

DELAWARE VALLEY DATA

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

ANALYTICAL DATA REPORT

Employment Base Analysis and Economic Census Update

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The Delaware Valley Regional Planning Commission (DVRPC) is an interstate, inter-county and intercity agency serving the Philadelphia-Camden-Trenton metropolitan area. As the region's metropolitan planning organization (MPO), the commission provides technical assistance and services to its member state and local governments, the private sector and the public. *Delaware Valley Data* is our periodic series of free data bulletins and analytical data reports. This analytical report reviews prior analysis of the Delaware Valley's employment base in light of the latest Economic Census data release. It draws new conclusions about our sector strengths and weakness and makes some recommendations for employment policy in the region.

Introduction

In 2003 DVRPC published the report *Three Decades of Job Growth and Decline in the Delaware Valley: Analyzing the Region's Economic Base by Sector*. As part of that study, 1997 Economic Census data was used to drill deeper into the North American Industry Classification System (NAICS) codes to determine specific industries in which our region excels. Last fall the Census Bureau released the new 2002 Economic Census data. It is now possible to gauge how our region's industry strengths and weaknesses may be changing. This report updates the previous analysis of the Economic Census and asks two questions: how does our region *then* compare to our region *now*, and how do comparable regions then compare to our region now?

Methodology

The initial DVRPC report used economic base theory and rudimentary location quotient analysis. Regional employment in various NAICS codes was divided by national employment by sector to create the ratio known as the location quotient. Industries with a score near <1> or higher were considered basic, meaning that compared to the national economy, our region had more jobs in a given industry than would be expected. These industries were considered strengths: sectors that export most of their products and services and therefore bring wealth into the region.

Using the same simple methodology, the chart to the right derives location quotients for two-digit NAICS codes from the new 2002 Economic Census data. The methodology has limitations but the data can be used as a rough scorecard for the region, and broad themes may also be discernable.



In the 2-digit NAICS data, most sectors (such as retail and wholesale trade, transportation, real estate, and administrative services) hover at or near <1>. These sectors typically are local industries. Of the remaining sectors, two are noticeably below <1> and four sectors are noticeably above <1>.

The lagging sectors are manufacturing and accommodation and food services. In 2002, the manufacturing sector had a location quotient of 0.80, and accommodation and food services a quotient of 0.73. Manufacturing and accommodation and food services are traditionally low skilled sectors. It is generally accepted that most North American regions no longer export the products and services of low skilled sectors. The data for our region attests to that reality.

However, there are new exporting sectors in our region growing the economy. It is now well known that the service sector is the region's primary economic engine. We excel in four service sectors, each scoring significantly above <1>. The sectors include the financial and insurance sector at 1.52; the professional technical and scientific services sector at 1.28; and the education services sector at 1.27. It should be noted that the education sector includes business and professional schools but not standard colleges and universities. If the economic census were to include such institutions of higher learning, education might be an even stronger category for our region. Finally, health care services, with a location quotient of 1.12, may also be an emerging export industry for the region despite its traditional role as a strictly locally consumed service.

As for absolute levels of employment, health care and social assistance have the highest ranking at 378,334 jobs, followed by retail with 313,850 jobs, and manufacturing with 262,470 jobs. When aggregated, the various white-collar service sectors represented by the NAICS codes beginning with the number 5 are the largest employers in the region. Just combining NAICS 52 for finance and NAICS 54 for professional, scientific and technical services, unveils over 430,000 jobs. Since these jobs are "basic" jobs, exporting their services and growing the region, these service jobs are even more important than their absolute numbers suggest. Via a multiplier effect, for every one job in these sectors several more jobs are being supported.

REGIONAL, TRADITIONAL INDUSTRIES, 2002			
NAICS	CATEGORY	JOBS	L Q
31-33 : MANUFACTURING		263774	
311	Food mfg	25112	0.93
312	Beverage & tobacco product mfg	3750	1.30
313	Textile mills	3750	0.78
314	Textile product mills	1750	0.53
315	Apparel mfg	7500	1.22
321	Wood product mfg	3750	4.69
322	Paper mfg	17000	1.75
323	Printing & related support activities	17000	1.93
324	Petroleum & coal products mfg	5368	0.42
325	Chemical mfg	37500	20.32
326	Plastics & rubber products mfg	17000	1.11
327	Nonmetallic mineral product mfg	10911	0.62
331	Primary metal mfg	7500	0.87
332	Fabricated metal product mfg	25938	2.95
333	Machinery mfg	13989	0.50
334	Computer & electronic product mfg	17000	0.81
335	Electrical equipment, appliance, & component mfg	7500	0.33
336	Transportation equipment mfg	17000	1.92
337	Furniture & related product mfg	7500	0.25
339	Miscellaneous mfg	16956	1.59
71-72 : HOSPITALITY		201881	
711	Performing arts, spectator sports, & related industries	9,048	1.07
712	Museums, historical sites, & similar institutions	3,978	1.62
713	Amusement, gambling, & recreation industries	23,848	0.92
721	Accommodation	18,534	0.63
722	Food services & drinking places	146,473	1.08

Source: DVRPC, derived from 2002 Economic Census

Philadelphia Then and Now

As demonstrated in the chart on page 1 of two digit NAICS codes, the service sector continues to be the driver of our regional economy with both the greatest level of employment and the most location quotients above <1>. However, NAICS codes can be further broken down into three-digit, four-digit or larger codes, revealing strengths in multiple sub-sectors. The following charts dig slightly deeper into the Economic Census NAICS code data, focusing on three broad groupings of employment:

- **Traditional Industries**, the formerly blue and pink collar jobs of manufacturing and the hospitality sector, NAICS codes, 31, 32, 33 and 71 and 72;
- **The Social Sector** made up of the emerging education and health care industries, NAICS codes 61 and 62;
- and **The Knowledge Economy**, consisting of the higher skill and higher paid services in information, finance and insurance, and professional, technical and scientific services, NAICS codes 51, 52 and 54.

As illustrated in the chart on page 2,

traditional Industries account for over 460,000 jobs: over 200,000 jobs in the hospitality services and over 260,000 in manufacturing. Although manufacturing has continued to decline as a percentage of overall employment and did not have a high location quotient in the aggregate, many specific manufacturing sectors are export leaders bringing wealth into the region. Chemical manufacturing is extremely strong with a location quotient in the double digits. Chemicals are clearly one of the pillars of economic strength in our region despite the region's move away from manufacturing.

Although the chemical sector is the star, a myriad of smaller manufacturing industries are also export leaders in our region with quotients above <1>, including: beverages and apparel, basic stock products (such as wood, paper and plastics), printing products and services, and finally complex manufacturing products such as transportation equipment and fabricated metals. The breadth of these manufacturing strengths attests to the economic diversity that is an enduring hallmark of our region.

REGIONAL, SOCIAL SERVICES, 2002			
NAICS	CATEGORY	JOBS	L Q
611	EDUCATION	11966	
6111	Primary Schools (not covered in the Economic Census)	X	X
6112	Junior Colleges (not covered in the Economic Census)	X	X
6113	Universities (not covered in the Economic Census)	X	X
6114	Business schools & computer & management training	1750	0.93
6115	Technical & trade schools	1988	0.78
6116	Other schools & instruction	6478	1.04
6117	Educational support services	1750	1.32
612	HEALTH CARE	378334	
621	Ambulatory health care services	115002	0.93
622	Hospitals	132758	1.02
623	Nursing & residential care facilities	78661	1.11
624	Social assistance	51913	0.97

Source: DVRPC, derived from 2002 Economic Census

While the hospitality industry is not as strong in basic accommodation and food services employment as might be expected, it too has a number of strengths that are not visible at the 2-digit NAICS code level but can be seen at the three-digit level and bode well for the future of this sector. The quotient for attractions, including performing arts and spectator sports, is 1.07 and the quotient for museum and historical sites is 1.62. At 0.92, the quotient for amusement and gambling lagged a bit in 2002 but should improve when gaming arrives in the region, perhaps in time for the 2007 Economic Census. These are sub-sector strengths that are likely to increase the regional number of accommodation and food service jobs.

The social service sector of education and health care providers are also vital components of our region's economy. Normally these sectors would not be considered basic since they are traditionally of limited geographic reach. However, the fact that there are location quotients above <1>, even if they are not noticeably higher, suggests that these two sectors may be more than just social services consumed locally. They may also be emerging wealth engines for our region. These two sectors are job-producing engines to keep an eye on. The above chart covers these sectors.

The most important sectors to watch, however, are in the set of industries we have dubbed the Knowledge Economy, illustrated on the chart to the right. Not only do these jobs make up the greatest percentage of our total employment, they also consist of the greatest number of our well-paid, highly skilled export-oriented jobs for which the region vigorously competes. In NAICS code 52 for financial and insurance services, the quotient for securities is 1.38 and for Funds and Trusts, 1.23. In NAICS 51 for information services, the quotient for publishing is at 1.35 and for telecommunications, 1.29. Additionally,

REGIONAL, KNOWLEDGE SERVICES, 2002			
NAICS	CATEGORY	JOBS	L Q
51	INFORMATION	75300	
511	Publishing	29550	1.35
512	Film & Recording	3750	0.61
515	Broadcasting	3750	0.64
516	Internet Publishing	750	0.93
517	Telecommunications	37500	1.29
518	Internet Services	7500	0.72
519	Other Info. Services	1750	1.50
52	FINANCE	214478	
521	Central Banks	1228	1.68
522	Credit Activities	100000	0.93
523	Securities Activities	37500	1.38
524	Insurance	75000	0.96
525	Funds and Trusts	750	1.23
54	PROFESSIONAL SERVICES	207851	
5411	Legal	37193	1.12
5412	Accounting	24677	0.65
5413	Architecture & Engineering	29517	0.81
5414	Specialized Design	2433	0.72
5415	Computer Systems	38283	1.20
5416	Consulting	23144	1.09
5417	Research and Development	29914	1.69
5418	Advertising	9230	0.79
5419	Other Prof. Services	13460	0.92

Source: DVRPC, derived from 2002 Economic Census

the information publishing strengths in our region most likely are interacting synergistically with our manufacturing strengths in paper and printing services.

Of these Knowledge Economy codes, NAICS 54 for professional, scientific, and technical services is of special significance. At the four-digit level we have four strengths in this grab bag sector of high-end services, including a quotient of 1.12 for legal services, 1.20 in computer services, 1.09 in consulting services, and a very strong 1.69 in research and development.

The previous analysis of the 1997 Economic Census data focused on NAICS code 54, stating that in the global, knowledge-driven economy NAICS 54 is an indicator of overall economic health. NAICS 54 represents a myriad of high paying value-adding services. It suggests the unique interactions that occur between important industries via synergies and clusters. It also has implications for economic policy in the region. With this sector we have drilled down further into the 2002 NAICS codes and compared changes with the data from 1997, as illustrated on the chart on page 5.

This simple location quotient methodology is a crude scorecard of the change in our region's industry mix. Data is only available from the 1997 and 2002 Economic Census for NAICS service codes. Two points in time do not necessarily represent a long-term trend. However, changes do *suggest* positive and negative trends that may be emerging. In a rapidly changing global economy policy makers need to be aware of these possibilities.

The outlines of several interesting stories are evident in this data. Most of the change looks positive, including three big possibilities: the emergence of a marketing synergy, strengthening diversification in clusters such as consulting and computer services, and the region's increasing prominence as a bio-technology research center.

The region's location quotients in marketing research, direct mail advertising and marketing consulting all increased from 1997 to 2002, suggesting an emerging synergy between these related fields. Direct mail advertising increased from 2,895 jobs to 3,171 jobs (an increase of 10%) while marketing research increased from 4,738 to 6,001 jobs, a 27% increase. The location quotients in these sub-sectors rose from 1.20 to 1.45 for direct mail advertising and 1.57 to 1.71 for marketing research, perhaps indicating that despite their slow growth these types of industries may be centralizing more in our region.

A more interesting story, however, is the increasing diversity among clusters of industries such as consulting and computer services. The emergence of the synergy between different marketing sub-sectors may also be a sign of this diversification. At the 2-digit level this diversification is not visible. In 1997, the computer systems and design services sector had an aggregate location quotient of 1.25, and consulting services had an aggregate quotient of 1.20. By 2002, these quotients had dropped to 1.21 and 1.09. Although this may not look promising, it is important to keep in mind that the location quotient tool is a crude ratio and that both these industry clusters are still export leaders for the region, representing a combined total of over 44,000 jobs in 1997 and 61,500 jobs in 2002. This is a percent change of jobs in these two categories of nearly 40% percent.

Most striking is what lays just under the 4-digit NAICS codes. At the 6-digit level, computer systems services went from having two location quotients above <1> in 1997 to three in 2002. The region diversified this cluster by adding a new strength in computer facilities management. This sub-sector had only 1,579 jobs in 1997 but by 2002 had increased to 5,852 jobs, an increase of 271 %.

Consulting services also diversified its number of sub-sectors with quotients above <1> going from three to four 6-digit sub-sectors with location quotients above <1>. General management consulting stagnated slightly, increasing by only 3% from 8,947 to 9,200 jobs, perhaps accounting for the drop in the aggregate location quotient for this sector. However, human resources consulting, marketing consulting, and economic and other scientific and consulting services all increased their employment and location quotients from 1997 to 2002. Human resources consulting increased from 2,765 to 6,223 jobs between 1997 and 2002 while marketing consulting increased from 1,436 to 2,747 jobs, representing increases of 125% and 91%, respectively, for these specialties. Such diversity is a historic characteristic of our region. The good news is that as the region becomes more knowledge-based, diversity is not only continuing but also strengthening.

NAICS 54 LOCATION QUOTIENTS, 2002

NAICS	Occupation	1997		2002	
5411	LEGAL	31063	1.06	37193	1.12
5412	ACCOUNTING	16164	0.59	24677	0.65
5413	ARCHITECTURE & ENGINEERING	34708	1.19	29517	0.81
	Architecture	3597	0.87	4772	0.90
	Landscape Architecture	*	*	784	0.75
	Engineering	28978	1.41	20024	0.81
	Surveying & Mapping	*	*	657	0.39
	Testing Laboratories	*	*	2505	0.93
5414	SPECIALIZED DESIGN	3039	0.96	2433	0.73
	Interior Design	801	0.84	893	0.80
	Industrial Design	1070	2.80	117	0.42
	Graphic Design	1092	0.63	1355	0.76
5415	COMPUTER SYSTEMS	26897	1.25	38283	1.21
	Programming	7844	0.88	10378	0.82
	Systems Design	16433	1.73	18516	1.49
	Computer Facilities	1579	0.78	5852	1.62
	Other Computer Services	1041	1.00	3537	1.15
5416	CONSULTING	17304	1.20	23144	1.09
	General Management	8947	1.52	9200	0.91
	Human Resources	2765	0.99	6223	1.79
	Marketing	1436	0.83	2747	1.01
	Distribution & Logistics	661	0.93	1085	0.86
	Environmental	1915	1.48	1949	1.19
	Economic	*	*	622	0.92
	Other Consulting	1243	0.82	971	1.08
5417	RESEARCH AND DEVELOPMENT	6273	0.74	29914	1.67
	Physical & Engineering	806	0.26	7500	0.84
	Biotechnology	*	*	13444	3.85
	Life Sciences	2756	1.87	7856	2.23
	Social Sciences & Humanities	418	0.41	750	0.43
5418	ADVERTISING	8695	0.74	9230	0.79
	Agencies	2564	0.65	3290	0.75
	Public Relations	639	0.59	478	0.37
	Media Buying	161	1.67	180	0.80
	Media Representatives	747	1.00	246	0.45
	Display	661	0.57	353	0.46
	Direct Mail	2895	1.20	3171	1.45
5419	OTHER SERVICES	6650	1.11	13460	0.92
	Marketing Research & Polling	4738	1.57	6001	1.71

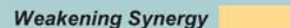
Cluster



Synergy



Weakening Synergy



* Data Not Available

Source: DVRPC, derived from 2002 Economic Census

By far the most exciting story that this data suggests is what is happening in life sciences research and development. Last year the region hosted *BIO 2005*. Cities, states and even nations attended, promoting themselves as the world's next big bio-tech center. Competition is stiff for biotechnology industries and jobs. Fortunately, this data suggests that our region may be a big winner in that "Bio-war".

In 1997, when NAICS codes did not delineate between biotechnology research and other life sciences, this region had an aggregate life sciences R&D location quotient of 1.87, representing roughly 2,756 jobs. By 2002 life sciences research had been split into two sectors: life science research and biotechnology research. Our region had extremely high quotients of 2.23 and 3.85 in both types of research. Together this research also represented 21,300 jobs, up from a mere 2,756 jobs in 1997 and representing a percent change of an astounding 673%. While it is true that the Census Bureau made a more detailed accounting of these jobs between 1997 and 2002, the number of new jobs cannot be explained only by changes in reporting. This is a phenomenal rate of change, representing many high paying jobs for the region. In terms of absolute numbers, bioresearch has now become as strong an employer in the Delaware Valley as stalwarts such as legal, accounting, engineering, computer systems, and consulting services. If this growth rate were to continue it would eventually eclipse these other professional services.

Before the region starts to celebrate, there is some bad news. Along with these big success stories are a few critical challenges. The bad news is that we may be losing strength in environmental consulting and engineering.

In 1997, environmental consulting had a location quotient of 1.48, representing 1,915 jobs. By 2002 the number of jobs had risen slightly to 1,949, but the location quotient had dropped to 1.19. While still a strong sector in a promising new industry, it may be stagnating in our region relative to growth nationwide. The engineering data also suggest a problem. In 1997, engineering jobs represented nearly 29,000 jobs with a location quotient of 1.41. Only legal services provided a greater number of higher paying professional, scientific, and technical jobs. By 2002 the number of engineers had actually dropped to 20,000 and the location quotient had fallen below <1>. This change was a percent decline of -31%.

Again, it is hard to say what this change may indicate. Engineering jobs are notoriously difficult to categorize, sometimes showing up, for example, in the manufacturing sector. Additionally, the economy was suffering a severe downturn in manufacturing, and services related to manufacturing and engineering in particular were being out-sourced to lower cost nations such as India. However, these conditions existed nationally and do not account for the decline in this sub-sectors location quotient from 1.41 to 0.81. To better understand what may be occurring in these declining sub-sectors, it is necessary to look at comparable regions. This will also aid in the assessment of our region's strengths.

Comparing the Region Then and Now

In the previous analytical report DVRPC compared the location quotients for NAICS 54 in the Philadelphia metro area with three competitors: Detroit, Boston, and Washington, DC. These regions were selected based on their similar population size, population change, geographic proximity, and historical circumstances. In the 1997 Economic Census the data for these regions was available at the Consolidated Metropolitan Statistical Area (CMSA). By 2002 the Census Bureau had created a new regional statistical measure called the Combined Statistical Area (CSA). CSA's tend to cover a larger area than CMSA's, but the metropolitan areas they represent are consistent with the metropolitan areas covered in the previous report. The chart on page 7 compares 2002 NAICS code 54 in the Philadelphia CSA to the 2002 CSA's for Detroit, Boston and Greater Washington DC.

The key finding in 1997 was that the Philadelphia metro region had fewer industry clusters and synergies than its competitors. Additionally, that report suggested that the Boston and DC metro regions not only had numerous sub-industry synergies and clusters but also synergies between entire clusters. In particular the Boston and DC metros had the possibility of a strong interaction between their regional strengths in R&D, computer technology, and consulting services.

METRO COMPARISON, 2002

NAIC	OCCUPATION	PHILADELPHIA	DETROIT	BOSTON	DC
5411	LEGAL	1.12	0.63	0.87	0.86
5412	ACCOUNTING	0.65	0.84	0.53	0.41
5413	ARCHITECTURE & ENGINEERING	0.81	1.75	1.02	0.87
	Architecture	0.90	0.66	1.29	0.65
	Landscape architecture	0.75	0.84	1.00	0.53
	Engineering	0.81	2.08	1.04	1.04
	Surveying & mapping	0.39	0.37	0.77	0.42
	Testing laboratories	0.93	2.42	0.63	0.33
5414	SPECIALIZED DESIGN	0.73	0.87	0.84	0.63
	Interior Design	0.80	0.35	0.76	0.74
	Industrial Design	0.42	2.15	2.36	0.09
	Graphic Design	0.76	0.82	0.80	0.66
5415	COMPUTER SYSTEMS	1.21	0.76	1.47	1.88
	Programming	0.82	0.85	1.56	1.39
	Systems Design	1.49	0.65	1.53	2.32
	Computer Facilities	1.62	0.91	0.66	2.53
	Other Computer Services	1.15	0.65	1.80	1.38
5416	CONSULTING	1.09	0.99	1.18	1.35
	General Management	0.91	0.84	1.09	1.83
	Human Resources	1.79	1.65	1.36	0.61
	Marketing	1.01	1.04	0.97	0.56
	Distribution & Logistics	0.86	1.95	1.37	1.00
	Environmental	1.19	0.46	1.36	1.13
	Economic	0.92	0.44	1.90	2.02
	Other Consulting	1.08	0.35	1.10	1.73
5417	RESEARCH AND DEVELOPMENT	1.67	1.29	1.57	1.48
	Physical & Engineering	0.84	1.98	1.19	1.72
	Biotechnology	3.85	1.12	2.06	0.74
	Life Sciences	2.23	0.22	1.89	1.19
	Social Sciences & Humanities	0.43	0.20	1.88	2.29
5418	ADVERTISING	0.79	1.00	0.84	0.64
	Agencies	0.75	1.54	0.77	0.43
	Public Relations	0.37	0.53	1.62	2.08
	Media Buying	0.80	0.76	0.68	0.23
	Media Representatives	0.45	0.73	0.66	0.26
	Display	0.46	0.69	0.25	0.22
	Direct mail	1.45	0.86	0.96	0.74
5419	OTHER SERVICES	0.92	0.62	0.64	0.53
	Marketing Research & Polling	1.71	0.60	0.59	0.54

Cluster ■ Weakening Cluster ■ Synergy ■ Weakening Synergy ■

Source: DVRPC, derived from 2002 Economic Census

According to the 1997 report, “The economies of both Boston and DC, but especially the latter, reflect the concept of an iron triangle locking other regions out of the competition for technology jobs. The first leg of their triangle begins with research and development. This in turn feeds into the second leg of their triangle, the computer services industry. Closing the triangle is the third leg of higher demand for consulting services for the technology industry.”

The 2002 data suggests that Detroit is struggling but Philadelphia is not. By 2002 the Philadelphia CSA had strong signs of the development of synergies between R&D, computer technology, and consulting clusters similar to the strengths observed in Boston and DC. Our location quotients still did not match Boston’s and DC’s, but through diversification the Delaware Valley had a greater variety of computer and consulting service strengths. ***The professional service sector remains vital in our region.***

Research and Development had the most noticeable improvement in our region. From a weak showing in R&D in 1997, the Philadelphia region catapulted to the lead in this sector with a location quotient of 1.67 compared to Boston’s quotient of 1.57 and DC’s quotient of 1.48. Both our physical and life science scores improved. However, our strengths in the life sciences and biotechnology research were the core reason for our improvement. Biotechnology research in our region ranked above <3> and life sciences research above <2>. Boston followed in second place with bio and life science R&D quotients near <2>, while DC and Detroit trailed with scores closer to <1>. Among these regions, ***Philadelphia may be winning the war for biotechnology research employment.***

It was not all a picture of success in the Philadelphia region. The bad news overshadowed by these biotechnology and life science success stories was that ***our region lagged all other regions in both engineering and physical R&D.*** Whereas Philadelphia had a physical R&D quotient of 0.84 by 2002, Boston’s was 1.19, DC’s 1.72 and Detroit’s was nearly <2>. In engineering the Philadelphia region’s location quotient of 0.81 compared unfavorably to Boston and DC’s rankings of 1.04 and Detroit’s ranking of over <2>. Unfortunately, this analysis supports concerns about the Delaware Valley region losing our strengths in these critical technology fields. Changes in the data reporting, the 2001 recession, and problems due to global outsourcing should have affected all regions relatively the same. However, while the Philadelphia region dropped by nearly 9,000 jobs in the engineering sub-sector, Boston gained nearly 9,000 jobs, DC gained nearly 12,000 jobs and Detroit doubled to nearly 50,000 jobs in this critical labor pool.

Conclusions

While it would not be prudent to draw too many conclusions from this simple methodology and these metro comparisons, broad themes are reinforced by this analysis. The first theme is the importance of varied and strong pools of professional, scientific, and technical labor. Many scholars concur that cross-fertilization of these labor pools is essential to grow the knowledge economy. The next theme is the question of the viability of a knowledge driven economy that does not excel in basic physical R&D and engineering. The last theme is the concern about the region’s ability to capture new growth industries, especially in the sustainability and “green” industry sub-sectors, recently cited in DVRPC’s March 2006 *Post-Global Economic Development Strategy* (DVRPC publication # 06004). These concerns and conclusions are outlined below.

Conclusion 1: Cross fertilization of critical pools of labor is essential to grow the knowledge economy

At a recent forum sponsored by the Central Philadelphia Development Corporation, Robert Weiss (an economic expert on the Knowledge Economy) discussed the essentials for growing vital service sectors. Weiss asserted that the key to knowledge employment growth is neither creating amenities nor attracting random firms but rather to focus on the career needs of the knowledge workers. This can be achieved by ensuring the economy has a number of opportunities for these workers to career network and job-hop. A different approach to enhance the knowledge economy is put forth by Richard Florida, who highlighted the need to attract creative workers in multiple industries by creating diverse and open environments attractive to all creative types.

Whichever means one uses to measure their presence and whatever term one uses to describe them, DVRPC agrees with the idea that it is essential for the region to pursue policies that increase **pools of skilled labor** in the knowledge economy. Most likely, Weiss and Florida are looking at the same phenomena of knowledge workers seeking like-minded people. Florida was able to measure the phenomena by a community's prevalence of unconventional groups such as immigrants and artists. Weiss focused more on the career needs of specific pools of skilled labor.

The data from this report reflects some of the characteristics of these critical labor pools. In light of research by Florida, Weiss, and other scholars, DVRPC recommends that all economic development plans and strategies should be evaluated by how they serve three vital functions:

- **Expanding existing pools** of skilled knowledge labor in the regional economy;
- **Creating new pools** of skilled knowledge labor in the regional economy; and,
- **Connecting these pools** to each other to grow the specialized industries that will turn our region into an export leader.

The diagram on page 10 of "Select Delaware Valley Labor Pools" depicts some of the key knowledge labor pools in our region found in NAICS code 54 for professional, scientific, and technical services. The size of the labor pool is represented by the size of each circle. Clusters of related industries are color-coded. The y-axis ranks location quotients from 0.60 to above $< 2 >$. The x-axis indicates percent change in employment by sub-sector between the 1997 and 2002 Economic Census. The diagram is also broken into four quadrants. Industry pools to the left of the dark 0 vertical line declined from 1997 to 2002 and industries below the dark 1.00 horizontal line have location quotients that are too low to be export leaders.

Conclusion 2: R&D and Engineering are critical to the region

One of the most notable aspects of the diagram on page 10 is the change to the engineering pool. It is the only job pool located in the quadrant of both negative growth and a location quotient below $< 1 >$. Sadly, engineering has also dropped in size. It used to rival legal services by being in the "25,000 or more jobs" category but is now represented by the next size down.

Can a region be a strong global player without strengths in physical R&D and engineering? This is an interesting question. Of the metro regions in this report, we are certainly falling behind in physical R&D and engineering. Of the competing regions analyzed, the Delaware Valley is the only region without physical R&D and engineering location quotients above $< 1 >$. While it is true that we cannot excel in every economic niche, physical R&D and engineering are arguably sectors that are important to future technology growth and development. If various pools of skilled labor were to be ranked, these sub-sectors would certainly appear at the top of most lists.

There are other, more compelling reasons to pursue physical R&D and engineering in the region, however, than for their own sake. These are critical labor pools to connect to other industries. Consider the life sciences sector in which we are excelling. Are there border areas between life sciences and physical R&D and Engineering that may be future growth industries? If there are, who is better positioned to take advantage of them: Boston, DC, or us? With a weak physical R&D and engineering labor pool, we may be last on the list of locations for such industries.

Nanotechnologies developed for medical purposes may be an example of one of these sectors, as may the development of alternative energy technologies. What are the others? At the very least, it is something for our economic development professionals to consider. First, the region must ascertain what the potential synergies between engineering, physical R&D, and the life sciences are, and then we must determine what can be done to insure these new industries happen here.

DIAGRAM of SELECT DELAWARE VALLEY LABOR POOLS



INDUSTRY CLUSTERS

- Accounting/Legal
- R&D
- Technology
- Architecture/Engineering
- Consulting/Marketing

NUMBER OF JOBS

- 5,000 or less
- 10,000
- 15,000
- 20,000
- 25,000 or more

Source: DVRPC, derived from 2002 Economic Census

Conclusion 3: Green Industries must be fostered in the region

As we have just seen with biotechnology, the region must increase the links—the synergies and clusters—not just between our existing pools of labor but also between the opportunities of the future. Another candidate for this kind of growth are the green industries recommended in the March 2006 DVRPC economic development strategy report. In that report, DVRPC highlighted a number of industries from green architecture to alternative fuels, labeling these emerging fields the Eco-economy.

Building green, for instance, clearly has engineering, architecture, as well as environmental consulting components. But it will also have physical and life science and even computer components. It is these synergies we should be fostering. We do not yet know how different labor pools could interact to create the Eco-economy, but there are multiple possibilities.

Consider our strengths in *computer systems integration consultants* and *environmental consultants*. These strengths appeared both in the data for 1997 and 2002. With the emergence of a potentially huge industry in retrofitting buildings in our region for energy efficiency and better environmental impact, couldn't there also be a huge need for consultants versed in environmental, engineering, architectural issues *as well as* the computer systems that could assist in creating energy and environmental efficiencies? For instance, could the nation and our region see the emergence of not just greater numbers of computer systems consultants or environmental consultants but also a large cadre of *Environmental Systems Consultants*? It would be a new job category that could arise from synergies between our various skilled labor pools. But regardless of whether or not this particular example is realistic, as a region we need to make two critical efforts: first to find these synergistic opportunities and second to ensure that we have the basic building blocks to capture them. This assessment is necessary not just in biotechnology, but also in the eco-industries that are on the verge of becoming major industry players in our region.

It is disheartening that not only the synergies between critical labor pools but also the size of these fields such as environmental consulting, architecture, engineering, and physical R&D may be weakening in our region just when these fields are emerging globally as vast economic opportunities. Action is needed to shore up these labor pools for both their intrinsic value as high paying sectors and for the sake of the future industries they will feed.

The data in this report suggests that the Delaware Valley has a number of success stories of which we may be proud. As a region we are successfully competing with global centers such as Boston and DC in the creation of virtuous economic triangles of R&D, computer technology, and consulting services, and our region's preeminence in biotechnology is astounding. But we must not lose site of the opportunities of the future. While celebrating these successes, it is also time to take the next critical steps.

Analytical report #12 is the latest in a series of bulletins designed to complement our traditional data releases. For more information on Analytical Data Reports, please visit the Delaware Valley Regional Planning Commission's website (www.dvrpc.org) or contact DVRPC at the telephone number below.

The Delaware Valley Regional Planning Commission was established in 1965 by interstate compact between Pennsylvania and New Jersey to plan for the orderly growth and development of the region, and to provide a variety of planning and technical assistance services responding to regional issues. DVRPC maintains a significant database for twenty-eight counties encompassing New Jersey, Delaware, Pennsylvania and Maryland. Included in the database are data profiles at the regional, county, and municipal level, and for other census geography as requested. DVRPC produces a diverse range of services, including demographic and economic data and projections; mapping and aerial photography; computer assisted mapping; geographic information systems; impact studies; and policy and program development.

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