

Oregon Industry Clusters

A Statistical Analysis

Prepared for
Oregon Economic and Community
Development Department

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1.0 Overview and Methodology

The purpose of this memo is to identify the principal industry clusters that represent Oregon's best opportunities for net job creation in the next 24 to 60 months. This study examines employment data for Oregon and for the nation to identify groups of industries in which Oregon appears to have a demonstrated competitive advantage based either on its concentration of employment, its relatively high level of wages, or its faster relative growth.

Our objective is to identify what economists call industry clusters—groups of similar or interrelated firms that share common markets and technologies and which draw on similar worker skills. Clusters of similar and related firms draw competitive advantage from the tendency of skilled labor to accumulate in places with a concentration of employers, from the opportunities for specialized supplier firms when critical mass is achieved, and from the spillovers of knowledge among firms. Clustering stimulates competition among firms and creates opportunities for strong buyer-supplier relationships.

Our primary focus is on traded sectors of the economy, those businesses that sell their goods and services in competition with firms in other locations. Some businesses may start out as exclusively local economic activity (i.e. selling all of their output to local consumers, but then producing for sale outside their community, state or nation. Many microbreweries for example started as brewpubs (or homebrewers) serving only a local demand, but then grew to serve much larger markets. While we focus on traded sectors, our analysis considers all sectors of the economy initially. We use location quotients and our case-by-case analysis of industries to determine whether they represent current or potential traded sector industries.

The following sections of this report spell out our approach to this question, our key findings about promising industry clusters, and recommendations. Our data appendix provides detailed information from our analysis.

This report is based on Impresa, Inc.'s analysis of statistical data provided by the Oregon Employment Department and the Bureau of Labor Statistics. We have also drawn extensively on Impresa, Inc.'s experience in analyzing several of these industry clusters in other research efforts. As our recommendations make clear, we strongly believe that statistical analysis is just the first step in developing an understanding of Oregon's industry clusters and building strategies for state efforts to realize their potential contribution to our economic development.

2.0 Cluster Indicators

Our analysis develops three sets of indicators of the relative strength of certain industries in the Oregon economy. We examine industry concentration, relative average pay levels, and growth rate differentials to identify industries that seem to be stronger in Oregon than elsewhere.

2.1 Employment Concentrations

Why this is important: The key characteristic of an industry cluster is specialization—that a higher than usual concentration of some productive activity is found in a particular location. A first step in the identification of industry clusters is to identify places with unusual concentrations of certain kinds of activity.

Data Sources: Detailed information on industry employment are available from the Oregon Employment Department and is comparable to a comprehensive national series, the Covered Employment and Wages (CEW) produced by the Bureau of Labor Statistics, also known as ES-202 data.

Analytical Approach/Descriptive Statistics: We use location quotients to determine the relative concentration of certain industries in Oregon compared to national averages. Our analytical approach is to examine data at the lowest possible levels of aggregation (2-digit, 3-digit and 4-digit SIC classification).

A location quotient is the ratio of the share of a particular industry's employment of total employment in Oregon compared to the share of that same industry's employment nationally compared to national employment. If an industry makes up 2% of Oregon employment and 2 percent of US employment, it has a location quotient of one. Industries that are more concentrated in Oregon than in the nation as a whole have higher location quotients, industries that are less concentrated here have lower location quotients.

Based on our past experience, we use a threshold value of 1.25 for a location quotient. This value suggests that we will focus our attention on industries that have a concentration in Oregon that is at least 25 percent greater than the concentration of employment found in the United States as a whole.

Our analysis shows that 161 reportable 4-digit industries had location quotients in excess of 1.25 for 2000 for Oregon.

2.2 Wage Levels

Why this is important: Firms generally pay higher wages to higher skilled workers, as a reflection of their higher productivity, greater level of human capital, or to compensate them for the maintenance of firm –specific skills. In knowledge-based industries, we would expect average payroll per employee to be higher than industry-wide averages, reflecting these knowledge-differentials. Alternatively, average wage levels may reflect firms with a different occupational mix—i.e. more high wage occupations as a fraction of their labor force. Differences in human capital productivity in cities have been shown to explain the observed wage premium for workers in urban areas (Rauch, 1993).

Data Sources: Detailed wage data are available from state labor market information agencies. The most comprehensive and comparable series nationally is the Covered Employment and Wages (CEW) series, also known as ES-202 data. Nationwide data is available on-line through the Bureau of Labor Statistics Website (www.bls.gov/CEW), but there are considerable data suppressions in counties with small populations.

Our analysis is complicated by the recent shift from the Standard Industrial Classification Code to the new North American Industrial Classification System. These classification schemes are used to assign firms to particular industries, and are fundamental to our analysis. Through calendar year 2000, employment data was reported by the state and federal governments using the SIC code system. From 2001 onward, state and federal governments use the NAICS system. The differences between the two systems are modest in some industries (particularly in low tech industries) but are profound in others, as new categories have been created to reflect the emergence of new industries and the realignment of old ones.

We use data from both of these two classification systems to triangulate our analysis of industry clusters. We rely on the familiar, though now somewhat data SIC code data because it allows us to construct a time series picture of industry growth from 1995 through 2000. We also supplement our analysis with the latest available NAICS data showing employment concentrations in Oregon compared to the nation for 2001. In the text, we note the different implications of the two data series.

Analytical Approach/Descriptive Statistics: Our objective here is to find industries with wage levels significantly above the national average. We have computed industry average annual pay levels for the nation and for Oregon for 2000. We have identified those

industries whose average annual pay exceeds the national average by at least 10 percent.

Findings: Tables A through C show our computation of Oregon location quotients for two-digit, three-digit and four-digit industries for 2000.

Our analysis shows that 73 reportable 4-digit industries had average wages at least 10 percent higher than the national average for their industry in 2000.

Table D shows our analysis of location quotients for 2001 based on NAICS data at the five digit industry classification level. We have used this NAICS data as a supplement to our SIC-code based analysis.

2.3 Differential Growth Rates

Why this is important: Industries that are growing faster in Oregon than in the nation as a whole are likely to be doing so because Oregon offers a more favorable environment for their particular industry. If Oregon firms consistently outperform their peers nationally over a long period of time, this may indicate the existence of a competitive advantage in Oregon for those firms.

Data Sources: As with our analysis of location quotients and wage levels we rely on information on industry employment from the Oregon Employment Department and the Bureau of Labor Statistics.

Analytical Approach/Descriptive Statistics: We examine the five year growth rates in Oregon and United States employment at the four digit industry level for the years 1995 through 2000. The five-year time frame is long enough to minimize the distorting effect of very short term changes in annual growth rates either at the state or national level. The five-year period corresponds to a time of relatively strong national growth and expansion, and has the added virtue of corresponding to a period in which there were no significant changes to industry classification schemes. A longer time period would pick up part of the effect of the recovery from the 1990-91 national recession, or the early phases of the national recession that began in 2001. In addition, beginning in 2001, state and national data series began changing over from the old Standard Industrial Classification (SIC) code to the new North American Industrial Classification System (NAICS), complicating time series analysis.

Findings: Table D shows our computation of state and national employment growth for four-digit industries for the period 1995 to

2000. We computed the five-year total percentage growth in each industry for the US and for the nation.

Our analysis shows that 136 reportable 4-digit industries had a growth rate at least 20 percentage points higher than the growth rate for the comparable industry nationally over the period 1995-2000.

2.4 Data Limitations and Caveats

We use location quotients to determine the relative concentration of certain industries in Oregon compared to national averages. Our analytical approach is to examine data at the lowest possible levels of aggregation (2-digit, 3-digit and 4-digit SIC classification). This report does not report, use or rely on confidential firm level data. References to specific firms are drawn from the author's knowledge of publicly available data and not and confidential source.

Non-Economic Code Changes: ES-202 data are classified according to the industry of covered firms (originally using the SIC system, and more recently NAICS). We have relied primarily on data tabulated by SIC code in this analysis. While most firms tend to retain the same industry classification from year to year, occasionally changes in ownership, or mergers and acquisitions, or a simple correction of an earlier error in classification, will cause a firm to be re-classified from one SIC code to another. These changes may produce apparent growth (or contraction) in particular SIC codes, but not be indicative of any fundamental economic change. We are not able to correct for the effects of these code changes.

Differences in State and National Coverage: ES-202 data are a by-product of the state-federal unemployment insurance system. Data are derived from payroll tax records maintained by states in administering the unemployment insurance system. Each state has some latitude in defining which firms and industries are "covered" under their unemployment insurance system. This produces anomalies in making comparisons among states, particularly in instances in which Oregon's coverage is broader than in other states. Oregon's system covers a larger fraction of agricultural workers than many states, and also covers certain kinds of workers, i.e. employees of religious organizations, who may be exempt in other states. Where Oregon's coverage is more complete than other state's this may exaggerate Oregon's location quotient for a particular industry. In addition, time series comparisons may be influenced by changes in the coverage of state unemployment insurance laws (i.e. changes in coverage enacted between 1995 and 2000).

Statewide Data: We have used the entire state of Oregon as our unit of analysis for this project. Some industries may be narrowly focused

in a particular region, i.e. there may be a cluster of a particular industry in one part of the state, and nowhere else in the state. Using some of our measures, particularly the location quotient, may make it difficult to identify the presence of some clusters that are highly localized. Our other measures, however—wage growth and growth differential—are less susceptible to this problem. Nonetheless, it may be possible to identify some other growth opportunities that are specific to particular communities or regions of the state using a more localized approach to the data.

Structural Changes in Economic Activity: The national and state economies are currently experiencing the effects of the recession that began in 2001. Many industries are in the midst of a cyclical downturn in economic activity. For the most part, it is likely that these cyclically depressed industries will be good candidates for Oregon job growth in an economic recovery. But some industries may be in the throes of deeper and more permanent or “structural change.” Due to changes in markets, technology, or changes in cost structures or competition, some Oregon industries may not rebound during a recovery. We are not able to fully predict which industries will experience such structural changes, or how they will limit growth opportunities. Such an analysis is an appropriate follow-up to this work, as explained in our recommendations.

Obscure and Emerging Clusters: Our statistical analysis is tightly constrained by the framework of the industrial classification system. The classification system is designed to characterize the variations among industries on a standard national (and now with the NAICS, international) basis. While useful in describing the contours of established industries for the nation, the classification system may not be fine grained or flexible enough to pick up unusual or emerging industry clusters. Some concepts that are used to describe an industry cluster either cut across a number of different industries or represent an industry segment so small nationally that it doesn’t merit a separate classification, or be so new that it hasn’t yet been designated. Neither the NAICS nor the SIC code has a category for sustainable industries or environmental services, Specializations like display devices or cybersecurity, which include firms almost exclusively in the high tech industry, are not specifically identified.

Non-Employer Firms: Our data only examine firms with covered employment. To the extent that an industry consists primarily of self-employed individuals (non-employers in data parlance) these data will not show the relative concentration of some specializations. This may be particularly important in industries characterized by many small firms and in emerging industry clusters.

3.0 Industry Cluster Growth Opportunities

Cluster identification is an important first step in working to build on Oregon's economic strengths. In order to maximize the benefit of the information provided in this analysis, Impresa recommends that the Oregon Economic and Community Development Department undertake a series of steps.

Our analysis identifies eleven broad cluster categories in which Oregon firms have demonstrated growth potential, based on our analysis of industry concentration, comparative pay levels, and comparative growth rates. Our focus is on businesses in the 'traded sector' of the economy—those that sell their goods and services in competition with firms in other states and nations. The following table lists cluster categories and the associated Oregon employment in four-digit industry groupings which meet at least one of the following three tests:

- Significantly higher than average concentration in Oregon than in the typical state economy
- Significantly higher average annual wage (an indicator of high value/high productivity work) than the US as a whole.
- Significantly faster growth in employment in Oregon over the last economic cycle (1995 through 2000) than in the nation as a whole.

Of 850 4-digit industry classifications with reportable private sector employment in Oregon in 2000, 264 met at least one of these three tests. Of these, 10 4-digit categories met all three tests, 76 met two of the three tests, and 178 met one of the three tests.

Summary of Analysis of 4-Digit SIC Industrial Categories by Wage Level, Location Quotient and National Growth Differential

Criteria Met	Sub-Total	Total
Met None of Three Selection Criteria		486
Met at Least One Criteria		264
Location Quotient	161	
Wage Level	73	
Growth Differential	136	
Total Industries		

Source: See text for description. Sub-Totals do not sum because individual industries could meet more than one criterion.

The following table shows the four digit industry categories that met all three tests. It is interesting to briefly review these industries as

they represent groups of firms that are highly concentrated in Oregon, growing faster than their counterparts nationally, and paying higher than national average wages in Oregon.

4 Digit SIC Codes with High Wages, Location Quotients and Growth Differentials

SIC	Industry	Firms	Employment
3674	Semiconductors and Related Devices	37	25,783
4911	Electric Services	137	6,041
5139	Footwear Wholesaling	61	5,065
7841	Video Tape Rental	297	3,553
6062	Credit Unions, State Chartered	61	1,740
5136	Men's and Boys' Clothing Wholesaling	65	1,198
3861	Photographic Equipment and Supplies	14	1,098
3365	Aluminum Foundries	12	602
3423	Hand and Edge Tools,	19	596
5993	Tobacco Stores and Stands	41	333

Source: See text for description.

The single largest industry is semiconductors, with more than 25,000 employees, the largest single segment of Oregon's high tech cluster. Second, is the electric services industry. Oregon produces (and uses) more electricity than the typical state in the US, and has been a net exporter of electricity (chiefly to California). Footwear wholesaling (and clothing wholesaling) includes sporting goods and apparel firms like Nike, Addidas and Pendleton.

Industry Clusters by Cluster Category, SIC Code Analysis

Cluster Category	2000 Employment
High Technology/Software	75,984
Wood & Paper Products	65,918
Food Processing and Agriculture	50,608
Apparel & Sporting Goods	18,121
Transportation Equipment	17,796
Creative Services	17,025
Recreation-Related	15,725
Metals/Machinery	10,107
Nursery Products	10,070
Professional Services	4,347
Biomedical	3,276

Oregon has a higher than average concentration of video rental firms, and notably is home to Hollywood Entertainment, a leading national chain. Oregon also has a higher than average concentration of state-chartered credit unions, but this reflects a different organization of local financial services rather than net export activity to other states, as state chartered credit unions are effectively restricted to serving Oregon residents. Photographic equipment and supplies includes firms that are suppliers to the high tech industry

(makers of photolithography equipment and supplies. Two metals industry segments, aluminum smelters and hand and edge tool manufacturing, are also significant export industries. One final four-digit industry sector, tobacco stores, is also significant.

Within each of these broad cluster categories, we will use more specific data to identify particular Oregon strengths (and related growth opportunities).

We also examined NAICS based data for 2000. Our analysis showed that 109 of 661 five-digit industry classifications had location quotients significantly above the US average. We describe our detailed findings from this data in the following section.

Summary of Analysis of 5-Digit NAICS Industrial Categories by Location Quotient

Criteria Met	Total
Did not meet Selection Criteria	109
Location Quotient	552
Total Industries	661

Source: See text for description.

3.1 High Technology and Software

One of Oregon's largest industry cluster groupings is high technology and software which employs more than 65,000 workers in four-digit industry classifications that met at least one of our standards. The cluster has two distinct but related components, high technology manufacturing and software.

The high technology cluster group consists of firms and manufacture and wholesale electronic products, computers and instruments. The cluster is dominated by the semiconductor industry segment, which meets all three of our standards, and which employs more than 25,000 workers at wages (in 2000) of more than \$100,000 per year.

The state is particularly specialized in semiconductors, test and measurement equipment and computer peripherals. These industry categories correspond to the studied technological specializations of the region, including semiconductor manufacturing, the production of semiconductor manufacturing equipment and the manufacture of printers and display products.

Wages are substantially above the national average in three industry segments, semiconductors, test and measurement equipment and electronics wholesaling. Many specialized supplier firms that provide or maintain equipment for semiconductor producers and other high tech firms are classified as wholesalers for statistical purposes, usually because they are the local service and support

branch of a worldwide manufacturing corporation that does its manufacturing elsewhere.

Most of the segments of the high technology industry included in our analysis have been growing substantially faster than their counterparts nationally.

High Technology Cluster Group Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
3674	Semiconductors and Related Devices	37	25,783	105,187	7.2	1.11	30%
5084	Industrial Machinery and Equipment	668	4,410	51,878			11%
3679	Electronic Components, NEC	41	4,291	41,105	2.2		166%
3825	Instruments for Measuring and Testing of Electricity and Electrical Signals	20	3,822	94,089	4.5	1.13	
5065	Electronic Parts and Equipment, Not Elsewhere Classified	426	3,404	90,975		1.28	40%
3577	Computer Peripheral Equipment, NEC	22	3,259	48,651	3.9		70%
3699	Electrical Machinery, Equipment, and Supplies, NEC	16	496	28,677	1.5		200%
3663	Radio and Television Broadcasting and Communication Equipment	12	475	55,015			37%
3677	Electronic Coils, Transformers, and Other Inductors	5	448	31,640	2.0		
3826	Laboratory Analytical Instruments	15	419	41,604			46%
3823	Industrial Instruments for Measurement, Display, and Control of Process Variables; and Related Products	19	418	56,565			25%
3648	Lighting Equipment, NEC	6	134	38,288		1.10	

Source: Impresa analysis, Employment Department data.

The second component of the high tech/software industry grouping is the Software Cluster Group. This consists of firms that produce prepackaged software, computer related services and those which provide data processing services. This industry segment consists of more than a thousand firms collectively employing about 17,000 statewide. The leading industry segment is prepackaged software, which qualifies based on two of our standards, industry concentration and relative growth. Four other industry segments qualify on their relative growth alone. Oregon wages are not

significantly above US averages in any industry segment. This industry definition includes only employment in firms classified as producers of software or providers of data processing services. It does not include employment in information technology occupations in other industries, for example a network administrator in an energy or wood products company, or a programmer for a bank or government agency.

Software Cluster Group

Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
7372	Prepackaged Software	372	8,018	66,190	2.2		68%
7379	Computer Related Services, NEC	745	4,829	57,671			18%
7374	Computer Processing and Data Preparation and Processing Services	93	2,689	53,608			12%
7375	Information Retrieval Services	200	1,618	51,478			899%
7376	Computer Facilities Management Services	13	471	55,807			19%

Source: Impresa analysis, Employment Department data.

NAICS basis data for 2001 confirm the significance of semiconductor manufacturing in Oregon and the role of software publishing.

High Technology/Software Cluster Group

Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage	LQ
33441	Semiconductor and Other Electronic Component Manufacturing	116	34,829	72,632	4.40
51121	Software Publishers	421	9,129	67,552	2.73
33411	Computer and Peripheral Equipment Manufacturing	41	5,261	65,381	1.49
33429	Other Communications Equipment Manufacturing	13	788	41,291	1.93
33599	All Other Electrical Equipment and Component Manufacturing	16	600	32,642	1.29

Source: Impresa analysis, Employment Department data.

Assessment: Oregon has a nationally significant concentration of high technology manufacturing firms, accounting for 10 percent of US semiconductor production. The industry also has a well-developed assortment of related and supporting firms, and has shown a demonstrated ability to grow faster than the US as a whole in a range of industry segments. This industry likely represents strong growth prospects if and when the US electronics industry emerges from its current slump, one of the most severe in its history.

3.2 Forest Products / Wood / Paper

The traditional backbone of the Oregon economy, the forest products, wood and paper industries show up quite clearly in our industry analysis. The state has extremely strong specializations in sawmill and planing mills, softwood veneer and plywood and millwork, and in related industries including forestry services and forest products wholesaling. In addition, the industry also includes a wide range of smaller industry segments that are relatively more specialized in Oregon than in other states.

In our analysis, 26 different four-digit industry classifications met one or more of our standards. Overwhelmingly, industry segments qualified based on their concentration in Oregon: 23 of the 26 industry segments had location quotients over the threshold value. Only 7 industry segments had wage levels significantly above national averages for their segment, suggesting that the industry doesn't have a significantly higher level of labor productivity across the board than other areas. Oregon firms have been significantly outgrowing their national counterparts in only three industry segments—hardwood plywood and veneer, wood furniture, and pallets and skids. The relatively small number of high growth sectors probably reflects the decline in the availability of local softwood logs as a major constraint on industry growth.

This industry is dominated by the production of lumber and plywood, by logging and millwork production and by the wholesaling of all these products. Significantly, although most industry segments do not show a significant wage premium for Oregon workers, several do, including saw milling, logging, wholesaling, and structural wood members. This latter category includes a variety of engineering wood products, like glulam beams and some kinds of laminated veneer lumber. The wage premium in these segments suggests Oregon firms may have a higher level of productivity in some activities related to wood products.

Interestingly, there are a number of related and supporting industries that seem to be a significant part of this cluster. These include forestry services, woodworking machinery and paper industries machinery. Oregon firms have a very high location quotient for forestry services, which includes technical work in forestry, tree planting and firefighting. Oregon is also a significant producers of woodworking machinery, and to a lesser extent papermaking machinery. These specializations in related industries may indicate the presence of industry-specific knowledge that can serve as the basis of further industry development.

Forest Products/Wood/Paper Cluster Group
Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
2421	Sawmills and Planing Mills, General	211	13,694	38,252	7.8	1.22	
2436	Softwood Veneer and Plywood	65	8,092	39,553	24.2		
2411	Logging	973	7,869	33,827	8.3	1.22	
2431	Millwork	101	6,053	29,144	3.9		
5031	Lumber, Plywood, Millwork, and Wood Panels	414	3,934	57,921	2.1	1.42	
851	Forestry Services	263	3,495	24,422	17.6		
2621	Paper Mills	13	2,789	58,121	1.6		
2493	Reconstituted Wood Products	23	2,635	40,308	9.9		
2451	Mobile Homes	13	2,493	29,827	3.1		
2435	Hardwood Veneer and Plywood	12	1,902	35,470	5.0		15%
2439	Structural Wood Members, NEC	38	1,891	33,804	3.2	1.15	
2434	Wood Kitchen Cabinets	87	1,808	27,621	1.4		
3553	Woodworking Machinery	45	1,733	39,579	12.6		
2631	Paperboard Mills	8	1,643	66,125	2.9	1.18	
811	Timber Tracts	109	1,424	23,086	11.0		
2541	Wood Office and Store Fixtures, Partitions, Shelving, and Lockers	44	1,033	33,098	1.6		
2512	Wood Household Furniture, Upholstered	18	687	22,753			16%
2426	Hardwood Dimension and Flooring Mills	9	601	25,671	1.3		
2491	Wood Preserving	16	441	35,488	2.8	1.12	
2452	Prefabricated Wood Buildings and Components	22	406	27,672	1.3		
2448	Wood Pallets and Skids	27	391	21,374			22%
2674	Uncoated Paper and Multiwall Bags	7	360	32,683	1.9		
3554	Paper Industries Machinery	12	342	47,952	1.6		
831	Forest Nurseries and Gathering of Forest Products	11	101	20,042	3.4		
2449	Wood Containers, NEC	7	58	30,327		1.14	
2429	Special Product Sawmills, NEC	8	43	18,389	1.8		

Source: Impresa analysis, Employment Department data.

NAICS basis data confirm the strong specializations Oregon has in lumber and wood products. Oregon is the dominant US producer of softwood plywood and veneer, engineered wood products and cut stock and re-sawn lumber.

Forest Products/Wood/Paper Cluster Group
 Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
32121	Veneer, Plywood, and Engineered Wood Product Manufacturing	126	12,351	35,292	8.60
32111	Sawmills and Wood Preservation	146	8,915	39,127	5.81
32191	Millwork	160	8,544	29,835	4.51
11331	Logging	950	7,528	35,140	8.60
11531	Support Activities for Forestry	269	3,934	22,847	19.58
33711	Wood Kitchen Cabinet and Countertop Manufacturing	294	3,064	26,977	1.66
32199	All Other Wood Product Manufacturing	105	2,997	28,403	2.20
42131	Lumber, Plywood, Millwork, and Wood Panel Wholesalers	213	2,915	55,182	1.92
32212	Paper Mills	8	2,638	59,787	1.67
33321	Sawmill and Woodworking Machinery Manufacturing	43	1,435	39,329	12.39
42211	Printing and Writing Paper Wholesalers	16	513	51,338	2.34
11311	Timber Tract Operations	43	344	46,046	7.12
11321	Forest Nurseries and Gathering of Forest Products	11	120	19,244	4.01

Source: Impresa analysis, Employment Department data.

Assessment: The forest products cluster shows the hallmarks of a mature but still significant industry. Wages in most segments are close to national averages. Growth rates seldom outpace the national market. Still, there are several segments of the industry which suggest opportunities for innovation led growth (engineered wood products) or the provision of knowledge-based services (forestry services).

3.3 Food Processing and Agriculture

Another long-time pillar of the Oregon economy includes a diverse array of firms in the food processing and agriculture cluster group. The largest segments of these industries the production, processing and marketing of the state's fruits and vegetables. The cluster group also includes a wide range of firms engaged in supplies, services, machinery and marketing.

As is characteristic of specialized resource based industries, most of the firms included in our analysis qualify based on their concentration in Oregon. Some 28 of the 35 industry segments qualified based on industry concentration. Oregon is the leading or principal producer of a number of crops including hazelnuts, several kinds of berries, cherries and pears. Similarly, Oregon has a higher concentration of fishing related industries due to its coast location. All of these specializations are reflected in high location quotients

Interpretation of this data is complicated by two factors. One is the scope of Oregon's unemployment insurance law. The data in our analysis are drawn from records of the Oregon Employment Department based on information provided by employers covered under Oregon's unemployment insurance system. In other state's many agricultural workers are not subject to unemployment insurance coverage and consequently there is no data gathered for those workers in such states, which has the effect of overstating the relative concentration of such workers in Oregon.

Retail and wholesale distribution play an important role in some crops and commodities. These include the wholesaling and distribution of food products (SIC 4149) and the operation of specialty food stores, which rank among the five leading industry segments in food processing.

A beverage industry cluster also seems to be apparent. Oregon has a higher than average rate of growth in grape production employment, a significant location quotient for beer and ale wholesaling, and wine production. While we think of these industries as being closely related to the resource base, the state also has a significant location quotient for coffee roasting as well.

Food Processing Cluster Group Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Rel. Growth
2037	Frozen Fruits, Fruit Juices, and Vegetables	31	7,120	23,270	12.7		
5149	Groceries and Related Products, NEC	405	4,572	34,938	1.3		
175	Deciduous Tree Fruits	228	4,132	13,552	5.4		29%
5191	Farm Supplies	356	3,676	30,565	1.8		23%
5499	Miscellaneous Food Stores	292	2,801	13,106	2.6		
5148	Fresh Fruits and Vegetables	93	2,583	24,534	2.0		
161	Vegetables and Melons	166	2,455	15,214	2.4		13%
191	General Farms, Primarily Crop	223	2,438	17,028	3.4		32%
2051	Bread and Other Bakery Products, Except Cookies and Crackers	55	2,248	32,483			12%
5181	Beer and Ale	74	1,983	34,292	1.6		11%
139	Field Crops, Except Cash Grains, NEC	148	1,721	20,387	7.3		0%
2033	Canned Fruits, Vegetables, Preserves, Jams, and Jellies	32	1,715	25,804	2.0		
723	Crop Preparation Services For Market, except Cotton Ginning	75	1,393	22,244	1.6		
2026	Fluid Milk	13	1,175	39,700	1.6		

2092	Prepared Fresh or Frozen Fish and Seafoods	26	1,118	19,073	2.2		
241	Dairy Farms	85	907	22,692		1.11	
134	Irish Potatoes	34	863	21,862	5.6		31%
2035	Pickled Fruits and Vegetables, Vegetables Sauces and Seasonings, and Salad Dressings	14	789	28,106	3.1		
2084	Wines, Brandy, and Brandy Spirits	60	775	19,588	2.3		27%
212	Beef Cattle, Except Feedlots	137	686	20,025	2.2		16%
4222	Refrigerated Warehousing and Storage	20	610	36,849	1.5	1.15	
2034	Dried and Dehydrated Fruits, Vegetables, and Soup Mixes	9	576	29,478	3.2		
5921	Liquor Stores	151	571	14,606			20%
172	Grapes	47	518	16,330			39%
5142	Packaged Frozen Foods	29	490	35,806			112%
5153	Grain and Field Beans	37	401	49,376		1.34	
2095	Roasted Coffee	16	393	39,455	3.3		36%
111	Wheat	56	361	19,234	7.4		30%
722	Crop Harvesting, Primarily by Machine	33	357	23,351	2.2	1.34	
252	Chicken Eggs	8	313	26,759	1.6	1.19	
2045	Prepared Flour Mixes and Doughs	5	287	29,490	1.6		
912	Finfish	108	238	40,237	4.3		
721	Crop Planting, Cultivating and Protecting	46	215	25,641		1.12	
913	Shellfish	43	94	33,850	2.3		
214	Sheep and Goats	7	34	22,922	2.1	1.27	

Source: Impresa analysis, Employment Department data.

NAICS basis data confirm most of the industrial and crop specializations illustrated in the SIC data. Tree fruit and nuts and frozen food manufacturing show up as the two largest sectors in food processing. The state also has relatively high concentrations of specialty food stores and food related wholesaling operations.

**Food Processing Cluster Group
Leading Industry Segments (NAICS Basis, 2001)**

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
11133	Noncitrus Fruit and Tree Nut Farming	404	7,267	13,635	3.93
31141	Frozen Food Manufacturing	38	6,724	24,048	5.51
11199	All Other Crop Farming	347	3,769	18,446	4.58
42249	Other Grocery and Related Products Wholesalers	185	3,401	35,423	1.34
44529	Other Specialty Food Stores	283	3,084	14,796	1.66
11121	Vegetable and Melon Farming	192	2,977	17,695	2.45
42291	Farm Supplies Wholesalers	231	2,735	30,379	1.99
31142	Fruit and Vegetable Canning, Pickling, and Drying	47	2,712	27,175	2.23
42248	Fresh Fruit and Vegetable Wholesalers	50	1,857	27,248	2.08
42281	Beer and Ale Wholesalers	39	1,537	33,788	1.55
62421	Community Food Services	82	1,235	18,015	3.22
31171	Seafood Product Preparation and Packaging	30	1,093	19,653	1.91
31182	Cookie, Cracker, and Pasta Manufacturing	22	1,024	38,987	1.32
11211	Beef Cattle Ranching and Farming, including Feedlots	158	929	20,478	1.70
31213	Wineries	65	837	20,895	2.68
11141	Food Crops Grown Under Cover	19	623	23,610	2.59
31192	Coffee and Tea Manufacturing	9	441	43,345	2.93
11114	Wheat Farming	55	369	19,155	7.44
11411	Fishing	157	316	32,152	3.38
11231	Chicken Egg Production	7	299	29,107	1.59
11194	Hay Farming	33	279	21,072	4.20
72233	Mobile Food Services	26	89	14,669	1.60
11293	Fur-Bearing Animal and Rabbit Production	10	84	18,527	7.79
11241	Sheep Farming	7	31	40,503	2.43

Source: Impresa analysis, Employment Department data.

Assessment: Food processing represents one of the most diverse industry cluster groups considered in this analysis. It includes a mix of commodity producers as well as very specialized, niche producers. Further work is needed to segment this industry according to markets in order to assess growth potential. The sheer number of different specializations however suggests that there are likely to be growth opportunities in several segments.

3.4 Apparel / Sporting Goods

Apparel and Sporting Goods includes firms that manufacture, distribute and retail clothing, apparel and sporting goods. This industry grouping, broadly defined includes six industry segments that meet our selection criteria. Two industry segments, in fact, met

all three of our selection criteria—a concentration of employment in Oregon, above average wages and higher than national growth. These are footwear and men’s and boys clothing wholesaling.

It is significant that wholesale activities rather than manufacturing dominate this industry. The manufacture of most of the footwear and apparel consumed in the US now occurs overseas, and the remaining US firms in this industry specialize in the design, marketing and distribution of apparel and footwear, rather than its manufacture. Oregon’s leading firms include Nike, Addidas America and Columbia Sportswear, all of which have their principal operations in the state.

This segment also includes three retail categories related to footwear and apparel, family clothing, shoe stores and men’s and boy’s clothing stores. Each of these retail activities is either more concentrated in Oregon than in the nation (family clothing) growing faster than in the nation (men’s and boys clothing and shoe stores). This may reflect greater local demand for specialized footwear and clothing in Oregon (contributing to industry growth) or be an anomaly of the Oregon retail environment. It may also be a reflection, in part, of factory outlet distribution of wholesale companies. Interconnections between wholesale and retail activity need to be further investigated in this cluster.

Apparel/Sporting Goods Cluster Group Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
5651	Family Clothing Stores	216	7,885	17,647	1.4		
5139	Footwear Wholesaling	61	5,065	80,705	15.5	1.34	41%
5661	Shoe Stores	231	1,844	24,237		1.38	27%
3949	Sporting and Athletic Goods, NEC	81	1,260	27,795	1.4		
5136	Men's and Boys' Clothing and Furnishings	65	1,198	50,550	1.8	1.23	49%
5611	Men's and Boys' Clothing and Accessory Stores	73	869	15,602			46%

Source: Impresa analysis, Employment Department data.

NAICS basis data present a somewhat different picture of the apparel sporting goods cluster than do the SIC basis data. There are two-thirds fewer firms listed in footwear wholesaling in the NAICS data than the SIC data and total employment in footwear wholesaling is almost 25 percent lower. We suspect that this is due in part to a change in the NAICS classification system’s treatment of corporate headquarters and management operations. Location quotients for

this segment are still impressively high; and are comparable to SIC data for the other industry segments.

Apparel/Sporting Goods Cluster Group Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
44814	Family Clothing Stores	223	7,534	16,805	1.42
42234	Footwear Wholesalers	19	3,881	90,869	12.55
33992	Sporting and Athletic Goods Manufacturing	82	1,192	29,448	1.47
42232	Men's and Boys' Clothing and Furnishings Wholesalers	28	803	41,042	1.77

Source: Impresa analysis, Employment Department data.

Assessment: This is an extremely strong cluster, centered on expertise in marketing, design and distribution. It is characterized by high wages. It may also have some important connections to the local economy through retailing as well.

3.5 Transportation Equipment

The transportation equipment cluster group includes firms manufacturing and retailing a wide range of trucks, aircraft parts, boats, recreational vehicles and even bicycles. This cluster group includes eleven four-digit industries, about 300 firms and employs slightly fewer than 18,000 workers. All but one of the eleven industries meets our standard for industry concentration, seven exceed comparable nationwide growth levels and four pay above average wages compared to their national counterparts.

The largest segment of this industry is motor vehicle bodies, a category that includes employment at Freightliner, the large Portland-based manufacturer of over the road trucks. The year 2000 data reflect a peak level of employment in this industry which has experienced a substantial retrenchment subsequently.

The second largest segment is a group of about two dozen manufacturers of aircraft parts, the largest of which is Boeing's Portland operation. Oregon has significant strength in a series of industries related recreational motoring: the state has above average concentrations of manufacturing of motor homes and travel trailers, and a very significant concentration of recreational vehicle dealers. Together there are nearly 120 firms and 5000 workers involved in recreational vehicle manufacture and sales in Oregon, although wage levels in this industry are considerable less than in other segments of the cluster group.

**Transportation Equipment Cluster Group
Leading Industry Segments (SIC Basis, 2000)**

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
3711	Motor Vehicles and Passenger Car Bodies	13	6,165	48,761	1.4		37%
3728	Aircraft Parts and Auxiliary Equipment, NEC	25	2,225	55,571	1.4	1.12	
3716	Motor Homes	7	2,211	25,006	8.1		96%
3792	Travel Trailers and Campers	15	1,626	27,160	5.2		15%
3731	Ship Building and Repairing	20	1,292	46,850		1.16	39%
5561	Recreational Vehicle Dealers	95	1,176	36,566	2.9	1.13	
3799	Transportation Equipment, NEC	19	756	29,096	1.9		105%
3537	Industrial Trucks, Tractors, Trailers, and Stackers	8	738	62,515	1.9	1.60	
5571	Motorcycle Dealers	77	700	27,820	1.3		
3715	Truck Trailers	11	515	31,284			50%
3751	Motorcycles, Bicycles, and Parts	20	392	26,706	1.7		91%

Source: Impresa analysis, Employment Department data.

NAICS data for 2001 suggest a considerably smaller group of firms are concentrated in Oregon than do the SIC data for the prior year. The specialization in RV retailing is still apparent. Total employment for motor vehicle body and trailer manufacturing is down more than 50 percent from the roughly comparable sectors listed in the 2000 SIC data (3711 and 3716). While there was a downturn in this industry, it may be that some employment was shifted to other industry categories (i.e. corporate headquarters). Further analysis of this data is needed.

**Transportation Equipment Cluster Group
Leading Industry Segments (NAICS Basis, 2001)**

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
33621	Motor Vehicle Body and Trailer Manufacturing	62	3,377	29,799	1.72
44121	Recreational Vehicle Dealers	88	1,061	37,059	2.70

Source: Impresa analysis, Employment Department data.

Assessment: This is an interesting mix of specialized industries, some catering to industrial markets (Freightliner trucks, Boeing aircraft, Gunderson railcars) and others driven by consumer markets, especially related to recreational vehicles. While there may be some overlap in technical issues and challenges in production in these two sets of industries, they face dramatically different markets. Both of these segments also face cyclical customer demand due to the capital goods cycle and shifts in consumer sentiment over the course of the business cycle.

3.6 Creative Services

The creative services cluster includes a range of industries related to information, advertising, publishing and art. Most of the segments included in this industry are classified as part of the service sector of the economy, but the cluster includes some manufacturing and wholesaling as well.

The cluster grouping is composed of 13 four-digit industry classifications that meet at least one of our three qualifications. Most—11 of 13—segments of this industry qualify based on relatively rapid segment growth. Fewer than half qualify based on existing concentration on just three based on relative wage. This suggests that this is a fast growing or “emerging” industry cluster.

The largest single segment in the industry cluster is video tape rental. Much of video tape rental is characterized by extremely local activity, but Oregon is also home to Hollywood Video, a major national chain, which probably affects the industry’s Oregon ranking. Significantly, this industry segment met all three of our standards: it is more concentrated in Oregon, pays higher wages than the industry nationally, and has been growing faster in Oregon than the nation as a whole. This remains, however, a relatively low wage industry.

Creative Services Cluster Group Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
7841	Video Tape Rental	297	3,553	17,801	1.7	1.53	23%
7311	Advertising Agencies	261	2,019	54,118			17%
7812	Motion Picture and Video Tape Production	178	1,747	31,122			80%
2759	Commercial Printing, NEC	113	1,711	33,664			21%
5192	Books, Periodicals, and Newspapers	135	1,619	27,767	1.6		48%
2741	Miscellaneous Publishing	154	1,597	44,043	1.4		214%
7319	Advertising, NEC	87	1,369	10,592	2.1		226%
7336	Commercial Art and Graphic Design	234	932	37,764			15%
8743	Public Relations Services	101	866	50,023	1.3		76%
5736	Musical Instrument Stores	75	557	23,647			13%
2796	Platemaking and Related Services	19	417	47,343			65%
2789	Bookbinding and Related Work	25	375	33,096		1.24	
3269	Pottery Products, NEC	15	263	39,077	1.8	1.68	

Source: Impresa analysis, Employment Department data.

Other segments of creative services, including advertising, public relations, commercial art, film and video production and some printing and publishing activities have all grown faster in Oregon in

the recent past than in the nation as a whole. The region also appears to have a significant concentration of firms involved in distributing published material and a collection of producers of pottery.

NAICS data show a small group of firms related to creative services with high location quotients.

Creative Services Cluster Group
 Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
53223	Video Tape and Disc Rental	307	2,744	11,898	1.41
54189	Other Services Related to Advertising	110	1,024	12,530	1.38
45392	Art Dealers	144	457	17,021	1.38
54187	Advertising Material Distribution Services	16	336	11,811	1.50

Source: Impresa analysis, Employment Department data.

Assessment: Though relatively small, creative services does appear to be an “emerging” or growth-oriented cluster of the Oregon economy. This is a cluster that seems likely to change in the years ahead as technology continues to change the entertainment industry and as rising incomes drive the demand for such services.

3.7 Recreation

The recreation cluster group consists of eight four-digit industries that provide recreation and entertainment and related services. Five of these industries meet our standard for industry concentration, four meet the standard for relative growth and two pay above national average wages for their industry.

The largest categories in this industry are amusement and recreation services “not elsewhere classified” and physical fitness centers. These two industries account for an overwhelming majority of this cluster group’s total firms and employment. Amusement and recreation services is a catch-all category that can include everything from hunting and fishing guides, to whitewater outfitters, to personal trainers.

This cluster group includes one category, professional sports clubs and promoters, with a very high level of average pay. This includes professional sports franchises such as the Portland Trailblazers. Outside of professional sports clubs, jobs in this industry cluster tend to have low pay levels (only two industries of the eight have average wages over \$18,000 annually). In many cases average pay levels reflect the seasonal nature of employment in these industries.

Recreation Cluster Group
Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
7999	Amusement and Recreation Services, NEC	513	8,065	17,625	1.5		39%
7991	Physical Fitness Facilities	176	3,927	11,533	1.5		37%
7933	Bowling Centers	71	1,096	12,742		1.11	
7033	Recreational Vehicle Parks and Campsites	136	760	12,998	2.6		
7941	Professional Sports Clubs and Promoters	43	582	180,489		1.62	
7032	Sporting and Recreational Camps	59	564	12,323	1.8		22%
4725	Tour Operators	44	523	27,759			47%
7041	Organization Hotels and Lodging Houses, on Membership Basis	60	208	7,738	1.4		

Source: Impresa analysis, Employment Department data.

NAICS basis data confirm the importance of recreational vehicle parks and camping areas, and also reveal the importance of employment in skiing facilities.

Recreation Cluster Group
Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
72121	RV (Recreational Vehicle) Parks and Recreational Camps	199	1,323	13,026	2.12
71131	Promoters of Performing Arts, Sports, and Similar Events with Facilities	16	1,007	16,042	1.76
71392	Skiing Facilities	10	976	13,921	2.37

Source: Impresa analysis, Employment Department data.

Assessment: Local demand plays an important role in the relative concentration of employment in the recreation cluster. The relatively large size of these industries reflects a tendency of Oregonians to be much more physically active and engage in a wide variety of recreational activities. A portion of this industry also reflects demands from out-of-state residents. This cluster's largest concentration of employment is reflected in a catch-all category—better information about the kinds of firms that make up this industry would be helpful in organizing this cluster. Relatively low pay levels make this a somewhat less attractive candidate for development efforts.

3.8 Metals

The metals cluster group consists of eleven four-digit industries manufacturing primary and fabricated metals. The industries in this group met our standards in a variety of ways. Eight industries grew faster than their counterparts nationally, seven industries were more concentrated in Oregon than the nation, and four industries had significantly higher wages than the nation as a whole. These industries are generally divided into two groups: primary metals and fabricated metals.

Three primary metals industries—steel mills, miscellaneous steel foundries and aluminum foundries met our standard. These industries produce large quantities of sheet coil and ingots for use in the production of metal products. They tend to be few in number and relative large in scale—the data reflect 25 firms total in these three industry categories. Leading Oregon firms include Oregon Steel Mills, Cascade Steel Rolling Mills and Northwest Aluminum. Since 2000, the year reflected in these data there has been a considerable downturn in the primary metals industry.

Metals Cluster Group Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
3499	Fabricated Metal Products, NEC	161	2,630	32,773	2.7		57%
3312	Steel Works, Blast Furnaces (Including Coke Ovens), and Rolling Mills	6	1,511	50,964			28%
3471	Electroplating, Plating, Polishing, Anodizing, and Coloring	59	1,447	29,953	1.3		29%
3325	Steel Foundries, NEC	7	1,380	42,676	4.3	1.14	
3479	Coating, Engraving, and Allied Services, NEC	41	619	29,228			13%
3365	Aluminum Foundries	12	602	39,558	1.9	1.18	50%
3423	Hand and Edge Tools, Except Machine Tools and Handsaws	19	596	42,951	1.3	1.19	894%
3498	Fabricated Pipe and Pipe Fittings	13	566	32,283	1.4		21%
3446	Architectural and Ornamental Metal Work	54	449	34,999			102%
3366	Copper Foundries	9	223	25,307	1.8		
3494	Valves and Pipe Fittings, NEC	3	84	41,532		1.12	

Source: Impresa analysis, Employment Department data.

In the fabricated industry segment, there are a much more numerous and diverse array of smaller firms making a range of products for

specialized markets. The largest single industry in the cluster group is “Fabricated Metal Products, Not Elsewhere Classified”—meaning that the firms generally produce products so obscure that they don’t fall into any recognized industry classification. Other leading industry segments include electroplating and coating and engraving, industries that serve as subcontractors or suppliers to other firms that make metal products or use metal in their manufacturing process.

The metals industry cluster has two industries that meet all three of our standards. The aluminum foundry industry was more concentrated in Oregon, paid higher wages than the same industry nationally and grew faster than its national counterparts between 1995 and 2000. The same was true for companies making hand and edge tools.

NAICS basis data show the relative importance of the steel (ferrous) and aluminum (nonferrous) metals industries, both with significant location quotients. The data also show the strength of the cutlery and hand tool industry, exemplified by firms such as Gerber, Kershaw, Leatherman and others.

Metals Cluster Group

Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
33151	Ferrous Metal Foundries	19	3,483	51,431	2.52
33329	Other Industrial Machinery Manufacturing	76	2,818	59,666	1.86
33221	Cutlery and Handtool Manufacturing	31	2,217	39,031	2.51
33152	Nonferrous Metal Foundries	37	1,955	41,332	1.83
42181	Construction and Mining (except Oil Well) Machinery and Equipment Wholesalers	115	1,738	43,258	1.66

Source: Impresa analysis, Employment Department data.

Assessment: The two segments of this industry cluster face fundamentally different sets of competitive challenges. Primary metal producers primarily sell their products into commodity markets. They are more sensitive to changes in energy costs than other producers, particularly in the aluminum industry. The fabricated metal products industry consists chiefly of smaller firms serving a number of different markets, including work as suppliers to other manufacturing industries, and specific market niches. Working with this cluster group will probably require two different sets of strategies that address these differences.

3.9 Nursery Products

The nursery products industry consists of two industry segments: producers of nursery products and distributors of flowers and nursery stock. Together, these two four-digit industry classifications employ about 10,000 people. Both qualify on the basis of a substantial location quotient, indicating a higher than average concentration of these firms in Oregon. In addition, the nursery products industry in Oregon has grown faster than its counterparts nationally. Nursery products are the single largest crop category in Oregon, accounting for about one-fifth of farm sales. They have also been the fastest growing segment of Oregon agriculture over the past decade. We separate nursery products from other components of agriculture because they are not related to food processing and sell their products through different market channels.

This industry is composed of relatively small firms, and generally pays wages lower than the other cluster groups identified in this analysis. Like other parts of agriculture, the high location quotient for nursery production in part reflects differences in the coverage of unemployment insurance laws among states.

Nursery Products Cluster Group Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
181	Ornamental Floriculture and Nursery Products	291	8,911	21,536	4.8		15%
5193	Flowers, Nursery Stock, and Florists' Supplies	102	1,159	23,516	1.5		

Source: Impresa analysis, Employment Department data.

NAICS location quotient data are similar to SIC data, except that they show a considerably larger level of firms and employment in nursery and floriculture production (one-third more firms and 1,400 more jobs than the 2000 SIC data).

Nursery Products Cluster Group Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage	LQ
11142	Nursery and Floriculture Production	379	10,368	21,525	5.41
44422	Nursery and Garden Centers	188	2,017	22,451	1.32

Source: Impresa analysis, Employment Department data. Assessment: This is a small but established cluster. Our previous studies of this cluster show that it benefits from a tightly knit spirit of collaboration embodied in the Oregon Nurserymen's Association, and that nursery

product firms benefit from the diversity and attendant economies of scope provided by the large assortment of producers. Demand for products in this industry is shaped by the market for new residential construction that is a major consumer of nursery products.

3.10 Professional Services

Professional services include businesses providing a range of research, advice and specialized technical assistance, chiefly to other businesses and to governments. Four industries employing about 4,000 people met one of our standards. These segments included commercial social, economic and educational research, testing laboratories, commercial physical and biological research and facilities management services. All four of these industries grew faster than their counterparts nationally; none is significantly more concentrated in Oregon than nationally, nor do any have higher than national average pay levels.

The relatively rapid rate of growth suggests that these professional services may be “emerging” industries in Oregon. Each of these industries is composed primarily of small firms, average firm size is less than 20 employees economic, social and educational research and less than ten employees in testing laboratories and physical and biological research. Wage levels vary substantial among the industries in this cluster group, from less than \$23,000 annually in economic and social research to more than \$50,000 annual for physical and biological research.

Professional Services Cluster Group
Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
8732	Commercial Economic, Sociological, and Educational Research	107	1,932	22,807			28%
8734	Testing Laboratories	135	1,182	35,015			30%
8731	Commercial Physical and Biological Research	98	708	53,899			14%
8744	Facilities Support Management Services	22	525	22,573			347%

Source: Impresa analysis, Employment Department data.

NAICS data suggest that there are three professional service industries more concentrated in Oregon than elsewhere, including specialized legal services, “other” professional scientific and technical services and drafting services, together employing about 2,000 workers. Since two of these three categories are “catchall”

classifications, it is difficult to know what kinds of specializations these industries represent.

Professional Services Cluster Group
Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
54119	Other Legal Services	94	976	34,507	1.30
54199	All Other Professional, Scientific, and Technical Services	155	763	67,827	1.81
54134	Drafting Services	58	182	31,143	1.31

Source: Impresa analysis, Employment Department data.

Assessment: It is striking that no professional service industry in Oregon met our standards for location quotient or above industry average pay levels. This suggests that Oregon is relatively weak in this cluster group. The fast growth in the four industries described above is encouraging, but none of these industries have yet reached the threshold for greater than US average concentration in Oregon. More detailed information about the identities of fast growing firms in this cluster group would be helpful in assessing its future prospects.

3.11 Biomedical

Oregon has a small but growing group of firms in activities related to medical devices and equipment and pharmaceutical products. Six four-digit industries met at least one of our standards; five based on growth and two based on location quotient. In all, Oregon firms in these industries employ slightly more than 3,000 workers.

Biomedical Cluster Group
Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
3843	Dental Equipment and Supplies	18	1,299	39,189	6.7		11%
7352	Medical Equipment Rental and Leasing	42	502	31,959			66%
3845	Electromedical and Electrotherapeutic Apparatus	15	470	56,211			430%
3842	Orthopedic, Prosthetic, and Surgical Appliances and Supplies	31	394	35,116			56%
2835	In Vitro and In Vivo Diagnostic Substances	10	380	60,057	1.8		
2834	Pharmaceutical Preparations	11	231	31,311			68%

Source: Impresa analysis, Employment Department data.

The largest industry segment is producers of dental equipment and supplies, accounting for 40 percent of employment in the cluster group. The largest firm in this industry is A-DEC located in Newberg. The cluster also includes firms that lease medical equipment, and manufacturers of electro medical equipment and surgical devices. Two drug-related segments of the industry employ about 600 people. In no industry segment do Oregon wages significantly exceed the national average for their segment.

NAICS basis data for 2001 do not show any 5-digit industries related to biomedical goods or services for which Oregon has a significant location quotient. Under NAICS, dental equipment is a six-digit industry, part of the broader medical equipment and supplies classification, for which Oregon does not have a significant location quotient.

Assessment: A small industry cluster with some growth prospects. Dental equipment is well established, and outgrowing national competitors by a small margin. Electro medical devices is much smaller, but growing robustly. This cluster seems to be divided into three major sub-groups. Dental equipment relates primarily to the state's machinery industry, albeit with a strong precision manufacturing orientation. Electro medical devices draws on the technological capability of the state's high tech electronics industry. Diagnostics and pharmaceuticals rely on knowledge of biological processes. Whether, and to what extent there are synergies or connections among firms in any of these segments should be investigated.

4.0 Non-Traded Industries

Our analysis of employment concentration, growth trends and comparative pay levels identified a number of industries that met one or more of the standards we established, but which did not seem to be part of any traded industry. We exclude these industries from inclusion in our list of growth opportunities because they depend primarily or exclusively on local demand, and therefore present limited opportunities to trigger net additional growth in the Oregon economy. In some cases, it may be that we lack adequate information to identify which cluster these firms are a part of, or in other cases, an industry may be connected to more than one cluster or be indicative of an up and coming industry that may eventually become a cluster.

Most of these industries represent firms that are outliers in our data for reasons not related to the presence of a traded sector industry cluster. Some industries pass one or more of our tests for reasons

solely related to the unique aspects of Oregon’s unemployment insurance statutes. For example, Oregon requires that employees of religious organizations be covered by unemployment insurance; most other states do not. Consequently, Oregon has an extremely high location quotient for religious employees, not because it has a significantly larger religious “industry” or because it is a large net exporter of religion to other states, but simply because of this quirk in state law.

Several other industries have high location quotients in Oregon because Oregon’s local industry is organized differently than similar industries in other states. Oregon, for example, has a higher concentration of state-chartered credit unions and credit union membership than other states, and credit unions provide a larger fraction of consumer financial services than in other states. Again, this is not indicative that these firms export their services to other states, simply in this case that more services are provided by this kind of institution.

4.1 Predominantly Local Health Care Services

Health care services are overwhelmingly provided to local customers. Because of the face-to-face nature of the provision of health care services, and the fact that they tend to be provided periodically over a long time, and depend on relationships between providers and patients, it is rare that health care services, other than extraordinary and specialized care, are provided to other than local residents. There are significant variations in the structure of health care provision among states due to the characteristics of the local population (especially the fraction of the population that is elderly), and the organization of the state’s health care industry. Oregon, for example, has a much higher level of the provision of care by health maintenance organizations, which provide the bulk of their primary care in clinic settings rather than individual doctors offices.

Data for Oregon’s health care sector show that the state has an unusually high concentration of residential and intermediate care facilities (about double the level of concentration found nationally) and about 40 percent more dentists and dental laboratories than found nationally. It may be that some residential care facilities are attracting patients from other states (and in effect importing income to Oregon) but it is not clear that this is a large impact.

Health Care Sector

Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
8361	Residential Care	1,447	18,992	17,024	1.9		28%
8021	Offices and Clinics of Dentists	1,647	11,665	34,845	1.4		
8052	Intermediate Care Facilities	72	5,431	19,590	2.1		
8049	Offices and Clinics of Health Practitioners, NEC	650	3,275	27,411			26%
8082	Home Health Care Services	92	2,550	19,573			11%
8093	Specialty Outpatient Facilities, NEC	66	1,497	25,246			35%
8072	Dental Laboratories	151	771	29,325	1.3		
8092	Kidney Dialysis Centers	18	465	35,271			36%

Source: Impresa analysis, Employment Department data.

NAICS data confirm the pattern of above average concentrations in dental care and long-term care facilities.

Health Care Sector

Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
62331	Community Care Facilities for the Elderly	961	12,143	15,381	1.98
62121	Offices of Dentists	1639	11,712	36,637	1.35
62431	Vocational Rehabilitation Services	186	5,836	18,509	1.56
62321	Residential Mental Retardation Facilities	348	5,771	18,703	1.49
62322	Residential Mental Health and Substance Abuse Facilities	110	2,757	21,956	1.58
62133	Offices of Mental Health Practitioners (except Physicians)	293	1,118	27,542	1.70

Source: Impresa analysis, Employment Department data.

4.2 Predominantly Local Education and Social Services

As with health care, educational and social service agencies rely primarily on face-to-face contacts with the populations they serve, means that they deal primarily with the local population. While the educational and social service industries that meet one or more of our standards all primarily serve these local populations (and therefore represent limited opportunities for traded sector economic development) a number of important observations are apparent.

First, religious organization employment appears to be entirely an artifact of the scope of Oregon's unemployment insurance laws. Many other states do not include employees of religious

organizations in their unemployment insurance system, biasing upward Oregon's location quotient for this industry. Oregon has a relatively high wage for its child care services, which may in part be a reflection of its relatively high minimum wage. Private schools—both higher education and elementary and secondary education—have grown faster in Oregon than their counterparts nationally. While private universities can attract students from out of state, generating net inflows of income to the state, elementary and secondary schools overwhelmingly serve local residents. It is difficult to know why Oregon's private schools and colleges have grown faster than their counterparts nationally, but this has occurred at a time when tuition at public universities has risen rapidly, and also at a time when concerns have been raised about the quality of public K-12 education.

Education & Social Services Sector Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
8661	Religious Organizations	2,760	15,875	15,109	8.2		13%
8351	Child Day Care Services	801	7,860	16,157		1.15	
8221	Colleges, Universities, and Professional Schools	52	7,398	27,982			14%
8211	Elementary and Secondary Schools	299	6,772	19,971			17%
8641	Civic, Social, and Fraternal Associations	348	5,861	17,563		1.14	
8331	Job Training and Vocational Rehabilitation Services	189	5,850	17,446	1.6		
8399	Social Services, NEC	347	1,864	26,840			23%
8249	Vocational Schools, NEC	93	916	23,873	1.4		16%
8244	Business and Secretarial Schools	10	207	31,687		1.29	
8651	Political Organizations	70	154	22,055	1.6		

Source: Impresa analysis, Employment Department data.

NAICS data for 2001 show a different pattern of specialization within social and educational services.

Education & Social Services Sector Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage	LQ
62411	Child and Youth Services	150	2,418	21,740	1.35
62423	Emergency and Other Relief Services	28	489	29,532	1.45
54193	Translation and Interpretation Services	36	176	34,561	1.68
81394	Political Organizations	45	103	22,190	1.43

Source: Impresa analysis, Employment Department data.

4.3 Predominantly Local Financial Services

The finance, insurance and real estate sector consists of a wide range of businesses and professionals. The bulk of firms in this sector provide personal services to individuals (i.e. personal banking or insurance). Others provide services to businesses. Most of the demand for these services is local, although there are opportunities for specialized firms to export their services. For example, First Consumers National Bank has acted as a nationwide credit card issuer.

Finance, Insurance, Real Estate Sector Leading Industry Segments (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
6531	Real Estate Agents and Managers	2,143	11,119	26,520			19%
6411	Insurance Agents, Brokers, and Service	1,989	9,991	37,770			18%
6324	Hospital and Medical Service Plans	32	5,185	43,142	1.4		27%
6035	Savings Institutions, Federally Chartered	279	2,604	34,748	1.4		
6153	Short-Term Business Credit Institutions, Except Agricultural	52	2,292	37,415	2.1		74%
6311	Life Insurance	47	2,173	49,065			24%
6061	Credit Unions, Federally Chartered	115	1,854	26,541	1.3		
6361	Title Insurance	92	1,784	40,802	1.9		
6062	Credit Unions, Not Federally Chartered	61	1,740	31,459	1.8	1.14	28%
6163	Loan Brokers	347	1,529	43,255	2.0		
6552	Land Subdividers and Developers, Except Cemeteries	226	962	46,016			12%
6541	Title Abstract Offices	84	784	32,600	1.5		64%
6515	Operators of Residential Mobile Home Sites	300	774	12,778	1.9		
6519	Lessors of Real Property, NEC	22	118	72,910		2.31	
6722	Management Investment Offices, Open-End	4	5	173,942		1.82	
6399	Insurance Carriers, NEC	3	4	51,797		1.15	

Source: Impresa analysis, Employment Department data.

The largest industry in this sector to meet one of our tests is real estate agents, which have grown faster in Oregon than other states. The late 1990s coincided with a period of relatively rapid economic growth in Oregon, which may account for the faster growth in real estate agent employment. One interesting category for further investigation is short-term business credit institutions (other than agricultural) which are twice as concentrated in Oregon as typical,

and which grew dramatically faster than their counterparts nationally.

NAICS basis data highlight a slightly different group of industries for consideration. Credit unions again appear as an industry more concentrated in Oregon than elsewhere. The data also suggest that Oregon has a very strong concentration of loan brokers, and a significant number of persons involved in financial transactions processing, which may be a more traded component of the financial services industry.

Finance Insurance and Real Estate Software Sector Leading Industry Segments (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
53131	Real Estate Property Managers	809	6,578	23,642	1.42
52213	Credit Unions	170	3,417	29,138	1.47
52232	Financial Transactions Processing, Reserve, and Clearinghouse Activities	40	2,822	37,985	3.02
52231	Mortgage and Nonmortgage Loan Brokers	381	1,797	57,114	2.22
53119	Lessors of Other Real Estate Property	325	906	20,891	1.71
53132	Offices of Real Estate Appraisers	218	630	39,661	1.50

Source: Impresa analysis, Employment Department data.

4.4 Other Sectors

Our analysis revealed a large number of industries (91 on an SIC code basis using our three tests, and 28 on an NAICS basis using only our location quotient test) that were not part of any identifiable industry cluster or part of one of the three predominantly local industry sectors discussed above.

In some cases, this listing may include some industries that might be part of one of our industry clusters (although we were not able to connect it to one based on the data at hand) or may be part of another latent or emerging industry cluster. For the most part, however, these industries meet one of our tests because of some characteristic of the organization of the Oregon economy, cyclical growth factors affecting Oregon more than elsewhere, or some regulatory issues.

For example, Oregon grocery stores and department stores are somewhat better paid than their counterparts nationally. This may reflect the impact of the higher Oregon minimum wage, greater unionization of some Oregon employers, or both. Similarly, the unionization of some construction employment in Oregon, coupled

with a robust construction market in the state in the 1990s may account for higher than average wages in that industry.

Peculiarities of Oregon law undoubtedly shape employment in other industries. Oregon's location quotient for gasoline stations (40 percent higher than the national average) results in large part from the state's ban on self-service gasoline—and implies that this law has the effect of employing about 3,000 more people that would work in the industry otherwise.

Two industries may be part of some other industry cluster or potentially an emerging cluster of their own. Oregon has somewhat higher than average concentrations of catalog and mail order sales (SIC basis) and telephone call centers and electronic shopping and mail-order houses (NAICS basis). About 5,000 people work in electronic shopping or mail order; a further 6,000 work in call centers. Some components of these industries are part of other industry clusters (for example, Bear Creek Corporation runs a mail order and electronic shopping operation, but is part of the food processing cluster group; and businesses in financial services and software have call centers). Whether these industries constitute a separate cluster of their own (or will grow to become one) is a question for further study.

Other Industries Not Part of Apparent Cluster Groups (SIC Basis, 2000)

SIC	Industry	Firms	Jobs	Avg. Wage	LQ	Rel. Wage	Growth
5311	Department Stores	242	36,814	22,101		1.23	33%
5411	Grocery Stores	1,465	35,719	20,186		1.12	
1731	Electrical Work	999	11,925	48,597		1.18	
1711	Plumbing, Heating, and Air-Conditioning	1,253	11,769	44,041		1.18	
5541	Gasoline Service Stations	834	10,899	15,963	1.4		13%
4212	Local Trucking Without Storage	1,035	8,848	31,538	1.4		
7349	Building Cleaning and Maintenance Services, NEC	807	8,193	14,015			12%
5531	Auto and Home Supply Stores	648	6,893	26,930	1.4	1.11	
1542	General Contractors-Nonresidential Buildings, Other than Industrial Buildings and Warehouses	550	6,791	48,486		1.11	
4911	Electric Services	137	6,041	87,691	1.4	1.35	15%
4513	Air Courier Services	75	5,523	33,346			261%
5961	Catalog and Mail-Order Houses	221	5,021	28,948	1.5		
4512	Air Transportation, Scheduled	35	4,960	39,390			11%

5712	Furniture Stores	539	4,282	26,332			17%
740	Cotton Ginning	432	3,843	22,171	1.4		
1721	Painting and Paper Hanging	776	3,507	24,784	1.3		
5331	Variety Stores	149	3,294	21,739	1.7	1.57	
1794	Excavation Work	553	3,256	35,896	1.4		
5731	Radio, Television, and Consumer Electronics Stores	275	3,198	25,587			22%
1629	Heavy Construction, NEC	196	2,522	50,593		1.24	42%
5082	Construction and Mining (Except Petroleum) Machinery and Equipment	153	2,136	43,345	1.8		
5945	Hobby, Toy, and Game Shops	166	1,981	13,041			37%
7549	Automotive Services, Except Repair and Carwashes	213	1,881	20,764	1.3		
5083	Farm and Garden Machinery and Equipment	182	1,860	33,960	1.3		16%
4832	Radio Broadcasting Stations	93	1,825	35,830	1.3		
4119	Local Passenger Transportation, NEC	113	1,816	23,574			23%
3559	Special Industry Machinery, NEC	47	1,774	65,254	1.8		133%
4581	Airports, Flying Fields, and Airport Terminal Services	78	1,623	21,783			34%
5171	Petroleum Bulk Stations and Terminals	99	1,601	31,625	2.2		
4953	Refuse Systems	44	1,360	42,449			27%
5169	Chemicals and Allied Products, NEC	230	1,236	50,378			22%
5521	Motor Vehicle Dealers (Used Only)	265	1,210	33,819		1.13	
7213	Linen Supply	21	1,167	26,519	1.3		21%
4491	Marine Cargo Handling	30	1,129	53,852	1.5	1.18	
3861	Photographic Equipment and Supplies	14	1,098	70,839	1.3	1.23	436%
5949	Sewing, Needlework, and Piece Goods Stores	105	1,091	12,432	1.8		
3993	Signs and Advertising Specialties	117	1,051	34,778			22%
5943	Stationery Stores	80	962	22,527			81%
7291	Tax Return Preparation Services	254	955	21,281		1.27	15%
1793	Glass and Glazing Work	97	892	36,306	1.4		20%
1442	Construction Sand and Gravel	45	889	40,312	2.1		
7353	Heavy Construction Equipment Rental and Leasing	83	889	43,254	1.3		
7361	Employment Agencies	116	885	41,034		1.30	
5735	Record and Prerecorded Tape Stores	86	778	16,389			25%
5734	Computer and Computer Software Stores	107	743	32,563			38%
1429	Crushed and Broken Stone, NEC	69	728	35,336	6.3		

5113	Industrial and Personal Service Paper	114	709	52,376			25%
2761	Manifold Business Forms	16	704	35,619	1.3		
7536	Automotive Glass Replacement Shops	105	695	23,798	1.6		20%
752	Animal Specialty Services, Except Veterinary	147	658	15,911			33%
5962	Automatic Merchandising Machine Operator	63	624	28,178		1.25	
1522	General Contractors-Residential Buildings, Other Than Single-Family	44	590	47,003		1.27	
5963	Direct Selling Establishments	128	582	18,990			26%
3088	Plastics Plumbing Fixtures	14	527	29,594	1.8		25%
3999	Manufacturing Industries, NEC	73	508	24,289			77%
5111	Printing and Writing Paper	29	480	52,010	1.7		
5048	Ophthalmic Goods	57	459	28,930	1.5		
3564	Industrial and Commercial Fans and Blowers and Air Purification Equipment	4	455	48,823		1.33	62%
3231	Glass Products, Made of Purchased Glass	32	446	27,004			142%
1743	Terrazzo, Tile, Marble, and Mosaic Work	142	436	27,228			25%
7533	Automotive Exhaust System Repair Shops	65	401	26,282	1.3		
4111	Local and Suburban Transit	12	389	17,642			29%
3084	Plastic Pipe	6	386	44,433	1.4	1.35	
5946	Camera and Photographic Supply Stores	57	385	18,224			86%
4226	Special Warehousing and Storage, NEC	22	367	53,728		1.59	
3589	Service Industry Machinery, NEC	14	361	35,664			85%
7622	Radio and Television Repair Shops	64	356	33,779	1.3	1.10	
1795	Wrecking and Demolition Work	45	347	34,597			16%
5993	Tobacco Stores and Stands	41	333	21,118	1.3	1.27	68%
2891	Adhesives and Sealants	13	331	55,221			39%
3053	Gaskets, Packing, and Sealing Devices	9	331	32,606			62%
5094	Jewelry, Watches, Precious Stones, and Precious Metals	66	321	26,907			73%
3593	Fluid Power Cylinders and Actuators	10	318	44,222	1.3	1.13	
2952	Asphalt Felts and Coatings	5	312	45,576	1.8		
3081	Unsupported Plastics Film and Sheet	6	299	50,355		1.23	
7215	Coin-Operated Laundry and Drycleaning	71	298	15,686		1.15	
3211	Flat Glass	3	271	26,592	1.4		
3083	Laminated Plastics Plate, Sheet, and Profile Shapes	8	248	25,178			104%
7534	Tire Retreading and Repair	14	226	27,219	1.4		

Shops						
3253	Ceramic Wall and Floor Tile	8	225	24,565	2.0	100%
5043	Photographic Equipment and Supplies	23	203	64,978		1.13
2393	Textile Bags	8	155	28,005	1.4	1.18
3567	Industrial Process Furnaces and Ovens	8	150	54,413		1.30
1531	Operative Builders	28	126	66,148		1.25
1499	Miscellaneous Nonmetallic Minerals, Except Fuels	10	124	28,647	2.0	
271	Fur-Bearing Animals and Rabbits	10	79	18,465	7.5	
4499	Water Transportation Services, NEC	20	63	68,896		1.57
3596	Scales and Balances, Except Laboratory	3	49	42,251		1.12
5989	Fuel Dealers, NEC	6	26	26,909	2.1	
1081	Metal Mining Services	3	7	67,859		1.26
3161	Luggage	4	6	38,856		1.41

Source: Impresa analysis, Employment Department data.

Other Industries Not Part of Apparent Cluster Groups (NAICS Basis, 2001)

NAICS	Industry	Firms	Jobs	Avg. Wage.	LQ
81311	Religious Organizations	2806	16,073	15,759	8.20
42512	Wholesale Trade Agents and Brokers	4142	9,357	61,475	1.47
56142	Telephone Call Centers	98	6,360	23,085	1.32
45411	Electronic Shopping and Mail-Order Houses	197	4,877	30,831	1.65
44719	Other Gasoline Stations	419	4,745	17,117	2.64
44132	Tire Dealers	272	4,299	33,585	2.18
54194	Veterinary Services	441	4,052	23,416	1.41
44512	Convenience Stores	611	3,960	12,653	2.18
48422	Specialized Freight (except Used Goods) Trucking, Local	583	3,412	29,496	1.50
56199	All Other Support Services	327	3,059	22,029	1.39
45121	Book Stores and News Dealers	222	2,618	15,729	1.30
81131	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	425	2,536	49,026	1.30
56211	Waste Collection	170	2,193	35,064	1.79
42111	Automobile and Other Motor Vehicle Wholesalers	94	2,053	38,372	1.33
23829	Other Building Equipment Contractors	141	1,862	55,143	1.40
51511	Radio Broadcasting	96	1,846	36,304	1.33
45331	Used Merchandise Stores	347	1,760	14,497	1.35
42212	Stationery and Office Supplies Wholesalers	51	1,323	29,311	1.36
45113	Sewing, Needlework, and Piece Goods Stores	109	1,163	12,325	1.77
42271	Petroleum Bulk Stations and Terminals	62	1,092	39,790	2.37

48832	Marine Cargo Handling	28	1,065	57,485	2.22
21232	Sand, Gravel, Clay, and Ceramic and Refractory Minerals Mining and Quarrying	44	838	38,359	1.45
48841	Motor Vehicle Towing	107	732	23,757	1.38
81291	Pet Care (except Veterinary) Services	119	594	16,322	1.45
53113	Lessors of Miniwarehouses and Self-Storage Units	165	549	15,924	1.45
48849	Other Support Activities for Road Transportation	34	537	26,706	1.83
48821	Support Activities for Rail Transportation	27	383	29,315	1.59
72131	Rooming and Boarding Houses	63	203	8,319	1.36

Source: Impresa analysis, Employment Department data.

5.0 Recommendations

Cluster identification is an important first step in working to build on Oregon's economic strengths. In order to maximize the benefit of the information provided in this analysis, Impresa recommends that the Oregon Economic and Community Development Department undertake a series of steps.

5.1 Develop Relationships with Clusters

Industry clusters can serve as a useful framework for structuring communications between statewide economic development efforts and individual private sector businesses in Oregon. The Oregon Economic and Community Development Department should work to build ongoing relationships with clusters in the state's traded sector.

- Convene groups of industry leaders, participants and other knowledgeable observers.
- Use the data contained in this report to begin a conversation about the industry's contours, growth trends and future opportunities.
- Work to identify industry-wide opportunities for joint action and supporting public policies that would facilitate the cluster's growth.
- For each industry cluster, develop benchmarks or indicators of the Oregon industries health and competitiveness compared to the rest of the industry nationally and internationally.

5.2 Refine and Extend Data Analysis

This analysis identifies industries in which Oregon has an apparently higher concentration than typical in the nation, which pay higher than average wages than in the nation, and which have grown faster in Oregon than in the nation as a whole. These metrics could be complemented by other data and analysis, which would help verify the relative strength and components of these apparent industry clusters, as well as possibly identifying other growth opportunities. We recommend that the Oregon Economic and Community Development Department consider analyzing four other types of data.

- Firm-Specific Data: OECDD should work with the Oregon Employment Department to identify fast growing firms in the Oregon economy.

- Patents: OECDD should use patent data to identify those industries in which Oregon has a relatively strong technological specialization relative to the rest of the nation. Patent data are public documents, and as a result can also be used to identify individual firms.
- Exports: Data on exports, particularly of value-added products, would be one potentially useful indicator of internationally competitive industries. OECDD should use export data to identify those particular products which are more frequently exported from Oregon than from other states (a measure of specialization) and also to help identify the principle components of industry clusters.
- Non-Employers: In some industries, it may be particularly useful to identify the number of self-employed individuals working in Oregon. This may be a particularly useful indicator for emerging industry clusters and serve as a good ongoing measure of entrepreneurial energy across clusters and over time.

5.3 Develop Sub-State Cluster Analysis

Our focus in this study has been on industry clusters that are significant at the statewide level. Some industries are statewide in character, while others tend to be located primarily in specific parts of the state. Some are primarily metropolitan in character, while others are more rural. We would recommend that the Oregon Economic and Community Development Department take these cluster definitions and use them to identify the geographic concentrations of different clusters in different parts of the state. In addition, the state may wish to undertake a further analysis of individual regions of the state to identify industry clusters that may be regionally significant, although they may not meet the selection standards for statewide significance.

6.0 Appendix: Detailed Data

Data Tables

Table A: Two-Digit Industry Employment, Location Quotients and Relative Wages for Oregon, 2000

Table B: Three-Digit Industry Employment, Location Quotients and Relative Wages for Oregon, 2000

Table C: Four-Digit Industry Employment, Location Quotients and Relative Wages for Oregon, 2000

Table D: Growth Rates of US and Oregon Employment by Four-Digit Industry, 1995-2000.

Notes for Tables A-C

Data for Tables A-C were provided by the Oregon Employment Department from data they collected, and from data obtained from the Bureau of Labor Statistics. Employment, wages and location quotients are annual average data for private employers only. Key data fields are:

Establishments: The number of reporting units or separate establishments (a single firm may have many different establishments, corresponding to branch locations).

Employment: Average annual employment.

Total Wages: Total wages paid in 2000 (in millions of dollars)

Avg. Wage: Average Wage—Total wages divided by average annual employment.

LQ: Location Quotient

Rel. Wage: Relative Wage—The Oregon average wage divided by the U. S. Average wage.

High LQ: Total employment in industries in which the location quotient exceeds the critical value of 1.25—i.e. the industry is at least 25% more concentrated in Oregon than is the case nationally.

High LQ: Total employment in industries in which the average wage exceeds the critical value of 1.1—i.e. Oregon wages are at least 10% higher than US wages.

Notes for Table D

Data for Tables D were provided by the Oregon Employment Department from data they collected, and from data obtained from the Bureau of Labor Statistics. Employment and employment growth rates are for private employers only. Data for 4-digit categories that contained only confidential data have been suppressed. Key data fields are:

Oregon Employment: Average annual employment in Oregon in 1995 and 2000.

New Jobs: Net change in annual average employment in Oregon between 1995 and 2000.

%Growth 1995-2000: The percentage change in employment in Oregon and the United States over the five year period 1995 to 2000.

Outperformed US. For each industry in which the five year Oregon growth exceeded the five-year US growth by at least 20 percentage points, we have listed the number of new jobs created in that industry in Oregon over the five year period (repeating the “New Jobs” column to the left) and reported differential--the percentage point difference in US and Oregon growth over the five year period.

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