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Tri-Cities, Washington
Innovation and Technology Index

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Economic Development Office
Pacific Northwest National Laboratory
Richland, Washington 99352

Cable Bridge Photographer
Bob Brawdy - Tri-City Herald

TRI-CITIES, WASHINGTON

INNOVATION AND TECHNOLOGY INDEX

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Economic Development Office
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Dear Reader:

The known story of the Washington state technology industry has centered for the last 10-15 years around a number of highly-successful software firms in the central Puget Sound area (the most famous of which is Microsoft) and a number of health-related businesses centered on the Fred Hutchinson Cancer Research Center and the University of Washington Medical School. Looking back a little further, the story was aerospace, centered on the Boeing companies. One rarely hears about technology businesses elsewhere in the state. And yet, there is a story to be told about some of the smaller cities in Washington, some of which are growing their own technology businesses and which have important advantages as places to live and do business.

This report from the Economic Development Office of Pacific Northwest National Laboratory provides a story of what the business community of the Tri-Cities (Richland-Kennewick-Pasco) area of the state has been doing to grow technology companies and also provides a comparison of the area to other technology areas in the Pacific Northwest and nation across critical dimensions known to be important to technology firms. The report shows an area that

- *Has been successful in founding and sustaining technology companies based on physics, chemical engineering, materials science, measurement equipment, and services*
- *Has considerable technical and entrepreneurial talent, leading to the founding of over 60 technical startups in the last five years*
- *Has not yet experienced many of the downsides of growth such as traffic congestion and high cost of living*
- *Has two factors impeding its technology-based economic development:a shortage of local equity capital and a need for greater high-bandwidth capacity*

We hope that you find the story of the Tri-Cities as a home for technology companies appealing and informative.

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Introduction

Innovation and technology are considered by many to be key drivers in local economic growth and development for today and for the future. Nurturing technology firms is thought to be a more cost-effective way of reaching development goals such as diversification or "family-wage jobs" than traditional industrial recruiting based on "smokestack chasing." However, to be successful at establishing a local technology industry base, it is important for a community such as the Tri-Cities area (Richland-Kennewick-Pasco metropolitan area, encompassing Benton and Franklin Counties) to understand the relationship between the needs of technology companies and the attributes of the community. It is also important for the community to understand how it stacks up against the competition. This report provides and discusses a set of indicators that compares the needs of technology firms against key Tri-Cities features. Not every comparison that a reader might wish to make appears in this report. For the most part, the report compares Benton County to other counties and regions, but sometimes includes Franklin County or specific cities when this is more appropriate or where county data are not available. Some economic and other data that technology companies find important are not always available or as up-to-date at the local level, especially in smaller metropolitan areas. Thus the story is necessarily less complete than at the state or national level, or even when comparing larger metropolitan areas. However, many indicators are available, and these provide a picture of a community with considerable strengths as well as some admitted weaknesses.

Summary Findings

The Tri-Cities rank highly for innovation, entrepreneurial activity, and high-tech growth, especially compared in per capita terms to much more famous innovation centers. While the vast majority of Washington State's technology employment is found in the Puget Sound area and has grown faster than elsewhere in the state, the Tri-Cities area is actually more technology-oriented in certain key respects and offers several important quality-of-life advantages such as low traffic congestion.

Indicators

The report provides information on five key indicator areas: innovation, competitiveness, growth, financial capacity, and quality of life. A sixth area that is sometimes reported at the state level, human potential, is more difficult to track at the local level, but some data that indicate the potential of the area have been included under innovation and quality of life.

INNOVATION

The Tri-Cities area is very innovative, especially for an area of its population size. While not as many new ideas flow out of science and technology in the Tri-Cities as in the much-larger Puget Sound area, the Tri-Cities area has a high percentage of high-technology output and employment, an even higher percentage of technology occupations than the Seattle area, very repectable new-patent statistics, and high growth rates in its high-technology sector.

Research and development is clearly alive and well in the Tri-Cities. Reflecting the historical makeup of the local high-technology sector, most patented innovations are in applications of physics, chemical engineering, and materials sciences rather than computer software and hardware, the mainstay of many other high-technology centers. The area is also very successful in attracting federal research and development spending.

COMPETITIVENESS

The Tri-Cities are competitive in developing, attracting, and keeping new technology industry, but has had to address some disadvantages in order to do so. Internet infrastructure, for example, meets minimal "connectivity" standards, but high-bandwidth connections remain an issue. The business climate is very pro-business, with a long list of business-assistance organizations and significant business incubator capacity. Tax burden is slightly higher than, and labor costs, lower than, key competitor areas.

GROWTH

While the Tri-Cities have not shown the spectacular growth in high-technology employment and income as the Puget Sound area experienced in the late 1990s, the growth rate has been very solid, especially for small startup firms. Although partly a reflection of the small size of many of the startups, the percentage of firms showing 15% per year or more growth ("gazelle" firms) is actually higher in the Tri-Cities than in the Puget Sound area, and is well ahead of the national average. The Tri-Cities also seem to be emerging from the historical boom-bust cyclic behavior that once depended almost exclusively on employment at the Department of Energy's Hanford Site.

FINANCIAL CAPACITY

As it is to lesser degree for Washington State as a whole, local financial capacity to bankroll new and innovative businesses is a significant weakness for the Tri-Cities. The area compensates for this weakness by being very assertive with the regional "angel" and venture capital communities.

QUALITY OF LIFE

Because it is not a large metropolitan area and has not become overcrowded, the Tri-Cities area has several distinct quality-of-life advantages that it can market in competing with other areas of the country. Among these advantages are a mild, sunny climate and very good air and water quality, very short commute times and comparatively uncrowded roadways, overall low cost of living and very reasonable housing costs, low crime rates, strong public school systems, and easily accessible outdoor recreation opportunities.

Fig. 1. Technology Ranks for Pacific Northwest Cities

Metropolitan Area, State	Tech-Pole Score	Tech-Pole Rank	Location Quotient Score	Location Quotient Rank	% of National Real Output Score	% of National Real Output Rank	Relative Output Growth (1990-98) Score	Relative Output Growth (1990-98) Rank
Richland-Kennewick-Pasco, WA	0.39	55	2.41	9	0.16	88	2.02	8
Boise City, ID	1.43	24	2.68	7	0.53	38	2.93	3
Portland-Vancouver, OR-WA	1.33	26	1.30	43	1.03	25	1.77	16
Seattle-Bellevue-Everett, WA	5.19	5	2.06	11	2.52	9	1.09	104
Spokane, WA	0.10	101	0.90	78	0.11	109	0.77	226

"Tech-Pole" is a composite index combining the percentage of national high-tech real output and the concentration of high-tech industries – or location quotient – for each metro.

Location Quotient compares the value of high-tech output as a share of total output in a metro area relative to the same percentage for the United States. If LQ > 1, high-tech industry is more concentrated in the metro than in the U.S. on average.

% of National Real Output measures the percentage of all the nation's high-tech output that comes from that metro.

Relative Output Growth (1990–98) measures growth in output of high-tech industries as compared to the national growth rate in high-tech. A value of more than 1.0 means the metro's high-tech output grew faster than the nation's high-tech growth from 1990-98.

A "metro" must contain either a place with a minimum population of 50,000 or a Census Bureau–defined urbanized area and total population of at least 100,000 (75,000 in New England). A metro comprises one or more counties.

Rank is relative to 315 metropolitan areas

Source: Milken Institute

INNOVATION

Innovation Capacity

Innovation is the most important difference between a technology-based economy and a traditional resource-based economy. A technology economy survives on its ability to produce new products and services that are based on new ideas. A high rate and dependence on innovation is the primary factor that distinguishes technology companies from more traditional firms. While there is no single indicator of local innovation capacity, one can begin to make an aggregate assessment based on a number of indicators that are published for local areas.

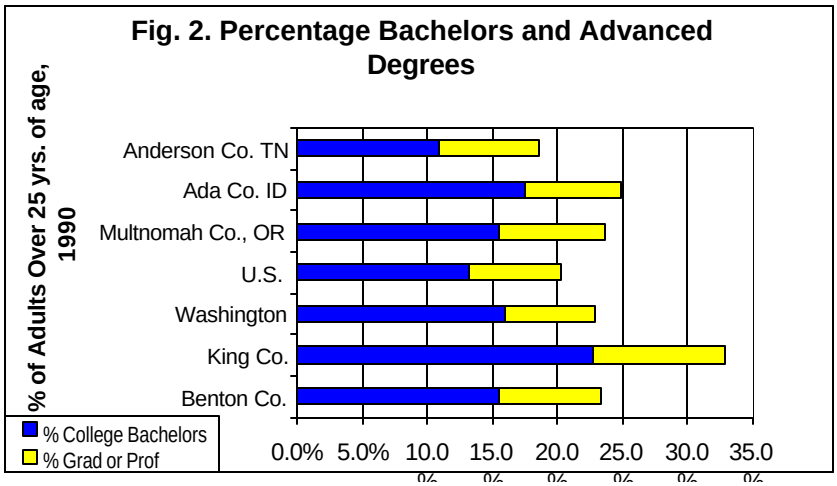
Indicators:

- output and rate of growth in technology firms
- relative shares of high-tech jobs
- education of the workforce
- technical workers in the workforce
- patent generation
- research and development expenditures

Several organizations publish data and analyses that attempt to rate states and localities on how "technically-oriented" they are, as well as comparing some of the key enabling features such as education of the labor force and number of measurements of idea "output" (patented ideas generated) or "input" (research and development expenditures).

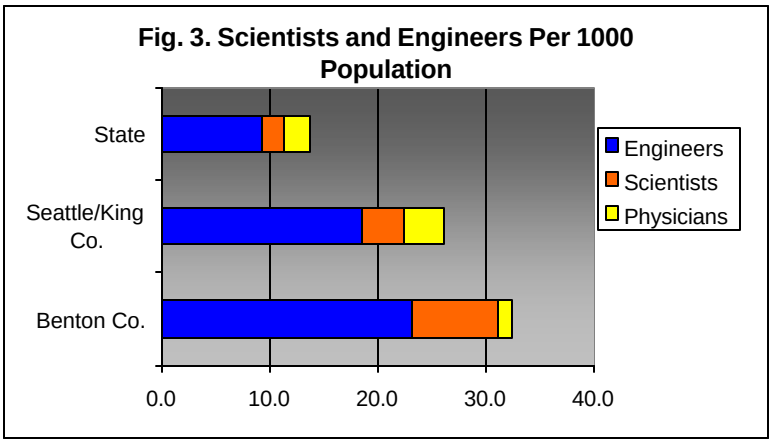
How well do the Tri-Cities perform?

The Tri-Cities area is near the top 10% of metropolitan areas of the country in terms of technology orientation. The area has a high concentration in technology–oriented industries and ranks in the top third for technology-oriented share of output. Furthermore, its real output growth in technology industries is among the top 10 in the country.



Education of the Workforce

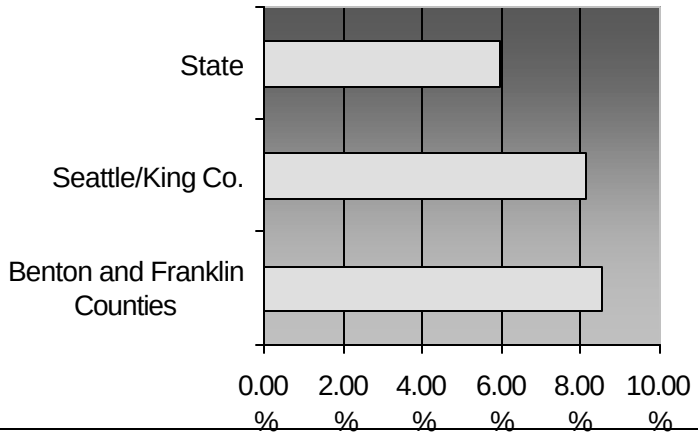
Experts advise that areas successful in the technology-based economy are those that are able to attract smart people. These people generate the ideas on which a high-technology economy runs. In a technology-based economy, in which metropolitan areas increasingly specialize in high-skilled, knowledge-based production, the future prosperity of local areas stems from how educated and skilled their workforces are.



How well do the Tri-Cities perform?

The Tri-Cities area is slightly ahead of the rest of the state in post-secondary educational attainment, except for King County, and is comparable to other competitor areas such as Multnomah Co., Oregon (Portland), Ada County, ID. (Boise) or Anderson Co., TN (Oak Ridge). The Tri-Cities area places well ahead of the Nation in general educational attainment. In addition, the Tri-Cities area has far more active scientists and engineers per capita (almost all of them work in Benton County) than the state. If physicians who are engaged in medical research are added to other scientists, King County comes closer, but Benton County still leads.

Fig. 4. Technology Occupations as % of Total Employment



Technology Orientation

A workforce oriented toward technology makes it easier for high-technology companies to start up and develop. A large grouping of such firms makes it easier for high-tech companies to find the services and allies they need to grow and prosper.

How well do the Tri-Cities perform?

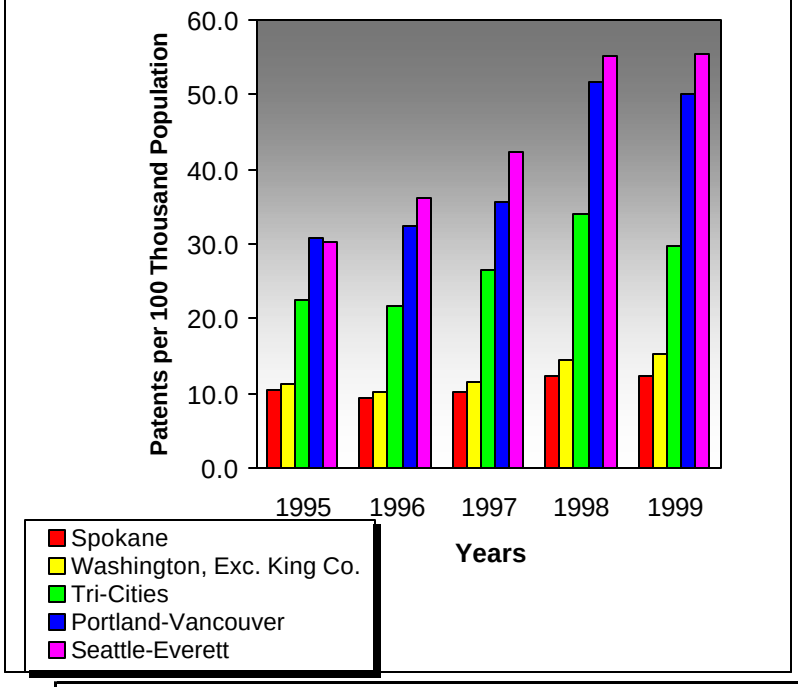
The Tri-Cities area has a greater percentage of its workforce in "technology occupations" (defined in Appendix B) than the state of Washington or the even the technology-oriented Seattle/King county area. Unlike the state of Washington as a whole, the Tri-Cities area is not a significant player in the software and internet industries. The Tri-Cities technical strengths are in physics, chemical engineering, materials, and instrumentation-related businesses, research and development and engineering services, and in advanced agricultural services.

When seen from the perspective of technology employers, the Tri-Cities have over 250 technology units (establishments) with over 6000 employees. This is a similar percentage of units and employment in high-technology industries as are found in the technology-dominated state of Washington as a whole. An advantage to prospective employers is the fact that wages in these Tri-Cities firms have not escalated to the degree that they have in the Puget Sound area.

Fig. 5. High-Tech Units, Employment and Wages in the Tri-Cities and Washington State, 1997-1999

		Tri-Cities High-tech as a % of Total	Washington State High-tech as a % of Total
1997	Units	3.8%	3.8%
	Employment	9.3%	10.3%
	Wages	17.4%	20.7%
	Average Wage	128.7%	149.1%
1999	Units	3.9%	4.2%
	Employment	9.8%	10.4%
	Wages	18.0%	25.7%
	Average Wage	132.7%	150.6%
1997-1999 Growth			
	High Tech Units	14.5%	10.4%
	High-Tech Employment	7.3%	7.0%
	High Tech Wages	12.7%	51.8%
	High Tech Average Wage	9.6%	17.3%

Fig. 6. Patenting Activity



Patent Generation

Number of patents generated by a region's companies, universities, and laboratories is a good general indication of how active the new idea creation process is. These new ideas are the basis for future products and companies. Without a sufficient number of these ideas, technology businesses will not grow as quickly and new businesses will not be founded.

In considering these data for small localities, it is important to remember that patent production is also affected by the strategies of individual companies in deciding whether to patent innovations. Some companies, for example, prefer to patent many related ideas to defend their "turf," while others patent only selectively.

Fig. 7. Tri-Cities Area Patents 1995-1999, by Category

Patent Category	Number
Class 376 , Induced Nuclear Reactions: Processes, Systems, and Elements	34
Class 073 , Measuring and Testing	11
Class 250 , Radiant Energy	10
Class 204 , Chemistry: Electrical and Wave Energy	9
Class 210 , Liquid Purification or Separation	9
Class 600 , Surgery	7
Class 048 , Gas: Heating and Illuminating	6
Class 423 , Chemistry of Inorganic Compounds	6
Class 324 , Electricity: Measuring and Testing	5
Class 424 , Drug, Bio-Affecting and Body Treating Compositions	5
Subtotal	**102**
Total, 1995-1999	**244**
% of All in Top 10	***42%***

How well do the Tri-Cities perform?

The number of patents granted to Washington inventors has consistently risen for the past five years. Measured as a share of total activity and in patents per 100,000 people in the population, the Tri-Cities are moving even faster. The two major patenting organizations in the Tri-Cities area are the Pacific Northwest National Laboratory (PNNL), operated by Battelle for the U.S. Department of Energy, and Siemens (now, Framatome ANP). These two organizations serve in the same capacity as major research universities in other localities. The top ten categories of innovation in the Tri-Cities have been in physics, chemical engineering, materials, and measurement devices. Over 40% of all patents were in these ten categories.

Fig. 8. Tri-City Patents by Organization						
	1995	**1996**	**1997**	**1998**	**1999**	**Total**
Battelle Memorial Institute	17	14	21	30	29	111
Individually Owned Patent	9	6	10	13	10	48
Siemens Power Corporation	6	7	5	9	5	32
Stirling Technology Company	0	0	2	1	3	6
Westinghouse Electric Corp.	2	2	1	0	0	5
Subtotal	**34**	**29**	**39**	**53**	**47**	**202**
Totals	**40**	**39**	**48**	**62**	**55**	**244**

Research and Development Expenditures and Assistance

The few companies that generate a large number of ideas provide a "spin-off" effect that has a positive result on the economy. In addition, large blocks of research expenditures provide opportunities for smaller technology companies to develop. Very little information is available at the local level for private R&D expenditures, but data on federal expenditures are available.

Fig. 9. Federal R&D Grants plus Procurements Per Capita, Year 2000			
	Federal Research Spending per Capita	**Federal R&D Grants per Capita**	**Federal Procurements per Capita**
Benton County	$11,131	$66	$11,065
King Co., WA (Seattle)	$1,136	$400	$737
Multnomah Co., OR (Portland)	$731	$239	$492
Santa Clara Co., CA (Palo Alto, San Jose)	$2,183	$335	$1,849
Cambridge, MA	$9,865	$6,999	$2,867
U.S.Average	$937	$96	$791

How well do the Tri-Cities perform?

PNNL is the second largest research organization in terms of federal dollars in the state of Washington, close behind the University of Washington. This represents a huge potential for economic development of the Tri-Cities area, which is being rapidly fulfilled. PNNL has an active program to deliberately "spin out" new companies based on its laboratory technologies and provides free technical assistance of up to one labor-week per year to small and local firms. Over 460 firms have been helped in this manner in the last 6 years, over 300 of them local technology-based companies. Ninety-six companies founded in the Tri-Cities area in the last 35 years have their roots in PNNL. About 60 successful local technology companies have been founded with major technical assistance from PNNL during the last five years alone.

The Tri-Cities attract about $1.7billion in non-defense spending by the federal government every year, most of it directed toward research, development, and science-based operations expenditures at the Hanford Site and PNNL. This represents a large pool of resources for smaller, specialized technology companies. The Tri-Cities area also compares favorably with other technology communities in per capita grants and procurements, especially when it is recognized that the Hanford contractors are generally not eligible to participate in the grants programs of the National Science Foundation (NSF). NSF provides a large portion of the federal grants for research and development.

COMPETITIVENESS

Competitiveness measures how well the Tri-Cities area compares with other regions in attracting and keeping high-technology industry. Many of the so-called "output" indicators such as growth in technology employment in particular sectors are not available for localities as small as the Tri-Cities.

Fig. 10. Internet Infrastructure

Location	Internet Back Bone (High-Speed Bandwidth) Providers	Pipes (Capacities in Megabytes /Sec.)	ISP Access Points per 1000 Population
Benton Co.	1	1 (155)	1.11
King Co.(Seattle)	22	86 (1.5-9600)	2.71
Multnomah Co.(Portland)	14	36 (45-9600)	2.59
Spokane Co.	5	5 (155-9600)	1.38
Ada Co.(Boise)	3	6 (622-9600)	1.82

Indicators

- Technology infrastructure
- Services to technology firms
- Tax burden
- Labor costs

Services to technology firms enhance competitiveness in the regional, national, and global marketplace. Tax burden and labor costs are costs of doing business that need to be in line with principal competitor regions.

Why is competitiveness important?

States and regions that are competitive are able to attract the people, businesses, capital and investment that will help them grow. Continued economic growth depends on this ability to renew and expand the area's talent and resources.

How well do the Tri-Cities perform?

The Tri-Cities' business and government communities have formed partnerships to assist startups and relocating businesses with infrastructure, regulatory and financial assistance. The Tri-Cities technical strengths are in physics, chemical process, materials, and instrumentation -related businesses, research and development and engineering services, and in advanced agricultural services. The Tri-Cities meet minimum standards for high-speed internet communication, but need more bandwidth capacity. Plans are in place to increase local capacity and upgrade local delivery systems for Internet services (the so-called "last mile").

Fig. 11. Tri-Cities Business Incubators
Technology Enterprise Center (TEC) Office Space
Kennewick Business Center
TEC Flexible Light Industrial Spaces
Applied Process and Engineering Laboratory
Port of Benton Development Building (Prosser)
Port of Benton Development Building II (Richland)
Port of Benton Richland Industrial Center (8 Buildings)
Port of Benton Manufacturing Mall (11 Buildings)
Port of Pasco Industrial Buildings
Port of Kennewick (4 Buildings)
Pasco Downtown Development Association
Columbia Basin Advanced Technology Center

Government Services and Functions

Experts advise governments to "foster an innovative business climate." Governments are advised to recognize and celebrate public and private innovation and support the formation of high-tech business councils to encourage networking and learning, and should reinvent and streamline land processes to have a functioning real estate market. Governments that succeed in the technology-based economy will encourage public and private partnerships. Technology-based economy governments should form strategic visioning and managing partnerships across local government boundaries, with all the key players in a region (private sector, universities, labor, community organizations).

Fig. 12. Alphabetical List of Tri-Cities Area Business Assistance Organizations
Agri-Business Commercialization and Development Center, Pacific Northwest National Laboratory
Applied Process Engineering Laboratory (APEL)
Benton-Franklin Council of Governments
City of Benton City
City of Kennewick
City of Pasco, Department of Community Development
City of Richland, Economic Development Department
City of West Richland
Columbia Basin College
Columbia Basin Advanced Technology Center
Columbia Basin College, Small Business Development Center
Economic Development Office, Pacific Northwest National Laboratory
Energy Northwest Industrial Site
Fluor Hanford Office of Economic Transition
Franklin County Public Utility District
Hanford Area Economic Investment Fund Committee
Historically Underutilized Business (HUB) Development Program
Kennewick Irrigation District
Office of Training Services and Asset Transaction, U.S. Department of Energy - Richland Operations
Pasco Chamber of Commerce
Pasco Downtown Development Association
Port of Benton
Port of Kennewick
Port of Pasco
Procurement Technical Assistance Program, WSU
Prosser Economic Development Association
Public Utility District No. 1 of Benton County
Realizing Every Communities Assets (RECA) Foundation
Richland Chamber of Commerce
Service Corps of Retired Executives
Southeastern Washington Development Association
Technology Enterprise Center
Tri-Cities Science & Technology Park
Tri-Cities Visitor and Convention Bureau
Tri-City Area Chamber of Commerce
Tri-City Industrial Development Council (TRIDEC)
Tri-City Venture Group
Volpentest HAMMER Training & Education Center (HAMMER)
Washington Manufacturing Services
Washington State University, Tri-Cities
Washington Technology Center
WSU Tri-Cities Business LINKS

How well do the Tri-Cities perform?

The Tri-Cities area boasts 40 organizations and government partnerships that assist in economic development. These organizations include the Economic Development Office at PNNL and Fluor Hanford's Office of Economic Transition, the Tri-Cities Industrial Development Council (TRIDEC), and organizations of local city and county governments, port districts, etc. Several provide incubator facilities.

Tax Burden

Although not the most important factor in business location for high-technology companies, high business taxes make it more difficult for businesses to operate and expand. Similarly, high personal tax rates make it difficult to recruit employees, especially experienced and therefore more highly compensated employees. Washington has a unique tax structure, due to the Business and Occupations Tax (B&O Tax) on gross sales, and no personal income tax. The portion of state and local taxes that are paid by business are the highest in the western states while the tax on personal income is the lowest of those same states. Washington State ranks 13th in nation on overall tax burden.

How well do the Tri-Cities perform?

The Tri-Cities have minimal control over Washington State's tax structure. However, the local property tax rate in the area is among the higher ones in the state (Benton County = $14.82/$1000; Franklin County = $15.92; the state averages $13.39).

Fig.13. Year 2000 Wage Rates from Survey Data, Selected Technical Occupations

	Median Annual Wage		
Occupation	**Benton Co.**	**King County**	**Washington State**
Civil engineers	$64,680	$57,030	$54,220
Computer and information systems managers	$91,370	$80,400	$78,140
Computer software engineers, applications	$57,120	$53,520	$53,160
Computer support specialists	$37,420	$36,900	$36,230
Computer systems analysts	$59,800	$63,170	$61,760
Electrical and electronic engineering technicians	$41,730	$46,570	$44,020
Electrical engineers	$62,990	$59,350	$57,740
Engineering managers	$79,310	$84,880	$81,510
Environmental scientists and specialists, including health	$56,110	$38,560	$42,950
Natural sciences managers	$43,350	$84,190	$72,530
Graphic designers	$29,870	$45,680	$38,190
Life scientists, all other	$53,400	$49,670	$49,030
Life, physical, and social science technicians, all other	$31,460	$33,910	$33,970

Labor Costs

Labor costs are usually the largest component of cost for an industry. Other things equal, a less-expensive and more productive labor force is attractive to many firms.

How well do the Tri-Cities perform?

The Tri-Cities area has some lower wage rates and some higher ones in the technical occupations. In general, however, employers must pay more in the King County area because of the relatively high cost of living.

Fig. 14. National Commission on Entrepreneurship Growth Company Index for Selected Labor Market Areas (LMAs)

LMA	Total Companies 1991	No. High Growth (100% Growth in 5 Years 1992-1997)	Index (U.S. Average =100)
LMAs more than 3 million population			
Seattle	79,123	3,797	102
1-3 million population			
Portland	39,656	2,349	150
300 to 500 thousand population			
Spokane	13,837	763	136
Boise	9,855	611	117
150 to 300 thousand population			
Kennewick	5,611	316	137

Data reflect the number of firms, not size.

GROWTH

Growth is measured both as an increase in available jobs and in the kind of jobs provided. The growth and vitality of individual companies improves the general ambience of the area and provides a ready market for locally produced goods and services. Many areas are concerned not just with the number of jobs created but in the quality of those jobs, with a preference for the so-called "family wage" jobs.

Indicators

Following indicators are related to growth:

- Employment in technology sectors
- Employment in startup companies
- Employment in fast-growing "gazelle" companies
- Average wage for technology workers
- Sensitivity to economic downturn

How well do the Tri-Cities perform?

It is difficult to track startups and fast-growing "gazelle" companies in areas as small as the Tri-Cities because of disclosure issues. However, more than 60 new technology-oriented companies have been started in the Tri-Cities area in the last five years, and nearly all of them continue to grow and prosper.

The Tri-Cities area (Kennewick LMA) performs well on the National Council on Entrepreneurship (NCOE) Growth Company Index (GCI). GCI is based on the Census Bureau's Business Information Tracking System (BITS) longitudinal database, which for the first time permits researchers to look at individual firms and track their employment growth over time. GCI shows the relative number of companies in each of 394 LMAs that grew 100% or more from 1992-1997. The GCI national average is 100.

Fig. 15. High-Tech Units, Employment and Wages in the Tri-Cities and Washington State, 1997-1999

		Tri-Cities		Washington State	
		High-tech	Total	High-tech	Total
1997	Units	221	5,877	7503	195,780
	Employment	7,457	79,819	257,666	2,508,962
	Wages (million)	$394	$2,258	$15,980	$77,164
	Average Wage	$36,415	$28,289	$45,868	$30,755
1999	Units	253	6,487	9,059	217,516
	Employment	7,999	81,846	275,678	2,645,008
	Wages (million)	$444	$2,462	$24,264	$94,539
	Average Wage	$39,917	$30,084	$53,813	$35,742
1997-1999	**Growth**				
	Employment	7.3%	2.5%	7.0%	5.4%
	Wages (million)	12.7%	9.0%	51.8%	22.5%
	Average Wage	9.6%	6.3%	17.3%	16.2%

Employment in Technology Firms

Employment in technology firms has been a key indicator for the growth of Washington State's economy during the last 20 years and has offset cycles in airframe manufacture, agriculture, pulp and paper and wood products, primary metals and agriculture. Employment in these industries is an indicator of how large and healthy these industries are.

How well do the Tri-Cities perform?

Although many of the high-technology firms outside of the "big two" (PNNL and Framatome) are still relatively small, a few have reached the 100-200 employee stage. In addition, the pace of adding local firms has accelerated in the last five years, and growth of many of them has been rapid. This is partly reflected in the area's strong GCI performance shown earlier.

Growth in Startups

Small companies have the potential to provide a majority of job growth. Rapid job growth in startup companies can significantly affect the overall increase in employment for the state. This measure also reflects the extent to which local entrepreneurs have an effect on the overall economy.

How well do the Tri-Cities perform?

Local technology startups are still a very small part of the local Tri-Cities economy, but are rapidly growing in importance. The various startups and technical assistance projects of the Department of Energy, PNNL, and Fluor Hanford have helped foster this growth.

Sensitivity to Economic Downturn

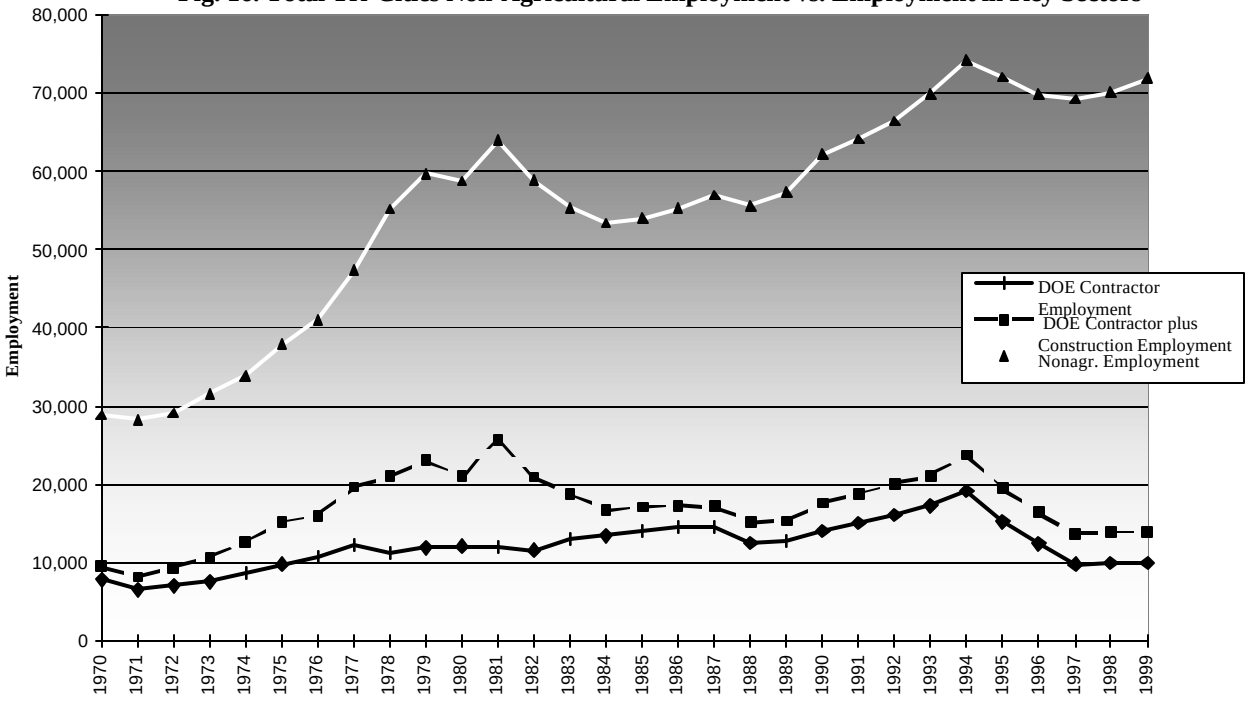
Washington State's major industries historically have been sensitive to business cycles. For example, the Boeing recession of the early 1970s severely affected the economy of the Seattle area, while business cycles in construction and wood products in particular have adversely affected many of the state's smaller communities. The Tri-Cities area economy has been driven by budget

cycles at the U.S. Department of Energy (DOE). Understanding the sensitivity of technology firms to business cycles provides some forewarning about future economic difficulties.

How well do the Tri-Cities perform?

Although grouped around energy production and defense funded with federal dollars, the Tri-Cities economy has also shown a marked cyclical sensitivity. Diversification of the local economy is one way to mitigate such cycles. Growth in the local Tri-Cities economy was fairly steady throughout the 1990s, even with loss of Hanford employment since 1995. This is a sign of increased maturity and depth of the local economy. It is not yet clear how dependent local technology firms may be on continued DOE budgets.

Fig. 16. Total Tri-Cities Non-Agricultural Employment vs. Employment in Key Sectors



FINANCIAL CAPACITY

Financial capacity is the ability of local firms to grow by attracting local capital investment.

Indicators

Both private (venture capital) and public (state and federal) sources of technology capital are important to measure financial capacity. Some indicators that are usually used include:

- Regional venture investment
- Growth in venture investment
- Distribution of venture investment
- Small Business Innovation Research (SBIR) program awards

Most of these indicators are not available for the Tri-Cities, but SBIR awards are, and the situation with respect to venture capital is well understood.

Why is financial capacity important?

It can be argued that ready access to capital is one of the most important success factors for technology companies, since they often make relatively large front-end investments. Especially in the technology sectors, strong capital backing is needed to ensure that new ideas can be translated into new products. Many partially developed ideas fail in the so-called "valley of death" for lack of ability to attract early investors.

There is frequently a strong geographic tie between capital investment and management guidance, and between a company and its investors. Thus, when a local company can attract local capital, it has a much higher chance of remaining in the locality.

How well do the Tri-Cities perform?

Lack of local private capital sources is a fundamental problem in the Tri-Cities. As the overall Washington state capital markets grow, this will become less of a constraint on growth, but for now entrepreneurs have to show considerable ingenuity and persistence to attract capital

Fig. 17. Financial Assistance Available to Tri-Cities Technology Businesses

Community Economic Revitalization Board (CERB)
Regional Revolving Fund Program
SBA 7(a) Loans
Technology Enterprise Center
Microloan Program
Micro Equity Fund
Rent Deferral Program
Hanford Area Economic Investment Fund (HAEIF)
Private Business Loans:
Municipal Loans:
Regional Revolving Loan Fund Program
Southeastern Washington Development Association
Washington Economic Development Finance Authority
Women's Prequalification Loan Program
Washington Technology Center (WTC) Grant Programs
Spokane Intercollegiate Research and Technology Institute (SIRTI)

investment. The Tri-Cities aggressively pursues the financing that is available in the Pacific Northwest. Several local agencies assist entrepreneurs with business plans and developing appropriate contacts within the financial community.

Regional Venture Investment

While the growth of local private investment in the Pacific Northwest has been impressive, growth is not keeping pace with other technology regions of the country. PricewaterhouseCooper's "Money Tree" reports rank Washington state as 6th out of 11 technology-growth regions in total private venture investment and 10th (of 11) in total venture capital investment for growth in 1999 and early 2000. The average increase in venture investment for these regions was 12%—more than double Washington's growth rate of 6%. The Tri-Cities have a very small (unreported) share of these dollars.

Washington's companies have been active in the Small Business Innovation Research (SBIR) program (ranking the state 11th of all states). For the latest period reported (1995-1998) the Tri-Cities area ranked about average in this successful state on a per capita basis.

How well do the Tri-Cities perform?

Because of the lack of local venture funding resources, Tri-Cities economic developers have decided to regularly attend meetings of the Northwest Venture Group, Alliance of Angels, and WSA (formerly, Washington Software Association) Investment Forums to form relationships with out-of-area funding sources. Statewide data from Northwest Venture Associates show that 80% of venture capital in the state goes into only three areas: computer related, medical and health care, and communications, none of which are considered Tri-Cities strengths.

Fig. 18. SBIR Awards 1995-1998

	No. of Awards	Total Dollars (1,000)	Dollars Per Capita
Benton County	14	$2,794	$20.83
King County	352	$81,186	$49.32
State of Washington	445	$99,159	$17.69
Multnomah County OR	38	$10,267	$16.88
State of Oregon	251	$61,129	$20.14
State of Idaho	22	$3,618	$3.29

SBIR Program Awards

The ability of small businesses to attract competitive research money is an indicator of the research competence and relevance of these firms to the federal sector. One indicator is the awards of the Small Business Innovative Research (SBIR) Program in the various federal agencies.

How well do the Tri-Cities perform?

Small Tri-Cities area firms have been successful in attracting some SBIR money. The consolidated reporting on this program lags considerably behind the recent success stories of small Tri-Cities firms; nevertheless, some local firms were successful, even in the period though 1998, and have become more so since then.

QUALITY OF LIFE

Indicators:

To gauge the quality of life in the Tri-Cities, we quantify some of the non-economic factors that make life enjoyable for residents and attract others to the area. Some indicators include:

- Weather
- Air and Water Quality
- Local Transportation and Traffic Congestion
- Transportation Access
- Cost of Living
- Crime
- School Quality
- Leisure Activities

Why is quality of life important?

A pleasant physical and social environment is important to technology workers. These factors are important both in attracting and retaining qualified individuals. Technology economy authorities advise metropolitan areas to "create a great quality of life." To make a region more attractive to knowledge workers, metropolitan areas need to take steps to boost forward-looking amenities like outdoor recreation facilities, improved public transportation, and reduced road congestion by (among other things) expanding road capacity and deploying new intelligent transportation systems.

How well do the Tri-Cities perform?

The Tri-Cities area provides its citizens with a pleasant physical environment with excellent weather and air and water quality. The area features many of the amenities of larger metropolitan areas with few of the drawbacks such as severe traffic congestion, high housing prices and crime.

Weather

Workers tend to prefer warm climates with low precipitation and with considerable sun.

Fig.19. Weather and Air Quality						
	Tri-Cities	**Boise**	**Portland**	**Seattle**	**Spokane**	**Nation**
Annual days with some precipitation	88	91	152	160	114	110
Annual days with mostly sun (clear or partly cloudy with < 70% cloud cover)	202	214	137	136	176	213
Air quality index (higher is better)	85	64	53	80	76	65.9

How well do the Tri-Cities perform?

The Tri-Cities area has a sunny, dry climate with warm-to-hot summers and mild winters. The area does not experience the high summer humidity or cold winters that characterize most of the eastern U.S. It also avoids much of the heavy cloud cover that characterizes many Pacific Northwest locations. Cloud cover in the Tri-Cities is largely confined to the period from mid-November to early February, with May-October mostly clear.

Air and Water Quality

Superior air and water quality is an important feature that attracts technology workers into an area.

How well do the Tri-Cities perform?

The Tri-Cities' air and water quality compares favorably with better-known principal competitor areas in the Pacific Northwest, which are in turn noted for their superiority to most of the country.

Fig. 20. Local Transportation					
	Tri-Cities (Hanford Commu-ters)	**Portland**	**Seattle**	**San Jose**	**Los Angeles**
Daily travel delay per person (minutes)	12	34	53	42	56
Mass transit availability index (Higher is better: nation = 8.0)	33.15	21.92	39.4	16.3	18.9
Daily travel time in congestion (% of 6-8 peak travel hours when speed is reduced due to congestion)	25	47.3	48.3	46.5	50

Local Transportation and Traffic Congestion

As is true in most small metropolitan areas, traveling to work, shopping, entertainment and other activities is primarily by car. However, the Tri-Cities area does have a bus-based public transportation system with reasonably frequent service, as well as vanpool and transportation assistance such as dial-a-ride.

How well do the Tri-Cities perform?

As reflected in average commuting delays, traffic congestion is practically non-existent in the Tri-Cities. As compared with Seattle or Portland metropolitan areas, the typical driver spends far less time on the road to accomplish the same work commute. The average commuting time in the Tri-Cities

area is about 20 minutes (perhaps 25 minutes for Hanford workers) and involves less than 12 minutes delay (round trip) for Hanford workers due to traffic. The delay is probably less than 5 minutes per day for other commuters, whereas other metropolitan areas typically have much higher figures for traffic delay.

Transportation Access

Access to the major metropolitan areas in the country and the world is important to the senior management and sales staff of high-technology companies. Major metropolitan areas have this ready access, whereas air service in smaller metropolitan areas is often less frequent and sometimes less convenient.

How well do the Tri-Cities perform?

One major carrier and two regional airlines serve the Tri-Cities Airport. Elapsed trip times to Chicago, Boston, New York, Atlanta, and San Francisco from the Tri-Cities and other metropolitan areas at most times of day are similar for the Tri-Cities and other Pacific Northwest cities; however, direct jet service from many of the competitors offers some faster connection times from Seattle, Portland, Spokane, and Boise. The Tri-Cities area is located on two interstate highways, with freeway access to Seattle, Portland, Boise, and Spokane. The Tri-Cities area is served by two major railroads and has five port facilities on the Columbia-Snake River barge system.

Fig. 21. Cost of Living

	Tri-Cities	Boise	Portland	Seattle	Spokane	Nation
Cost of Living Index (Lower is better)	98.7	96.8	111	130.2	102	104
Median home price (in thousands)	$112	$125	$166	$221	$107	$129
Property taxes (per $1,000 of home value)	$13.30	$11	$14.80	$12.90	$13.7	$15.64
Home utility cost index (lower is better)	73	80.5	80.5	75	64.7	105
Health cost index (lower is better)	126.1	97.6	121.9	130	122.2	103

Cost of Living

High costs of living mean that workers must work longer hours and employers must pay higher wages to support an equivalent lifestyle. Larger metropolitan areas typically have higher costs of living (especially housing). Smaller metropolitan areas frequently do not show costs that are as high.

How well do the Tri-Cities perform?

The Tri-Cities area shows median housing prices slightly below the national average, compared with much higher prices in many

metropolitan areas. Thanks to low electricity and gas prices and relatively mild weather, utility bills are also low. The overall cost of living is slightly below the national average, and much lower than in many metropolitan areas.

Fig. 22. Crimes per 100 Thousand Population

	Tri-Cities	Boise	Portland	Seattle	Spokane	Nation
Violent crime	310	308	566	436	553	506
Property crime	4,244	4,061	5,177	5,772	6,448	4,329

Crime

Violent crime and property crime are both serious issues in many parts of the United States. To attract and retain workers, they must believe that they are safe in their homes and at work and that their children are safe in their school and after-school lives.

How well do the Tri-Cities perform?

Tri-Cities crime rates are very low for a metropolitan area, and there is very little violent crime. This makes the area an exceptionally safe environment in which to live and work.

Fig. 23. Average Percentile Scores on Iowa Standard Achievement Tests by 4th, 8th and 11th Graders, Selected School Districts vs Nation and State, 1993-1997

	4 th Grade vs. Nation		8 th Grade vs. Nation		11th Grade vs. State	
	Math	**Overall**	**Math**	**Overall**	**Math**	**Science**
Benton County						
Richland	64	64	66	65	69	69
Kennewick	54	56	51	54	51	56
King County						
Seattle	48	51	50	51	44	40
Bellevue	65	64	71	69	66	61
Lake Washington	61	65	66	66	62	61
Northshore	67	69	67	68	60	60
State Percentiles vs. Nation	50	51	53	54	52	52

Quality of Schools

Experts advise that a strong K-12 system in an area is important not only because it produces better workers, but also because it is a key amenity in drawing knowledge workers. It is impossible for a city or region to be a successful in the technology-based economy over the long run if its schools are failing or even mediocre.

How well do the Tri-Cities perform?

The Tri-Cities schools do a good job of educating the area's children. Richland in particular has strong outcomes in comparison with either the state or the nation.

Leisure Activities

Technology workers are interested in an environment with a variety of leisure activities, especially those involving outdoor recreation.

Fig. 24. Selected Outdoor Recreation Opportunities

	Miles of Paved Bike Trails per 100 Thousand People	Park Acres per 1000 People	Boat Ramps, Launch Areas per 1000 People	Public Golf Holes per 100,000 People
Benton-Franklin Counties	16.7	29.0	16.2	75.1
King County	5.8	22.3	2.3	28.0
Multnomah Co. (Portland, OR)	11.8	56.0	0.3	28.6
Ada County (Boise ID)	12.6	12.8	1.0	47.9
Spokane County	8.9	8.3	5.0	40.9

How well do the Tri-Cities perform?

Thanks to its climate, the Tri-Cities area offers a variety of outdoor activities centered on golf, team sports, and river-based recreation, with more than 4 million visitor days per year to the area's parks, beaches, and marinas. The new Hanford Reach National Monument is expected to add a new dimension to outdoor recreation. Golf opportunities are particularly abundant, with year-round play possible in most years. In addition, the local area is home to minor-league hockey and baseball franchises and numerous local arts organizations, including a symphony orchestra, an opera company, and a light opera company.

Appendix A

Summary Comparisons: Tri-Cities, Washington, State and the U.S.

The following table summarizes some comparisons between the Tri-Cities and the state of Washington as a location for high-technology activity. Many of the Washington state values are taken from the Index of Innovation and *Technology Washington State 2001* by the Washington Technology Center.

	Washington State	**Tri-Cities (Benton County)**
Innovation		
Innovation Capacity (Progressive Policy Institute)	8th in Nation	No equivalent local measure
Tech Pole Index (high tech real output and concentration in tech industries) (Milken Institute) 1990-1998	5th out 315 in nation (Seattle)	55th out of 315 in nation
Patent Generation per 100,000 population, 1999	State, Including King County, per 100,00 population: 31.3 Excluding King County: 15.2	29.8
R&D Expenditures (National Science Foundation)	16th in Nation	No equivalent local measure
R&D Expenditures per capita (Grants plus contracts)	State: $791 King County $1,136 Nation: $937	$11,131
Technology Occupations as % of Total Employment (State Dept. of Employment Security) 3Q 2000	State: 6.0 % King County: 8.1%	8.5%
Education of the Workforce: Bachelors and Graduate Degrees (% of Workforce> 25 Years of age) (1990 Census)	State: 22.9% King County: 32.8%	23.3%
Competitiveness		
Tax Burden (Institute on Taxation and Economic Policy)	4th for business, 45th for individuals in nation	No equivalent local measure
Property Tax Rate (combined) (Washington State Dept. of Revenue)	State: $13.39/$1000	$14.82/$1000
Growth		
Rate of Growth in Startup Companies (Progressive Policy Institute)	2nd in nation	No equivalent local measure
Growth Company Index (No. of firms per capita growing at more than 15% per year, 1992-97)	U.S. average index: 100.0 King County: 102	137
Growth in high-tech employment, 1997-1999 (Employment Security)	20.7%	14.5%
Average Wage in High-Tech Industries, 1999 (Employment Security)	$53,813	$39,917
Annual labor costs in 13 Technical Occupations (Employment Security)	King County: Above state average for 11 out of 13	Above state average for 7 out of 13
Financial Capacity		
Initial Public Offerings (IPOs) for Technology Companies	$894 million (5th in nation)	No equivalent local measure
Small Business Innovative Research Investments, per capita, 1994-1998	State: $17.69 King County: $49.32	$20.83

Iowa Standard Achievement Test Scores, 11th Grade, Percentile vs. Nation. Tri-Cities vs. State	Math: 52 Science: 52	Richland: Math 69 Science 69 Kennewick: Math 51 Science 56
Quality of Life		
Daily Travel Delay (Minutes) (Texas Transportation Institute)	Seattle: 53	Hanford Commute: 12
Mass Transit Availability Index Money.com "Best Places" Rankings	Seattle: 39.4 Nation: 8	33.15
Annual Days, Mostly Sun (Clear or Partly Cloudy) (NOAA)	Seattle: 136	202
Air Quality Index (Higher is better) Nation = 65 Money.com "Best Places" Rankings	Nation: 65 Seattle: 80	85
Cost of Living Index (Lower is Better)	Seattle: 130 Nation: 102	98.7
Median Housing Price	Seattle: $221,400	Tri-Cities: $112,300
Home Utility Cost Index (Lower is Better)	Seattle: 75 Nation: 105	73
Crimes per Thousand Persons Money.com "Best Places" Rankings	Nation: Violent 506 Property 4,329 Seattle: Violent 436 Property 5,772	Benton and Franklin Counties: Violent 310 Property 4,224
Golf Holes Per 100 Thousand People	King County: 28	Benton and Franklin Counties: 75.1
Paved Bike Trails per Capita (Miles)	King County: 5.8	Benton and Franklin Counties: 16.7

Appendix B: Definitions of the Technology Occupations and Industries

Technology industries are industries that employ a high percentage of the technology occupations. As used in the Index of Innovation and Technology, Washington State 2000 by the Washington Technology center, a practical working definition is any Standard Industrial Classification (SIC) Code having at least 7% or more of its employment in "technology" occupations. The occupations and industries meeting those definitions in Washington State are listed below.

Technology Occupations

Physicians

Physicists & Astronomers

Biological Scientists

Medical Scientists

Life Scientists, Not Elsewhere Classified (NEC)

Mathematical Scientist, NEC

Operations Research Analysts

Engineer, Math, Natural Science Mgrs

Aeronautical & Astro Engineers

Metallurgists & Rel Engineers

Mining Engineers, Incl Safety

Petroleum Engineers

Chemical Engineers

Nuclear Engineers

Civil Engineers, including Traffic

Agricultural Engineers

Electrical & Electronic Engineer

Computer Engineers

Industrial Engineers, Ex Safety

Safety Engineers, Except Mining

Mechanical Engineers

Marine Engineers

Engineers, NEC

Technology SIC Codes

281 Industrial inorganic chemicals

2813 Industrial gases

2816 Inorganic pigments

282 Plastics, rubber and fibers

2821 Plastics material synthetic resins and nonvulcanizable elastomers

2823 Cellulosic manmade fibers

283 Drug manufacturing

2833 Medicinal chemicals and botanical products

2834 Pharmaceutical preparations

2835 In vitro and in-vivo diagnostic substances

2836 Biological products, except diagnostic substances

286 Organic chemicals

2865 Cyclic crudes and intermediates, organic dyes

2869 Chemicals, industrial organics NEC

287 Agricultural chemicals

289 Misc chemicals and chemical preparations

2899 Chemicals and chemical preparations NEC

354 Industrial tools

3545 Tools, cutting and precision, and machine tool accessories

357 Computers and office equipment

3571 Electronic computers

Chemists

Meteorologists

Geologists, Geophysicists, Ocean

Physical Scientists, NEC

Systems Analysts

Data Base Administrators

Computer Support Specialists

Computer Programmers

All Other Computer Scientists

Statisticians

Medical and Clinical Laboratory Technologists

Technical Writers

Civil Engineering Technicians and Technologists

Electrical and Electronic Engineering Technicians

and Technologists

Industrial Engineering Technicians and Technologists

Mechanical Engineering Technicians and Technologists

All Other Engineering and Related Technicians

and Technologists

Biological, Agricultural, and Food Technicians

and Technologists, Except Health

Chemical Technicians and Technologists, Except Health

Nuclear Technicians and Technologists

Petroleum Technicians and Technologists

All Other Physical and Life Science Technicians

and Technologists

Mathematical Technicians

3572 Computer storage devices

3575 Computer terminals

3577 Computer peripheral equipment NEC

361 Electrical distribution equipment

3612 Power, distribution and specialty transformers

3613 Switchgear and switchboard apparatus

362 Electrical industrial apparatus

3621 Motors and generators

3624 Carbon and graphite products

3625 Relays and industrial controls

3629 Electrical industrial apparatus NEC

363 Household equipment

3634 Electric housewares and fans

364 Electric wiring and lighting

3643 Wiring devices, current-carrying

3644 Wiring devices, noncurrent-carrying

365 Household audio visual equipment

3651 Household audio and video equipment

3652 Phonograph records and prerecorded audio tapes and disks

366 Communications equipment

3661 Telephone and telegraph apparatus

3663 Radio and television broadcasting and communication equipment

3669 Communications equipment NEC

367 Electronic components and accessories

3671 Electron tubes

3672 Printed circuit boards

3674 Semiconductors and related devices

3675 Electronic capacitors

3678 Electronic connectors

3679 Electronic components NEC

369 Misc electrical equipment and supplies

3691 Batteries, storage

3695 Magnetic and optical recording media

3699 Electrical machinery, equipment and supplies NEC

Motor vehicles and equipment

3711 Motor vehicles and car bodies

Aircraft and parts

3724 Aircraft engines and engine parts

376 Guided missiles, space vehicles and parts

3761 Aerospace, guided missiles & space vehicles

3764 Aerospace, propulsion units and propulsion parts

381 Search and navigation equipment

3812 Search, detection, navigation, guidance, aeronautical and nautical systems and instruments

382 Measuring and controlling devices

3822 Automatic controls for regulating residential and commercial environments and appliances

3823 Industrial instruments for measurement, display and control of process variables

3824 Totalizing fluid meters and counting devices

3825 Instruments for measuring and testing of electricity and electrical signals

3826 Laboratory analytical instruments

3827 Optical instruments and lenses

3829 Measuring and controlling devices NEC

384 Medical equipment, instruments and supplies

3841 Surgical and medical instruments and apparatus

3844 X-ray apparatus and tubes and related irradiation apparatus

3845 Electromedical and electrotherapeutic apparatus

481 Telephone communications services

4812 Radiotelephone communications

4813 Telephone communications, except radiotelephone

482 Telegraph and other message communications

4822 Telegraph and other message communications

489 Misc communications services

4899 Communications services NEC

737 Computer and data processing services

7371 Computer programming services

7372 Prepackaged software

7373 Computer integrated systems design

7374 Computer processing and data preparation and processing services

7375 Information retrieval services

7379 Computer related services NEC

807 Medical and dental laboratories

8071 Medical laboratories

871 Engineering and architectural services

8711 Engineering services

873 Research and testing services

8731 Commercial physical and biological research

8733 Noncommercial research organizations

874 Management and public relations services

Appendix C: References

Innovation

Figure 1: Technology Ranks for Pacific Northwest Cities. Milken Institute, *America's High-Tech Economy: Growth Development, and Risks for Metropolitan Areas*. 1999. **www.milken-inst.org.**

Figure 2: Percentage Bachelors and Advanced Degrees. Educational Attainment 1990. U.S. Census Bureau, *American Factfinder.* 2001**. factfinder.census.gov**

Figure 3: Scientists and Engineers Per 1000 Population. Washington State Department of Employment Security, WILMA System. Figures are for 3rd Quarter, 2000.

Figure 4. Technology Occupations as % of Total Employment. Washington State Department of Employment Security

Figure 5. High-Tech Units, Employment and Wages in the Tri-Cities and Washington State, 1997-1999. Washington State Department of Employment Security.

Figure 6. Patenting Activity. U..S. Patent Office and Trademark Office, Information Products Division, *Patenting In Metropolitan and Non-Metropolitan Areas of the United States Breakout by Organization 1995 - 1999 Utility Patent Grants. Patenting in Metropolitan and Non-metropolitan Areas of the United States - Breakout By Organization*. 2001. www.uspto.gov/web/offices/ac/ido/oeip/taf/masgstc/mregions.htm

Figure 7. Tri-Cities Area Patents, 1995-1999, by Category. See Figure 6.

Figure 8. Tri-Cities Patents by Organization. See Figure 6.

Figure 9. Federal R&D Grants plus Procurements Per Capita, Year 2000. U.S. Census Bureau, *Federal, State, and Local Governments Consolidated Federal Funds Report,* Searchable Database. 2001. www.census.gov/govs/www/cffr.html

Competitiveness

Figure 10. Internet Infrastructure. Compiled from: MAPNET website. 2001, www.caida.org/tools/visualization/mapnet/Backbones/; FindanISP website. 2001. www.findanisp.com/; ISP directory. 2001. www.ispworld.com. Supplemented with data from individual provider websites.

Figure 11. Tri-Cities Business Incubators. Tri-Cities Industrial Development Council website: www.tridec.org

Figure 12. Alphabetical List of Tri-Cities Area Business Assistance Organizations. Tri-Cities Industrial Development Council website: www.tridec.org

Figure 13. Year 2000 Wage Rates from Survey Data, Selected Technical Occupations. Washington State Department of Employment Security, WILMA System.

Growth

Figure 14. National Commission on Entrepreneurship Growth Company Index for Selected Labor Market Areas (LMAs). National Commission on Entrepreneurship, *High-Growth Companies: Mapping America's Entrepreneurial Landscape.* www.ncoe.org/lma/lma.pdf. Kennewick LMA is Benton and Franklin Counties.

Figure 15. High-Tech Units, Employment, and Wages in the Tri-Cities and Washington State, 1997-1999. Special tabulation by the Washington State Department of Employment Security.

Figure 16. Total Tri-Cities Non-Agricultural Employment vs. Employment in Key Sectors. Derived from the Washington State Department of Employment Security, LMI System. www.wa.gov/esd/lmea/labrmrkt/byarea.htm

APPENDIX C

Figure 17. Financial Assistance Available to Tri-Cities Technology Businesses. Tri-Cities Industrial Development Council website: www.tridec.org

Figure 18. SBIR Awards 1995-1998. Small Business Administration, *SBIR Award Winners [Year].* On-line database of individual award winners. www.sba.gov/sbir/indexsbir-sttr.html#sbirawards

Figure 19. Weather and Air Quality. Most data: From Money.Com website, Best Places to Live. www.money.com/money/depts/real_estate/bplive/ . Precipitation and sunshine data for the Tri-Cities: Pacific Northwest National Laboratory, PNNL-13117. 2000. *Hanford Site Climatological Data Summary 1999, With Historical Data*. D. J. Hoitink, K. W. Burk, and J. V. Ramsdell. Pacific Northwest National Laboratory, Richland, Washington, Table 6.1.

Figure 20. Local Transportation. Most commuting data from Texas Transportation Institute, *2001 Urban Mobility Study*. http://mobility.tamu.edu/. Data for Tri-Cities estimated form data compiled in Perteet Engineering, Thomas/Lane and Associates, Inc., and SCM Consultants, Inc., *The Impact of the Tank Waste Remediation Project on the Hanford Communities*. August 2001(draft). Transit data from Money.Com website, Best Places to Live.

Figure 21. Cost of Living. From Money.Com website, Best Places to Live. www.money.com/money/depts/real_estate/bplive/.

Figure 22. Crimes per 100 Thousand Population. From Money.Com website, Best Places to Live. www.money.com/money/depts/real_estate/bplive/

Figure 23. Average Percentile Scores on Iowa Standard Achievement Tests by 4^{th}, 8^{th}, and 11^{th} Graders, Selected School Districts vs. Nation and State, 1993-1997. Office of the Washington State Superintendent of Public Instruction www.k12.wa.us/assessment/assesshist/default.asp.

Figure 24. Selected Outdoor Recreation Opportunities. Data on trails and acres were compiled from telephone interviews with local county officials. Some additional data came from the following websites. Trails: http://www.metrokc.gov/parks/trails/trails1.htm, http://www.weirscyclery.com/trails.htm. Golf courses: http://www.golfwashington.com/courses.html, http://www.idahogolfassn.org/affiliat.htm, http://www.oregongolf.com/. Boat ramps: Washington Interagency Commission on Outdoor Recreation website http://boat.iac.wa.gov/