
Section Twelve

Industry Clusters

Arizona has developed a plan to guide the State's economy into the 21st century through the Governor's Strategic Partnership for Economic Development (GSPED). As part of GSPED, five key industry clusters have been identified as targets for Greater Phoenix. These clusters represent geographic concentrations of interdependent firms in related industries. Each cluster includes companies that sell products outside the region as well as locally, and suppliers that provide raw materials, intermediate manufactured products and business services to other businesses in their cluster. These clusters create large and diverse labor pools and attract suppliers who tend to concentrate geographically for increased efficiency.

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12.0 High-Tech Industry

The High Tech cluster includes the computer hardware, electronic equipment, semiconductor, telecommunications, and related industries. These industries develop, manufacture, and distribute products such as office equipment, measuring and controlling devices, circuit boards, and associated items. This cluster has a sizeable amount of firms involved in either manufacturing or services.

Greater Phoenix has a well-established base of firms in the high tech industry, including Intel, Motorola, Microchip Technology, and ON Semiconductor. Many High Tech companies have recently located to Greater Phoenix and some are expanding operations. This is contributing to a projected growth of 12.4% in semiconductor manufacturing employment and is due to the pool of talented workers and available land that Greater Phoenix has to offer.

Employers in the area have access to a large pool of talented administrative, executive, and professional workers, including those trained in business, professional, and technical services. Arizona State University and Maricopa Community Colleges both offer programs that train students in high-tech fields. Greater Phoenix is also well positioned in other critical site factors for the industry such as low unemployment insurance and energy dependability.

High-Tech industries in Greater Phoenix employ almost 50,000 people in over 630 firms. This represents a 61% increase in employment since 1990. At \$65,221, wages in high tech are almost double the average wage in Greater Phoenix.

Figure 12-1

High-Tech Related Industries

Industry	Employment	Establishments	Average Wage	Location Quotient*
Semiconductor Component Manufacturing	25,636	116	\$78,411	4.36
Telecommunications	18,017	377	\$46,483	1.31
Communications Equipment	1,314	23	\$67,561	0.67
Automatic Environmental Control	956	4	\$72,421	0.83
Semiconductor Machinery Manufacturing	891	15	\$80,213	4.21
Computer and Peripheral Equipment	736	19	\$67,632	0.26
Industrial Process Instruments	402	15	\$45,355	0.55
Audio and Video Equipment	386	10	\$40,933	0.80
Manufacturing for Measuring Electrical Signals	344	16	\$61,487	0.58
Manufacturing Media	216	20	\$40,621	0.35
Fluid Meter and Counting Devices	159	1	\$71,973	2.44
Manufacturing and Controlling Devices	120	9	\$48,371	0.32
Analytical Laboratory Instrument	77	6	\$60,878	0.19
Total	49,252	631	\$65,221	1.76

*Location Quotient (LQ) equals the percent employment in Greater Phoenix divided by percent employment in the U.S. If the LQ is greater than one, the industry is more concentrated in Greater Phoenix than in the U.S. on average. Source: Minnesota IMPLAN 2002

Figure 12-2

Selected High-Tech Occupations

Occupation	Employment
Sales and Related Occupations	185,000
Electrical and Electronic Technicians	6,990*
Electrical Engineers	6,620
Computer Programmers	5,440
First Line Supervisors of Mechanics	5,170
Inspectors, Testers, Sorters, and Samplers	4,040
Electronics Engineers, except computer	4,930
Engineering Managers	3,570
Packaging and Filling Machine Operators	3,350
Electrical and Electronic Equipment Assemblers	1,900
All Other Assemblers	1,640
All Other Engineers	660

Source: Arizona Department of Economic Security 2003; *2002

Figure 12-3

Major High Tech Firms

Company	Employment
Honeywell	12,000
Intel Corp.	9,500
Freescale Semiconductor	3,500
General Dynamics C4 Systems	3,200
Motorola	1,800
Microchip Technology Inc.	1,500
Medtronic Microelectronics	1,365
ON Semiconductor	1,190
Orbital Sciences Corp.	930
STMicroelectronics Inc.	842
Varian Electronics Manufacturing	800
Sanmina-SCI Phoenix	750

Sources: Business Journal Book of Lists 2005

12.1 BioIndustry

The Bioindustry cluster includes businesses that provide products and services characterizing life science activities (excluding health care delivery) such as medical and surgical devices, pharmaceuticals, medical technology, research and testing. The two main sectors of bioindustry are biotechnology and medical devices. Both sectors are characterized by intensive and highly reciprocal crossover and technology transfer among private-sector firms, academia, government labs, and private research institutes. BioIndustry also includes the application of computer-based management information systems and statistical methods to research.

The Greater Phoenix region has made a significant investment in the growth of the bioindustry sector, from efforts to attract top companies to the formation of research organizations to support the biosciences. One such organization is the Arizona BioIndustry Association, comprised of more than 140 bioindustry businesses in Greater Phoenix.

In Greater Phoenix, growth of bioindustry has outpaced the national average. Bioindustry is identified as one of the fastest growing and more innovative industries in the region. Moreover, the state's universities have devoted a large portion of research and development funding to improve expertise in bioindustry, as the construction of ASU's Arizona Biodesign Institute research complex shows.

Greater Phoenix recently succeeded in attracting both the International Genomics Consortium (IGC) and the Translational Genomics Research Institute (TGen) to the region. The IGC will elevate the status of bioindustry in the region with its medical research expanding upon the Human Genome Project. The Translational Genomics Research Institute (TGen) was formed by several statewide organizations to provide necessary funding and support for the continued growth of bioindustry in Greater Phoenix.

Greater Phoenix has much to offer bioindustry, including a high-quality talent pool and existing strength in bio-related industries such as electronics, information, optics, and materials. BioIndustry in Greater Phoenix employs over 9,000 people in nearly 600 firms. This represents an over 330% growth in employment since 1990, and at \$50,086 per worker, wages in bioindustry are more than \$15,000 above the Greater Phoenix metro average.

Figure 12-4

BioIndustry in Greater Phoenix- 2003

<i>Industry</i>	<i>Employment</i>	<i>Establishments</i>	<i>Average Wage</i>	<i>Location Quotient*</i>
Medical Laboratories	3,334	62	\$43,603	2.08
Testing Laboratories	1,663	175	\$46,844	0.92
Pharmaceutical preparation manufacturing	846	17	\$54,575	0.23
Research in physical and life sciences	745	97	\$66,519	0.14
Diagnostic imaging centers	721	59	\$77,107	1.00
Electromedical apparatus manufacturing	631	8	\$45,329	1.00
Dental laboratories	563	104	\$32,661	0.80
Surgical appliances and supplies manufacturing	236	25	\$44,918	0.23
Irradiation apparatus manufacturing	159	1	\$114,491	1.09
Surgical and medical instrument manufacturing	91	6	\$42,154	0.07
Dental equipment and supplies manufacturing	58	5	\$35,674	0.29
Nitrogenous fertilizer manufacturing	58	4	\$42,168	0.07
Other bioindustry manufacturing	258	21	\$39,580	5.75
Total	9,363	584	\$50,086	0.50

*Location Quotient (LQ) equals percent employment in Greater Phoenix divided by percent employment in the U.S.

If the LQ is greater than one, the industry is more concentrated in Greater Phoenix than in the US on average.

Source: Minnesota IMPLAN, January 2005

Figure 12-5

Major BioScience Firms

<i>Company</i>	<i>Employment</i>	<i>Company</i>	<i>Employment</i>
Sonora Quest Laboratories	1,838	Watson Pharmaceuticals Inc.	245
Bard Peripheral Vascular	370	Medicis	175
Vantage Mobility	270	Naturally Vitamins	100
Arizona Natural Resources	250	Interface, Inc.	92

Source 2005 Phoenix Business Journal Book of Lists, "Top BioScience Firms"

12.2 Software

The Software cluster includes businesses that develop, market or distribute software products for business, scientific or personal use. These businesses provide products for a wide variety of platforms including consumer electronics, personal computers, workstations, mini-computers, and mainframe computers.

Greater Phoenix has a well-established base of firms in software and high-tech industries including Motorola, Intel, JDA Software, Microchip Technology, ON Semiconductor, and Medtronics.

Increasing demand for bandwidth and speed is expected to exceed current capacity in the next two to three years, creating demand for more computer-related occupations in the near future. Greater Phoenix is well positioned to meet this increase in demand in computer related fields. With a current workforce of 1.8 million, Maricopa County's employment number is expected to increase about 15.2% by 2010, providing a new pool of workers to support (and use the services of) the software industry.

The Arizona Technology Council works with member organizations to grow the technology industry in Arizona, helping it to become a top-tier center for technology-based industries and businesses. The technology sector of Greater Phoenix is also supported by Arizona State University, which graduated more than 300 students in computer information systems, computer science and engineering in 2004.

Figure 12-6

Software Related Industries- 2003

<i>Industry</i>	<i>Employment</i>	<i>Establishments</i>	<i>Average Wages</i>	<i>Location Quotient*</i>
Computer Systems Design	5,249	965	\$69,715	0.92
Custom Computer Programming	4,449	650	\$64,586	0.71
Software Publishers	1,861	131	\$69,956	0.62
Computer Facilities Management	777	13	\$51,882	1.06
Other Computer Related	401	112	\$69,010	0.28
Total	12,737	1,871	\$66,849	0.74

*Location Quotient (LQ) equals percent employment in Greater Phoenix divided by percent employment in the US. If the LQ is greater than one, the industry is more concentrated in Greater Phoenix than in the US on average.

Source: Minnesota IMPLAN, January 2005

Figure 12-7

Selected Software Occupations

<i>Occupation</i>	<i>Employment (rounded)</i>
Mathematical Occupations	33,880
Computer Support Specialists	9,290
Data Entry Keyers	6,990
Programmers	5,440
Computer Systems Analysts	4,780
Software Engineers, Applications	3,750
Network and Computer Systems Administrators	3,130
Information Systems Managers	3,000
Software Engineers, Systems	2,980
Computer Operators	2,270
Network Systems and Data Communications Analysts	1,520
Database Administrators	1,020
Computer Specialists, All Other	680
Desktop Publishers	200

Source: Arizona Department of Economic Security, 2003

Figure 12-8

Major Software Firms

<i>Company</i>	<i>Employment</i>
McKesson Corp.	700
JDA Software Group Inc.	646
Information Network Corp.	360
Computer Guidance Corp.	106
MediServe Information Systems	102
Business Integration Group Inc.	85
Oracle Corp.	85
ICM Conversions Inc.	70
ILinc Communications	66
Evans Newton Inc.	60

Source: Phoenix Business Journal Book of Lists, 2005

12.3 Aerospace

The Aerospace cluster includes manufacturing firms involved in the production of aircraft, aircraft engines, guided missiles, space vehicles, space vehicle propulsion units, as well as search and navigation equipment. Service sector operations include air transportation and courier services, airport and terminal services, and aircraft repair facilities. Electronics industries are especially important suppliers to aerospace industries.

Greater Phoenix has a number of qualities that make it very suitable for aerospace. It has a well-established base of firms in both aerospace manufacturing and services, including Boeing and America West. Sky Harbor International Airport is the fifth busiest airport in the world for takeoffs and landings, with 550,000 arrivals and departures annually. There is also a network of eight municipal airports, including military reuse facilities, with available space to expand. Greater Phoenix has the perfect climate for flight operations, with 300 days of sunshine a year. Greater Phoenix has a well-established supplier network and available real estate. Training for professions in the aerospace industry is available through Arizona State University, the Maricopa County Colleges System, and several local flight training schools.

Because of Greater Phoenix's suitability for aerospace, a number of businesses have opened new facilities. Regional Airline Academy chose Mesa as the location for its second flight training school. Comtek, a Canadian company that repairs, engineers, and manufactures advanced composite materials, recently opened its US headquarters in Phoenix.

Figure 12-9

Aerospace-Related Industries- 2003

Industry	Employment	Establishments	Average Wages	Location Quotient
Scheduled passenger air transportation	13,297	26	\$49,903	2.21
Aircraft engine manufacturing	6,438	30	\$64,121	6.25
Search and navigation equipment	7,634	18	\$76,825	4.11
Aircraft manufacturing	4,090	17	\$69,816	1.55
Other aircraft part manufacturing	2,981	52	\$53,850	2.92
Other support activities for air transport	1,852	55	\$40,466	2.02
Missile and space vehicle manufacturing	1,051	10	\$64,911	1.62
Other airport operations	989	17	\$22,011	1.32
Chartered passenger air transport	349	19	\$46,515	0.84
Other nonscheduled air transport	77	13	\$33,487	2.17
Iron and steel forging	61	1	\$41,583	0.20
Scheduled freight air transport	54	11	\$66,628	0.24
Nonferrous forging	36	9	\$42,567	0.32
Air Traffic control	27	1	\$43,414	0.70
Chartered freight air transport	13	1	\$39,836	0.13
Transportation equipment rental	15	9	\$48,623	0.13
Other space vehicle equipment	10	1	\$49,648	0.12
Space propulsion units and parts	10	1	\$48,991	0.06
Total	38,960	279	\$58,950	2.38

*Location Quotient (LQ) equals percent employment in Greater Phoenix divided by percent employment in the US. If the LQ is greater than one, the industry is more concentrated in Greater Phoenix than in the US on average.

Source: Minnesota IMPLAN, January 2005.

Figure 12-10

Major Aerospace Firms

Company	Employment
Honeywell	12,000
America West Airlines	8,539
Southwest Airlines	4,672
The Boeing Company	4,500
General Dynamics C4 Systems	3,400
Orbital Sciences Corporation	930
Goodrich Corporation	733
Mesa Air Group	390
ASIG	350
MD Helicopters, Inc.	282

Source: Dunn & Bradstreet Q2 2005, 2005 Book of Lists.

Figure 12-11

Selected Aerospace Occupations

Occupation	Employment
General and Operations Managers	18,880
Electronics Engineers	4,930
Computer Systems Analysts	4,780
Inspectors and Testers	4,040
Computer Applications Engineers	3,750
Mechanical Engineers	3,210
Machinists	3,100
Computer Systems Software Engineers	2,980
Electrical Engineers	2,620
Aircraft Mechanics and Service Technicians	2,100

Arizona Department of Economic Security, 2003.

12.4 Advanced Business Services

The Advanced Business Services cluster includes financial institutions in the credit, lending, collections, investments, and brokerage sectors. The industry includes general office, data center, and regional and corporate headquarters operations. Employers in this cluster include customer contact centers, data processing centers, financial institutions, insurance companies, and real estate firms.

Greater Phoenix has a well-established base of firms in the advanced business services industry, including Wells Fargo, JP Morgan Chase, American Express, Discover Financial Services, DHL Worldwide Express, and USAA.

Many advanced business services companies, such as Lydian Data Services and Countrywide Home Loans, have recently located to Greater Phoenix. Employers in the advanced business services sector have access to experienced and talented administrative, executive, and professional workforce. Industry growth in Greater Phoenix is also supported by Arizona State University, which awarded almost 2,000 undergraduate and graduate level business degrees in 2004.

At \$52,402 the Advanced Business Services sector's average wage is more than \$14,000 above the region's average wage.

Figure 12-12

Advanced Business Services- Related Industries in Greater Phoenix, 2003

Industry	Employment	Establishments	Average Wages	Location Quotient*
Credit intermediation and related activities	60,949	2,141	\$49,065	1.73
Management of companies and enterprises	17,251	307	\$63,952	0.81
Insurance carriers	14,789	417	\$54,292	0.92
Management and scientific consulting	14,331	2,811	\$51,456	1.57
Accounting and bookkeeping services	12,376	1,644	\$36,557	1.18
Engineering and design services	11,861	1,310	\$59,117	1.26
Legal services	10,349	1,755	\$67,198	0.78
Securities and commodity contracts	8,867	832	\$71,542	0.93
Office administrative services	5,164	445	\$46,138	1.36
Advertising and related services	5,094	786	\$42,558	0.83
Marketing research and polling	2,645	100	\$29,730	2.00
All other professional and technical services	1,586	95	\$36,567	2.56
Funds, trusts, and other financial vehicles	1,154	76	\$40,407	1.06
Photographic services	1,135	141	\$22,429	1.08
Research and development in the social sciences	275	32	\$52,570	0.32
Translation and interpretation services	79	23	\$38,188	0.63
Total	167,630	12,883	\$52,402	1.19

*Location Quotient (LQ) equals percent employment in Greater Phoenix divided by percent employment in U.S.

Source: Minnesota IMPLAN, January 2005.

Figure 12-13

Selected Advanced Business Services Occupations

Occupation	Employment (rounded)
Chief Executives, General	25,160
Payroll and Bookkeeping Clerks	22,850
Accountants and Auditors	15,210
Bill and Account Collectors	11,160
Budget, Credit, and Financial Analysts	8,560
Management Analysts	8,290
Financial Managers	8,110
Employment, Training, Compensation	7,390
Adjusters, Appraisers, Cost Estimators	7,140
Loan Interviewers and New Account Clerks	5,470
Advertising/Marketing Managers	4,500
Tellers	4,290
Administrative Services Managers	3,870
Human Resources Managers	2,950
Underwriters	1,740
Brokerage Clerks	1,040

Source: Arizona Department of Economic Security, 2003, Greater Phoenix Data

Figure 12-14

Major Advanced Business Services Firms

Company	Employment
Wells Fargo	11,000
JP Morgan Chase	9,200
Bank of America	7,268
American Express	7,000
Vanguard Health Systems	4,092
Charles Schwab & Co. Inc.	2,300
United Parcel Service	2,021
USAA	1,694
Blue Cross Blue Shield	1,147
Discover Card	1,100
U-Haul	1,000

Sources: Dun & Bradstreet 2005; Phoenix Business Journal Book of Lists 2005