrix Applicable Across All Target Industries

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
Education and Workforce Development	▪ Overall K-12 public school quality ▪ High levels of public and private investment in public K-12 education ▪ Quality and reputation of UT-Austin ▪ Training quality and capacity of ACC ▪ Diverse array of private four-year colleges ▪ Engaged business community ▪ High levels of educational attainment	▪ Potential lessening of public K-12 graduation standards ▪ Bureaucracy and budget dynamics at UT-Austin limit ability to start new degree programs ▪ Poor mobility – difficult to access education, training and work ▪ Few multi-modal options to access education, training and work	▪ Creation of more career-focused K-12 programs and campuses ▪ Continuing improvement of college matriculation rates ▪ Growth of Texas State in San Marcos and Round Rock ▪ Better leveraging of Travis and regional WIBs ▪ Large "underemployed" workforce ▪ Leveraging Texas-Exes	▪ Growth in under-17 population potentially a strain on K-12 capacity ▪ Increasingly "at-risk" public school population ▪ Enrollment caps at UT-Austin ▪ Tightening labor force ▪ Lack of "C-level" executives ▪ Increasing lack of affordable workforce housing
Business Costs	▪ Overall competitive cost climate ▪ High wages (good for workers) ▪ Competitive tax rates (high property tax balanced by no income tax) ▪ Competitive provision of incentives ▪ Online and "one-stop shop" for permitting	▪ Higher relative power costs ▪ Development costs said by some to be high ▪ High transportation costs ▪ Relatively high wages (cut into company profits)	▪ Provision of power-rate discounts for high-volume users ▪ Lowering of transportation costs through capacity enhancements ▪ More robust incentives for incumbent firms ▪ Continued streamlining of development-review process	▪ Lower overall business costs overseas, especially cost of labor ▪ Consensus for provision of incentives weakening as economy grows?

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
Business Climate	▪ Active, high-capacity regional Chamber of Commerce ▪ Good relationship b/w governments and business community	▪ A reported continuing "disconnect" between technology and real estate/banking firms	▪ Leveraging of existing executives for job-creation potential ▪ Better synergies between industries ▪ Further improving regional cooperation, participation and planning	▪ Potential for lessening of public-private investment in economic and community development
Innovation and Entrepreneurship Capacity/ Resources	▪ Strong and well-developed "entrepreneurial culture" ▪ Strong research capacity at UT-Austin and in private sector – high number of patent awards ▪ UT-Austin Office of Technology Commercialization ▪ Competitive supply of capital resources ▪ Strong VC community compared to most metro areas ▪ Central Texas Angels Network ▪ Significant SBA lending	▪ Limited technology incubation space ▪ Bureaucracy at UT-Austin still a challenge for successful tech transfer ▪ Lack of coordinated regional small-business and entrepreneurial development system	▪ Improving tech transfer climate at UT-Austin ▪ Leveraging of top regional executives and their business networks ▪ Enhancing R&D at Texas State ▪ Translating patents into creation of companies and jobs ▪ Increasing per-capita S&L and bank loans to small businesses	▪ VC money said to be in shorter local supply – top firms migrating to Silicon Valley ▪ Thin supply of "C-Level' executives for early-stage firms
Infrastructure (traditional and technological)	▪ Strong wireless and wireline telecommunications capacity ▪ No reported issues of non-competitive utilities infrastructure	▪ No east-west Interstate and generally poor east-west road accessibility ▪ Lack of rail rapid transit ▪ Significant disadvantage in rail and intermodal distribution capacity ▪ MPO only represents 3 of 5 regional counties	▪ Toll roads and design-build construction scenarios ▪ Soon-to-open commuter rail and potential for Austin-San Antonio line ▪ Expanding MPO to serve entire region	▪ State legislature clamping down on options for toll-road development

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
Quality of Life	▪ Strong overall local quality of life ▪ Safe community ▪ Strong non-profit community ▪ Compelling natural environments and parkspace ▪ Numerous arts/culture and entertainment amenities ▪ Thriving Downtown Austin – retail and residential ▪ Burgeoning regional retail, residential and mixed-use development ▪ Low number of facilities that release pollutants into atmosphere	▪ Traffic congestion ▪ Few direct domestic and international flights ▪ Lack of major-league professional sports ▪ Fewer physicians-per-capita than certain comparison metros	▪ Telework strategies ▪ Marketing Austin lifestyle to outside companies, professionals, executives and entrepreneurs ▪ Multi-modal transportation options ▪ Mixed-use and downtown development in regional cities ▪ Continuing growth in hospital and healthcare capacity ▪ Increasing local voting rates	▪ Rising housing costs and overall cost of living ▪ Increasing poverty rates, especially among children ▪ Potential air quality concerns

Base Targets

Convergence Technologies and Creative Media represent current key areas of Greater Austin's economy that contribute significantly to the region's creative culture and identity. These are sectors with higher concentrations of firms in Austin relative to the nation, as exemplified by higher location quotients. Focusing economic development activities on these targets will help ensure that the needs of major local employers are met, while also working to leverage Greater Austin's key business clusters for economic growth.

Convergence Technologies

Sector Description and Trends

Advances in technology are creating dynamic new processes and products that blur traditional definitions. For example, these advances have created cell phones with camera and MP3 player capabilities and gaming consoles that play CDs and DVDs. It is an incredibly fast-paced segment, where innovation is constantly expanding the potential product-development landscape. Collectively, these "convergence" technologies are driving the telecommunications, software, media, automotive, computer, semiconductor, and related industries into new, and often overlapping, directions. "Facilitators" like nanotechnology can leverage these converging forces and transform them further into marketable products and processes. In essence, technological "convergence" refers to a trend where some technologies having distinct functionalities evolve to technologies that overlap, i.e. multiple products come together to form one product, with the advantages of each initial component.[9]

To best leverage these trends, the Austin metro needs to refocus its previous efforts related to Semiconductors, Wireless, and the cross-platform technological components of Digital Media and Automotive, into a merged Convergence Technologies target aimed at growing the whole through the sum of its parts. Nanotechnology applications are also integrated into this cross-pollination of products and technologies into new, marketable amalgams. While the development of each technological component of Convergence Technologies will continue to leverage Greater Austin's workforce, research, educational and organizational assets, a focus on the synergies of these technologies will position the region to capitalize on the dizzying product-development potential of the Information Age's convergence revolution.

[9] Source: Wikipedia, accessed 6/5/07, at http://en.wikipedia.org/wiki/Technological_convergence.

Metro Austin's Convergence Technologies target is predominantly comprised of R&D activities, computer systems design, software publishing, wireless telecommunications, and related product manufacturing. Existing and prospective companies in these sub-sectors will be marketed as a component of the broader Convergence Technologies target. Based on projected job growth numbers, much of the convergence-technology-related growth in the U.S. will be in computer systems design and software publishers.

Also detailed in the following table, certain of the manufacturing sub-sectors leveraging potential Convergence Technologies product components are clearly vulnerable to the same global forces pressuring nearly all U.S. manufacturing employment. However, numerous manufacturers have innovated to remain competitive domestically. As an example, while semiconductor manufacturing is a particularly vulnerable U.S. sub-sector, recent Austin-area investments (most importantly, Samsung's expanded $3.5 billion 300-mm water fabrication plant), suggest Greater Austin may retain its competitive position in this sub-sector, despite national trends.

National Growth Projections for Convergence Technologies, 2004-2014

NAICS Code	Sector Name	*Projected Job Growth, U.S. 2004-2014*	
		Percent	**Number**
3332	Industrial machinery manufacturing	-12.5%	-14,900
3342	Communications equipment manufacturing	-10.3%	-15,500
3344	Semiconductor and other electronic component mfg.	-11.7%	-52,900
5112	Software publishers	67.6%	161,300
5172	Wireless telecommunications carriers (except satellite)	30.6%	57,951
5413	Architectural, engineering, and related services	15.8%	198,900
5415	Computer systems design and related services	39.5%	452,900
5417	Scientific research and development services	11.9%	65,300
	Total employment, all workers	*13.0%*	*18,927,569*

Source: U.S. Bureau of Labor Statistics "2004-14 National Employment Matrix"

For the Austin metro area, certain of these projected national trends illustrate the vital importance of the regional economy diversifying to other sectors beyond the high-tech computer, semiconductor, and wireless-related activities for which it is so well known and has become so reliant. The high-tech industry bust in 2001 had a devastating impact on the Austin regional economy. The effects may have not been as severe if the metro had supported a broader diversity of employers.

Convergence Technologies is a key target for prioritization because of the potential of the region's vast experience and knowledge base in IT, semiconductor, wireless, software, nanotechnology, and related high-tech operations to create and support new ventures and product development opportunities. Much of Convergence

Technologies' growth potential will come out of R&D and related activities that focus on developing new products and distribution methods, and service offerings that can keep up with the fast-moving pace of convergence technology development.

The following chart "defines" the Austin metro's Convergence Technologies target, as best as the NAICS classification system allows. The sub-sectors included in Convergence Technologies do not constitute separate and distinct growth targets, but rather represent *Market Street*'s attempt to focus recruitment, retention/expansion and small business development efforts on those components that will most effectively "move the needle" of Convergence Technologies growth.

Another key distinction relates to the dynamics of companies that comprise a target industry and the workforce that supports that industry. NAICS codes are simply classifications of employment; most large companies contain a workforce made up of many different employment specializations, and, therefore, a wide assortment of various NAICS definitions.

By applying specific NAICS sub-sectors to the Convergence Industries target, *Market Street* is positioning the Greater Austin Chamber to be able to track the employment dynamics related to Opportunity Austin II target-specific programming. It is not assumed that each separate NAICS code equates to a "development target."

This will be true for all of the target industries featured in this report.

Convergence Technologies

- NAICS definition:
  - 333295 Semiconductor machinery manufacturing
  - 3332 Industrial machinery manufacturing
  - 3342 Communications equipment manufacturing
  - 3344 Semiconductor & electronic component manufacturing
  - 5112 Software publishers
  - 5172 Wireless telecommunications carriers
  - 5413 Architectural & engineering services
  - 5415 Computer systems design & related services
  - 5417 Scientific research & development services

- Examples:
  - Semiconductor chip and related product manufacturing
  - Software writing, modifying, testing, and support
  - Planning and designing the integration of computer hardware, software, and communication technologies
  - Engineering design services
  - Research and product development activities

- Total U.S. employment is 4.57 million as of Q3 2006
- The national average annual pay is $74,425

- Location Factors:
  - ✓ Highly educated workforce
  - ✓ Significant R&D activities in high-tech
  - ✓ Strong quality of life

Existing Regional Employment

Convergence Technologies is the largest of Greater Austin's recommended targets, as would be expected because so many of the Austin area's large employers are involved in the convergence components of computing, software, telecommunications, and semiconductor chip manufacturing (see the subsequent Large Employers section for more information).

Austin stands out among U.S. metro areas in the NAICS definition of this target, as evidenced by its high LQ of 2.20. Particularly noteworthy existing strengths – measured by sub-sector LQ and average annual wages – are semiconductor and electronic component manufacturing (6.64 and $101,882, respectively), software

publishers (4.01 and $87,262), communications equipment manufacturing (2.13 and $95,770), and computer systems design and related services (1.78 and $93,395).

Several of the sub-sectors within this target experienced job losses from third quarter 2002 to third quarter 2006: communications equipment manufacturing (-23.1%), software publishers (-12.0%), and semiconductor and electronic component manufacturing (-4.6%). Even so, because of Greater Austin's robust existing capacity in Convergence Technologies (represented by the LQ of 2.20), it has been designated as a "base" target.

Convergence Technologies Employment in Metro Austin, Q3 2002 and Q3 2006

		Jobs Q3 2006			*Average Annual Wages Q3 2006*		*Establishments Q3 2006*	
NAICS Code	**Sector Name**	**Total**	**LQ**	**% Change Since 3Q 02**	**Austin MSA**	**U.S.**	**Total**	**% Change Since 3Q 02**
333295	Semiconductor machinery manufacturing	129	n/d	n/d	$87,789	$101,455	8	n/d
3332	Industrial machinery manufacturing	n/d	n/d	n/d	n/d	$57,982	n/d	n/d
3342	Communications equipment manufacturing	1,642	2.13	-23.1%	$95,770	$77,891	18	5.9%
3344	Semiconductor & electronic component mfg.	16,349	6.64	-4.6%	$101,882	$68,999	98	-3.9%
5112	Software publishers	5,250	4.01	-12.0%	$87,262	$117,070	131	-16.6%
5172	Wireless telecommunications carriers	2,150	2	26.5%	$49,310	$57,018	81	50.0%
5413	Architectural & engineering svs	11,840	1.52	25.0%	$60,871	$63,614	1,011	11.0%
5415	Computer systems design & related svs	12,262	1.78	22.3%	$93,395	$81,389	1,205	28.5%
5417	Scientific research & development svs	4,269	1.26	11.6%	$64,554	$79,842	150	36.4%
	Total, Convergence Technologies	**53,891**	**2.2**	**7.2%**	**$84,242**	**$74,425**	**2,702**	**18.0%**

Sources: Texas Workforce Commission, U.S. Bureau of Labor Statistics

The large employers in the sub-sectors that feed Convergence Technologies represent many of metro Austin's most well-known firms – specifically, Dell, IBM, Freescale Semiconductor, and National Instruments, to name a few. Collectively, these employers have attracted a world-class regional workforce in tech-related research, development, production, and services.

Convergence Technologies: Example Large Employers

Company	Primary Product or Service	Employees
Dell Inc. - headquarters	Computer equipment manufacturing & sales	6,000+
IBM Corp. - divisional/regional headquarters	Computer hardware & software manufacturing	6,000+
Advanced Micro Devices	Semiconductor chip manufacturing	2,000-5,999
Applied Materials - divisional/regional headquarters	Semiconductor production equipment mfg.	2,000-5,999
Freescale Semiconductor - headquarters	Semiconductor chip design & manufacturing	2,000-5,999
National Instruments - headquarters	Virtual instrumentation software & hardware mfg.	2,000-5,999
Solectron Texas - divisional/regional headquarters	Electronics manufacturing	2,000-5,999
Apple Computer - divisional/regional headquarters	Computer mfg., technical, and administrative support center	1,000-1,999
AT&T Labs	Telecommunications	1,000-1,999
Cisco Systems - divisional/regional headquarters	Interconnect devices manufacturing	1,000-1,999
Samsung Austin Semiconductor - headquarters	Semiconductor chip manufacturing	1,000-1,999
Spansion	Semiconductor memory chip manufacturing	1,000-1,999

Sources: Greater Austin Chamber of Commerce, Harris InfoSource

The presence of so many vital large employers, in addition to the tremendous dynamism of Greater Austin's innovation, entrepreneurship and small business development assets related to the components of Convergence Technologies, positions the region to be the standard-bearer for U.S. metro areas capitalizing on the multi-trillion-dollar opportunities generated by the "coming-together" of technological processes and products.

Strengths, Weaknesses, Opportunities, Challenges

The following chart represents this target sector's key strengths, weaknesses, opportunities, and challenges as they relate to the primary areas of Greater Austin's competitiveness.

Convergence Technologies Target SWOC Matrix

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
Education and Workforce Development	▪ UT-Austin strong in numerous convergence industry programs and specializations ▪ Master of science in science and technology commercialization at UT-Austin	▪ Low four-year degree attainment in technology relative to business and humanities	▪ Better K-12 career-focused linkages in convergence industries ▪ Higher Texas State degree totals in programs feeding convergence workforce ▪ Higher ACC degree totals in programs feeding convergence workforce	(see Master Matrix)
Business Costs	▪ Technology wages are not restrictively high	(see Master Matrix)	▪ Marketing Austin region to convergence firms in high-cost regions	(see Master Matrix)
Business Climate	▪ Existing industry-specific trade councils, i.e., AusTech Alliance; Austin Technology Council; Austin Wireless Alliance	(see Master Matrix)	(see Master Matrix)	▪ General disengagement of technology firms from Greater Austin Chamber
Innovation and Entrepreneurship Capacity/ Resources	▪ SEMATECH ▪ Advanced Materials Research Center ▪ Austin Technology Incubator (IC^2) ▪ UT-Austin research centers (not a complete list): Center for Complex Quantum Systems; Center for Electrochemistry Center for	(see Master Matrix)	▪ Leveraging new Central Texas Regional Center of Innovation and Commercialization	(see Master Matrix)

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
	Electromechanics; Center for Mechanics of Solids, Structures, and Materials; Center for Molecular and Cellular Toxicology; Center for Nano and Molecular Science and Technology; Center for Strategic and Innovative Technologies; Institute for Computational Engineering and Sciences; Wireless Networking and Communications Group; Wireless Systems Innovations Laboratory ▪ University of Texas Office of Technology Licensing			
Infrastructure (traditional and technological)	(see Master Matrix)	(see Master Matrix)	▪ WiMax technologies	(see Master Matrix)
Quality of Life	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)

CREATIVE MEDIA

Sector Description and Trends

Creative Media includes the companies involved in the development, production, distribution, and marketing of music, film, television, and video games. In the third quarter of 2006, the sector employed 2.86 million nationwide and paid an average annual wage of $72,269. Because of the variety of occupations that support the companies in Creative Media – from game programmers to sound technicians to broadcast engineers to managers and actors – the sector is an appealing employment option for workers of varying backgrounds and skill levels.

Film and television are two of the traditional components of Creative Media. Historically, film and television production has been concentrated in Los Angeles and New York City. However, rising business costs have caused some studios and production companies to seek out lower-cost locations. Austin has benefited from this trend and has served as a filming location for television shows and movies including *Friday Night Lights*, *Fast Food Nation*, and *Sin City*, among others.[10] The local presence of Austin Studios, the home-base of top filmmakers such as Richard Linklater and Robert Rodriguez, and a large film-and-television-production workforce also bolster Greater Austin's film industry and national reputation.

Strong movie ticket sales, DVD sales and rentals, and cable subscription enrollments nationwide portent continuing strong industry growth. As shown in the following chart, entertainment revenues have grown considerably over the last decade.

U.S. Creative Industries Consumer Spending (in billions), 1996-2005

	1996	2005	Percent Change
Computer and Video Games	$3.7	$7.0	89.2%
Movie Box Office	$5.9	$9.0	52.1%
Basic and Premium Cable	$27.7	$62.3	124.7%
VHS & DVD rentals and Sales	n/a	$24.9	n/a

Source: National Cable and Television Association;
National Organization of Theater Owners, Entertainment Software Association

Companies developing and producing online and console-based video games represent another growing sub-sector of the Creative Media industry. U.S. computer and video game sales topped $7 billion in 2005, nearly twice the sales registered in 1996. Much of this growth was due to expanding product choice, increased

[10] Austin Film Commission: http://www.austintexas.org/film/austin_films

affordability, and a growing consumer demographic. In 2005, the Entertainment Software Association reported that 38 percent of women play video games, as do 25 percent of Americans over the age of 50.

The music recording and distribution sub-sector represents another key component of Creative Media. Leaps in technology and broadband capacity have created enormous changes in the way that people access entertainment. The range of delivery formats has increased from local radio and compact discs (CDs) to satellite radio, iPods, online streaming, cell phone ring tones, and other digital formats. The concept of buying music is shifting towards a subscription model. This trend is illustrated by the increase in global song downloads from subscription services - up 89 percent from 220 million in 2005 to 795 in 2006.[11] Greater Austin's world-class roster of local musicians also creates the potential to leverage this talent in the recruitment and development of music production and distribution labels.

In the following table, *Market Street* has applied NAICS codes to represent collective Creative Media employment. While not a perfectly reflective definition, this aggregation nevertheless allows for an approximation of projected U.S. growth in Creative Media companies.

[11] IFPI *2007 Digital Music Report*. Accessed online at: http://www.ifpi.org/content/library/digital-music-report-2007.pdf

National Growth Projections for Creative Media Employment, 2004-2014

NAICS Code	Sector Name	*Projected Job Growth, U.S. 2004-2014* Percent	Number
Gaming and Online Broadcasting			
5122	Sound recording industries	-3.3%	-700
5161	Internet publishing and broadcasting	43.5%	13,600
5182	Data processing, hosting, and related services	33.1%	89,500
5415	Computer systems design and related services	39.5%	452,900
Film, TV, Music Producation, and Traditional Broadcasting			
3346	Manufacturing and reproducing magnetic and optical media	-0.2%	-100
5121	Motion picture and video industries	17.1%	62,700
5122	Sound recording industries	-3.3%	-700
5151	Radio and television broadcasting	-1.9%	-4,500
5152	Cable and other subscription programming	46.0%	39,400
Performers, Promoters, Agents, and Managers			
7111	Performing arts companies	17.4%	20,000
7113	Promoters of arts & sports	10.6%	9,300
7114	Agents and Managers	N/A	N/A
7115	Independent artists, writers, and performers	45.1%	18,900

Source: U.S. Bureau of Labor Statistics "2004-14 National Employment Matrix."

The following chart presents NAICS codes that reflect the employment dynamics of Creative Media companies. As noted previously in this report, each NAICS sub-sector does not constitute a separate and distinct "target" for growth, but rather the specializations that contribute to development of the overall Creative Media industry.

Creative Media

- NAICS definition:
  Gaming and Online Broadcasting
  - 5112 Software publishers
  - 5161 Internet publishing and broadcasting
  - 5182 Data processing and related services
  - 5415 Computer systems design and related services

  Film, TV, and Music Production and Traditional Broadcasting
  - 3346 Magnetic media manufacturing and reproducing
  - 5121 Motion picture and video industries
  - 5122 Sound recording industries
  - 5151 Radio and television broadcasting
  - 5152 Cable and other subscription programming

- Examples:
  - Computer and online gaming and related
  - Music production and recording
  - Managers and producers
  - Film and video production
  - Digital music technology and marketing

- Total U.S. employment is 2.86 million as of Q3 2006
- The national average annual pay is $72,269

- Location Factors:
  - ✓ Culture of creativity and entrepreneurship
  - ✓ Proximity to existing music producers, businesses, studios, and artists
  - ✓ Competitive quality of life and lower cost of living

Existing Regional Employment

The Austin MSA is very strong in sound recording industries, with a location quotient of 5.06 and average annual wages of $50,538. Motion picture and video industries is emerging into a standout area, especially if the region can maintain the strong 60.4 percent growth rate that was achieved from the third quarter 2002 to the same quarter of 2006.

In 2006, the City of Austin commissioned an economic impact study of the local gaming and digital media industry. Based on data collected through surveys, interviews, and national data sources, the report estimated local employment in this

sub-sector to be about 1,116.[12] However, it is difficult to replicate this study's methodologies to produce an up-to-date count of sub-sector employment using Texas Workforce Commission employment data alone. This is because the codes that cover these activities also support other industries. Those sectors include software publishers, which have a high LQ of 4.01. Computer systems design and related services also has a high LQ of 1.78, and has benefited from 22.3 percent job growth from the third quarter 2002 to the same quarter of 2006. The other two sub-sectors – internet publishing and broadcasting, and application hosting and related services – have suffered losses, yet still have solid – not strong – LQs. Each of these four sub-sectors has very high average annual wages.

An additional component of the gaming industry is the development and production of products for cross-platform scenarios. For example, gaming software is being embedded in cellular phones, PDAs and other communications devices. The technology behind this cross-pollination of digital media into different communications platforms is a component of this report's Convergence Technologies target.

Creative Media Employment in Metro Austin, Q3 2002 and Q3 2006

Component	NAICS Code	Sector Name	*Jobs Q3 2006*			*Average Annual Wages Q3 2006*		*Establishments Q3 2006*	
			Total	LQ	% Change Since 3Q 02	Austin MSA	U.S.	Total	% Change Since 3Q 02
Gaming and Online Broadcasting[1]	5112	Software publishers	5,250	4.01	-12.0%	$87,262	$117,070	131	-16.6%
	5161	Internet publishing & broadcasting	166	0.89	-25.6%	$106,395	$73,732	30	15.4%
	5182	Application hosting & related services	1,510	1.06	-38.2%	$76,955	$64,587	120	22.4%
	5415	Computer systems design & related srvs	12,262	1.78	22.3%	$93,395	$81,389	1,205	28.5%
Film, TV, & Music Production & Traditional Broadcasting	3346	Magnetic media mfg. & reproducing	199	0.92	-13.9%	$64,961	$65,640	12	-25.0%
	5121	Motion picture & video industries	1,468	0.77	60.4%	$25,496	$47,735	111	26.1%
	5122	Sound recording industries	562	5.06	n/d	$50,538	$69,177	36	n/d
	5151	Radio & TV broadcasting	1,373	1.08	-9.8%	$45,689	$59,603	28	-9.7%
	5152	Cable & other subscription programming	n/d	n/d	n/d	n/d	$65,388	n/d	n/d
		Total, Creative Industries	**22,790**	**1.652**	**6.9%**	**$82,435**	**$75,377**	**1,673**	**23.6%**

Sources: Texas Workforce Commission, U.S. Bureau of Labor Statistics

[12] City of Austin. (September 2006). *The Economic Impact of Austin's Entertainment Software/Digital Media Industry*. Prepared by TXP, Inc. Accessed online at: http://www.ci.austin.tx.us/redevelopment/downloads/gaming_study09-26-06.pdf

Related to the gaming side of Creative Media, the Austin metro is home to several game-development companies, including Midway, Nintendo, NCSoft, Sony Online Entertainment, Take Two Interactive, and Ubisoft. Other, smaller area game developers include Amaze Entertainment, Animation Farm, Arkane Studios, Aspyr Media, BioWare Austin, Critical Mass Interactive, Game Titan, Junction Point Studios, Midway Studios Austin, Online Alchemy, Pulse Interactive, Red Fly Studio, Retro Studios, Spacetime Studios, Total Immersion Software, and Vigil Games.[13]

Most of the other large media employers are in Cable TV and radio and TV broadcasting. Some examples of these firms are listed in the following chart.

Creative Media Industry: Example Large Employers

Company	Primary Product or Service	Employees
Time Warner Cable Co.	Media & communications	1,000-1,999
Texas & Kansas City Cable	Cable TV	500-999
Grande Communications	Media & communications	250-499
Clear Channel Communications	Radio broadcasting station	100-249
Emmis Austin Radio	Radio broadcasting station	100-249
Kvue-TV	Television broadcasting	100-249
Lin Television of Texas	Television broadcasting	100-249
Los Angels Times Communications	Television broadcasting	100-249
NW Communications of Austin	Television broadcasting	100-249

Sources: Greater Austin Chamber of Commerce, Harris InfoSource

Not reflected in the list of large employers are Austin's music and film companies, which are an important, thriving component of the region's Creative Media target. Austin's reputation as the "Live Music Capital of the World" is not unwarranted, as dozens of establishments in the city's Warehouse District, south Austin, and on Sixth Street feature live bands. Local initiatives like "Live from the Plaza" (a free concert series held downtown on Friday afternoons between April and October) and the City of Austin's music channel also help to showcase local musicians. Other shows and events like "Austin City Limits" and South-by-Southwest (SXSW) promote Austin and its music to national and global audiences.

As noted, Grater Austin has a growing reputation for its capacity related to filmmaking. *MovieMaker* magazine ranks Austin second in the U.S. as the best place to live, work, and make movies (after New York City). The magazine praised the city for respecting "the passion – and pocketbooks – of its indie community. They know that moviemaking is a win-win situation, whether you're making a multimillion-dollar feature starring Sandra Bullock or a $250 production with your

[13] Tech-based product development that supports the gaming industry is included in the Convergence Technologies target.

dad's digital camcorder."[14] A component of this indie-film capacity was developed in 2003, when the University of Texas at Austin created the UT Film Institute and Burnt Orange Productions to complement the traditional film-school "model." Together, these entities partner to produce low-budget, independent feature films for theatrical release.

Key assets of the metro area's film industry include: the Austin Film Commission; Austin Film Festival and Austin Gay & Lesbian International Film Festival; Austin Film Society; Burnt Orange Productions; Reel Women organization; SXSW Music, Media, Film and Interactive Conferences; and related education programs including those of the University of Texas Film Institute, Motion Media Arts Center, and Austin Community College. The Austin Film Society manages the 100,000 square foot Austin Studios film production facility. The studio has housed both independent film and studio features, including Fast Food Nation, Friday Night Lights, Miss Congeniality, Secondhand Lions, and Spy Kids 3-D.

Strengths, Weaknesses, Opportunities, Challenges

The following chart represents this target sector's key strengths, weaknesses, opportunities, and challenges as they relate to the primary areas of Greater Austin's competitiveness.

[14] "Top 10 American Cities to be a Moviemaker." *MovieMaker.* Issue #61 (Winter 2006) Accessed online 28.05.07. <http://www.moviemaker.com/magazine/editorial.php?id=515>

Creative Media Target SWOC Matrix

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
Education and Workforce Development	▪ UT-Austin strengths in radio/TV/film production ▪ Capable existing film-production workforce ▪ Gaming curricula at Austin Community College ▪ Digital media management MBA at St. Edward's University ▪ Master of science in science and technology commercialization at UT-Austin	▪ Lack of digital media-specific bachelor's/ master's degree programs at UT-Austin	▪ Better leveraging of existing degree programs (higher enrollments) and creation of new media-specific programs when necessary	(see Master Matrix)
Business Costs	▪ More robust film production incentives recently made available at state level	(see Master Matrix)	(see Master Matrix)	▪ Higher levels of film/TV location and production incentives offered in competitor states and Canada
Business Climate	▪ Government supports and celebrates local creative industries ▪ Good collaboration among entertainment entities ▪ Austin Film Society	▪ No major film, TV or music studios located in Greater Austin	▪ Improved synergies between entertainment, media, and technology companies ▪ Leveraging Proposition 4 monies for Austin film development	▪ Tremendous national and international competition for film and TV production
Innovation and Entrepreneurship Capacity/ Resources	▪ Burnt Orange Productions ▪ Digital Media Collaboratory ▪ UT-Austin research centers: Center for	▪ Negligible entrepreneurial assistance specifically focused on media companies	▪ Creation of more robust artist-and producer-development programs ▪ Creation of digital media incubation program/ facility	▪ Stronger, more fully developed artist-development systems in major entertainment competitor markets

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
	Advanced Studies in the Arts (CASA); Computational Visualization Center; Laboratory for Image & Video Engineering (LIVE); Vaughn Gross Center for Reading and Language Arts ▪ UT Film Institute ▪ Digital Convergence Initiative			
Infrastructure (traditional and technological)	▪ Existing film production capacity sufficient for current needs ▪ Austin Studios	▪ No local presence of a major, "Hollywood-style" film-development studio	▪ Development of additional film, TV and music production infrastructure ▪ Proposed Villa Muse development	▪ Development of significant film, TV, music production infrastructure is potentially cost-restrictive
Quality of Life	▪ "Live Music Capitol of the World" ▪ Austin City Limits ▪ South-by-Southwest festival	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)

Diversification Targets

The following targets – Green Industries, Corporate and Professional Operations, and Health Care and Life Sciences – represent emerging areas of economic opportunity for Greater Austin. Leveraging local assets to capitalize on national growth trends in these areas opens up opportunities to further diversify the metro economy.

Green Industries

Sector Description and Trends

Events such as wars in the Middle East and Hurricane Katrina, escalating fossil fuel costs, global warming concerns, and other occurrences have heightened national awareness of the implications of America's dependency on foreign oil and non-renewable energy sources. With this awareness comes more prominent calls for leveraging renewable and "clean" energy sources, reducing personal and corporate "carbon footprints" through changed consumption patterns and business policies, increasing recycling efforts, and constructing more energy efficient buildings.

As more Americans choose to adopt "lifestyles of health and sustainability" (a term now commonplace in marketing), demand for environmentally responsible goods and services is expected to increase. Because of heightened demand, entrepreneurs are starting new businesses, and existing companies are re-strategizing to take advantage of these new "green" opportunities.

A primary component of Green Industries is clean energy (often referred to as "green" power). Clean energy is electricity generated from renewable energy resources such as solar, wind, geothermal, biogas, biomass and low-impact hydro resources. Green-power resources have little or no "greenhouse gas" emissions that contribute to climate change and are said by many to accelerate global warming. Applications of clean energy are numerous, including hybrid engines in automobiles and solar powered traffic message boards and transportation signs.

In addition to clean forms of electricity, renewable biofuels are gaining a foothold in the U.S. market. One of the most prominent of these fuels is ethanol, which can be produced from a number of crop-based products and can be used to power "flex-fuel" automobiles. A recent report on ethanol noted that, "The ethanol industry is undergoing major expansion. Not only will plants currently under construction increase capacity by 25.7%, but the industry will need to grow significantly more within the next 8-10 years to meet mandated levels of future ethanol production."

These mandated levels of ethanol production – included in the Renewable Fuels Standards component of the 2005 federal energy bill – will total 7.5 billion gallons in 2012.[15] Such changing dynamics in the nation's energy industry bring with it vast economic opportunities. Fuel-cell car batteries are also a promising "clean and green" automotive technology.

Another Green Industries component is "green" building (also called "green construction" or "sustainable architecture and design"). Homes, office buildings, retail establishments, civic institutions, and other buildings consume great amounts of electricity, land, and water. In fact, building operations account for 40 percent of energy use nationwide.[16] Furthermore, materials used to make these building often contain toxic materials such as formaldehyde, which can have adverse impacts on human health. By using green building techniques, homeowners and businesses not only enjoy healthier living and working environments, but also they typically enjoy lower electricity, utility, and landscaping bills as well. The U.S. Green Building Council's LEED designation (Leadership in Energy and Environmental Design) certifies buildings that promote sustainability and environmental responsibility and efficiency. LEED buildings must demonstrate outstanding performance in five areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.[17] Because of the many aspects of green building, this niche area provides business opportunities in energy, building materials, university technology transfer, indoor environmental air quality, and sustainable site development.

While not all Americans may be able to live or work in a green building, they have the option to support environmental sustainability in their everyday purchases. Green products represent a growing sub-sector of Green Industries. As noted in a recent *Newsweek* article entitled "Green America: Why Environmentalism is Hot," Wal-Mart's decision to start carrying environmentally conscious products, such as organic foods, is helping the change the culture of consumption in the U.S. Items such as compact fluorescent light bulbs, EPA-certified "Energy Star" appliances, organic foods, and non-toxic household cleaners represent some of the more popular green products that are gaining an economic foothold.[18]

The following chart attempts to "define" Green Industries employment according to NAICS sectors. While there are likely a number of configurations that can be used to

[15] Dhuyvetter, Kevin C., and Terry L. Kastens, and Michael Boland. "The U.S. Ethanol Industry: Where will it be located in the future?" Agricultural Issues Center, University of California at Davis, November 2005, p. I

[16] U.S. Green Buildings Council (2006). Green Building Research Funding: An Assessment of Current Activity in the United States.

[17] U.S. Green Buildings Council

[18] Adler, Jerry (July 16, 2006). Green America: Why Environmentalism is Hot. *Newsweek*.

describe the overall green economy, *Market Street* feels these sectors accurately reflect the sub-sectors feeding Green Industries development.

Green Industries

- NAICS definition:
  - 5112 Software publishers
  - 2211 Power generation & supply
  - 2371 Utility system construction
  - 3334 HVAC & commercial refrigeration equipment
  - 3336 Turbine & power transmission equipment manufacturing
  - 3344 Semiconductor & electronic component manufacturing
  - 3345 Electronic instrument manufacturing
  - 3351 Electric lighting equipment manufacturing
  - 3353 Electrical equipment manufacturing
  - 3359 Other electrical equipment & component manufacturing
  - 5413 Architectural & engineering services
  - 5417 Scientific research & development services

- Examples:
  - Clean energy production (wind, solar, etc.)
  - Mechanical ventilation systems
  - Sustainable architecture

- Total U.S. employment is 4.53 million as of Q3 2006
- The national average annual pay is $64,844

- Location Factors:
  - ✓ Existing regional presence of related firms
  - ✓ Community culture and local government support sustainability
  - ✓ Strengths in technology and innovation
  - ✓ Attractive quality of life

Existing Regional Employment

The companies that constitute Green Industries are varied and contain many employment specializations that may not directly relate to clean-energy production or other specific components of Green Industries development. Nevertheless, *Market Street* feels the following employment sub-sectors represent the principal categories

with applications to clean energy, green building, and other Green Industries sub-sectors.

Green Industries Employment in Metro Austin, Q3 2002 and Q3 2006

NAICS Code	Sector Name	Jobs Q3 2006			Average Annual Wages Q3 2006		Establishments Q3 2006	
		Total	LQ	% Change Since 3Q 02	Austin MSA	U.S.	Total	% Change Since 3Q 02
2211	Power generation & supply	4,066	1.56	7.2%	$63,625	$73,620	33	3.1%
2371	Utility system construction	3,115	1.33	14.7%	$44,191	$48,866	128	11.3%
3334	HVAC & commercial refrigeration equipment	43	0.05	n/d	$49,716	$41,580	4	n/d
3336	Turbine & power transmission equipment mfg.	n/d	n/d	n/d	n/d	$57,445	n/d	n/d
3344	Semiconductor & electronic component mfg.	16,349	6.64	-4.6%	$101,882	$68,999	98	-3.9%
3345	Electronic instrument manufacturing	2,109	0.9	-13.4%	$68,237	$72,860	54	-5.3%
3351	Electric lighting equipment manufacturing	808	2.55	12.4%	$41,467	$44,480	13	-7.1%
3353	Electrical equipment manufacturing	668	0.8	16.4%	$58,112	$49,384	13	0.0%
3359	Other electrical equipment & component mfg.	349	0.47	208.8%	$50,921	$47,832	9	0.0%
5413	Architectural & engineering services	11,840	1.52	25.0%	$60,871	$63,614	1,011	11.0%
5417	Scientific research & development services	4,269	1.26	11.6%	$64,554	$79,842	150	36.4%
	Total, Green Industries	**43,616**	**1.8**	**6.9%**	**$75,533**	**$64,844**	**1,513**	**11.0%**

Sources: Texas Workforce Commission, U.S. Bureau of Labor Statistics

Of the NAICS employment sub-sectors with relevance to this target, the Austin MSA is strongest (as measured by location quotients) in semiconductor and electronic component manufacturing (6.64) and electric lighting equipment manufacturing (2.55). As measured by average annual wages, the Austin area is also strong in electronic instrument manufacturing ($68,237) and power generation and supply ($63,625). However, these two sub-sectors average annual wages for the Austin MSA trail the national averages. "Other" electrical equipment component manufacturing stands out for having substantial job growth (208.8%) from third quarter 2002 to third quarter 2006. It remains a small sub-sector with only 349 jobs. The sub-sector also has regional average wages that are higher than the national average ($50,921 and $47,833, respectively). HVAC and commercial refrigeration equipment manufacturing and electrical equipment manufacturing also have average wages higher than the national average.

For the Green Industries target, examples of Austin-area large employers were selected based on those which have been identified to be pursuing a "green" product or service (even if that is not the company's primary product or service offering). For example, IBM, Advanced Micro Devices, and Freescale Semiconductor are representative "green" employers because they have developed products that support more energy efficient operations within their industries. Other employers have developed divisions within their overall operations that focus on green technologies and services. For example, Applied Materials, which is primarily involved in chip fabrication, recently announced it would begin to manufacturing solar photovoltaic equipment.

Also illustrated in the following chart are several examples of smaller firms that specialize in "green" energy development. The list of example employers in the Austin area's Green Industries target is varied in approach and product offering at this time. For example, a number of these firms specifically focus on wind-power development (Green Mountain Energy, Cielo Wind Power, Renewable Generation, RES, and Tierra Energy). Other examples include HelioVolt, which is in the solar-power development field, and Austin Biofuels, which is in the vegetable-oil based fuel development field.

Green Industries Example Large Employers

Company	"Green" Product or Service	Employees
IBM Corp. - divisional/regional headquarters	Energy consumption tracking computer technology	6,000+
Advanced Micro Devices	Semiconductor chip-related energy efficient technology	2,000-5,999
Applied Materials - divisional/regional headquarters	Semiconductor production equipment manufacturing	2,000-5,999
Freescale Semiconductor – headquarters	Semiconductor chip-related energy efficient technology	2,000-5,999
SEMATECH	Research consortium	250-499
Active Power	Flywheel (battery-free) power supply sources	100-249
Green Mountain Energy Co.	Wind and other renewable power utility supplier	100-249
Cielo Wind Power	Wind-power developers	25-49
Austin Biofuels	Vegetable-oil based fuel for fleet and commercial customers	Unknown
HelioVolt	Solar-enabled power-generating building construction materials	Unknown
Renewable Generation	Wind-power developers	Unknown
RES	Wind-power developers	Unknown
Tierra Energy	Wind-power developers	Unknown

Sources: Greater Austin Chamber of Commerce, Harris InfoSource

Strengths, Weaknesses, Opportunities, Challenges

The following chart represents this target sector's key strengths, weaknesses, opportunities, and challenges as they relate to the primary areas of Greater Austin's competitiveness.

Green Industries Target SWOC Matrix

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
Education and Workforce Development	▪ UT-Austin strengths in engineering, physics, geophysics and other specialties with green-technology-serving potential	▪ No K-12 programs focused on green technologies	▪ Creation of regional two- and four-year degree programs specifically focused on green technologies	(see Master Matrix)
Business Costs	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)	▪ Costs to retrofit or build new green utilities infrastructure is potentially restrictive
Business Climate	▪ Austin city government has a stated "green" agenda (i.e., Austin's Green Building Program) ▪ Austin Energy – largest green-power program in the U.S. ▪ Austin citizenry's ethos in line w/ green development ▪ Austin receiving positive national press on its "green" opportunities	(see Master Matrix)	▪ Leveraging Austin's reputation as a "green" city that is favorable for the clean-energy economy ▪ Fast-growing region – more opportunities to integrate green technologies into new development ▪ Dell Computer's announcement that it wants to "become the greenest technology company on Earth for the long-term"[19]	▪ General disengagement of environmental from Greater Austin Chamber
Innovation and Entrepreneurship Capacity/ Resources	▪ Clean Energy Incubator ▪ UT-Austin research centers: Biochemical Institute; Bureau of	(see Master Matrix)	(see Master Matrix)	▪ Millions of dollars being invested in "green" development across nation and around the

[19] "Dell sets goal of becoming greenest technology company." *Austin American-Statesman,* June 5, 2007.

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
	Economic Geology; Center for Energy and Environmental Resources; Center for Excellence in Distributed Global Environments (EDGE); Center for Ionospheric Research; Center for Petroleum & Geosystems Engineering; Center for Systems and Synthetic Biology; Combustion & Engines Research; Construction Materials Research Group (CMRG); Environmental Science Institute; Environmental Solutions Program; Institute for Geophysics; Nuclear and Radiation Engineering Program; Plant Resources Center			world – stiff competition
Infrastructure (traditional and technological)	(see Master Matrix)	(see Master Matrix)	▪ Growing the region's capacity of clean-energy-generating facilities	(see Master Matrix)
Quality of Life	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)

Corporate and Professional Operations

Sector Description and Trends

The national shift from a production to a more service-oriented economy has decreased opportunities within certain commodities manufacturing, but dramatically increased opportunities in service-oriented sectors. Traditionally, "services" has included firms that provide a wide variety of support to persons, businesses, and other organizations. The Corporate and Professional Operations target focuses on generating additional jobs with competitive earning potential for a variety of skill levels. This target sector includes management at corporate headquarters and regional offices, but also small to mid-sized service firms in finance insurance, design, consulting, advertising, marketing, and accounting.

Typical functions that occur in these types of offices include executive decision-making and strategy, sales and marketing, human resources, financial operations, advanced information technology operations, consulting, and training. Because of the variety of employment opportunities, advancement opportunities, and earning potential, many jobs in Corporate And Professional Operations appeal to young professional workers with business and humanities degrees, a key talent area for Greater Austin. Furthermore, the region's quality of life and reasonable cost of living makes metro Austin a competitive location for these types of jobs.

Call centers and other back office operations are generally not classified as corporate and professional operations as the target is intended to be focused on the high-paying jobs associated with strategic company operations. However, these types of services may provide job opportunities for lower-skill and entry-level workers and should not be ignored. The same holds true for Data Centers – an existing Greater Austin Chamber target. Data Centers do not result in large employment gains (the typical center employs roughly 60 to 70 people), but center employees earn high wages and the centers contribute positively to local tax rolls and utility receipts.

The following chart shows the national employment growth projections from the U.S. Bureau of Labor Statistics (BLS) between 2004 and 2014. With the exception of depository credit intermediation, which is expected to experience a slight decline, all sub-sectors in this target cluster are expected grow faster than the national employment average of 13 percent. Many sub-sectors like management, scientific, and technical consulting services; marketing research; accounting services; and specialized design services are expected to add thousands of jobs nationwide in the coming years.

National Growth Projections for Corporate and Professional Operations, 2004-2014

NAICS Code	Sector Name	*Projected Job Growth, U.S. 2004-2014*	
		Percent	Number
5111	Newspaper, periodical, book, and directory publishers	6.5%	43,700
5221	Depository credit intermediation	-1.7%	-29,473
5222	Nondepository credit intermediation	14.2%	109,072
5223	Activities related to credit intermediation	24.3%	73,633
5239	Other financial investment activities	22.7%	61,862
5241	Insurance carriers	3.5%	48,800
52412	Direct insurance (except life, health, and medical) carriers	3.5%	21,103
5412	Accounting, tax preparation, bookkeeping, and payroll services	34.8%	283,900
5414	Specialized design services	28.1%	34,000
5416	Management, scientific, and technical consulting services	60.5%	471,200
5418	Advertising and related services	22.4%	95,200
54191	Marketing research and all other prof., scientific, and technical services	39.3%	63,435
55	Management of companies and enterprises	10.6%	182,200
	Total employment, all workers	*13.0%*	*18,927,569*

Source: U.S. Bureau of Labor Statistics "2004-14 National Employment Matrix."

Jobs in Corporate and Professional Operations have high average wages and provide good opportunities for advancement. Although some occupations are facing pressure from global outsourcing, core competencies and innovation remain in the United States because these are the areas where firms can maintain their competitive edge. In addition, there are still a large number of occupations, such as retail banking, financial planning, and consulting, which often require face-to-face interaction and cannot be outsourced.

The following table represents the employment sub-sectors in the Corporate and Professional Operations industry. They do not constitute separate and distinct "targets" for development, but rather enable Greater Austin officials to track employment dynamics in companies that comprise the Corporate and Professional Operations target.

Corporate and Professional Operations

- NAICS definition:
  - 5111 Newspaper, book, & directory publishers
  - 5221 Depository credit intermediation
  - 5222 Non-depository credit intermediation
  - 5223 Activities related to credit intermediation
  - 5239 Other financial investment activities
  - 5241 Insurance carriers
  - 5242 Insurance agencies, brokerages, & related
  - 5412 Accounting & bookkeeping services
  - 5414 Specialized design services
  - 5416 Management & technical consulting services
  - 5418 Advertising & related services
  - 54191 Marketing research & public opinion polling
  - 55 Management of companies & enterprises

- Examples:
  - Large corporate headquarters
  - Small and medium-sized firms
  - Regional offices
  - U.S. offices of foreign companies
  - Holding companies

- Total U.S. employment is 10.34 million as of Q3 2006
- The national average annual pay is $62,093

- Location Factors:
  - ✓ Highly educated workforce
  - ✓ Availability of professional business services
  - ✓ Proximity to an airport that has numerous non-stop destinations
  - ✓ High speed internet and other advanced telecommunications
  - ✓ Strong quality of life

Existing Regional Employment

The Austin MSA has experienced job growth in most of the identified priority areas of Corporate And Professional Operations. The four finance related sub-sectors – depository, non-depository, and activities related to credit intermediation (25.4%, 13.6%, and 128.7% respectively) and other financial investment activities (16.8%) –

each had particularly strong growth from third quarter 2002 to that same quarter of 2006. This growth shows the metro's job market is already beginning to resolve the underserved status of the Austin MSA's finance industry (based on the low LQs for three of these sub-sectors). A similar pattern of strong job growth and low LQs is also occurring in the areas of newspaper, book, and directory publishers; accounting and bookkeeping services; and specialized design services.

The Austin region can also strengthen this target by focusing on viable means of reversing losses in insurance carriers (-6.8%; a large sub-sector of 6,869 jobs), advertising and related services (-12.7%; an important sub-sector for supporting Austin's existing reputation as a creatively-minded community), and marketing research and public opinion polling (-8.5%; a good source of entry-level jobs for recent college graduates, and projected to grow nationally by 39.2 percent from 2004 to 2014).

Many of the Corporate and Professional Operations sub-sectors have average annual wages higher than the metro total economy average of $43,278. The Austin area is particularly competitive in those sub-sectors which have average wages higher than the national average for that sub-sector. Those sub-sectors are depository credit intermediation ($51,166 in the Austin MSA), management and technical consulting services ($74,085), and advertising and related services ($63,725).

Corporate & Professional Operations Employment in Metro Austin, Q3 2002 and Q3 2006

NAICS Code	Sector Name	Jobs Q3 2006			Average Annual Wages Q3 2006		Establishments Q3 2006	
		Total	LQ	% Change Since 3Q 02	Austin MSA	U.S.	Total	% Change Since 3Q 02
5111	Newspaper, book, & directory publishers	3,119	0.89	11.4%	$48,933	$49,003	143	12.6%
5221	Depository credit intermediation	6,620	0.68	25.4%	$51,166	$46,954	367	29.2%
5222	Non-depository credit intermediation	5,889	1.41	13.6%	$59,312	$65,520	322	12.2%
5223	Activities related to credit intermediation	1,347	0.74	128.7%	$47,006	$55,508	167	54.6%
5239	Other financial investment activities	1,084	0.64	16.8%	$103,308	$132,678	290	31.8%
5241	Insurance carriers	6,869	1.01	-6.8%	$57,073	$62,084	269	38.7%
5242	Insurance agencies, brokerages, & related	6,442	1.35	10.4%	$48,645	$53,793	709	10.1%
5412	Accounting & bookkeeping services	2,857	0.64	32.9%	$49,374	$53,045	540	22.7%
5414	Specialized design services	705	0.95	32.3%	$39,647	$49,254	182	31.9%
5416	Management & technical consulting services	6,416	1.27	48.0%	$74,085	$67,325	1,075	47.7%
5418	Advertising & related services	2,883	1.18	-12.7%	$63,725	$57,088	291	13.2%
54191	Marketing research & public opinion polling	814	1.38	-8.5%	$29,470	$44,044	54	42.1%
55	Management of companies & enterprises	4,528	0.47	0.3%	$43,384	$78,501	106	34.2%
	Total, Corporate & Professional Operations	**49,573**	**0.9**	**13.4%**	**$55,874**	**$62,093**	**4,515**	**27.4%**

Sources: Texas Workforce Commission, U.S. Bureau of Labor Statistics

The following list of large headquarters operations in the Austin MSA is more representative of the area's many assets than the NAICS 55 Management of Companies and Enterprises sub-sector data in the above chart.[20] Internationally, the Austin MSA is recognized as the home of Dell Inc. and related computer and semiconductor operations. For diversifying Austin's image and economic realities, equal recognition is deserved for headquarters operations in industries ranging from health care (Seton Healthcare Network, Girling Health Care), telecommunications (AT&T), insurance (Progressive, State Farm), and retail trade (Whole Foods Market).

[20] Data for this NAICS code is not representative of all corporate/divisional/regional headquarters in the Austin MSA, because many are classified based on their primary product or service offering, and not their management-level status.

Headquarter Example Large Employers

Company	Primary Product or Service	Employees
Dell Inc. - headquarters	Computer equipment manufacturing & sales	6,000+
IBM Corp. - divisional/regional headquarters	Computer hardware & software manufacturing	6,000+
Seton Healthcare Network - headquarters	Health care services	6,000+
Applied Materials - divisional/regional headquarters	Semiconductor production equipment manufacturing	2,000-5,999
AT&T - divisional/regional headquarters	Telecommunications	2,000-5,999
Freescale Semiconductor - headquarters	Semiconductor chip design & manufacturing	2,000-5,999
National Instruments - headquarters	Virtual instrumentation software & hardware manufacturing	2,000-5,999
Solectron Texas - divisional/regional headquarters	Electronics manufacturing	2,000-5,999
3M - divisional/regional headquarters	Electronic connectors & test equipment mfg./R&D	1,000-1,999
Apple Computer - divisional/regional headquarters	Computer mfg., technical, and administrative support center	1,000-1,999
Cisco Systems - divisional/regional headquarters	Interconnect devices manufacturing	1,000-1,999
Girling Health Care SVC - headquarters	Health care services	1,000-1,999
Lower Colorado River Authority - headquarters	Electric power distribution	1,000-1,999
Progressive Insurance - divisional/regional headquarters	Insurance	1,000-1,999
Samsung Austin Semiconductor - headquarters	Semiconductor chip manufacturing	1,000-1,999
State Farm Insurance - divisional/regional headquarters	Insurance	1,000-1,999
Whole Foods Market - headquarters	Grocery retailer	1,000-1,999

Sources: Greater Austin Chamber of Commerce

Collectively, the Corporate and Professional Operations target provides an opportunity to diversify the Austin economy through the development and pursuit of businesses of all sizes. Importantly, many of the target's sub-sectors are predominantly comprised of small businesses. For all Austin area businesses, the average number of employees per establishment is 19. In Corporate and Professional Operations, that average is only 10.

The target also includes a number of large employers, including the following examples in the fields of publishing, advertising, insurance, and banking. Importantly, growing employment opportunities in this target through expansion and recruitment will provide the opportunity to better utilize the region's "underemployed" population.

Corporate and Professional Operations Example Large Employers

Company	Primary Product or Service	Employees
Austin American-Statesman	Newspaper publishing	1,000-1,999
Harte-Hanks Response Management	Marketing & advertising	1,000-1,999
Progressive Insurance - divisional/regional headquarters	Insurance	1,000-1,999
State Farm Insurance - divisional/regional headquarters	Insurance	1,000-1,999
Bank of America	Banking	500-999
Farmers Insurance Group - divisional/regional headquarters	Insurance	500-999
GSD&M - headquarters	Advertising agency	500-999
Guaranty Financial Services - headquarters	Banking	500-999
Holt, Rinehart & Winston - headquarters	Publishing	500-999
JPMorgan Chase Bank	Banking	500-999
Wells Fargo Bank, Texas - divisional/regional headquarters	Banking	500-999

Sources: Greater Austin Chamber of Commerce, Harris InfoSource

Strengths, Weaknesses, Opportunities, Challenges

The following chart represents this target sector's key strengths, weaknesses, opportunities, and challenges as they relate to the primary areas of Greater Austin's competitiveness.

Corporate and Professional Operations Target SWOC Matrix

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
Education and Workforce Development	▪ Strong output of business graduates at two-and four-year degree level	(see Master Matrix)	▪ Leveraging "underemployed" business-school graduates	▪ Lack of multiple, major professional services firms to employ recent graduates
Business Costs	▪ By and large, regional office rents not anti-competitive	▪ Downtown Class A office rents comparatively high ▪ Comparatively few direct domestic and international flights from ABIA	▪ Continuing growth of ABIA traffic and direct-flight destinations and frequencies	(see Master Matrix)
Business Climate	▪ Strong professional real estate and banking community with close ties to Greater Austin Chamber	▪ Historical lack of participation among certain local Fortune 500 CEOs in regional economic development	▪ Leveraging Greater Austin Chamber's new CEO council ▪ Developing better overall synergies between corporate/ professional firms and local technology sector	(see Master Matrix)
Innovation and Entrepreneurship Capacity/ Resources	▪ SBDC at RRHEC ▪ UT-Austin research centers: Center for Applied Research in Economics; Center for Business Decision Analysis; Center for Business, Technology and Law; Center for Business Measurement and Assurance Services (BMAS); Center for Ethical Leadership;	▪ No incubation facilities and/or programs specifically focused on professional services	▪ Better coordination among various entrepreneurial and small business development resources ▪ Local small-business development potential of ex-patriot Texas Exes with business and/ or professional degrees ▪ Region underserved in certain professional services sub-sectors	▪ More robust "base" of customers in more populous regions with higher numbers of large corporations

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
	Center for Information Assurance and Security; Center for International Business Education and Research; Center for Management of Operations and Logistics; Center for Research in Electronic Commerce; Center for Risk Management and Insurance; Center for Strategic and Innovative Technologies; Center for Studies in Acquisition; Center for the Study of Western Hemispheric Trade; Ray Marshall Center for the Study of Human Resources; Strauss Center for International Security and Law; Telecommunications and Information Policy Institute			
Infrastructure (traditional and technological)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)
Quality of Life	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)

Health Care and Life Sciences

Sector Description and Trends

The Health Care and Life Sciences sector is broadly defined and extends far beyond health care providers to include biotechnology, scientific research and testing activities, and the manufacture of medical products and devices, medicine/ pharmaceutical products. These vertical linkages can have a profound impact on the delivery of health care services.

As the Baby Boom generation enters retirement, an increasing number of individuals will require health care and will purchase trillions of dollars worth of medications and medical products. Most economic forecasters agree that health care will experience explosive growth in the coming decades. This growth will coincide with developments in life science research that will result in a new generation of highly specific drugs and medical devices, targeting ever more finite health areas. Various fields such as manufacturing, R&D, information technology, and patient care are converging, as health care providers are increasingly using state-of-the-art technologies to optimize and personalize medical treatments and procedures. This field provides solid employment growth opportunities in the coming years.

Jobs in Health Care and Life Sciences feature higher than average wages. While doctors, researchers, and specialists earn top salaries, the jobs available to individuals without substantial professional training can still provide viable, high-paying career opportunities in a stable profession. Furthermore, numerous technical support occupations require only one or two years of education beyond high school. In the third quarter of 2006, health care and life sciences provided over 11 million U.S. jobs, paying an average annual wage $52,690.

The following chart shows the national employment growth projections from the U.S. Bureau of Labor Statistics (BLS) between 2004 and 2014. Most sub-sectors in this target cluster are expected grow faster than the national employment average of 13 percent.

National Growth Projections for Health Care & Life Sciences, 2004-2014

NAICS Code	Sector Name	*Projected Job Growth, U.S. 2004-2014*	
		Percent	**Number**
3254	Pharmaceutical & medicine mfg.	26.1%	76,000
3345	Measuring, electromedical, and control instruments mfg.	4.2%	18,300
3391	Medical equip. & supplies mfg.	2.6%	7,900
5417	Scientific R&D services	11.9%	65,300
6211	Offices of physicians	37.0%	759,532
6212	Offices of dentists	31.7%	240,554
6213	Offices of other health practitioners	42.7%	223,615
6214	Outpatient care centers	44.2%	197,138
6215	Medical & diagnostic labs	27.1%	51,214
6221	General medical & surgical hospitals	16.0%	648,062
6222	Psych & substance abuse hospitals	-15.4%	-14,217
6223	Other hospitals	36.2%	54,455
	Total employment, all workers	*13.0%*	*18,927,569*

Source: U.S. Bureau of Labor Statistics "2004-14 National Employment Matrix."

Pharmaceutical and medicine development requires large investments in R&D before reaching the production stage. Businesses in the manufacturing sub-sector make drugs, serums, vaccines, chemicals, and diagnostic substances such blood glucose kits, among other things. Although manufacturing takes place throughout the country, pharmaceutical research and development is concentrated in only a few metropolitan areas. However, Greater Austin has a presence in this sub-sector, and can leverage it for enhanced growth in Health Care and Life Sciences.

The following table details NAICS employment sub-sectors that comprise the companies included in Greater Austin's Health Care and Life Sciences target.

Health Care and Life Sciences

- NAICS definition:
  - 3254 Pharmaceutical & medicine manufacturing
  - 3345 Measuring, electro-medical, and control instruments manufacturing
  - 3391 Medical equip. & supplies manufacturing
  - 5417 Scientific R&D services
  - 6211 Offices of physicians
  - 6212 Offices of dentists
  - 6213 Offices of other health practitioners
  - 6214 Outpatient care centers
  - 6215 Medical & diagnostic labs
  - 6221 General medical & surgical hospitals
  - 6222 Psych & substance abuse hospitals
  - 6223 Other hospitals

- Examples:
  - Laboratory apparatus and hospital furniture, surgical and medical instruments, dental equipment and supplies
  - Health care practitioners, doctors, outpatient care and medical centers
  - Medical and diagnostic laboratories, ambulance services
  - Hospitals and mental health facilities
  - Allergy drugs, insulin products – research and manufacturing

- Total U.S. employment is 11.59 million as of Q3 2006
- The national average annual pay is $52,690

- Location Factors:
  - ✓ Close proximity to existing hospitals and health care facilities
  - ✓ Available, affordable, and technically skilled labor force
  - ✓ Close proximity to a university medical school and research laboratories
  - ✓ Strong quality of life

Existing Regional Employment

The majority of jobs in this target business sector are on the services side of the health care industry. In the Austin MSA, hospitals, physician's offices, and similar establishments represent 80.6% of 46,913 total local jobs. Health care services – in particular hospitals – are vital catalysts for the R&D side of life sciences by providing opportunities for clinical trials and related activities. Additionally, the services-based

sub-sectors have strong job and income growth generating potential. From third quarter 2002 to third quarter 2006, the Austin metro's jobs in general medical and surgical hospitals grew by 23.0 percent, and offices of physicians, dentists, and other health professionals, combined, grew by 16.5 percent.

During this same time period, the Austin metro lost jobs in each of the target manufacturing sub-sectors. The competitive wages and typically "high growth" potential of businesses within these three sub-sectors make them an attractive target, assuming they are pursued in a manner which complements Austin's existing assets and areas of opportunity.

Health Care & Life Science Employment in Metro Austin, Q3 2002 and Q3 2006

Component	NAICS Code	Sector Name	Jobs Q3 2006			Average Annual Wages Q3 2006		Establishments Q3 2006	
			Total	LQ	% Change Since 3Q 02	Austin MSA	U.S.	Total	% Change Since 3Q 02
Product Mfg., Development & Research	3254	Pharmaceutical & medicine mfg.	1,689	1.09	-1.4%	$59,580	$79,983	12	9.1%
	3345	Measuring, electromedical, and control instruments mfg.	2,109	0.9	-13.4%	$68,237	$72,860	54	-5.3%
	3391	Medical equip. & supplies mfg.	1,035	0.63	-42.4%	$60,756	$50,351	48	-17.2%
	5417	Scientific R&D services	4,269	1.26	11.6%	$64,554	$79,842	150	36.4%
Services	6211	Offices of physicians	10,898	0.94	13.6%	$74,319	$66,324	998	19.5%
	6212	Offices of dentists	3,735	0.88	15.8%	$43,920	$40,349	534	15.8%
	6213	Offices of other health practitioners	3,069	0.99	28.8%	$32,403	$32,850	568	26.8%
	6214	Outpatient care centers	1,747	0.59	-33.6%	$50,791	$43,622	66	32.0%
	6215	Medical & diagnostic labs	1,210	1.11	16.5%	$52,999	$49,059	49	36.1%
	6221	General medical & surgical hospitals	14,705	0.53	23.0%	$47,533	$46,563	32	39.1%
	6222	Psych & substance abuse hospitals	1,670	1.27	-7.2%	$36,402	$40,043	6	0.0%
	6223	Other hospitals	777	0.74	-1.8%	$34,467	$47,717	5	-16.7%
		Total, Health Care and Life Sciences	**46,913**	**0.76**	**8.6%**	**$55,333**	**$52,690**	**2,522**	**20.0%**

Sources: Texas Workforce Commission, U.S. Bureau of Labor Statistics

The following chart illustrates some examples of large employers in the Austin area's Health Care and Life Science industry. Both services and R&D/manufacturing-related businesses are represented in the chart. The two primary hospital systems – Seton Healthcare Network and St. David's Healthcare Partnership – lead the list. Within the manufacturing and R&D side of this target sector, giants Hospira and PPD Development illustrate the strengths – and the numerous mid-size firms illustrate the breadth – of Greater Austin's existing assets.

Health Care & Life Sciences Example Large Employers

Company	Primary Product or Service	Employees
Seton Healthcare Network - headquarters	Health care services	6,000+
St. David's Healthcare Partnership	Health care services	2,000-5,999
Girling Health Care SVC - headquarters	Health care services	1,000-1,999
Hospira	Health care products manufacturing	1,000-1,999
PPD Development	Pharmaceutical, medical device & biotech R&D services	1,000-1,999
CarboMedics Inc	Surgical & medical instrument manufacturing	250-499
Encore Medical Corp	Surgical appliance & supplies manufacturing	250-499
Zimmer	Surgical & medical instrument manufacturing	250-499
Ambion	Biological product manufacturing	100-249
Cedra Corp	Bioanalytical services	100-249
Luminex	Biological product manufacturing	100-249
Molecular Genetics	Pharmaceutical preparation manufacturing	100-249

Sources: Greater Austin Chamber of Commerce, Harris InfoSource

The numerous mid-size to large general medical and surgical hospital facilities in the Austin area further illustrate the large impact this sub-sector has on the metro's Health Care and Life Sciences target. The following chart lists Austin's largest regional hospitals (with the number of acute care beds as the unit of measure).

Largest General Medical & Surgical Hospitals*[21]

Hospital	City	Acute Care Beds
Seton Medical Center	Austin	300+
Brackenridge Hospital	Austin	300+
St. David's Hospital	Austin	300+
Austin State Hospital	Austin	300+
South Austin Hospital	Austin	200-299
North Austin Medical Center	Austin	200-299
Cornerstone Hospital of Austin	Austin	100-199
Round Rock Medical Center	Round Rock	100-199
St. David's Georgetown Hospital	Georgetown	100-199
Central Texas Medical Center	San Marcos	100-199
Seton Northwest Hospital	Austin	100-199

Source: Texas Department of State Health Services

Positive recent developments continue to build on Greater Austin's assets in this target business sector. In March 2007, Seton announced it would relocate its headquarters to the mixed-use development at the old Mueller Municipal Airport site. This site will serve as a campus and house (in addition to retail and residential

[21] Also falling within the 100 to 199-bed range is Seton Shoal Creek Hospital, which provides mental health and substance abuse care.

developments) a Ronald McDonald House and the new Dell Children's Medical Center of Central Texas slated to open July 1, 2007.[22]

The Michael & Susan Dell Foundation also donated $50 million to the University of Texas to establish the Dell Pediatric Research Institute, to compliment treatment efforts at the children's hospital with cutting edge research in children's health and biomedicine. In addition, the Dell Foundation funded the Center for Advancement of Healthy Living, a research center focused on combating childhood obesity.[23] The donation is one of the highest in the University's history and its impact will only help strengthen Austin's case for a medical school in the future.

As previously noted in the *Competitive Realities* report, among its peer metro areas (Denver, Nashville, Phoenix, and Raleigh-Durham,) Greater Austin is the only region without a medical school. The University of Texas-Austin is one of the top research institutions in the nation. As such, the research opportunities and technological synergies that could potentially emerge from a local medical school would have significant impacts across all of the target business sectors. Thus, building a medical school at UT-Austin would not only serve as the lynchpin for substantial growth in the Health Care and Life Science target, but potentially is the most important catalyst for Greater Austin's overall economic growth.

A recent economic impact study by the Perryman Group found that developing a major medical school at UT-Austin has the potential to:

- Generate $2.381 billion in yearly spending within the region.
- Create 19,307 new jobs in Greater Austin.
- Effectively position Texas and Greater Austin as a competitive location for biosciences firms and research.
- Greatly increase research funding at UT-Austin. The report notes that between 2001 and 2003, median annual research expenditures by universities without medical schools totaled $75.3 million compared to $224.8 million for universities with medical schools nationwide.[24]

---

[22] Seton Family Hospital, Dell Children's medical center, Ronald McDonald House Rockwell, Lilly. (March 22, 2007). Seton to Move Headquarters to Mueller. The Austin American-Statesman.

[23] Source: University of Texas System. Accessed online at: http://www.utsystem.edu/news/2006/UTS-MSDFGrant05-15-06.htm

[24] The Impact of Developing a Major Medical School at the University of Texas at Austin on Regional and State Business Activity. (April 2007). The Perryman Group.

Strengths, Weaknesses, Opportunities, Challenges

The following chart represents this target sector's key strengths, weaknesses, opportunities, and challenges as they relate to the primary areas of Greater Austin's competitiveness.

Health Care and Life Sciences Target SWOC Matrix

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
Education and Workforce Development	▪ Strong two-year training programs and output for health care support professionals	▪ No regional medical school	▪ Continuing capacity enhancement for health care training ▪ Ongoing efforts to develop local medical school ▪ Recent funding of nursing school at RRHEC	▪ Costs to develop regional medical school potentially prohibitive ▪ Competitor life sciences regions have significant advantage in workforce capacity
Business Costs	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)
Business Climate	▪ Strong regional hospitals and health care networks	▪ Austin not a recognized "health care/life sciences" economy	▪ Burgeoning collaboration among local life sciences firms ▪ Leveraging Austin Chamber's new Life Sciences Council	▪ Certain competitor regions have much more fully developed life sciences clusters ▪ Strong international competition
Innovation and Entrepreneurship Capacity/ Resources	▪ UT-Austin research centers: Biomedical Engineering Laser Laboratory (BELL); Center for Biological and Medical Engineering; Center for Computational Biology and Bioinformatics; Center for Health Promotion and Disease Prevention Research in Underserved Populations; Center for Molecular and Cellular Toxicology; Center for	▪ No incubation programs/facilities specifically geared toward life sciences ▪ Limited wetlab space for developing firms ▪ Limited capacity in life sciences R&D	▪ Enhancement of life-sciences-specific R&D and research commercialization potential ▪ Enhanced linkages with biotech research elsewhere in UT system	▪ Strong life-sciences regions have tremendous head start in R&D capacity and talent

Competitive Concern	Strengths	Weaknesses	Opportunities	Challenges
	Structural Biology; Center for Systems and Synthetic Biology; Drug Dynamics Institute; Female Sexual Psychophysiology Laboratory; Human Factors Research Project; Institute for Cellular and Molecular Biology; Waggoner Center for Alcohol and Addiction Research			
Infrastructure (traditional and technological)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)
Quality of Life	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)	(see Master Matrix)

CONCLUSION

Slowing workforce growth nationwide is predicted to result in critical labor shortages in key occupation areas. Because competition for talent between communities will intensify - particularly for workers in highly skilled management and technology positions - Greater Austin's continued economic growth will increasingly rely on its ability to meet the workforce needs of current and prospective employers. While Greater Austin's quality of life has made it an attractive location for the young and educated "creative class," research presented in this report suggests a general mismatch between their skills and the skills demanded by local employers. New and inventive strategies must work to effectively connect the dots between worker and employer needs. In this regard, building the local talent base will be a critical component of target business sector development.

This *Target Business Review* report utilized quantitative and qualitative information to arrive at a list of target industries (and component sub-sectors that feed into each industry's optimal growth) to prioritize for local economic development investment. By assessing Greater Austin's existing target sectors – and those with strong potential to further diversify the regional economy – this report took a new and different look at target-industry development in the region.

Metro Austin's current array of targets has been refocused on industries that form the "base" of the regional economy and those that can diversify that base, raise levels of regional wealth and ensure the five-county area can weather potential future economic downturns. Each target industry includes sub-sectors that feed into overall industry growth through enhancement of the "parts" to better grow the "whole."

The following are the recommended sectors:

- **Base Targets:** These are business sectors that represent existing strengths of the Austin region.
  - **Convergence Technologies**
    - This target combines existing strengths – wireless, software, nanotechnology, semiconductors – and refocuses them on the synergies possible from a convergence of these technologies into new and revolutionary products and processes
  - **Creative Media**
    - This target broadens Greater Austin's focus from Digital Media to the full spectrum of media and entertainment companies as they relate to economic development and wealth creation

- **Diversification Targets:** These are business sectors that represent opportunities for further economic diversification in Greater Austin.
  - **Green Industries**
    - This target seeks to leverage the seed planted regionally in clean energy by growing local companies into dynamos built to capitalize on the coming U.S. "green revolution"
  - **Corporate and Professional Operations**
    - This target is focused on leveraging Greater Austin's existing firms and wealth of untapped business and professional services talent to help further diversify the regional economy and retain top young professionals in the area
  - **Health Care and Life Sciences**
    - This target seeks to harness the growth potential of the burgeoning health care sector and marry it to the technology-focused advances possible from cutting-edge research in life sciences, bioinformatics, bioscience, and nanoscience

The *Opportunity Austin II* strategy – "Taking It to the Next Level" – will provide specific recommendations for the growth and development of the priority target industries profiled in this report.

APPENDIX: METHODOLOGY

Target Business Sectors

Identifying specific target business sectors requires both *quantitative* and *qualitative* research. Quantitative examination of indicators like wages paid or local employment compared to national averages determines the magnitude and impact of specific business sectors.

These data are collected according to North American Industry Classification Systems (NAICS) codes from the U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages and from the Texas Workforce Commission.[25] *Market Street* used the most recent available data.

NAICS classifies businesses into sectors similar to the now defunct Standard Industrial Classification (SIC) codes system, but in categories more closely aligned with today's service-oriented economy. Twenty different divisions represent the broadest (two-digit) codes, which were used in analyzing employment in potential target clusters. These divisions and their corresponding codes are:

Division	Code
Forestry, Fishing, Hunting, & Agriculture Support	11
Mining	21
Utilities	22
Construction	23
Manufacturing	31-33
Wholesale Trade	42
Retail Trade	44-45
Transportation & Warehousing	48-49
Information	51
Finance & Insurance	52
Real Estate & Rental & Leasing	53
Professional, Scientific, & Technical Services	54
Management of Companies & Enterprises	55
Admin., Support, Waste Mngmt. & Remediation Svcs.	56
Educational Services	61
Health Care & Social Assistance	62
Arts, Entertainment & Recreation	71
Accommodation & Food Services	72
Other Services (except public administration)	81
Public Administration	92

[25] Data are sometimes suppressed, or only ranges of employment size are listed, if the information provided would compromise the identity of a particular employer.

Within each major sector grouping (two-digit level) are business sectors classified into increasingly specific categories, down to the six-digit level code. In recommending target business sectors, *Market Street* used more specific sector classification codes where it was appropriate. Targets can cut across multiple classification categories, and *Market Street's* goal in identifying targets was to be specific enough to clearly understand the focus of the target, but also to be broad enough so that the target was not limited and confined to a small number of opportunities.

An important quantitative term used in this report is *location quotient* (LQ). A location quotient is a ratio representing the strength of a particular local business sector in relation to the national average. It is represented formulaically as:

$$LQ = \frac{\text{(Regional Employment in Sector/Total Regional Employment)}}{\text{(National Employment in Sector/Total National Employment)}}$$

If a location quotient is *greater* than 1.0, the area has a larger share of employment in that sector than the nation. The higher the LQ, the more concentrated the level of local employment compared to its U.S. equivalent. LQs provide insight into a community's economic structure and its level of industrial diversity. If one or two sectors dominate local employment, slowdowns in these industries may decimate an area's economy.

Conversely, if a location quotient is *less* than 1.0, this indicates a smaller local share of employment than the nation. Just because a sector has a location quotient below 1.0 does not preclude it from being a target business cluster for the community. Similarly, an LQ over 1.0 does not automatically mean the community should aim for that sector. A number of factors, including national trends, local support services, and regional clusters, contribute to the viability of a local industry group.

Another important concept in local economic development is the *traded,* or *export* sector. A traded sector is a community's economic engine – that part of the economy that sells goods and services to customers outside the region, importing income that then circulates throughout the rest of the local economy. The "new" money entering the economy is then used to purchase local goods and services, creating new wealth in the Greater Austin. Conversely, retail is considered a *non-traded* sector because those monies originate within the community and have no "multiplier effect" on other spending. Local economic developers should always strive to recruit and develop traded industries because these sectors have a greater benefit to overall community vitality.

Underemployment

The U.S. Bureau of Labor Statistics employs two education and training classification systems. The first system assigns occupations into 11 categories based on the most significant training needed for workers to be able to work in that occupation. These categories include:

1. First professional degree
2. Doctoral degree
3. Master's degree
4. Bachelor's or higher degree, plus experience
5. Bachelor's degree
6. Associate degree
7. Postsecondary vocational award
8. Work experience in a related occupation
9. Long-term on-the-job training
10. Moderate-term on-the-job training
11. Short-term on-the-job training

However, many occupations do not have just one path to entry such as just a Bachelor's degree. In fact, many occupations are flexible. A worker with a Bachelor's degree may have the same qualifications in a particular occupation as a person with an associate's degree and work experience. As such, this system can be misleading about the educational hiring preferences of businesses.

The second system groups occupations into six "educational attainment clusters" based on the educational attainment of workers 25-44 years old in each occupation nationwide. These clusters include:

- High school occupations (HS)
- High school/some college occupations (HS/SC)
- Some college occupations (SC)
- High school/some college/college occupations (HS/SC/C)
- Some college/college occupations (SC/C)
- College occupations (C)

Definition of BLS Education Clusters, 2004

Education cluster	Percent of employees aged 25 to 44 in the occupation whose highest level of educational attainment is—		
	High school or less	Some college (including associate degree)	Bachelor's degree or higher
High school occupations (HS)	Greater than or equal to 60 percent	Less than 20 percent	Less than 20 percent
High school/ some college occupations (HS/SC)	Greater than or equal to 20 percent	Greater than or equal to 20 percent	Less than 20 percent
Some college occupations (SC)	Less than 20 percent	Greater than or equal to 60 percent	Less than 20 percent
High school/ some college/ college occupations (HS/SC/C)	Greater than or equal to 20 percent	Greater than or equal to 20 percent	Greater than or equal to 20 percent
Some college/ college occupations (SC/C)	Less than 20 percent	Greater than or equal to 20 percent	Greater than or equal to 20 percent
College occupations (C)	Less than 20 percent	Less than 20 percent	Greater than or equal to 60 percent

Source: U.S. Bureau of Labor Statistics

Market Street employed the "educational attainment cluster" classification to occupations in Greater Austin in order to estimate the number of jobs that show preference for or require a Bachelor's degree or higher. Our estimate includes jobs in the HS/SC/C, SC/C, and the C clusters. While the HS/SC/C cluster captures some lower-skill jobs, this methodology results in a conservative underemployment estimate and ensures that all occupations that may show preference for hiring someone with a Bachelor's degree are included.