Key Industries, Key Occupations, Key Skills: Targeting Workforce Priorities in the Twin Cities

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Key Industries, Key Occupations, Key Skills:
Targeting Workforce Priorities in the Twin Cities
Executive Summary

Where should economic and workforce development organizations devote their resources? Every region, county and city is characterized by a set of industries and occupations that set it apart from all others. In the case of the Twin Cities, that industry base is very diverse consisting of numerous manufacturing and service industries that each have their own specific requirements for skilled workers. With so many options for investment, in what industry sectors and occupations should we focus our finite economic and workforce development resources? The Twin Cities Employment Services Partnership recently reviewed available information to identify some key industries in the Metro and associated occupations and skills.

It should be noted that the industries identified in this report represent only a portion of the economic activity in the Metro Region and should not be considered the only alternatives for focused economic and workforce development. These industries were identified using criteria that were prioritized in a single point in time. When the process of industry targeting was initiated in early 2004, the Metro labor market was still recovering from the recession of 2001. It is recognized and anticipated that economic changes in the near future will necessitate the continuous reevaluation of targeted industries.

Metro industries were examined using a variety of quantitative criteria including employment size, recent growth, projected growth, wages and relative competitiveness and scored according to those criteria. Industries were also examined by other qualitative factors such as their tendency to hire growing tiers of the workforce (e.g. immigrants, retirees, etc.) or their tendency to be capital importers. Taken together, these priorities were weighted and those industries with the highest scores were considered targeted industries. Five broad industry sectors were identified by this process:

- Healthcare
- Finance and Insurance
- Professional and Technical
- Freight and Air Passenger Transportation
- High Tech Manufacturing

Using DEED LMI data, a group of 98 occupations were identified that were highly utilized by these industries. Subsequently, the O*NET skills database was used to identify the specific skills most important to the industries and their respective occupations. The following pages summarize this analysis for the 5 targeted industry groups.

Targeted Industry Brief: Healthcare

As a broad industry sector, healthcare has added over 16,000 jobs in the Twin Cities between Q2, 2000 and Q2, 2004. More recently, vacancies for healthcare-related occupations have declined. However, shortage conditions still exist for many occupations and are expected to intensify in coming years.

Top 10 Occupations (by % industry employment) Employed in Twin Cities Healthcare Industries

Occupation	Twin Cities Occupational Employment	Median Wage	Job Vacancies (Q4, 2004)	Projected Growth 2000-2010
Registered Nurses	29,200	$28.43	865	19.5%
Nursing Aides, Orderlies, and Attendants	13,670	$12.70	371	15.3%
Home Health Aides	5,880	$10.85	534	36.6%
Licensed Practical and Licensed Vocational Nurses	7,240	$17.63	254	14.1%
Personal and Home Care Aides	4,390	$9.88	100-200	45.4%
Office Clerks, General	40,350	$13.50	834	14.2%
Maids and Housekeeping Cleaners	9,580	$9.54	<100	8.6%
Receptionists and Information Clerks	13,710	$11.72	413	19.2%
Medical Secretaries	3,420	$15.04	NA	12.4%
Social and Human Service Assistants	5,020	$12.94	<100	42.9%

Source: MN DEED Occupational Employment Statistics, Job Vacancy Survey and Occupational Projections 2000-2010. Twin Cities Employment represents estimates from Q4, 2003. Median Wages represent estimates from Q4, 2004. Note that occupational information reflects data for all industries beyond healthcare.

Top 5 Skills Associated with Twin Cities Healthcare Jobs

Skill	Description
Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
Speaking	Talking to others to convey information effectively.
Time Management	Managing one's own time and the time of others.
Service Orientation	Actively looking for ways to help people.
Social Perceptiveness	Being aware of others' reactions and understanding why they react as they do.

*Source: O*NET www.onetcenter.org*

Targeted Industry Brief: Finance and Insurance

As a broad industry sector, finance and insurance have added over 6,600 jobs in the Twin Cities between Q2, 2000 and Q2, 2004. More recently, vacancies for many finance-related occupations have declined. Increasing interest rates may tame some of the growth that has taken place in recent years.

Top 10 Occupations (by % industry employment) Employed in Twin Cities Finance and Insurance Industries

Occupation	Twin Cities Occupational Employment	Median Wage	Job Vacancies (Q4, 2004)	Projected Growth 2000-2010
Customer Service Representatives	26,360	$15.39	426	26.9%
Tellers	5,980	$10.97	684	2.4%
Office Clerks, General	40,350	$13.50	834	14.2%
Securities, Commodities, and Financial Services Sales Agents	5,590	$37.54	<100	20.7%
Loan Officers	3,500	$15.09	263	23.1%
First-Line Supervisors/Managers of Office and Administrative Support Workers	16,260	$21.84	100-200	9.0%
Insurance Sales Agents	1,020	$22.39	<100	6.6%
Loan Interviewers and Clerks	4,490	$15.61	<100	-18.4%
Executive Secretaries and Administrative Assistants	17,090	$18.13	243	7.8%
Claims Adjusters, Examiners, and Investigators	1,560	$21.30	<100	18.1%

Source: MN DEED Occupational Employment Statistics, Job Vacancy Survey and Occupational Projections 2000-2010. Twin Cities Employment represents estimates from Q4, 2003. Median Wages represent estimates from Q4, 2004. Note that occupational information reflects data for all industries beyond finance and insurance.

Top 5 Skills Associated with Twin Cities Finance & Insurance Jobs

Skill	Description
Reading Comprehension	Understanding written sentences and paragraphs in work related documents.
Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
Speaking	Talking to others to convey information effectively.
Mathematics	Using mathematics to solve problems.
Writing	Communicating effectively in writing as appropriate for the needs of the audience.

*Source: O*NET www.onetcenter.org*

Targeted Industry Brief: Professional and Technical Services

As a broad industry sector, professional and technical services have lost 7,900 jobs in the Twin Cities between Q2, 2000 and Q2, 2004. More recently, vacancies for many professional occupations have increased. Future job growth is expected to be strong for many of these occupations and wages are typically higher than the average.

Top 10 Occupations (by % industry employment) Employed in Twin Cities Professional and Technical Services Industries

Occupation	Twin Cities Occupational Employment	Median Wage	Job Vacancies (Q4, 2004)	Projected Growth 2000-2010
Lawyers	10,210	$42.11	<100	17.4%
Accountants and Auditors	16,020	$25.77	529	16.8%
Management Analysts	11,180	$32.93	100-200	31.3%
Office Clerks, General	40,350	$13.50	834	14.2%
Computer Software Engineers, Applications	12,450	$36.12	414	78.5%
Legal Secretaries	3,820	$21.85	NA	6.7%
Paralegals and Legal Assistants	4,110	$21.25	<100	21.1%
Bookkeeping, Accounting, and Auditing Clerks	18,300	$16.12	200-300	3.6%
General and Operations Managers	18,820	$43.19	NA	11.8%
Computer Software Engineers, Systems Software	5,910	$38.12	100-200	77.8%

Source: MN DEED Occupational Employment Statistics, Job Vacancy Survey and Occupational Projections 2000-2010. Twin Cities Employment represents estimates from Q4, 2003. Median Wages represent estimates from Q4, 2004. Note that occupational information reflects data for all industries beyond professional and technical services.

Top 5 Skills Associated with the Twin Cities Professional and Technical Services Industry

Skill	Description
Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
Critical Thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
Speaking	Talking to others to convey information effectively.
Active Learning	Understanding the implications of new information for both current and future problem-solving and decision-making.
Writing	Communicating effectively in writing as appropriate for the needs of the audience.

*Source: O*NET www.onetcenter.org*

Targeted Industry Brief: Freight and Air Transportation

As a broad industry sector, transportation and warehousing has lost over 10,000 jobs in the Twin Cities between Q2, 2000 and Q2, 2004. More recently, transportation has begun to add back some of the jobs it has lost over the last four years. Despite the recent downturn, transportation is considered to be important for the future economic vitality of the region.

Top 10 Occupations (by % industry employment) Employed in Twin Cities Transportation Industries

Occupation	Twin Cities Occupational Employment	Median Wage	Job Vacancies (Q4, 2004)	Projected Growth 2000-2010
Truck Drivers, Heavy and Tractor-Trailer	13,590	$19.91	534	12.7%
Truck Drivers, Light and Delivery	9,350	$14.28	100-200	14.0%
Aircraft Mechanics and Service Technicians	4,580	NA	NA	NA
Customer Service Representatives	26,360	$15.39	426	26.9%
Laborers and Freight, Stock, and Material Movers, Hand	18,780	$12.52	1,182	8.4%
Office Clerks, General	40,350	$13.50	834	14.2%
Reservation and Transportation Ticket Agents and Travel Clerks	1,330	NA	<100	-1.8%
Business & Operations Specialists, All Other	29,610	$24.00	433	17.4%
First-Line Supervisors/Managers of Transportation and Material-Moving Machine and Vehicle	3,090	$21.69	<100	15.2%
Dispatchers, Except Police, Fire, and Ambulance	2,160	$19.46	<100	13.9%

Source: MN DEED Occupational Employment Statistics, Job Vacancy Survey and Occupational Projections 2000-2010. Twin Cities Employment represents estimates from Q4, 2003. Median Wages represent estimates from Q4, 2004. Note that occupational information reflects data for all industries beyond transportation.

Top 5 Skills Associated with Twin Cities Transportation Jobs

Skill	Description
Operation and Control	Controlling operations of equipment or systems.
Speaking	Talking to others to convey information effectively.
Operation Monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly.
Time Management	Managing one's own time and the time of others.
Equipment Maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.

*Source: O*NET www.onetcenter.org*

Targeted Industry Brief: High Tech Manufacturing

As a broad industry sector, the Twin Cities manufacturing sector has lost over 32,000 jobs between Q2, 2000 and Q2, 2004. However, the sector continues to pay higher than average wages and supplies 12 percent of the total employment in the region. The industries included in this analysis are those that fit the Institute of Electrical and Electronics Engineers (IEEE) definition of high technology that have a significant presence in the Twin Cities Region. Included in this grouping are industries such as machinery, computer and medical device manufacturing. While current and projected employment conditions are unfavorable for many occupations, individual employers may face specific labor shortages as existing workers retire and skill requirements increase with automation.

Top 10 Occupations (by % industry employment) Employed in Twin Cities High Tech Manufacturing Industries

Occupation	Twin Cities Occupational Employment	Median Wage	Job Vacancies (Q4, 2004)	Projected Growth 2000-2010
Team Assemblers	15,700	$13.84	NA	2.1%
First-Line Supervisors/Managers of Production and Operating Workers	8,590	$23.22	<100	-4.3%
Welders, Cutters, Solderers, and Brazers	3,650	$18.95	<100	8.2%
Electrical and Electronic Equipment Assemblers	4,400	$13.93	NA	-27.2%
Cutting, Punching, and Press Machine Setters, Operators, and Tenders,	3,830	$15.47	NA	2.1%
Machinists	3,690	$19.81	200-300	-4.0%
Computer Software Engineers, Systems Software	5,910	$38.12	<100	77.8%
Inspectors, Testers, Sorters, etc.	4,630	$16.61	<100	-12.3%
Industrial Engineers	3,070	$34.25	100-200	-16.1%
Mechanical Engineers	4,300	$31.15	100-200	0.4%

Source: MN DEED Occupational Employment Statistics, Job Vacancy Survey and Occupational Projections 2000-2010. Twin Cities Employment represents estimates from Q4, 2003. Median Wages represent estimates from Q4, 2004. Note that occupational information reflects data for all industries beyond manufacturing.

Top 5 Skills Associated with Twin Cities High Tech Manufacturing Jobs

Skill	Description
Equipment Selection	Determining the kind of tools and equipment needed to do a job.
Mathematics	Using mathematics to solve problems.
Quality Control Analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
Operation and Control	Controlling operations of equipment or systems.

*Source: O*NET www.onetcenter.org*

Project Methodology

In order to identify potential industry priorities, members of the Employer Services Partnership, Metropolitan WIB and representatives of the regional economic development community reviewed industry employment data for the 7-County Metropolitan Area. Appendix I lists these Twin Cities industries and their employment conditions. Employment-related data for each industry was summarized for each industry. These data included such variables as recent employment change, size, average wages, projected future employment change, and competitiveness with respect to other like industries nationwide. Each of the quantitative variables was given a simple score of "+" or "-" depending upon whether it met a certain threshold criterion. For instance, if an industry displayed recent growth, paid higher than average wages, was competitive with respect to other U.S. firms and is projected to add jobs in the future, the industry received a "+" score for each of those variables. Failure to meet those criteria resulted in a "-" score. The positive scores of each industry were tallied to provide a list of possible industry priorities that might reflect that values of the participants.

Once participants reviewed this list of industries and their employment attributes, the group identified additional criteria and associated weighting based on level of perceived importance. The criteria and their weights are as follows:

- Capitol Importer (2 pts)
- Wages Above Average (2 pts)
- Building on Sector Strengths – distinguishing industries (2 pts)
- Projected Growth (2 pts)
- Social Need (1 pt)
- Hire populations that are expected to grow - immigrants (1 pt)

Total of 10 points possible

The following industries were rated on the criteria to identify potential industries of focus:

Industry	Score
Medical Care/Healthcare Industry	8
Advanced Manufacturing and Medical Devices/Biosciences	9.5
Business & Professional services	8.5
Financial/Insurance services	9
Construction	6
Education	5
Transportation	8
Telecomm	4
Retail	4

From this list of industries and their criteria, the following industries were identified as

potential targets:

- Healthcare
- Finance & Insurance
- Professional & Technical Services
- Transportation
- High Tech Manufacturing

Using the five industry targets as a guideline, a list of target occupations was identified. Using Occupational Employment Statistics from DEED, 98 occupations were identified that comprised at least 1 percent of the total employment in each of the five industry targets. Once identified, the occupations were characterized by current demand (job vacancies), wages and projected employment change (2000-2010). Occupations and their educational and experience requirements are listed on Appendix III.

Skill information for each occupation was derived from the O*NET database. Those skills being most important to each occupation were identified. Summary information for total skills needed in each of the five industry categories was identified by weighting each occupation by its employment level and comparing it to the importance level of the skills that were most often utilized by occupations within that industry.

In the initial planning stages of this project, a collaboration was proposed with the State of Utah LMI Office to procure data from the SkillWindow Project. SkillWindow programming methodology would have been used to mine specific skills data from employer job orders in the Minnesota Job Bank. Beyond the somewhat broad skill categories provided by O*NET, SkillWindow would have provided specific point in time skills (*e.g*. specific computer programs, certifications, etc.) needed by Minnesota employers for the 98 identified occupations. However, staffing and funding issues around the Utah SkillWindow Project did not allow for this step in the analysis.

Summarized results were presented to a variety of groups in the Twin Cities comprised of economic development and workforce professionals. Verbal and written comments were collected during and after the presentations. Participant comments are summarized in Appendix II.

Twin Cities Healthcare Industry Assessment

With over 150,000 jobs, healthcare is a major employer in the Twin Cities. This represents 9 percent of the total employment in the region. As a major industry sector, healthcare generally pays better than average wages and has displayed high growth adding about 16,000 private sector jobs between Q2, 2000 and Q2, 2004. However, some variability is noticeable when looking at individual industries within the larger healthcare sector. See Table 1.

Table 1 lists various healthcare-related industries in the region along with their recent growth trends and average weekly wage. Industries growing the fastest include various residential care facilities. These industries also display lower than average wages. Ambulatory health services (offices and clinics of doctors and dentists) have displayed significant growth coupled to high wages. Some specific sectors have lost employment over the last three years. Losses are likely to reverse with improvements in the economy.

Table 1: Employment Change (Q2, 2000-04) for Metro Healthcare Industry Sectors

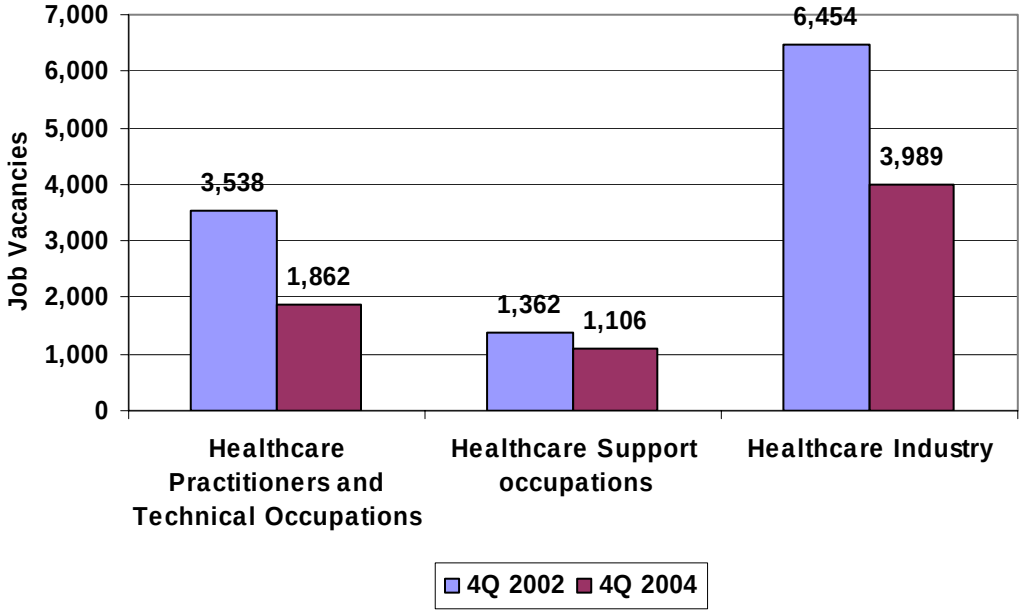
Industries	Covered employment, Q2, 2004 average	Percent Change (Q2, 2000-2004)	Numeric Growth (Q2, 2000-2004)	Average weekly wage, Q2, 2004
Ambulatory Health Care Svcs. (private)	56,104	13.5%	6,650	$1,040
Hospitals	54,813	12.1%	5,931	819
Nursing & Residential Care Facilities (private)	36,947	12.8%	4,181	454
Offices of Dentists	9,167	11.6%	952	994
Offices of Chiropractors	1,968	14.1%	243	550
Offices of Specialty Therapists	1,040	-24.3%	-334	651
Outpatient Mental Health Centers	247	19.3%	40	579
Nursing Care Facilities (Private)	19,965	-3.3%	-685	488
Residential Mental Health Facilities (Private)	10,783	23.4%	2,044	399
Community Care Facility for the Elderly	5,149	100.2%	2,577	382
Other Residential Care Facilities	1,050	30.4%	245	437
Total, All Industries	**1,581,446**	**-1.6%**	**-26,470**	**847**

Source: MN DEED Quarterly Census of Employment & Wages

Over the last 4 years, the healthcare industry has witnessed workforce shortages in a number of occupations. With the onset of recession, these shortages have lessened somewhat. Figure 1 compares current job vacancy conditions with conditions from 2002 for two broad healthcare-related occupation groups. Healthcare practitioners represent occupations such as RN, LPN and various technical occupations that typically require a degree beyond high school. Healthcare support represents occupations that often require at least a high school diploma with some requiring some advanced training. The number of vacancies has dropped considerably over two years in both healthcare practitioner and healthcare support occupations. Healthcare practitioner vacancies have dropped 47

percent while vacancies in healthcare support have dropped 19 percent. Over the same time period, total vacancies in the Metro Region declined 8.3 percent.

Figure 1: Healthcare-related Vacancies in the Twin Cities (4Q, 2002 vs. 4Q, 2004)



Source: MN DEED, MN Job Vacancy Survey, Q4, 2004

Table 2 lists job vacancy conditions for specific healthcare-related occupations in the Twin Cities. The healthcare industry as a whole had 3,989 vacancies in 4th Quarter, 2004 with a median wage of $12.00. The largest numbers of vacancies are in the registered nurse, licensed practical nurse, nursing aide, and home health aide occupations. In terms of the greatest number of vacancies as a percent of workers in the field (Job Vacancy Rate), home health aides and LPN's display some of the greatest need. It should be noted that some occupations have not necessarily displayed high need in the past. Registered nurse, nurses aides and LPNs have displayed consistently high levels of need across multiple iterations of the Job Vacancy Survey.

Table 2: Healthcare-Related Occupations: Twin Cities Projected Growth (2000-2010) and Vacancies (Q4, 2004)

Occupation	Q4, 2004 Metro Vacancies	Projected Employment Change 2000-2010		
		Percent Growth	Numeric Growth	Replacement Openings
Registered Nurses	865	19.5	5,206	5,393
Nursing Aides, Orderlies, and Attendants	371	15.3	2,206	1,839
Home Health Aides	534	36.6	3,754	1,309
Licensed Practical and Licensed Vocational Nurses	254	14.1	1,046	1,897
Personal and Home Care Aides	100-200	45.4	3,076	1,032
Office Clerks, General	834	14.2	6,415	8,666
Maids and Housekeeping Cleaners	<100	8.6	942	2,383
Receptionists and Information Clerks	413	19.2	2,846	3,265
Medical Secretaries	NA	12.4	381	520
Social and Human Service Assistants	<100	42.9	1,825	632
Medical Assistants	<100	46.6	1,669	948
Dental Hygienists	NA	28.9	860	431
Dental Assistants	NA	29.2	698	427
Food Servers, Nonrestaurant	NA	6.5	148	1,007
Medical and Health Services Managers	<100	24.9	627	434
Food Preparation Workers	<100	14.1	927	2,533
Medical and Clinical Laboratory Technicians	<100	16.3	236	340
Billing and Posting Clerks and Machine Operators	<100	3.6	809	4,229
Secretaries, Except Legal, Medical, and Executive	<100	-4.6	-564	2,064
Business Operations Specialists, All Other	459	17.4	4,586	6,709
Medical Records and Health Information Technicians	<100	48.2	817	377
Radiologic Technologists and Technicians	<100	24.7	349	311
Healthcare Support Workers, All Other	<100	19.0	286	399
First-Line Supervisors/Managers of Office and Administrative Support Workers	100-200	9.0	1,766	3,794

Occupation	Q4, 2004 Metro Vacancies	Projected Employment Change 2000-2010		
		Percent Growth	Numeric Growth	Replacement Openings
Executive Secretaries and Administrative Assistants	200-300	7.8	1,464	3,171

Source: MN DEED, Twin Cities Occupational Projections, 2000-2010 and Q4, 2004 MN Job Vacancy Survey. Note that occupational information reflects data for all industries beyond healthcare.

Job vacancies have been impacted by the recession. However, with extended economic growth, healthcare is expected to experience increased worker shortages again. Job growth in the healthcare industry in the Twin Cities is projected to top 20 percent between 2000 and 2010 and result in the creation of over 25,000 jobs. Table 2 shows this job growth by individual occupation. Note that significant demand for workers will occur due to replacement openings in such occupations as nursing and nurses aides and orderlies.

Table 3: Healthcare-Related Occupations: Twin Cities Wages (Q4, 2004) and Education and Experience Requirements

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Registered Nurses	Assoc.	20.59	28.43	36.31
Nursing Aides, Orderlies, and Attendants	ST OJT	9.94	12.70	16.14
Home Health Aides	ST OJT	8.80	10.85	13.99
Licensed Practical and Licensed Vocational Nurses	Voc.	14.31	17.63	22.05
Personal and Home Care Aides	ST OJT	8.06	9.88	12.39
Office Clerks, General	ST OJT	9.05	13.50	18.97
Maids and Housekeeping Cleaners	ST OJT	7.20	9.54	13.29
Receptionists and Information Clerks	ST OJT	7.60	11.72	16.02
Medical Secretaries	Voc.	12.17	15.04	18.55
Social and Human Service Assistants	Mod. OJT	9.67	12.94	18.16
Medical Assistants	Mod. OJT	9.76	13.45	17.21
Dental Hygienists	Assoc	20.53	31.51	35.89
Dental Assistants	Mod. OJT.	15.02	17.96	21.97
Food Servers, Nonrestaurant	ST OJT	6.59	9.07	12.74
Medical and Health Services Managers	W + Bach.	24.00	36.24	63.31
Food Preparation Workers	ST OJT	6.99	10.09	13.54
Medical and Clinical Laboratory Technicians	Assoc.	12.75	16.81	21.97
Billing and Posting Clerks and Machine Operators	ST OJT	11.86	15.22	20.03
Secretaries, Except Legal, Medical, and Executive	Mod. OJT.	11.92	16.04	21.36

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Business Operations Specialists, All Other	Bach.	14.15	24.00	41.94
Medical Records and Health Information Technicians	Assoc.	10.23	13.80	20.76
Radiologic Technologists and Technicians	Assoc	22.99	28.62	36.71
Healthcare Support Workers, All Other	ST OJT	10.22	13.46	17.29
First-Line Supervisors/Managers of Office and Administrative Support Workers	Rel. Exp.	14.94	21.84	32.63
Executive Secretaries and Administrative Assistants	Mod. OJT.	14.06	18.13	24.65

ST OJT= short term on the job training, MT OJT= Moderate Term on the Job Training, LT OJT= Long-Term on the Job Training, Rel. Exp= Experience in a Related Occupation, Assoc.= Associate's Degree, Voc.=Post-secondary vocational training, Bach.= Bachelor's Degree, W+Exp.=Work Experience plus a Bachelor's Degree. Source: MN DEED, Occupation Employment Statistics. Note that occupational information reflects data for all industries beyond healthcare.

Healthcare-related occupations display a range of wages. As would be expected, wages increase with levels of education. Some occupations display a large difference between entry level and experienced wages such as the nurse and nursing aid occupations-greater than 60 percent difference. Other occupations such as L.P.N. or home health aide display lesser differences between high and low end wages- less than 60 percent difference. See Table 3.

Table 4 lists the skills required in healthcare-related occupations by training requirement category. Active Learning and basic communication skills are common across categories. As would be expected, social skills are generally required across categories with higher cognitive skills being required by nurses and other professionals. Descriptions of these skills can be found in Appendix IV.

Table 4: Skills Required by Training Requirement for Occupations in the Healthcare Industry

Short-Term on the Job Training	Moderate Term on the Job Training	Vocational Training	Associate's Degree
Active Listening	Active Listening	Active Listening	Active Listening
Service Orientation	Speaking	Reading	Reading Comprehension
Speaking	Reading Comprehension	Speaking	Speaking
Reading	Social Perceptiveness	Time Management	Critical Thinking

Coordination	Time Management	Active Learning	Instructing
Time Management	Writing	Writing	Time Management
Writing	Active Learning	Service Orientation	Service Orientation
Monitoring	Service Orientation	Coordination	Writing
Critical Thinking	Coordination	Judgment & Decision Making	Active Learning
Judgment & Decision Making	Instrumentation	Instructing	Social Perceptiveness

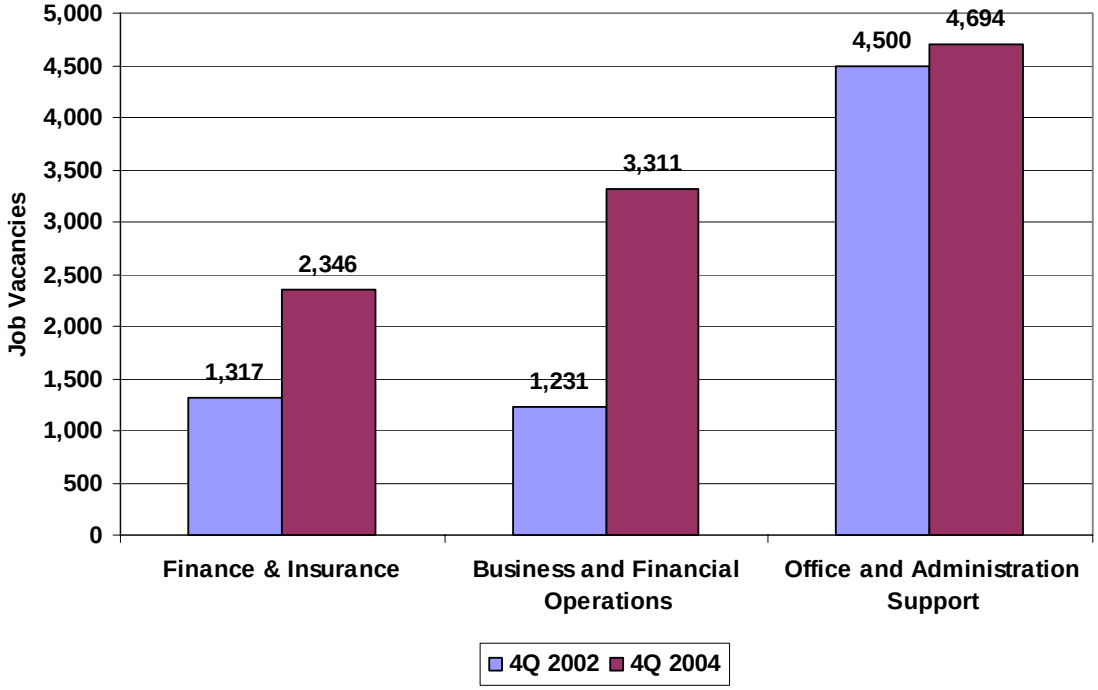
*Source: O*NET www.onetcenter.org*

Twin Cities Finance and Insurance Industry Assessment

With over 105,000 jobs, the finance and insurance industry is a major employer in the Twin Cities. The combined industries account for about 8 percent of the total employment in the region. However, in recent years the finance industry has followed a different trajectory than insurance. Between Q2, 2000 and Q2, 2004 the credit intermediation industry (banking and related activities) grew faster than any other industry adding about 8,400 jobs (+27 percent). In the meantime, insurance carriers have lost 400 jobs (-1 percent). Moreover, more losses are likely with industry consolidation and anticipated relocations.

Prior to the recession, the industry witnessed some occupational shortages. With the onset of recession, these shortages have lessened somewhat. Figure 2 compares current job vacancy conditions with conditions from 2002 for the finance and insurance industry as well as a subset of occupations often found within the industry. Overall industry vacancies are up 78 percent from Second Quarter, 2002. Business and financial occupation (occupations that typically require a bachelor's degree) vacancies have increased 169 percent over the last two years while office and administrative support occupations (jobs typically requiring an associate's degree or less) are up only 4.3 percent. Regardless, industry and occupational vacancies have out-performed the regional trend for total vacancies which have declined 8.3 percent over two years.

Figure 2: Finance and Insurance Industry-related Vacancies in the Twin Cities (4Q, 2002 vs. 4Q, 2004)



Source: MN DEED, MN Job Vacancy Survey, 4Q, 2004

Table 5 lists job vacancy conditions for specific finance and insurance occupations in the Twin Cities. The finance and insurance industries as a whole had 2,174 vacancies in 2nd Quarter, 2004 with a median hourly wage of $16.83. The largest numbers of vacancies are in the loan officer, teller, insurance and financial services sales, customer service and accountant occupations. In most cases, the numbers of vacancies listed below are significantly lower than previous years. Occupations commonly found in banking (loan officers, tellers, loan processors, etc.) may not reach previous peak levels due to increasing interest rates and increasing use of technology. Vacancies in occupations such as accountants and auditors and financial analysts may increase over time due to new financial reporting standards instituted by the Sarbanes-Oxley Act.

Table 5: Finance and Insurance-Related Occupations: Twin Cities Projected Growth (2000-2010) and Vacancies (Q4, 2004)

Occupation	Q4, 2004 Metro Vacancies	Projected Employment Change 2000-2010		
		Percent Growth	Numeric Growth	Replacement Openings
Customer Service Representatives	426	26.9	7,770	2,448
Tellers	684	2.4	97	1,937
Office Clerks, General	834	14.2	6,415	8,666
Securities, Commodities, and Financial Services Sales Agents	<100	20.7	1,088	424
Loan Officers	263	23.1	294	254
Supervisors/Managers of Office and Administrative Support Workers	100-200	9.0	1,766	3,794
Insurance Sales Agents	<100	6.6	426	1,591
Business Operations Specialists, All Other	433	17.4	4,586	6,709
Loan Interviewers and Clerks	<100	-18.4	-542	200
Executive Secretaries and Administrative Assistants	243	7.8	1,464	3,171
Claims Adjusters, Examiners, and Investigators	<100	18.1	582	358
Brokerage Clerks	NA	-0.3	-10	379
Financial Managers	200-300	20.1	1,511	1,149
Insurance Claims and Policy Processing Clerks	<100	-20.0	-997	860
Bookkeeping, Accounting, and Auditing Clerks	<100	3.6	809	4,229
Supervisors/Managers of Non-Retail Sales Workers	NA	4.0	350	1,290
Managers, All Other	200-300	4.3	440	1,815
Insurance Underwriters	<100	6.9	124	274
Accountants and Auditors	459	16.8	2,790	2,458
General and Operations Managers	NA	11.8	3,001	4,282
Sales and Related Workers, All Other	NA	25.4	4,309	3,732
Computer Systems Analysts	100-200	50.1	4,210	738
New Accounts Clerks	NA	18.7	179	202

Occupation	Q4, 2004 Metro Vacancies	Projected Employment Change 2000-2010		
		Percent Growth	Numeric Growth	Replacement Openings
Computer Software Engineers, Applications	414	78.5	7,190	613
Financial Specialists, All Other	100-200	25.7	1,088	841
Computer Specialists, All Other	100-200	51.6	4,256	725
Financial Analysts	100-200	22.0	608	376
Computer Support Specialists	100-200	92.1	9,942	458
Loan Counselors	NA	23.1	294	254
Management Analysts	100-200	31.3	2,423	676

Source: MN DEED, Twin Cities Occupational Projections, 2000-2010 and Q4, 2004 MN Job Vacancy Survey. Note that occupational information reflects data for all industries beyond finance and insurance.

Occupations commonly found in the finance and insurance industries span a wide range of wages and educational and experience requirements. See Table 6. As would be expected, wage levels generally rise with the level of education or experience required for a position. Some occupations display very large differences between low-end and high-end wages. The largest variations are typically found in jobs requiring higher levels of education though some occupations such as claims adjusters and bookkeepers can vary by about 100 percent or more.

Table 6: Finance and Insurance-Related Occupations: Twin Cities Wages (Q4, 2004) and Education and Experience Requirements

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Customer Service Representatives	Mod. OJT	10.93	15.39	22.18
Tellers	ST OJT	9.36	10.97	14.18
Office Clerks, General	ST OJT	9.05	13.50	18.97
Securities, Commodities, and Financial Services Sales Agents	Bach.	19.43	37.54	>70.00
Loan Officers	Bach.	12.40	15.09	20.34
Supervisors/Managers of Office and Administrative Support Workers	Rel. Exp.	14.94	21.84	32.63
Insurance Sales Agents	Bach.	17.59	22.39	56.95
Business Operations Specialists, All Other	Bach.	14.15	24.00	41.94
Loan Interviewers and Clerks	ST OJT	11.44	15.61	22.79
Executive Secretaries and Administrative Assistants	Mod. OJT	14.06	18.13	24.65
Claims Adjusters, Examiners, and Investigators	LT OJT	14.97	21.30	33.48
Brokerage Clerks	Mod. OJT	11.73	15.68	20.56
Financial Managers	W + Bach.	30.83	46.53	>70.00

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Insurance Claims and Policy Processing Clerks	Mod. OJT	11.88	15.73	23.36
Bookkeeping, Accounting, and Auditing Clerks	Mod. OJT	11.68	16.12	22.02
Supervisors/Managers of Non-Retail Sales Workers	Rel. Exp.	20.71	35.56	67.66
Managers, All Other	W + Exp	26.53	43.28	>70.00
Insurance Underwriters	Bach.	18.75	26.16	38.54
Accountants and Auditors	Bach.	18.44	25.77	44.22
General and Operations Managers	W + Bach.	21.76	43.19	>70.00
Sales and Related Workers, All Other	Mod. OJT	10.72	21.09	40.54
Computer Systems Analysts	Bach.	22.44	32.76	45.35
New Accounts Clerks	Rel. Exp.	11.45	14.47	17.90
Computer Software Engineers, Applications	Bach.	24.32	36.12	51.33
Financial Specialists, All Other	Bach.	16.52	23.37	39.54
Computer Specialists, All Other	Assoc.	19.34	31.81	44.93
Financial Analysts	Bach.	19.88	30.62	48.05
Computer Support Specialists	Assoc.	14.40	20.84	32.29
Loan Counselors	Bach.	12.40	15.09	20.34
Management Analysts	W + Bach	21.08	32.93	51.84

ST OJT= short term on the job training, MT OJT= Moderate Term on the Job Training, LT OJT= Long-Term on the Job Training, Rel. Exp= Experience in a Related Occupation, Assoc.= Associate's Degree, Bach.= Bachelor's Degree, W+Exp.=Work Experience plus a Bachelor's Degree. Source: MN DEED, Occupation Employment Statistics. Note that occupational information reflects data for all industries beyond finance and insurance.

Table 7 lists the skills required in finance and insurance-related occupations by training requirement category. Communication and customer services skills are common across categories. As would be expected, social skills are generally required across categories with problem solving and judgment and decision-making skills being required with higher education requirements. Descriptions of these skills can be found in Appendix IV.

Table 7: Skills Required by Training Requirement for Occupations in the Finance and Insurance Industry

Short Term on the Job Training	Moderate term on the Job Training and Jobs Requiring Related Work Experience	Bachelor's Degree
Active Listening	Speaking	Judgment & Decision Making
Reading	Reading	Speaking
Mathematics	Active Listening	Reading
Service Orientation	Writing	Active Listening
Speaking	Critical Thinking	Mathematics
Social Perceptiveness	Active Learning	Writing
Writing	Monitoring	Active Learning

Time Management	Service Orientation	Complex Problem Solving
Active Learning	Mathematics	Coordination
Critical Thinking	Learning Strategies	Monitoring

*Source: O*NET www.onetcenter.org*

Twin Cities Professional & Technical Services Industry Assessment

With over 94,000 jobs, the professional and technical services industry is a major employer in the Twin Cities. The industry accounts for about 6 percent of the total employment in the region and spans a variety of activities. See Table 8. With the collapse of the "Dot-Com" industry, employment in the professional and technical services sector declined significantly. Between Q2, 2000 and Q2, 2004 the industry declined 7.8 percent- a loss of 7,900 jobs. However, employment conditions have varied among industry subsectors. While computer design and advertising have witness declines of around 20 percent, legal services has grown by over 10 percent.

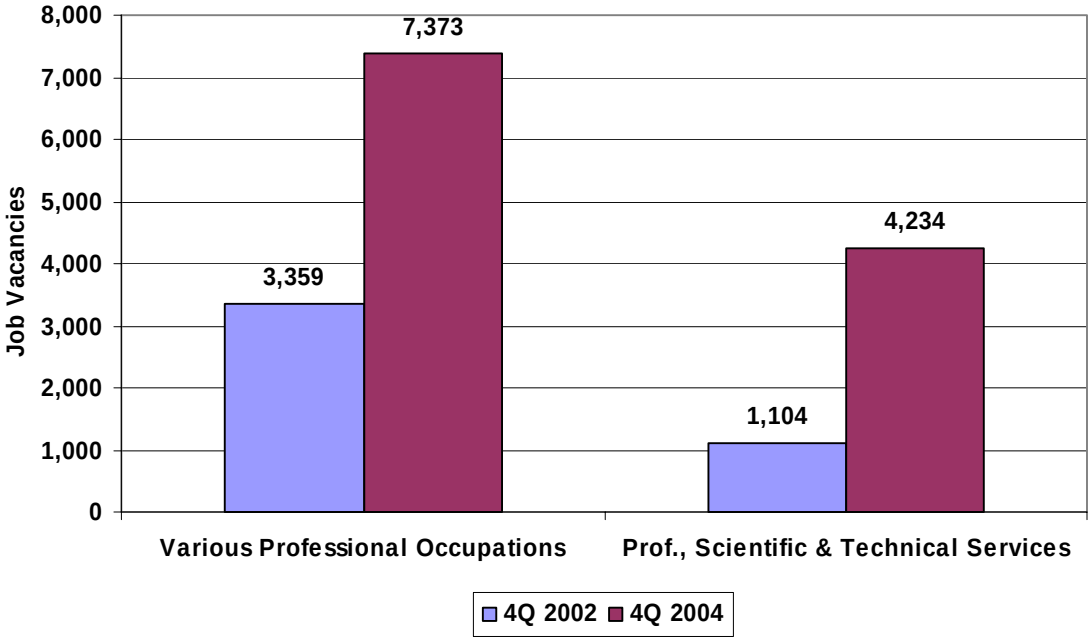
Table 8: Employment Change (Q2, 2000-04) for Metro Professional and Technical Services Industry Sectors

Industries	Covered employment, Q2, 2004 average	Percent Change (Q2, 2000-2004)	Numeric Growth (Q2, 2000-2004)	Average weekly wage, Q2, 2004
Legal Services	16,069	10.7%	1,549	$1,323
Accounting & Bookkeeping Services	11,032	-10.1%	-1,423	1,062
Architecture & Engineering Services	14,800	-7.7%	-1,226	1,110
Computer Systems Design Services	20,078	-20.2%	-5,093	1,414
Management & Technical Consulting	9,036	8.0%	672	1,239
Advertising & Related Services	8,745	-22.0%	-2,475	1,123
Other Professional Services	5,943	13.5%	706	635
Total, All Industries	**1,581,446**	**-1.6%**	**-26,470**	**$847**

Source: MN DEED Quarterly Census of Employment & Wages

Prior to the recession, the industry witnessed some occupational shortages-especially in computer-related occupations. With the onset of recession, these shortages have lessened greatly. Figure 3 compares current job vacancy conditions with conditions from 2002 for the professional and technical services industry as well as a subset of occupations often found within the industry. Between 4th Quarter 2002 and 4th Quarter, 2004 the industry has witnessed a resurgence in hiring with vacancies increasing 284 percent over the last 2 years. Indeed, with 4.5 job openings per 100 existing positions, the industry has one of the highest job vacancy rates in the Twin Cities. A similar trend is evident for professional occupations where vacancies have increased 119 percent. As of Q4, 2004, accountants, other business operations specialists, computer software engineers, sales representatives (services) and marketing managers had some of the highest numbers of vacancies in the region. Industry and occupational vacancies have substantially out-performed the regional trend for total vacancies which have declined 8.3 percent over two years.

Figure 3: Professional and Technical Services Industry-related Vacancies in the Twin Cities (4Q, 2002 vs. 4Q, 2004)



Source: MN DEED, MN Job Vacancy Survey, 4Q, 2004

Table 9 lists job vacancy and employment projection data for specific professional and technical service-related occupations in the Twin Cities. The industry as a whole had 4,234 vacancies in 4th Quarter, 2004 with a median wage of $9.00.

Table 9: Professional and Technical Services-Related Occupations: Twin Cities Projected Growth (2000-2010) and Vacancies (Q4, 2004)

Occupation	Q4, 2004 Metro Vacancies	Projected Employment Change 2000-2010		
		Percent Growth	Numeric Growth	Replacement Openings
Lawyers	<100	17.4	1,662	635
Accountants and Auditors	529	16.8	2,790	2,458
Management Analysts	100-200	31.3	2,423	676
Office Clerks, General	834	14.2	6,415	8,666
Computer Software Engineers, Applications	414	78.5	7,190	613
Legal Secretaries	NA	6.7	206	525
Paralegals and Legal Assistants	<100	21.1	638	184
Bookkeeping, Accounting, and Auditing Clerks	200-300	3.6	809	4,229
Business Operations Specialists, All Other	459	17.4	4,586	6,709
Sales and Related Workers, All Other	NA	25.4	4,309	3,732
Sales Representatives, Services, All Other	379	26.5	2,184	1,799
General and Operations Managers	NA	11.8	3,001	4,282

Occupation	Q4, 2004 Metro Vacancies	Projected Employment Change 2000-2010		
		Percent Growth	Numeric Growth	Replacement Openings
Computer Software Engineers, Systems Software	100-200	77.8	2,891	249
Executive Secretaries and Administrative Assistants	200-300	7.8	1,464	3,171
Computer Support Specialists	100-200	92.1	9,942	458
Computer Programmers	100-200	9.7	771	1,664
Graphic Designers	<100	24.3	678	280
First-Line Supervisors/Managers of Office and Administrative Support Workers	100-200	9.0	1,766	3,794
Architects, Except Landscape and Naval	<100	21.6	404	107
Computer Systems Analysts	100-200	50.1	4,210	738
Receptionists and Information Clerks	414	19.2	2,846	3,265
Civil Engineers	100-200	9.3	179	301
Veterinary Assistants and Laboratory Animal Caretakers	NA	45.0	268	157
All Other Secretaries, Administrative Assistants, and Other Office Support	NA	5.4	463	1,386
Customer Service Representatives	433	26.9	7,770	2,448
Demonstrators and Product Promoters	NA	19.1	423	718
Computer and Information Systems Managers	<100	43.0	2,506	982

Source: MN DEED, Twin Cities Occupational Projections, 2000-2010 and Q4, 2004 MN Job Vacancy Survey. Note that occupational information reflects data for all industries beyond professional and technical services.

Job vacancies have been impacted by the recession. However, with the onset of economic growth, professional and technical services may feel some workforce shortages. With the new regulatory standards imposed by the Sarbanes Oxley Act, many companies have hired increased numbers of finance and computer professionals. See Table 9.

Table 10 summarizes wage information for occupations typically found in the professional and technical services sector. As would be expected, wage levels generally rise with the level of education or experience required for a position. Some occupations display very large differences between low-end and high-end wages. The largest variations are typically found in jobs requiring higher levels of education though some occupations such as office clerks and paralegal professionals can vary by about 100 percent or more.

Table 10: Professional and Technical Services-Related Occupations: Twin Cities Wages (Q4, 2004) and Education and Experience Requirements

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Lawyers	Prof.	25.37	42.11	>70.00
Accountants and Auditors	Bach.	18.44	25.77	44.22
Management Analysts	W + Bach.	21.08	32.93	51.84
Office Clerks, General	ST OJT	9.05	13.5	18.97
Computer Software Engineers, Applications	Bach.	24.32	36.12	51.33
Legal Secretaries	Voc.	15.32	21.85	27.73
Paralegals and Legal Assistants	Assoc.	15.32	21.25	29.73
Bookkeeping, Accounting, and Auditing Clerks	MT OJT	11.68	16.12	22.02
Business Operations Specialists, All Other	Bach.	14.15	24.00	41.94
Sales and Related Workers, All Other	Mod. OJT	10.72	21.09	40.54
Sales Representatives, Services, All Other	Mod. OJT	NA	NA	NA
General and Operations Managers	W + Bach.	21.76	43.19	>70.00
Computer Software Engineers, Systems	Bach.	25.10	38.12	54.59
Executive Secretaries and Administrative Assistants	Mod. OJT	14.06	18.13	24.65
Computer Support Specialists	Assoc.	14.40	20.84	32.29
Computer Programmers	Bach.	19.71	30.78	46.58
Graphic Designers	Bach.	13.98	20.27	30.03
First-Line Supervisors/Managers of Office and Administrative Support Workers	Rel. Exp.	14.94	21.84	32.63
Architects, Except Landscape and Naval	Bach.	19.16	27.56	42.81
Computer Systems Analysts	Bach.	22.44	32.76	45.35
Receptionists and Information Clerks	ST OJT	7.60	11.72	16.02
Civil Engineers	Bach.	19.78	29.46	43.95
Veterinary Assistants and Laboratory	ST OJT	7.23	8.57	13.69
All Other Secretaries, Administrative Assistants, and Other Office Support	ST OJT	8.62	13.34	19.53
Customer Service Representatives	Mod. OJT.	10.93	15.39	22.18
Demonstrators and Product Promoters	Mod. OJT.	7.32	9.30	16.25
Computer and Information Systems Managers	W + Bach.	33.09	47.63	>70.00

ST OJT= short term on the job training, MT OJT= Moderate Term on the Job Training, Rel. Exp= Experience in a Related Occupation, Assoc.= Associate's Degree, Voc.=Post-secondary vocational training, Bach.= Bachelor's Degree, W+Exp.=Work Experience plus a Bachelor's Degree, Prof.=Professional Degree. Source: MN DEED, Occupation Employment Statistics. Note that occupational information reflects data for all industries beyond professional and technical services.

Table 11 lists the skills required in professional and technical services-related

occupations by training requirement category. Communication skills are common across categories. Some skills such as critical thinking are common to occupations that require fairly little in terms of training. Descriptions of these skills can be found in Appendix IV.

Table 11: Skills Required by Training Requirement for Occupations in the Professional &Technical Services Industry

Short-Term on the Job Training	Moderate Term on the Job Training	Vocational Training & Associate's Degree	Bachelor's Degree
Active Listening	Reading	Reading	Reading
Reading	Active Listening	Active Listening	Critical Thinking
Speaking	Speaking	Writing	Active Listening
Writing	Critical Thinking	Speaking	Active Learning
Critical Thinking	Social Perceptiveness	Active Learning	Judgment & Decision Making
Learning Strategies	Writing	Time Management	Writing
Social Perceptiveness	Active Learning	Critical Thinking	Speaking
Coordination	Learning Strategies	Learning Strategies	Complex problem Solving
Time Management	Mathematics	Social Perceptiveness	Monitoring
Service Orientation	Service Orientation	Mathematics	Mathematics

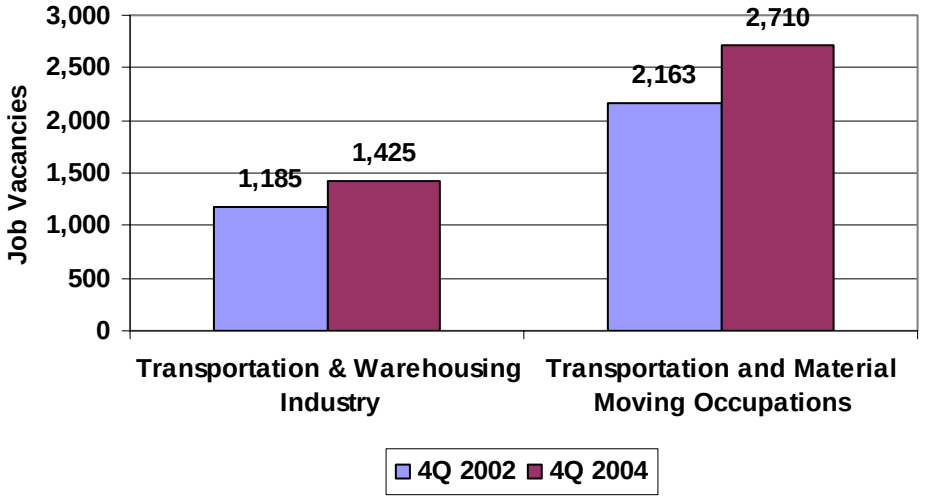
*Source: O*NET www.onetcenter.org*

Twin Cities Transportation (Freight and Air Passenger) Industry Assessment

With about 66,500 jobs, transportation is a major employer in the Twin Cities. The combined industries account for about 4 percent of the total employment in the region. However, in recent years the industry has lost substantial numbers of jobs. Between Second Quarter, 2000 and Second Quarter, 2004 close to 11,000 jobs were lost- a decline of 14 percent. For the purposes of this report, transportation reflects those specific industries involved in freight handling rather than ground transportation of people. Industries included in this analysis are air transportation, railway transportation, truck transportation, support activities for transportation and warehousing and storage. Because many of these industries are dominated by one or two major local employers, employment data can not be reported for individual industries such as air or rail transportation. Regardless, it can be stated that such industries generally pay higher than average wages but have also laid off significant numbers of workers in recent years.

Prior to the recession, the industry witnessed some occupational shortages. With the onset of recession, shortages were lessened. However, in recent years, the number of job vacancies has steadily increased in the transportation industry and in the occupations typically found in the industry. Indeed, industry vacancies have increased 20 percent in the last two years while occupational vacancies have increased 25 percent. Industry and occupational vacancies have out-performed the regional trend for total vacancies which have declined 8.3 percent over two years. See Figure 4.

Figure 4: Transportation Industry-related Vacancies in the Twin Cities (4Q, 2002 vs. 4Q, 2004)



Source: MN DEED, MN Job Vacancy Survey, 4Q, 2004

Table 12 lists job vacancy conditions for specific freight transport-related occupations in the Twin Cities. The transportation industry as a whole had 2,710 vacancies in 4th Quarter, 2004 with a median wage of $13.50. The largest numbers of vacancies are in the laborer and freight handler, heavy and tractor trailer driver, and various office and

administrative occupations. Laborers and freight handlers and truck drivers have displayed consistently high levels of need across multiple iterations of the Job Vacancy Survey. However, laborers and freight handlers often display low wage offers. The median wage for this occupation was equal to the median hourly wage of all occupations at $12.00 as of Q4, 2004.

Table 12: Transportation-Related Occupations: Twin Cities Projected Growth (2000-2010) and Vacancies (Q4, 2004)

Occupation	Q4, 2004 Metro Vacancies	Projected Employment Change 2000-2010		
		Percent Growth	Numeric Growth	Replacement Openings
Truck Drivers, Heavy and Tractor-Trailer	534	12.7	2,011	2,167
Truck Drivers, Light or Delivery Services	100-200	14.0	1,891	1,847
Aircraft Mechanics and Service Technicians	NA	NA	NA	NA
Customer Service Representatives	426	26.9	7,770	2,448
Laborers and Freight, Stock, and Material Movers, Hand	1,182	8.4	2,144	8,518
Office Clerks, General	834	14.2	6,415	8,666
Reservation and Transportation Ticket Agents and Travel Clerks	<100	-1.8	-39	581
Business Operations Specialists, All Other	433	17.4	4,586	6,709
Dispatchers, Except Police, Fire, and Ambulance	<100	13.9	461	546
First-Line Supervisors/Managers of Transportation and Material-Moving Machine	<100	15.2	547	771
Bus & Truck Mechanics and Diesel Engine Specialists	<100	11.3	407	921
Managers of Office and Administrative Support Workers	200-300	9.0	1,766	3,794
Bookkeeping, Accounting, and Auditing Clerks	<100	3.6	809	4,229
Locomotive Engineers	NA	NA	NA	NA
All Other Secretaries, Administrative Assistants, and Other Office Support	NA	5.4	463	1,386
Railroad Conductors and Yardmasters	NA	NA	NA	NA
Managers, All Other	200-300	4.3	440	1,815
Sales and Related Workers, All Other	NA	25.4	4309	3732
Cargo and Freight Agents	NA	3.2	30	191
Stock Clerks and Order Fillers	200-300	8.5	1,866	7,809
Cleaners of Vehicles and Equipment	NA	13.2	543	1,566
Shipping, Receiving, and Traffic Clerks	<100	5.7	634	2,240

Source: MN DEED, Twin Cities Occupational Projections, 2000-2010 and Q4, 2004 MN Job Vacancy Survey. Note that occupational information reflects data for all industries beyond transportation.

Job vacancies have been heavily impacted by the recession. However, with the onset of economic growth, transportation could experience tighter labor conditions once again.

Job growth in the transportation industry in the Twin Cities is projected to top 12 percent between 2000 and 2010 and result in the creation of over 15,600 jobs. Table 12 shows this job growth by individual occupation.

Table 13 summarizes wage information for occupations typically found in the transportation and warehousing sector. As would be expected, wage levels generally rise with the level of education or experience required for a position. Some occupations display very large differences between low-end and high-end wages. The largest variations are typically found in jobs requiring higher levels of education though some occupations such as light and delivery truck drivers and freight handlers can vary by about 100 percent or more.

Table 13: Transportation-Related Occupations: Twin Cities Wages (Q4, 2004) and Education and Experience Requirements

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Truck Drivers, Heavy and Tractor-Trailer	Mod. OJT	14.19	19.91	26.98
Truck Drivers, Light or Delivery Services	ST OJT	8.88	14.28	22.12
Aircraft Mechanics and Service Technicians	Voc.	NA	NA	NA
Customer Service Representatives	Mod. OJT	10.93	15.39	22.18
Laborers and Freight, Stock, and Material Movers, Hand	ST OJT	7.58	12.52	19.69
Office Clerks, General	ST OJT	9.05	13.50	18.97
Reservation and Transportation Ticket Agents and Travel Clerks	ST OJT	NA	NA	NA
Business Operations Specialists, All Other	Bach.	14.15	24.00	41.94
Dispatchers, Except Police, Fire, and Ambulance	Mod. OJT	12.12	19.46	29.18
Managers of Transportation and Material-Moving Machine and Vehicle	Rel. Exp.	12.13	21.69	33.80
Bus and Truck Mechanics and Diesel Engine Specialists	Voc.	14.53	19.90	26.12
Managers of Office and Administrative Support Workers	Rel. Exp.	14.94	21.84	32.63
Bookkeeping, Accounting, & Auditing	Mod. OJT	11.68	16.12	22.02
Locomotive Engineers	ST OJT	NA	NA	NA
All Other Secretaries, Administrative Assistants, & Other Office Support	ST OJT	8.62	13.34	19.53
Railroad Conductors & Yardmasters	Rel. Exp.	NA	NA	NA
Managers, All Other	Rel. Exp.	26.53	43.28	>70.00
Sales and Related Workers, All Other	Mod. OJT	10.72	21.09	40.54
Cargo and Freight Agents	Mod. OJT	12.44	17.10	29.75
Stock Clerks & Order Fillers	ST OJT	7.83	11.05	17.51

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Cleaners of Vehicles and Equipment	ST OJT	7.44	9.80	16.64
Shipping, Receiving, and Traffic Clerks	ST OJT	9.58	13.84	19.51

ST OJT= short term on the job training, MT OJT= Moderate Term on the Job Training, Rel. Exp= Experience in a Related Occupation, Voc.=Post-secondary vocational training, Bach.= Bachelor's Degree. Source: MN DEED, Occupation Employment Statistics. Note that occupational information reflects data for all industries beyond transportation.

Table 14 lists the skills required in transportation and warehousing-related occupations by training requirement category. Communication skills are common across categories. As would be expected, mechanical ability is common to all categories though the level of skill is likely to vary substantially. Descriptions of these skills can be found in Appendix IV.

Table 14: Skills Required by Training Requirement for Occupations in the Freight and Air Passenger Transportation Industry

Short Term on the Job Training	Moderate term on the Job Training and Jobs Requiring Related Work Experience	Vocational Training
Reading	Speaking	Equipment Maintenance
Active Listening	Operation & Control	Troubleshooting
Speaking	Reading	Repairing
Writing	Writing	Operation Monitoring
Coordination	Mathematics	Reading
Mathematics	Active Listening	Installation
Service Orientation	Operation Monitoring	Equipment Selection
Operation & Control	Equipment Maintenance	Judgment & Decision Making
Judgment & Decision Making	Active Learning	Quality Control Analysis
Time Management	Monitoring	Active Listening

*Source: O*NET www.onetcenter.org*

Twin Cities High Tech Manufacturing Industry Assessment

With over 50,000 jobs, the high tech manufacturing industries are major employers in the Twin Cities. For the purposes of this report, high tech manufacturing consists broadly of four major industries- machinery manufacturing, transportation manufacturing, computer and electronics manufacturing and electrical equipment manufacturing. In recent years the high tech manufacturing industry has lost about 15,000 jobs in the region. More recently, the pace of employment loss has slowed and some industries have begun to add jobs. Indeed, over the last 12 months, the manufacturing industry has posted a higher number of job openings. Between Q2, 2002 and Q2, 2004, the job vacancies in manufacturing grew 23 percent while vacancies in production-related occupations grew 56 percent. Industry and occupational vacancies have out-performed the regional trend for total vacancies which have declined 8.3 percent over two years. See Figure 5.

Figure 5: Industry-related Vacancies in the Twin Cities (4Q, 2002 vs. 4Q, 2004)

Source: MN DEED, MN Job Vacancy Survey, 4Q, 2004

Table 15 lists job vacancy and occupational projections data for specific high tech manufacturing-related occupations in the Twin Cities. The manufacturing industry as a whole had 2,788 vacancies in 4th Quarter, 2004 with a median wage of $12.00. The largest numbers of vacancies were in assembler and fabricator occupations where the median wage is $12.02.

Table 15: High Tech Manufacturing-Related Occupations: Twin Cities Projected Growth (2000-2010) and Vacancies (Q4, 2004)

Occupation	Q4, 2004 Metro Vacancies	Projected Employment Change 2000-2010		
		Percent Growth	Numeric Growth	Replacement Openings
Team Assemblers	NA	2.1	323	2,749
Electrical and Electronic Equipment Assemblers	NA	-27.2	-1,408	1,328
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	NA	-14	-640	894
Welders, Cutters, Solderers, and Brazers	<100	8.2	336	1,151
Mechanical Engineers	100-200	0.4	16	1,161
First-Line Supervisors/Managers of Production and Operating Workers	<100	-4.3	-452	2,766
Machinists	200-300	-5.1	-380	1,523
Computer Software Engineers, Systems Software	<100	77.8	2,891	249
Inspectors, Testers, Sorters, Samplers, and Weighers	<100	-12.3	-709	1,270
Industrial Engineers	100-200	-16.1	-694	720
Electrical and Electronic Engineering Technicians	<100	-8.5	-227	540
Electronics Engineers, Except Computer	<100	0.3	7	506
Computer Software Engineers, Applications	414	78.5	7,190	613
Mechanical Engineering Technicians	NA	NA	NA	NA
Electrical Engineers	<100	-6.3	-146	424
Purchasing Agents, Except Wholesale, Retail, and Farm Products	<100	4.2	176	834
Engineering Managers	<100	-4.5	-149	536
Shipping, Receiving, and Traffic Clerks	<100	5.7	634	2,240
Electromechanical Equipment Assemblers	NA	-16.7	-280	430
General and Operations Managers	NA	11.8	3,001	4,282
Coil Winders, Tapers, and Finishers	NA	NA	NA	NA
Customer Service Representatives	433	26.9	7,770	2,448
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	100-200	3.4	824	6,524
Mechanical Drafters	<100	5.3	76	433
Semiconductor Processors	NA	-26.1	-643	430
Tool and Die Makers	NA	-11.4	-231	507
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific	<100	1.6	94	1,633

Source: MN DEED, Twin Cities Occupational Projections, 2000-2010 and Q4, 2004 MN Job Vacancy Survey. Note that occupational information reflects data for all industries beyond manufacturing.

Job vacancies have been impacted by the recession. However, with extended economic

growth, manufacturing could face some shortages of workers. On the whole, manufacturing is not projected to produce large numbers of new jobs. However, manufacturing is expected to need large numbers of replacement workers as the Baby Boom Generation starts to retire. See Table 15.

Table 16 summarizes wage information for occupations typically found in the high tech manufacturing sector. As would be expected, wage levels generally rise with the level of education or experience required for a position. Some occupations display very large differences between low-end and high-end wages. The largest variations are typically found in jobs requiring higher levels of education though some occupations such as assemblers and machine operators can vary by about 100 percent or more.

Table 16: High Tech Manufacturing-Related Occupations: Twin Cities Wages (Q4, 2004) and Education and Experience Requirements

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Team Assemblers	Mod. OJT	9.63	13.84	19.59
Electrical & Electronic Equipment Assemblers	ST OJT	10.11	13.93	18.34
Cutting, Punching, & Press Machine Setters, Operators, and Tenders, Metal & Plastic	Mod. OJT	10.23	15.47	21.17
Welders, Cutters, Solderers, & Brazers	Voc.	13.57	18.95	25.83
Mechanical Engineers	Bach.	23.41	31.15	45.47
Managers of Production & Operating Workers	Rel. Exp.	15.71	23.22	34.94
Machinists	LT OJT	14.54	19.81	26.71
Computer Software Engineers, Systems Software	Bach.	25.10	38.12	54.59
Inspectors, Testers, Sorters, Samplers, and Weighers	Mod. OJT	11.53	16.61	25.89
Industrial Engineers	Bach.	23.79	34.25	47.37
Electrical & Electronic Engineering Technicians	Assoc.	15.50	23.63	36.10
Electronics Engineers, Except Computer	Bach.	24.54	36.33	56.28
Computer Software Engineers, Applications	Bach.	24.32	36.12	51.33
Mechanical Engineering Technicians	Assoc.	16.25	22.03	30.48
Electrical Engineers	Bach.	24.47	35.60	50.55
Purchasing Agents, Except Wholesale,	Bach.	17.15	24.71	35.24
Engineering Managers	W + Bach.	33.79	49.09	70.14
Shipping, Receiving, & Traffic Clerks	ST OJT	9.58	13.84	19.51
Electromechanical Equipment Assemblers	ST OJT	11.21	14.24	18.88
General & Operations Managers	W + Bach.	21.76	43.19	>70.00
Coil Winders, Tapers, & Finishers	ST OJT	8.49	14.02	17.69
Customer Service Representatives	Mod. OJT	10.93	15.39	22.18

Occupation	Educ/Exp. Requirement	4th Quarter, 2004 Hourly Wages		
		10th Percentile Wage	Median Wage (50th %)	90th Percentile Wage
Sales Representatives, Wholesale & Manufacturing, Except Technical & Scientific Products	Mod. OJT	15.30	27.12	57.70
Mechanical Drafters	Voc.	15.86	22.57	33.36
Semiconductor Processors	Assoc.	NA	NA	NA
Tool and Die Makers	LT OJT	18.16	24.66	35.75
Sales Representatives, Wholesale & Manufacturing, Technical & Scientific Products	Mod. OJT	17.70	30.12	68.09

ST OJT= short term on the job training, MT OJT= Moderate Term on the Job Training, LT OJT= Long Term on the Job Training, Rel. Exp= Experience in a Related Occupation, Assoc.= Associate's Degree, Voc.=Post-secondary vocational training, Bach.= Bachelor's Degree, W+Exp.=Work Experience plus a Bachelor's Degree. Source: MN DEED, Occupation Employment Statistics. Note that occupational information reflects data for all industries beyond manufacturing.

Table 17 lists the skills required in high tech manufacturing-related occupations by training requirement category. Communication skills are common across categories. Some abstract skills such as mathematics, science and critical thinking are commonly found in occupations that do not always require high levels of training. Descriptions of these skills can be found in Appendix IV.

Table 17: Skills Required by Training Requirement for Occupations in the High Tech Manufacturing Industry

Short-Term on the Job Training	Moderate Term and Long Term on the Job Training	Vocational Training & Associate's Degree	Bachelor's Degree
Quality Control Analysis	Reading	Equipment Selection	Critical Thinking
Equipment Selection	Mathematics	Mathematics	Mathematics
Installation	Operation & Control	Reading	Reading
Mathematics	Equipment Selection	Operation & Control	Active Listening
Reading	Operation & Monitoring	Critical Thinking	Judgment & Decision Making
Equipment Maintenance	Active Listening	Active Learning	Speaking
Operations Monitoring	Critical Thinking	Troubleshooting	Active Learning
Operation and Control	Speaking	Quality Control Analysis	Complex Problem Solving
Science	Complex Problem Solving	Operation Monitoring	Operations Analysis
Monitoring	Quality Control Analysis	Equipment Maintenance	Science

*Source: O*NET www.onetcenter.org*

Conclusions

The five industries and their predominant occupations and skills outlined in this report represent only a rough framework for workforce planning. As noted previously, labor market conditions can be somewhat volatile. Workforce planning is especially difficult given the fairly recent recession and slow labor market recovery. Recessions result in substantial restructuring of firms and entire industries. It may take several years before the impacts of the recession are understood. Some industries incurring employment losses may never recover from those losses while other industries may only be temporarily impacted. For this reason, it is important that labor market assessments be reviewed on a continuous (perhaps yearly) basis.

Healthcare represents an industry that faces increasing employment challenges as the aging resident population demands more services and the incumbent healthcare workforce faces retirement. While job openings have dropped off in recent years, the number of new vacancies is expected to increase in coming years. Workforce shortages are likely to recur in a variety of occupations including but not limited to nurses, nursing aides and orderlies, technicians and others.

Finance and insurance has witnessed rapid growth in recent years. Much of the growth has been in the banking sector where low interest rates and refinancing activity has driven growth. However, increasing interest rates, consolidation in the insurance industry, the implementation of new technologies, and the elimination of checking regulations may threaten recent growth. However, these industries are likely to maintain a large presence in the region for many years to come. Indeed, banking consolidation in the late 1990's did not result in the large layoffs that many had expected.

Professional and Technical Services suffered greatly with the crash of the "Dot-Com" industry in the late 1990's. More recently, the industry has witnessed resurgence as companies slowly increase their investments in IT. Also, implementation of the Sarbanes-Oxley Act, has resulted in increased demand for finance and IT professionals. In general, wages in the industry are high though education well beyond high school is often required.

Freight and air transportation was one of the hardest hit sectors during the recessionary and post-recessionary years. Undoubtedly, recovery of lost jobs will be a long process. However, maintenance of a high-quality transportation industry is considered to be crucial to long-term economic growth. Among the target industries, transportation has one of the highest number of jobs requiring lesser degrees of education. However, wages often reflect lessened education requirements.

High tech manufacturing includes a group in industries that witnessed particularly high employment losses in recent years. Beyond the downturn in product demand brought on by the recession, the industry faces long-term structural changes that will shape industry employment patterns. Globalization will undoubtedly result in employment losses-

particularly in occupations requiring lower skill levels. New technology may also make other occupations obsolete. While manufacturing is not expected to recover from employment losses in the near term, the industry may still face workforce shortages. With the aging of the workforce, the industry faces large numbers of retirements in occupations that may have smaller numbers of replacement workers. While some jobs may be lost to outsourcing, new technologies may require workers with new sets of skills. Moreover, the high-tech nature of this group of industries makes them the most likely to adopt and develop new technologies that will interface with the new sciences of biotechnology and nanotechnology. Beyond, the prospect of workforce growth and replacement, the manufacturing sector generally pays higher than average wages and represents a capital importer in the region.

Using the five targeted industries as a starting point, occupational information was derived from existing labor market information tools. A list of 98 occupations was derived from Occupational Employment Statistics. This list represents occupations requiring a wide array of education and experience requirements. As would be expected, wage levels often reflect these requirements. The list generated serves to identify career laddering possibilities and the wage potentials around career decisions. These occupations and their education and experience requirements are listed in Appendix III.

In order for workforce planning to close gaps between workforce supply and demand, skills information is critical. In a knowledge-based economy that seemingly changes over night, employers need workers with a strong foundation of primary skills (as identified by O*NET) but also specific skills around the tools and processes currently being utilized by business. Having an approximation of such demand is critical to the region's higher education institutions in trying to provide employers with the highest quality workforce. It is also useful to jobseekers and the counselors preparing them for employment or reemployment.

In the initial planning stages of this project, a collaboration was proposed with the State of Utah LMI Office to procure skills data from the SkillWindow Project. SkillWindow programming methodology would have been used to mine specific skills data from employer job orders in the Minnesota Job Bank. Beyond the somewhat broad skill categories provided by O*NET, SkillWindow would have provided specific point in time skills (*e.g*. specific computer programs, certifications, etc.) needed by Minnesota employers for the 98 identified occupations. However, staffing and funding issues around the Utah SkillWindow Project did not allow for this step in the analysis.

Appendix I

Overview of Twin Cities Industries and Conditions

Industry	LQ	Employment Change (2000-2003)	Avg. Weekly Wage	Size (2003)	Competition	Overall
Management of Companies and Enterprises	2.5	-6,078	1,590 (+)	53,782 (+)	+	+++
Computer and Electronic Product Mfg	2.3	-4,417	1,290 (+)	37,200 (+)	+	+++
Printing and Related Support Activities	2.1	-1,047	937(+)	19,635 (+)	+	+++
Miscellaneous Manufacturing	1.7	-136	1,079 (+)	14,994 (+)	+	+++
Machinery Manufacturing	1.7	-4,396	1,076 (+)	21,782 (+)	+	+++
Insurance Carriers & Related Activities	1.6	401	1,277 (+)	45,716 (+)	-	+++
Publishing Industries	1.6	-2,504	1,164 (+)	17,388 (+)	+	+++
Fabricated Metal Product Manufacturing	1.5	-4,354	932 (+)	24,734 (+)	+	+++
Nonstore Retailers	1.5	-1,543	811(-)	6,703 (-)	+	+
Electronic Markets and Agents/Brokers	1.4	378	1,312 (+)	12,792 (-)	-	++
Transit and Ground Passenger Transport	1.3	-212	411 (-)	6,079 (-)	-	-
Merchant Wholesalers, Durable Goods	1.3	-3,072	1,119 (+)	45,435 (+)	+	+++
Performing Arts and Spectator Sports	1.2	748	1,218 (+)	6,663 (-)	-	++
Museums, Parks and Historical Sites	1.2	-120	589 (-)	1,751 (-)	+	+
Personal and Laundry Services	1.2	-132	426 (-)	19,683 (+)	-	+
Professional and Technical Services	1.2	-6,675	1,218 (+)	93,764 (+)	+	+++
Miscellaneous Store Retailers	1.2	-1,050	387 (-)	13,162 (-)	+	+
Plastics & Rubber Products Manufacturing	1.2	-1,479	853 (+)	10,896 (-)	+	++
Membership Organizations & Associations	1.2	-957	478 (-)	19,367 (+)	-	+
Social Assistance	1.1	3,323	409 (-)	31,732 (+)	-	++
Sporting Goods/Hobby/Book/Music Stores	1.1	-422	327 (-)	9,355 (-)	+	+
Couriers and Messengers	1.1	-424	574 (-)	7,859 (-)	+	+
Paper Manufacturing	1.1	-597	904 (+)	6,746 (-)	+	++
Furniture and Home Furnishings Stores	1.0	410	571 (-)	7452 (-)	-	+
Total Employment	**1.0**	**-40,108**	**847 (-)**	**1,364,980**		
Electronics and Appliance Stores	1.0	-635	622 (-)	5,913 (-)	-	-
Nursing and Residential Care Facilities	0.9	2,582	454 (-)	36,779 (+)	-	++
Credit Intermediation & Related Activity	0.9	6,503	1,106 (+)	39,179 (+)	-	+++
Amusement, Gambling & Recreation	0.9	1,176	288 (-)	17,216 (+)	-	++
Specialty Trade Contractors	0.9	-1,487	933 (+)	49,554 (+)	-	++
Wood Product Manufacturing	0.9	438	1,047 (+)	6,879 (-)	-	++
Food Services and Drinking Places	0.9	3,528	258 (-)	101,376 (+)	-	++
Repair and Maintenance	0.9	-481	696 (-)	14,091 (+)	+	++
Building Material & Garden Supply Stores	0.9	146	545 (-)	13,799 (+)	-	++
Merchant Wholesalers, Nondurable Goods	0.9	1,108	1,061 (+)	24,148 (+)	-	+++

Administrative and Support Services	0.9	-4,750	515 (-)	83,280 (+)	+	++
General Merchandise Stores	0.9	1,817	374 (-)	33,928 (+)	-	++
Gasoline Stations	0.9	-714	346 (-)	9,639 (-)	+	+
Construction of Buildings	0.9	-660	1,076 (+)	17,008 (+)	-	++
Clothing and Clothing Accessories Stores	0.9	-714	309 (-)	14,062 (-)	+	+
Telecommunications	0.9	-2,202	1,047 (+)	10,160 (-)	+	++
Utilities	0.8	-605	1,338 (+)	5,511 (-)	+	++
Ambulatory Health Care Services	0.8	3,991	1,045 (+)	54,398 (+)	-	+++
Motor Vehicle and Parts Dealers	0.8	-66	765 (-)	18,825 (+)	-	+
Food and Beverage Stores	0.8	-1,823	408 (-)	27,093 (+)	+	++
Broadcasting (except Internet)	0.8	-335	1,156 (+)	2,931 (-)	+	++
Furniture and Related Product Mfg	0.8	-648	769 (-)	5,407 (-)	+	+
Educational Services	0.8	1,443	597 (-)	22,578 (+)	-	++
Hospitals	0.7	3,030	791 (-)	43,428 (+)	-	++
Waste Management and Remediation Service	0.7	9	858 (+)	3,086 (-)	-	++
Health and Personal Care Stores	0.7	182	512 (-)	8,948 (-)	-	+
Chemical Manufacturing	0.7	-262	1,209 (+)	7,717 (-)	+	++
Truck Transportation	0.7	-640	794 (-)	10,663 (-)	+	+
Food Manufacturing	0.6	176	796 (-)	12,499 (-)	-	+
Accommodation	0.6	-1,602	393 (-)	12,091 (-)	+	+
Heavy and Civil Engineering Construction	0.4	-140	1,153 (+)	4,902 (-)	+	++
Nonmetallic Mineral Product Mfg	0.4	-244	979 (+)	2,564 (-)	+	++
Textile Product Mills	0.4	-121	604 (-)	721 (-)	+	+
Transportation Equipment Manufacturing	0.2	128	1,079 (+)	4,399 (-)	+	+++

LQ= Location Quotient,. A LQ>1 indicate a higher percentage of regional employment than the national average. A LQ < 1 indicates a lower percentage of national employment than the national average.

Employment Change represents the change in private sector employment between 2000 and 2003.

Size represents the total private sector industry employment as of 2003. A "+" score indicates that the industry has greater than 1.0% of the total regional employment.

Competition measures the relative health of the industry compared to the U.S. between 2000 and 2003. A "+" score indicates that the industry grew faster than the U.S. average or lost jobs slower than the U.S. average.

Source: MN DEED Quarterly Census of Employment and Wages.

Appendix II: Audience Feedback

2004 Minnesota Development Conference

ESP sponsored a breakout session at the 2004 Minnesota Development Conference to provide information on the progress of the *Twin Cities Regional Economic Profile* and solicit feedback from participants on the process used by the project group and the five industry sectors we identified: healthcare, finance and insurance, professional and technical, transportation, and high tech manufacturing. We also requested suggestions on additional data we could use to make projections on future growth and employer needs within the metropolitan region for each of the five industry sectors.

Overall, breakout group participants felt the five industry sectors identified by the project are accurate. Following a lively discussion, many of the breakout group participants submitted written comments as well. Following is a summary of the oral comments and verbatim written comments of the breakout group:

Oral Comments (Summary)

- Present the information to the Metropolitan Workforce Board (Metro WIB) and each of the six metro Workforce Investment Boards (WIB). Ask each WIB to choose one of the identified industries, bring the data to industry leaders, and ask them to help us project t the metro-wide trends and future indications within that industry.
- Get feedback from participants in the DEED pilot projects in Minneapolis (finance and insurance) and Ramsey County (healthcare). Ensure the data from this project group is linked with data from the pilots.
- Solicit feedback from ESP partners and groups already in place: employer focus groups, MnSCU industry advisory committees, industry associations (such as Medical Alley), Chambers, city economic development groups, etc.
- When presenting the data to groups, make sure we identify how the information will be valuable to them.

Written Comments (Verbatim)

- Yes—I believe you listed the correct occupations. We need to make certain MnSCU/partners are giving training needed. Not obsolete training. Restructure classes/training and keep it current. Comment—the WIB is the place you need to present this for our county (Dakota County). Our marketing in WIB driven.
- Take more action. Keep talking about the project.
- I would suggest you want to ask business (industry) that would be part of the WIB…what they would want to get out of the process. If business is going to be part of the process they are going to want to know what's in it for them!
- Yes. When you establish the six WIB industry specific focus groups, remember to tie in at the least the two pilot WFC-business service teams. They have already been calling on businesses w/industry specialists assigned to each in healthcare, finance/banking and manufacturing in the metro area. Those pilots have already gathered a large amount of data. Also tie in the regional manager in the metro (Dave Niermann) and the economic development reps from the metro (Patti Neuman). Also the city economic development groups, i.e. Minneapolis CPED and all the partners: WIBS, Chambers, Pilots, Regional Administrators, MnSCU, Economic Development, State and County.

- Good direction to go. I'd suggest WIBs sharing vs. adopting a particular industry.
- Yes, I think you've hit it. They are the top industries. The data I found also gives career ladders in the fastest growing industries--as well as
    - hot jobs that require a 4-year degree
    - hot jobs that do not require a 4-year degree.

  NOTE: Joe Klein, Employment and Economic Development Representative, MN Department of Employment and Economic Development, submitted to this group several reports with data from U.S. Department of Labor. Thank you, Joe!
- The Skills Window∗ looks extremely useful to Employment Counseling. To pinpoint the specific skills workers need for the top 90 occupations is immensely valuable! We'll be able to tell workers where they should focus their learning, and much better guide their career planning. I'd like to get access to the Skills Window a.s.a.p.!
- I think your data is right on track – especially like the "Skills Window*." Work at commonalities between industries, i.e. customer service is a common occupation.
- Need all metro area WIBs to get together and develop common goal(s). Otherwise it will be "just like playing jazz" – everyone doing their "own thing" and if everything goes right, OK. Hit one "sour note" and it was you, not me! (i.e. "It ain't my fault"). c/o NW Minnesota Initiative
- An adjunct group that I think would be helpful is the ISO 9000 group, meeting monthly at Hennepin Tech in Plymouth. Contact is Rich Kelly, Customized Training.
- Use Needs Assessment information from MJSP grants, i.e. all healthcare grants in metro region would have a lot of information regarding their needs. Same thing for manufacturing—medical device, other high end manufacturing. Focus group of MJSP grant managers and/or staff at colleges who have same kinds of industry-specific representatives.
- Two industries have already been chosen by the pilot projects – healthcare and finance. Have different counties focus on a predominant industry in their county: Dakota—transportation; Ramsey/Hennepin—Medical Alley. Work with all partners, especially MnSCU.
- Yes. I feel data is sufficient to move into the action phase.
- Use employer focus groups, industry associations, the U of MN, MnSCU. Follow up with all groups. The five industries seem appropriate.

Twin Cities Regional Workforce Investment Boards

In late 2004 and early 2005, ESP representatives of the DOL-TAT Project Group attended and presented project information to five of the six metro area WorkForce Investment Boards (WIBs), the Metropolitan Workforce Council (Metro WIB), and other groups as follows:

- Ramsey County WIB – 10/7/04
- Minneapolis Private Industry Council – 11/9/04
- West Metro ESP – 11/9/04
- Hennepin County WIB – 11/9/04
- Twin Cities ESP Board of Directors – 11/10/04
- Anoka County WorkForce Council – 12/2/04
- Metro WIB – 12/8/04
- Washington County WIB, Executive Committee – 1/12/05

∗ Staffing and funding issues around the State of Utah's SkillWindow Project did not allow for this step in the analysis. See Project Methodology (P. 10) or Conclusions (p.35) for a description of the project.

Project Group members presented information on the progress of the *Twin Cities Economic Profile* and solicited feedback from WIB members on the process used by the project group and the five industry sectors identified: healthcare, finance and insurance, professional and technical, transportation, and high tech manufacturing. We also requested suggestions on identifying additional sources of information or data to make projections on future growth and employer needs within the metropolitan region for each of the five industry sectors.

Overall, WIB members confirmed that the five industry sectors identified by the project group accurately represent the top five priority industries in the Twin Cities. Following is a summary of the key questions, oral comments and verbatim written comments of the WIB feedback sessions:

Key Questions

1) **Do you agree with our assessment of the top five Twin Cities priority industries? (If not, what did we miss?)**
2) **Are there other data sources we should access or groups we should be contacting to obtain additional information (i.e. future trends, outlook, employer demand, etc.)?**

Oral Comments (Summary)

- Identify the period of time skills will most likely need to be up-to-date: (i.e. one, two, or three years).
- When available, this information should be given to the WorkForce Service Area vendors.
- Additional industries to consider: legal, manufacturing, IT.
- Suggest we use the term, "older American services" instead of "nursing homes." Note that the wages of this industry are higher than the hospitality industry.
- When using "wages" as an identifying criteria, try using a scale of comparisons, such as "wages/affordable housing."
- We may wish to broaden the number of industries identified to include the top 10 or top 20. If our scope is too narrow, we may miss opportunities for federal grants or other funding sources.

Written Comments (Verbatim)

- 1) Industries are good. 2)For employer feedback, share the SkillWindow∗ data and ask them to verify if what that shows is accurate. Then be able to tell them what you're doing with that information to prep our future workforce.
- 1) Industries: education. 2) Process: Ask key industries to identify which occupations they currently have the hardest time filling and what occupations in the next five years most likely to have difficulty finding.
- Accurate reflection of industries.
- 1) Building and the trades. 2) Retail.
- The system planning staff at MnSCU has created a large database that draws on a variety of sources (including DEED), the original purpose of which was helping the state colleges and universities to respond programmatically to workforce needs. The planning unit at MnSCU is headed by Dr. Leslie Mercer. (submitted by W. Lowe, Metropolitan State University).

∗ Staffing and funding issues around the State of Utah's SkillWindow Project did not allow for this step in the analysis. See Project Methodology (P. 10) or Conclusions (p.35) for a description of the project.

- 1) Yes; also include the nonprofit community (other than health care). 2) Minnesota Council of Nonprofits; Greater Twin Cities United Way.
- 1) Yes; I was surprised by the "Professional/Technical" category. 2) Grow Minnesota data from the Minnesota Chamber of Commerce.
- 1) Yes; the data helps the workforce predict future development needs. 2) Other web sites and WIBs.

Appendix III: Summary of Occupations and Training

Short-Term on the Job Training	Moderate-Term on the Job Training	Long-Term on the Job Training	Vocational Training	Associate's Degree	Bachelor's Degree
All Other Secretaries, Admin. Assistants & Office Support	Bookkeeping, Accounting & Auditing Clerks	Claims Adjustors, Examiners & Investigators	Aircraft Mechanics & Service Technicians	Computer Specialists, All Other	Accountants & Auditors
Billing & Posting Clerks & Machine Operators	Brokerage Clerks	Machinists	Bus & Truck Mechanics & Diesel Engine Specialists	Computer Support Specialists	Architects
Cleaners of Vehicles & Equipment	Cargo & Freight Agents	Managers, All Other	Legal Secretaries	Dental Hygienists	Business Operations Specialists, All Other
Coil Winders, Tapers & Finishers	Customer Service Representatives	Managers of Office & Administration Support Workers	Licensed Practical and Licensed Vocational Nurses	Electrical & Electronic Engineering Technicians	Civil Engineers
Electrical & Electronic Equipment Assemblers	Cutting, Punching & Press Machine Setters & Operators	Managers of Nonretail Sales Workers	Mechanical Drafters	Mechanical Engineering Technicians	Computer & IS Managers
Electromechanical Equipment Assemblers	Demonstrators & Product Promoters	Managers of Production Workers	Medical Secretaries	Medical & Clinical Laboratory Technicians	Computer Programmers
Food Preparation Workers	Dental Assistants	Managers of Transportation & Material Moving Machine Workers	Welders, Cutters, Solderers & Brazers	Medical Records & Health Information Technicians	Computer, Software Engineers, Applications
Food Servers, Nonrestaurant	Dispatchers, Except Police, Fire & Amb.	New Accounts Clerks		Paralegals and Legal Assistants	Computer, Software Engineers, Systems
Healthcare Support Workers, All Other	Executive Secretaries & Administrative Assts.	Railroad Conductors & Yardmasters		Radiologic Technologists & Techs.	Computer Systems Analysts
Home Health Aides	Inspectors, Weighers, Sorters, Samplers & Testers	Tool & die Makers		Registered Nurses	Electrical Engineers
Laborers & Freight, Stock & Material Movers, Hand	Insurance Claims & Policy Processing Clerks			Semiconductor Processors	Electronics Engineers, Except Computer
Loan Interviewers & Clerks	Medical Assistants				Engineering Managers
Short-Term on the	**Moderate-Term on**	**Long-Term on the Job**	**Vocational Training**	**Associate's Degree**	**Bachelor's Degree**

Job Training	the Job Training	Training			
Locomotive Engineers	Sales & Related Workers, All Other				Financial Analysts
Maids and Housekeeping Cleaners	Sales Reps., Wholesale & Mfg., Except Technical & Scientific Products				Financial Managers
Nurses Aides, Orderlies and Attendants	Sales Reps., Wholesale & Mfg., Technical & Scientific Products				Financial Specialists, All Other
Office Clerks, General	Secretaries, except Legal, Medical & Exec.				General & Operations Managers
Receptionists and Information Clerks	Social & Human Service Assistants				Graphic Designers
Reservation & Transportation Ticket Agents & Travel Clerks	Team Assemblers				Industrial Engineers
Shipping, Receiving & Traffic Clerks	Truck Drivers, Heavy & Tractor Trailer				Insurance Sales Agents
Stock Clerks & Order Fillers					Insurance Underwriters
Tellers					Lawyers
Truck Drivers, Light & Delivery					Loan Counselors
Veterinary Assistants & Laboratory					Loan Officers
					Management Analysts
					Mechanical Engineers
					Medical & Health Service Managers
					Purchasing Agents, Except Wholesale
					Securities, Commodities & Fin. Svcs. Sales Agents

Appendix IV: Description of Skills

Most common skills associated with targeted occupations in the Twin Cities- ranked in order of importance.

Rank	Skill	Description
1	Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
2	Reading Comprehension	Understanding written sentences and paragraphs in work related documents.
3	Speaking	Talking to others to convey information effectively.
4	Writing	Communicating effectively in writing as appropriate for the needs of the audience.
5	Critical Thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
6	Time Management	Managing one's own time and the time of others.
7	Mathematics	Using mathematics to solve problems.
8	Coordination	Adjusting actions in relation to others' actions.
9	Active Learning	Understanding the implications of new information for both current and future problem-solving and decision-making.
10	Monitoring	Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
11	Judgment and Decision Making	Considering the relative costs and benefits of potential actions to choose the most appropriate one.
12	Social Perceptiveness	Being aware of others' reactions and understanding why they react as they do.
13	Service Orientation	Actively looking for ways to help people.
14	Learning Strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.
15	Complex Problem Solving	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
16	Instructing	Teaching others how to do something.
17	Equipment Selection	Determining the kind of tools and equipment needed to do a job.
18	Persuasion	Persuading others to change their minds or behavior.
19	Quality Control Analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
20	Negotiation	Bringing others together and trying to reconcile differences.
21	Systems Evaluation	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.
22	Troubleshooting	Determining causes of operating errors and deciding what to do about it.
23	Operation and Control	Controlling operations of equipment or systems.
24	Operations Analysis	Analyzing needs and product requirements to create a design.
25	Management of Material Resources	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.
26	Systems Analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect

		outcomes.
27	Management of Financial Resources	Determining how money will be spent to get the work done, and accounting for these expenditures.
28	Management of Personnel Resources	Motivating, developing, and directing people as they work, identifying the best people for the job.
29	Operation Monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly.
30	Technology Design	Generating or adapting equipment and technology to serve user needs.
31	Equipment Maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
32	Installation	Installing equipment, machines, wiring, or programs to meet specifications.
33	Science	Using scientific rules and methods to solve problems.
34	Repairing	Repairing machines or systems using the needed tools.
35	Programming	Writing computer programs for various purposes.

Appendix V:
Accessing and Using Labor Market Information for Workforce Planning

Labor market conditions are constantly changing. For this reason, it is necessary to constantly reassess the industries and occupations that have been targeted. Labor market information provided by the Minnesota Department of Employment and Economic Development (DEED) provides an important tool for assessing local and regional employment conditions. Most labor market information resources can easily be found on the department's LMI webpage though some aspects of the analysis previously described may have to be carried out in collaboration with department staff. Below is a brief primer on accessing the LMI data from the web.

Industry Data

DEED has the most comprehensive database available describing industry employment in the State of Minnesota and its various regions and locales. The Quarterly Census of Employment and Wages (QCEW) represents administrative data supplied by Minnesota employers. Representing 98 percent of the employment in the state, the data summarizes employment and payroll numbers by industry and geography. Updated quarterly, QCEW can be used to gauge employment conditions over time. QCEW data can be accessed at this website: www.deed.state.mn.us/lmi/tools/qcew

Step 1: Select a Geography: QCEW data is available at a variety of geographies ranging from Minnesota as a whole down to individual cities and townships. The menu lists options such as Minnesota, the 87 counties of the state, 10 of the largest cities, the 13 economic development regions and 6 Workforce Service Areas of the state. The user can select any of these geographies and click the "choose area" button. Alternatively, the user can click on "Minor Civil Division Data" to get employment information for very small geographies (cities and townships). It should be noted that one often loses employment information at smaller geographies. Due to data privacy standards, DEED is prohibited from distributing information on individual firms. Therefore, data is suppressed when there are two or fewer firms in a given industry type or if one firm has greater than 80 percent of the employment in a given industry or region. The likelihood of data being suppressed increases as one looks at smaller and smaller geographies. At smaller geographies, it is unlikely that QCEW is giving the user a true picture of total an area's employment distribution.

Step 2: Select an industry classification, time period and ownership type: There are two systems for classifying industries: the Standard Industrial Classification (SIC) and the North American Industrial Classification System (NAICS). Information for both systems is available on the LMI website. NAICS data is available between 2000 and the present while SIC data is available for 2000 and prior years. While one can compare total employment between the two systems, it is important to note that one cannot compare industry-data between the two systems. Therefore, present industry trend data can only be calculated back to the year 2000.

The user can look at information for either individual years or quarters. In order to look at information for two or more time periods, the user can click on one choice, hold down the "ctrl" key and select up to 10 time periods. Once selected, click on the "Choose Year" or "Choose Quarter" button.

On the right-hand side of the screen, a series of check boxes give the user the option to look at employment data for various ownership categories. In most cases, it is desirable to look at the "Total, all ownerships" though users may want to look at private sector or government employment data as well. As noted for small geographies, choice of ownership category may limit information availability.

Step 3: Choose an Industry: Whether looking at SIC or NAICS classifications, the QCEW tool allows the user to drill down into finer and finer levels of industry detail. Under NAICS, the starting screen gives the user the choice of several "2 digit" industry classifications. In some circumstances, 2-digit industry information may be sufficient. Here, one can find employment and payroll information for broad industry sectors such as manufacturing or leisure and hospitality. Simply click on the desired industries (hold down the ctrl key for more than one choice) and click on "view selected data."

Within each of these 2-digit classifications are numerous smaller industry categories. For the purpose of example, if one was interested in computer and electronics manufacturing employment, one would choose "31-Manufacturing" from the menu and click "choose 3-digit industries." Users may also want to look at all of the data that is available. In this case, the user can click on "view at all data." This will give the user all the disclosable industry data for the years/quarters and geographies selected. Doing this often results in a large amount of data that can be somewhat confusing. Alternatively, one can hold down the ctrl key and select all of the 2-digit industries of interest. By clicking on the "view 3-digit industries" button, the user can display industry choices at the "3-digit" industry level. Now, manufacturing is split into its various components such as food manufacturing, computer and electronics manufacturing, fabricated metals manufacturing, etc.. The user can click on one or more (hold down the ctrl key) industry categories and click "view data." Alternatively, users can click on "select all" and then "view data" to investigate employment data for all of the 3-digit industries. One can also click on "view detailed industries" to look at even finer levels of industry detail. As noted previously, finer levels of industry data may not provide useful data if information is suppressed.

Step 4: Interpreting the Data: Once the user has finished choosing the geography, time periods and industries, they must interpret the data presented. The screen should show one or more industry categories on the left hand side followed by several columns of data. Establishments represent the number of firms in each category. Average Number of Employees represents the number of jobs at the firms that fall under an industry category. Total Wages represents the total wages and salary paid to employees at those firms. Finally, Average Weekly Wage represents the average amount of money paid to

employees given the number of employees and the total payroll. It should be noted that average weekly wages do not represent the wage that any prospective employee is likely to find on entering a firm. It is an average wage including everyone from the highest paid employees to the lowest paid employees. It only gives the data user a relative idea of what industries are likely to pay higher of lower wages. Persons seeking wage data might find Occupational Employment Statistics (OES) to be more useful- see next section.

QCEW data can sometimes be difficult to use when looked at online. On the top of the screen is a button labeled "download data." Clicking on this button will allow the user to take the data that has been queried and place it in an Excel spreadsheet where it can be more easily manipulated.

Wage and Salary Data:

Whether a user of LMI is an employer, government planner, or employment counselor, wage and salary data is often of great interest. To employers, wages often represent the largest cost of doing business. For a job seeker, wages can determine the decision to pursue certain types of employment. DEED has wage information for over 800 occupations found in the state and its regions. This data is updated on a continuous basis (every quarter). Data found online is typically one quarter prior to the present quarter and is therefore very timely. Data is not available at the county or city level. Wages are available only for the state as a whole, its major metropolitan statistical areas, its workforce service areas and economic development regions. Wage and salary data can be found at www.deed.state.mn.us/lmi/tools/oes

Step 1: Choose a data tool: Occupational wage data can be found on through one of two tools. The Salary Tool allows the user to search for information on one specific occupation. The OES data tool allows one to find wage information on a number of occupations.

Step 2a: Using the Salary Tool: After clicking on the box marked "Salary Tool," the user is prompted to enter an occupation and a zip code. The simplest option is to simply enter the name of the occupation of interest and a zip code. It should be noted that salary information is not specific to any zip code. Entering the zip code only serves to locate the user in one of the five major workforce service areas of Minnesota. Once an occupation and region is identified, the user will click the "search" button to be given a list of occupations that might fit the occupation of interest. Clicking on any one of these occupations will send the user to a page outlining specific information on the occupation. The user should look at the job description provided to decide whether the occupation listed best suits the occupation of interest. The wage information on this first page is somewhat limited and gives only the median wage rate but provides no information on wage ranges or suitable choices for an entry level or experienced wage. Looking at the right hand side of the screen, the user should notice a link to "detailed wage and employment estimates." Clicking on this link, the user will find five wage percentiles

ranging from the 10th to 90th percentiles. There is no firm methodology to discern which percentile might represent X number of years of experience. However, it is generally assumed that wages rise with increased levels of education and experience. Therefore, a person just starting out in an occupation might expect to find wages near the 10th or 25th wage percentile. Persons with many years of experience in an occupation might expect to make wages in the 75th or 90th wage percentiles.

Step 2b: Using the OES data tool: After clicking on the box labeled "OES Data Tool," the user will be prompted to choose a geographic area. There is no local (county or city) wage information produced for occupations. Choices include state, metropolitan statistical area, workforce service area and economic development region. The user can select up to five geographic areas (holding down the ctrl key) then click "select." The user is now prompted to choose a broad occupational category of interest that is precluded by a 2-digit SOC code. This exercise presumes that the user is familiar with the Standard Occupational Coding (SOC) system. In order to find an occupation and its specific code, users might find www.bls.gov/soc/ to be a useful resource.

After choosing one or more occupational codes, the user can drill down into more specific occupational categories by clicking the "view detailed occupations" button. Depending upon the occupational category chosen, the user will now see of list of many specific occupations. For instance, if the user originally chooses "41-office and administration occupations" they will now have the option of looking at about 60 specific occupations including office clerk, bookkeeper, legal secretary, etc..

One is now able to choose one or more occupations of interest (hold down ctrl key) and click the "view selected data" button. The user will now see a list of occupations with their SOC codes as well as some summary information on median wages and employment at the regional, state and national level. While this information is sometimes useful, most users would rather have a range of wage information that gives a relative idea of entry-level or experienced wages. Clicking on the blue SOC code to the left of the occupational title will give the user access to five wage percentiles ranging from the 10th to 90th percentiles. There is no firm methodology to discern which percentile might represent X number of years of experience. However, it is generally assumed that wages rise with increased levels of education and experience. Therefore, a person just starting out in an occupation might expect to find wages near the 10th or 25th wage percentile. Persons with many years of experience in an occupation might expect to make wages in the 75th or 90th wage percentiles.

Skills Data:

Skills data is one piece of labor market information that is not produced by the Minnesota Department of Employment and Economic Development. In the near term, LMI users rely on the O*NET consortium to produce skills and other information on specific occupations. O*NET skills information can be accessed at the website www.onetcenter.org and clicking on "O*NET Online."

One now has the option of looking at skills data in one of two ways. By clicking on "Find Occupations," the user can enter an occupation. Once entered, O*NET provides a list of occupations that might provide a best fit. Clicking on an occupation, one can now look at a vast array of occupational data including the skills, abilities, knowledge, education, etc. necessary in a given occupation. Note that these data reflect national trends and do not specifically reflect the skills needed in Minnesota or its regional industries.

Alternatively, users can click on "Skill Search" to determine how a given skill set might align with occupations. The user is given a list of 35 skill sets and is asked to assess whether they have the skill or are developing the skill. Checking the appropriate boxes and then clicking the "Go" button, will result in a list of occupations that are likely to use the types of skills input by the user. The user can click on any one of these occupations to investigate the various attributes (knowledge, education, abilities, etc.) necessary to do the job.