Regional Industry Cluster Report

2005

NORTHWEST IOWA

Developers Coalition

"Charting A Course For Success"

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INTRODUCTION

Industry cluster analysis allows businesses, economic developers, researchers, and others to identify industries that are geographically concentrated, of a similar nature, and make use of related buyers, suppliers, infrastructure, and workforce. By identifying these industries, recruitment efforts may be focused on those companies that complement existing businesses to capitalize on local resources such as agricultural products, knowledge base, and workforce.

In the analysis that follows, six main industry clusters emerge as either having a strong presence in the region and/or as having the potential for future development. These industry clusters are Biotechnology, Chemical Production, Pharmaceuticals, Processed Food, and Transportation and Logistics. These industry clusters primarily export goods, make use of local resources, and are mutually supporting.

STUDY REGION

The Northwest Iowa study region consists of Cherokee, Lyon, O'Brien, Osceola, Plymouth and Sioux counties

- Region: 3,769 square miles[1]
- 2002 Population: 102,664[1]
- 2002 Average Per Capita Personal Income: $15,624[1]
- 2004 Second Quarter Employing units: 3,483[2]
- 2004 Second Quarter Employment: 45,084[2]
- 2004 Second Quarter Average Annual Wage: $25,868[2]

RECOMMENDATIONS OVERVIEW

Collaborate with existing industry businesses in *Biotechnology* and *Chemical Production/Pharmaceuticals.*

- Prepare needs assessment and perform cluster benchmarks. A cluster benchmark refers to a survey of existing industries that verifies the theoretical buyer/supplier and infrastructure relationships as identified within this analysis. Although IMPLAN input/output modeling software (recognized as the industry standard) was used in preparing this analysis, it is highly recommended that industry leaders are included in benchmarking buyer/ supplier relationships.

- Foster connections with leaders in similar industries to create an achievable

[1] *Source: State Library of Iowa, State Data Center Program, Regional Economic Profiles*
[2] *Source: Iowa Workforce Development, Employment Statistics Bureau, Regional Data Analysis Tool. Second Quarter 2004 data is preliminary*

vision or development plan and address common issues. This may be achieved by creating cluster associations or organizing ad hoc meetings.

Retain, expand, and recruit new businesses to the area, focusing on Biotechnology and Chemical Production/Pharmaceuticals.

- Develop a strategy for attracting new businesses and target specific core businesses for recruitment. Existing concentrations in these clusters position the region to build on these strengths.

- Lessen the impact of imports by also targeting industries *supplying* to the core identified in this analysis and through the cluster benchmark. Identify potential sites for new businesses.

- Expand core industry businesses to lessen reliance on a few firms.

Use clusters as the context for educating and training the workforce.

- Form partnerships between educators and cluster associations or core business leaders.

- Collaborate with industry cluster representatives on developing school-to-work, two-plus-two programs, internships, and experiential learning opportunities.

ANALYSIS TOOLS

Four primary analysis tools were used to evaluate industry clusters in the region: location quotient, shift/share, Implan input/output modeling, and Pennsylvania's Regional Data Analysis Tool (RDAT).

The ***location quotient*** is a ratio of an industry's share of the local economy to the industry's national economy. In other words, it measures an industry's concentration in the Northwest Region relative to the rest of the United States (or the region to Iowa). A location quotient greater than 1.0 means that an industry is producing more goods and services than are consumed locally (i.e. allowing the excess to be exported) and a location quotient less than 1.0 means that local production is assumed to be insufficient to satisfy local demand, thus requiring products to be imported. A ratio of 1.0 indicates an industry's share is exactly equal to their share in the national economy.

Shift/share demonstrates the region's competitiveness and cluster growth. Shift/share is comprised of three components. The national growth or share component measures the local job loss or gain as a result of changes in the national economy and is especially susceptible to the peaks and valleys of the business cycle. The proportional

shift or industry mix component measures the net effects of the business cycle – job loss or gain - on a specific industry. The differential shift or competitiveness component measures the job loss or gain that can not be accounted for by either the share component or the industry mix component. This change generally reflects some local advantage such as availability of natural resources.

Implan input/output modeling software, a product of the Minnesota Implan Group, was used to determine relationships among industries. Input-output modeling shows how industries interact. They show how industries provide input to and use output from each other to produce goods or services and provide detailed information on the flows of the goods and services that make up the production processes of industries. Implan was used to determine the buyers/suppliers and infrastructure industries for the core industries in the clusters. In addition to defining relationships among buyers/suppliers, Implan was used to calculate the economic impact of adding jobs in specific industry clusters.

Pennsylvania's Regional Data Analysis Tool (RDAT) is a data base used to calculate employment changes, wage growth, location quotient, and shift/share. Iowa data was loaded along with national data. Separate RDATs were used for historical data and other state data.

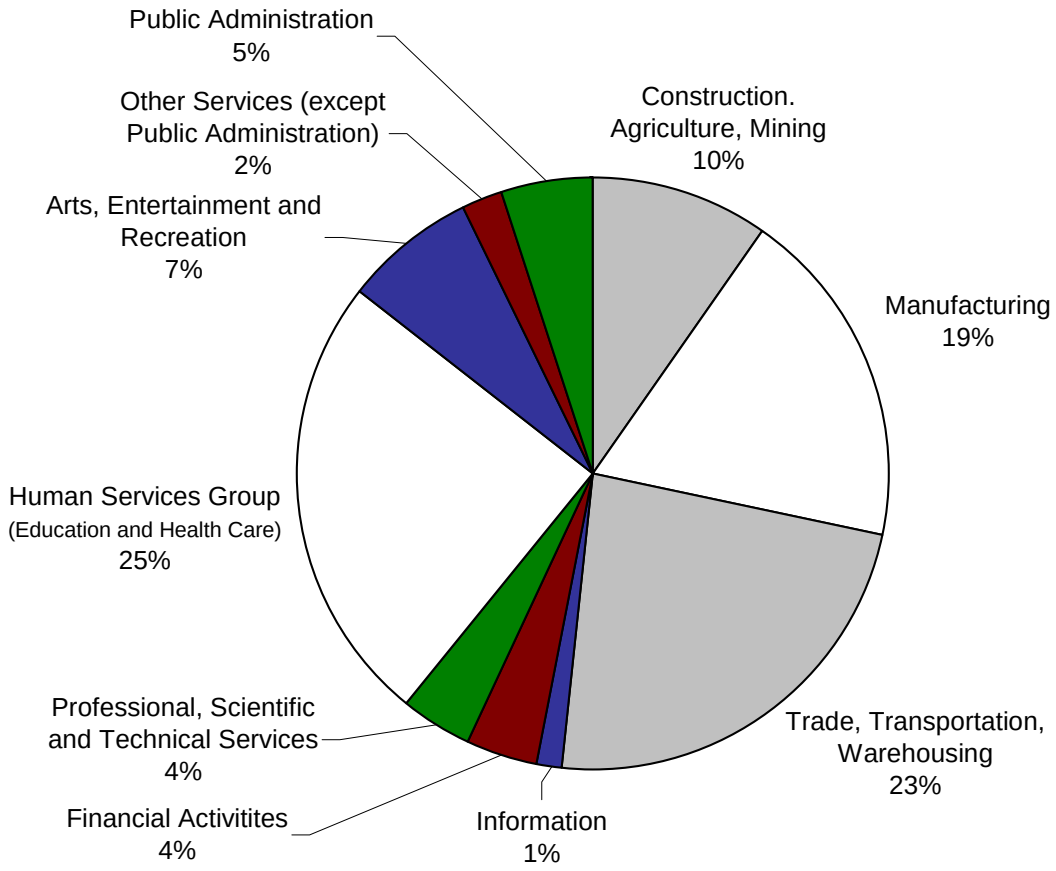
EXISTING INDUSTRIES[3]

Total employment in the region for 2004 second quarter[4] stood at 45,084. Employment was down 78 jobs from the second quarter 2000. Wages were up 18.7 percent from four years ago, to $25,868 for all industries. The human services group, which includes education services and health care and social assistance, is the largest industry group in the region with 23.6 percent of total employment, or 10,636 jobs. However, combined average annual wage for the human services group at $25,992 is well below the state average wage for all industries of $30,740 and slightly above the average wage for Northwest Iowa of $25,868. Utilities showed the highest average annual wage at $48,184, although employment made up only 3.6 percent of total employment for the Northwest Iowa study region.

Regional, state and national employment levels began to decline in late 2000. State employment slipped down by 38,100 jobs through 2003. At the national level, employment nudged down by 1,839,973 in the two years 2001 to 2003. However, in 2004, seasonally adjusted data for the first two quarters indicate that employment levels are slowly rising. Employment in the region will likely continue to increase over the next few years.

[3] As of December 1, 2004: Quarterly updates will be forthcoming as data become available
[4] Source: Iowa Workforce Development, Quarterly Census of Employment and Wages, 2004 Second Quarter

Northwest Iowa Existing Industries, 2004 2nd Quarter



Largest employers in existing industries[5]

- Tyson Deli Meats
- Hope Haven Inc
- HyVee Food Stores
- Village Northwest Limited
- Wells Dairy Inc
- American Identity
- Advance Brands LLC
- Wal-Mart Inc
- Pella Corp
- Exopack

[5] *Ibid*

1990 Through 1999 –Trends in Wages and Employment[6]

In 2000, retail trade was the largest industry and made up employment of 5,719 in the region. The services group was the second largest industry, with employment of 5,008. Services covered accommodation, personal services, business services, amusement and recreation services, health services and educational services. (Under NAICS, business services and amusement and recreation are separated from "Other Services".) Most industry groups gained employment over the ten-year period. However, Public Administration showed almost no change over the period. Manufacturing, on the other hand, showed a sharp decrease from 1996 to 1997 in nondurable goods manufacturing, then leveled out through 1999.

[6] *Source: Bureau of Labor Statistics, Covered Employment and Wages (CEW/ES-202) DBF Disk Number 2, Version 3 County Level*
[7] *Clusters and the New Economics of Competition, Porter, Michael E., Harvard Business Review, November-December 1998 p. 78.*

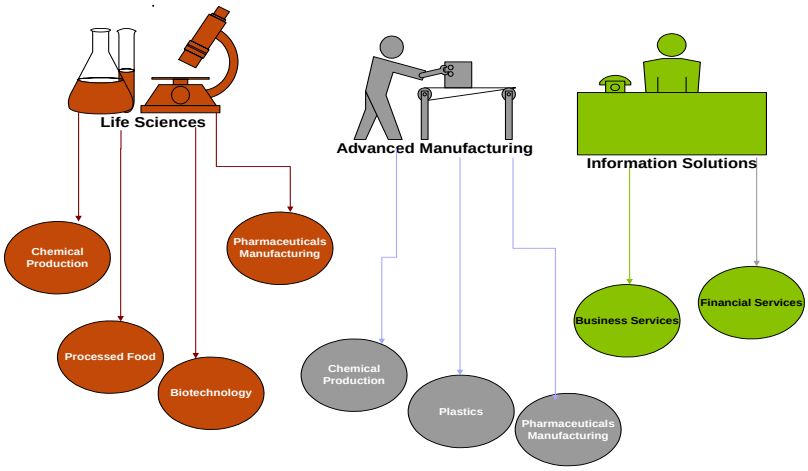
OVERVIEW OF INDUSTRY CLUSTERS

Industry clusters are a group of concentrated industries that share similar processes, workforce, and resources. Harvard's Michael E. Porter describes industry clusters as "geographic concentrations of interconnected companies and institutions in a particular field."[7]

Traded Clusters

In 1999, Economic Development (IDED) commissioned a study by Stanford Research Institute (SRI) to examine targeted industries in light of Iowa's actual experience. This study identified key competitive advantages for Iowa (including workforce quality, training capacity, physical infrastructure, quality of life, etc.) and ultimately identified three very broad industry clusters for future investments. They are:

- Life sciences (including production agriculture, value-added processing, Pharmaceuticals)
- Advanced manufacturing (involving the rapid introduction of new processes), and
- Information solutions (including insurance, financial services, and information technology).



Some preliminary work was done by IDED to show which specific industries might fit into these broad clusters.

Iowa Workforce Development has further refined these targeted clusters into 42 traded clusters based on Porter's clusters.

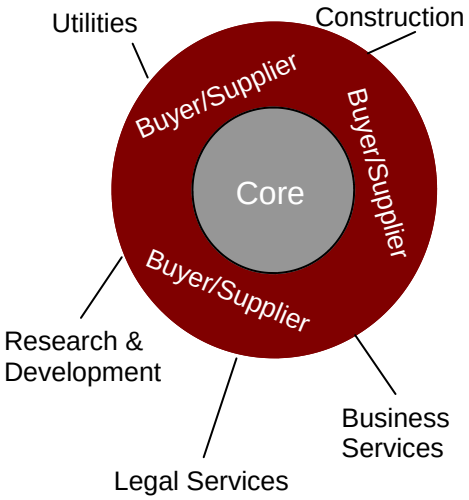
Armed with knowledge of where geographic concentrations and gaps exist, policy can support clusters and help foster their growth in a variety of ways. Investments for research and infrastructure can be more precisely targeted; new cooperative relationships can be brokered between firms within "core" industry sectors as well as with region suppliers and customers. Occupations within key industries can be identified, and education and training institutions can use this information to counsel and train students for high-demand, high-wage careers.

Industry cluster analysis is extremely dynamic and must be updated periodically. For example, in the late 1990's the Printing and Publishing cluster was shown to be a

vibrant cluster in Iowa. However, with the closure of two of Iowa's largest printing companies, employment and wages in this cluster have waned. On-going analysis is vital to stay current on industry fluctuations.

Industry clusters have three major components or "layers":

- Core industries are industries intrinsic to the cluster. Core industries are the essential elements at the center of the cluster and are necessary for cluster formation. For example, the Metal Manufacturing cluster has forging and stamping as part of the core industries.



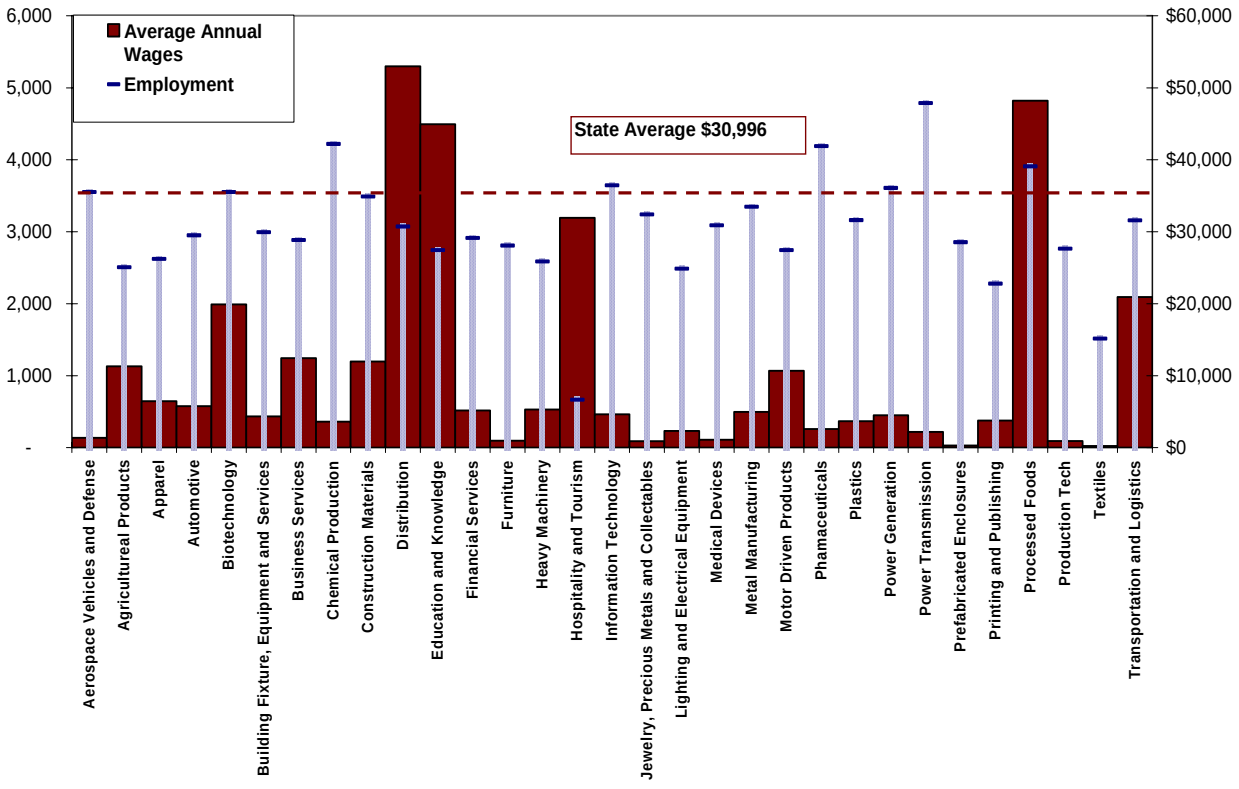
- Buyers/Suppliers are those industries that directly supply goods or services to the core or purchase goods or services directly from the core industries. The industry "manufacturing molds for metal casting" would be a supplier for the Metal Manufacturing cluster.
- Infrastructure industries provide basic support to the core. Infrastructure industries are generally utilities, construction, research and testing, legal services, employment services, business services, and other professional services such as architecture, landscaping, and accounting. Most industry clusters will share infrastructure industries. In the same way, what is in the core of one cluster may be a buyer/supplier for another or be part of the infrastructure for other clusters.

INDUSTRY CLUSTERS IN NORTHWEST IOWA

Some industry clusters did show job loss from 2000 to 2004; however, about half of the industry clusters show some job growth in the core industries from 2000 second quarter through 2004 second quarter. The clusters with the largest four-year growth based on NAICS are Construction Materials, Distribution, Agricultural Products, Education and Knowledge, Business Services, Processed Food, Transportation and Logistics, Building Fixtures, Plastics, and Heavy Machinery Manufacturing.

Traded Industry Clusters in Northwest Iowa	
Aerospace Vehicles and Defense	Jewelry, Precious Metals & Collectables
Agricultural Products	Lighting and Electrical Equipment
Apparel	Medical Devices
Automotive	Metal Manufacturing
Biotechnology	Motor Driven Products
Building Fixture, Equipment & Services	Phamaceuticals
Business Services	Plastics
Chemical Production	Power Generation
Construction Materials	Power Transmission
Distribution	Prefabricated Enclosures
Education & Knowledge	Printing & Publishing
Financial Services	Processed Foods
Furniture	Production Tech
Heavy Machinery	Textiles
Hospitality and Tourism	Transportation and Logistics
Information Technology	

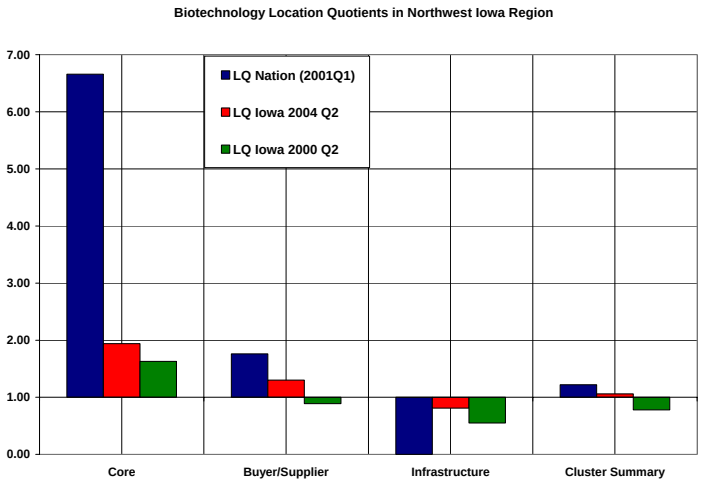
Northwest Iowa Industry Cluster Core Industry Wages and Employment
2004 2nd Quarter (preliminary)



KEY OBSERVATIONS

BIOTECHNOLOGY

Biotechnology is the use of living organisms or their products for commercial purposes. Biotechnology core industries showed a net employment decrease of 258 jobs from second quarter 2000 to second quarter 2004. However, the region to state core location quotient increased from 1.63 in 2000 to 1.94 in 2004. The Biotechnology industry cluster has strong employment location quotients in the cluster as a whole (1.06 region to state and 1.22 region to nation), the buyer/supplier (1.30 region to state and 1.76 region to nation) and core industries (1.94 region to state and 6.66 region to nation). These location quotients indicate a strong presence in the region. In this cluster, there were 33 employing units with 1,989 employees in the core in second quarter 2004.



Employment in the cluster summary in second quarter 2004 was at 20,260, the highest level of employment in any cluster in the region. Core industries had employment of 1,989 and ranked sixth in core industry employment. Biotechnology had an average annual wage of $30,812, higher than the state's average annual wage of $30,740. In the core industries, employment reached 1,989 with an average annual wage of $35,508. Industries in the core include:

- animal slaughtering and processing
- petrochemical production
- other organic chemical production
- fertilizer manufacturing
- pesticide and other agricultural chemical production
- pharmaceuticals and medicine manufacturing.

Some of the larger employers in the region in the core industries are Tyson Deli Meats, Advance Brands, Novartis Animal Health (Grand Laboratories), and Little Sioux Corn Processors.

Buyer/supplier[8] industries for Biotechnology comprise:

- seed and animal farming
- animal food manufacturing
- starch and vegetable oil manufacturing
- animal slaughtering and processing

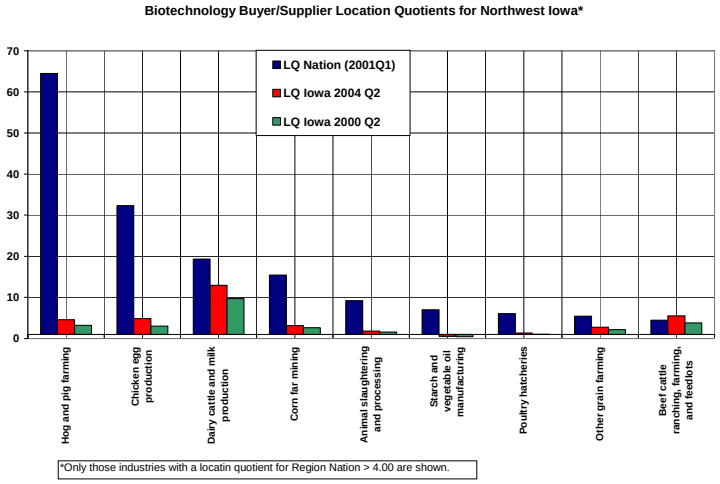
[8] The buyer/supplier industries listed for each cluster are not all-inclusive. A cluster benchmark will assist in identifying buyer/supplier industries and their impact

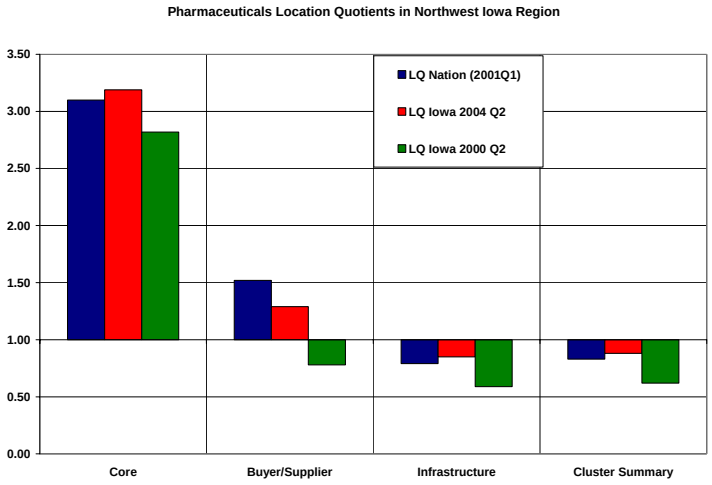
- wood container and pallet manufacturing
- paper bag and coated and treated paper manufacturing
- printing
- synthetic dye and pigment manufacturing
- other basic inorganic chemical manufacturing
- resin and synthetic rubber manufacturing
- soap and cleaning compound manufacturing
- all other chemical preparation manufacturing
- plastic packaging
- plastics and glass bottle manufacturing

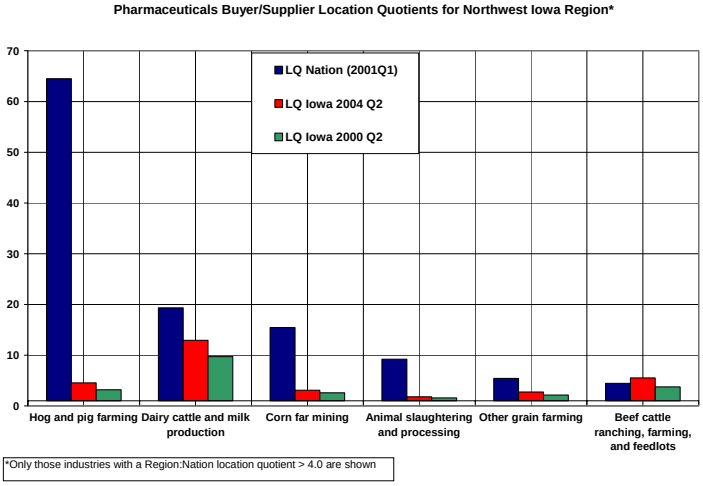
This cluster had 237 employing units with 4,930 employees in buyer/supplier industries.

PHARMACEUTICALS

Pharmaceuticals cluster is described as manufacturing pharmaceutical products intended for internal and external consumption in such forms as ampoules, tablets, capsules, vials, ointments, powders, solutions, and suspensions. The cluster had employment of 8,922 and 259 for core industries for second quarter 2004. Core industries had an annual average wage of $41,896 and a core location quotient of 3.19 region to state and 3.10 region to nation, signifying a robust existence in the region. Shift/share analysis for second quarter 2003 through second quarter 2004 indicated cluster







reduction of 110 jobs; however, the potential for growth does exist. The buyer/supplier location quotient is also quite strong at 1.29, with cluster growth of 13 jobs. Industries in the Pharmaceuticals core include pharmaceutical and medicine manufacturing which are primarily engaged in one or more of the following:

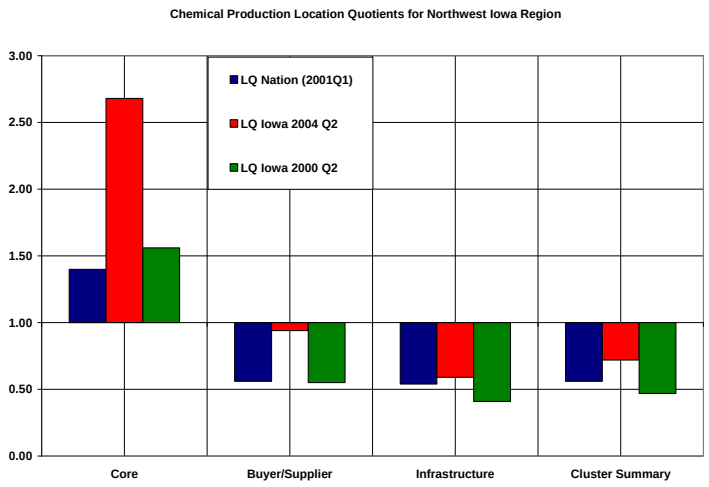
- manufacturing biological and medicinal products;
- processing (i.e., grading, grinding, and milling) botanical drugs and herbs;
- isolating active medicinal principals from botanical drugs and herbs; and,
- manufacturing pharmaceutical products intended for internal and external consumption in such forms as ampoules, tablets, capsules, vials, ointments, powders, solutions, and suspensions

Large employers in the region in the Pharmaceuticals cluster include Grand Laboratories, Sioux Biochemical, Animal Health Inc, and Pro Pork Associates. In second quarter 2004, this cluster had four employing units with 259 employees in core industries.

Buyer/supplier industries for this cluster include:

- paperboard container manufacturing
- plastics and glass container manufacturing
- animal and seed farming

Buyer/supplier industries had five employing units with 392 employees.

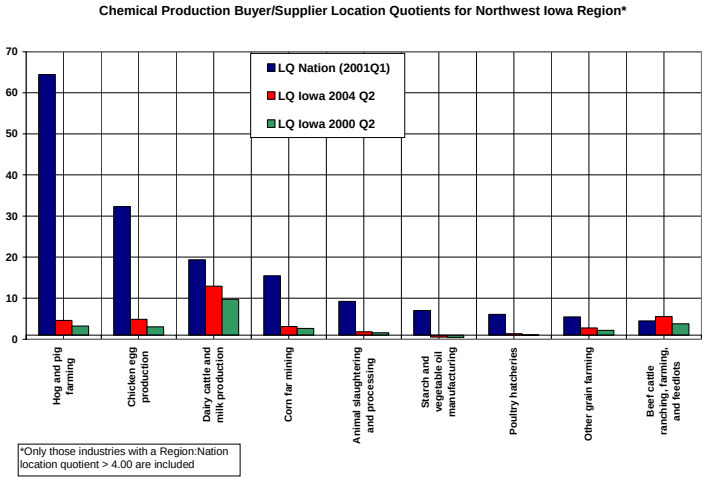


CHEMICAL PRODUCTION

Chemical Production and Biotechnology share many of the same industries in both the core and infrastructure. Chemical Production may be described as the transformation of organic and inorganic raw materials by a chemical process and the formulation of products. Although the cluster with all its layers and the infrastructure industries only have weak location quotients (location quotients less than one) in Chemical Production, the location quotients for core industries, 2.68 region to state and 1.40 region to nation, indicate a strong presence in Chemical Production. Employment in second quarter 2004 was 7,693, while the annual average wage was $29,540. Core wages of $42,196 were significantly higher than the state's average annual wage of $30,740. Industries in Chemical Production core include:

- petroleum refineries
- petrochemical production
- other basic inorganic chemical production
- other basic organic chemical production (including ethanol production)

- pesticides and other agricultural chemical production
- pharmaceuticals and medicine manufacturing
- explosive manufacturing
- other chemical product and preparation manufacturing.

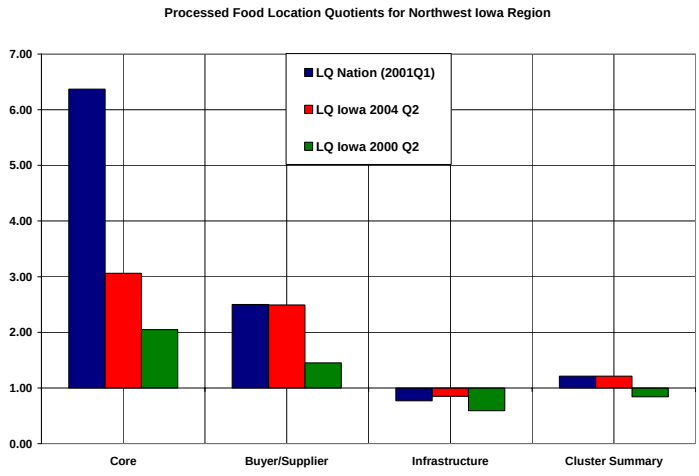


The largest employers in the region in this industry cluster core are Little Sioux Corn Processors, Siouxland Energy and Livestock Cooperative, Novartis Animal Vaccines Inc, Newport Labs, Sioux Biochemical, Animal Health Inc., and Pro Edge LP (Trans Ova Genetics). This cluster depended on seven employing units with 361 employees in the core in second quarter 2004.

Buyer/supplier industries for this cluster include:

- paperboard container manufacturing
- plastics and glass container manufacturing
- animal and seed farming
- rubber product manufacturing

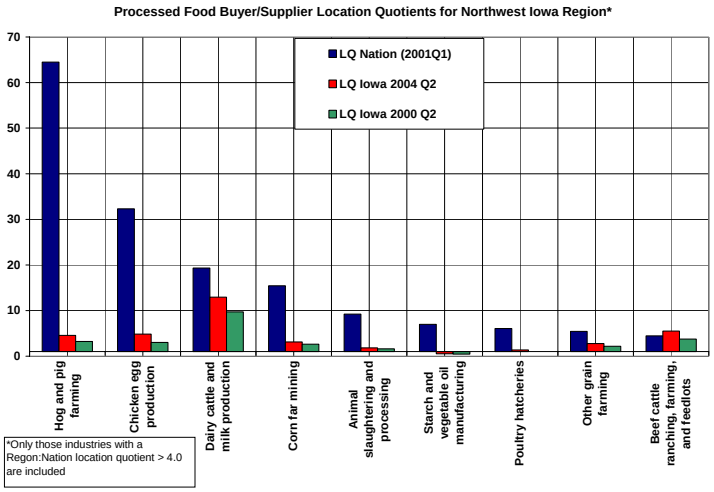
In second quarter 2004, the buyer/ supplier industries had 207 units with 2,881 employees.



PROCESSED FOOD

Processed Food is the transformation of livestock and agricultural products into products for intermediate or final consumption. The Processed Food cluster, with a region to state location quotient of 3.06 and a region to nation location quotient of 6.37, has a strong competitive advantage in the region. Average annual wages of $39,080 are above the state average annual wage of $30,740. The buyer/ supplier industries have a location quotient of 2.49, clearly reflecting the advantage of natural resources in the region. The cluster relies heavily upon animal slaughtering and processing, with 28 employing units and 1,628 employees. Industries in the Processed Food core include:

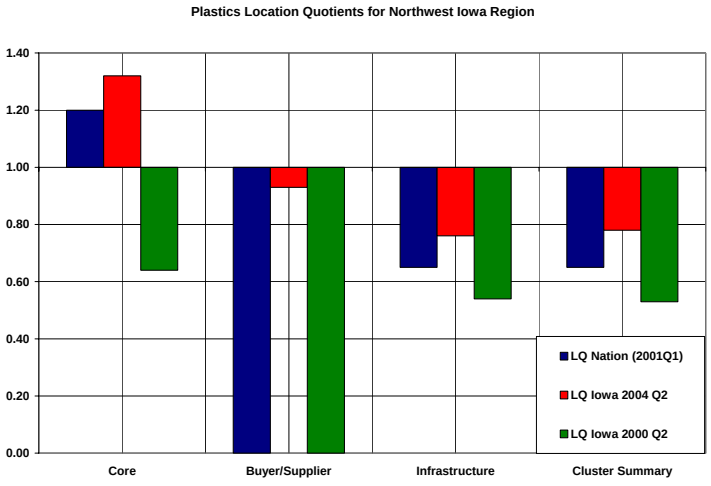
- flour milling and malt manufacturing
- starch and vegetable oil manufacturing
- breakfast cereal manufacturing
- confectionery manufacturing from purchased chocolate
- nonchocolate confectionery manufacturing
- frozen food manufacturing
- fruit and vegetable canning and drying
- dairy products
- ice cream and frozen food manufacturing
- animal slaughtering and processing
- bread and bakery product manufacturing
- cookie, cracker, and pasta manufacturing
- tortilla manufacturing
- snack food manufacturing
- coffee and tea manufacturing
- flavoring syrup and concentrate manufacturing
- seasoning and dressing manufacturing



The largest employers in the region in this industry core include Tyson Retail Deli Meats, Wells Dairy, Advance Brands, and Sioux-Preme Packing Company.

Buyer/supplier industries for this cluster include:

- animal and seed farming
- animal slaughtering and processing

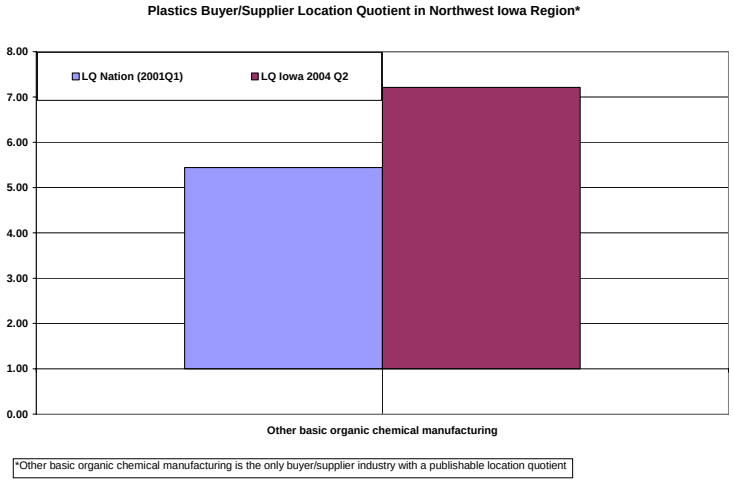


ADDITIONAL CLUSTERS

Plastics

Industries in the Plastics cluster make goods by processing plastic materials and raw rubber. The Plastics cluster and Transportation and Logistics cluster provide a major portion of the buyer/supplier and infrastructure to the core industries in Biotechnology, Pharmaceuticals, Chemical Production and Processed Food clusters.

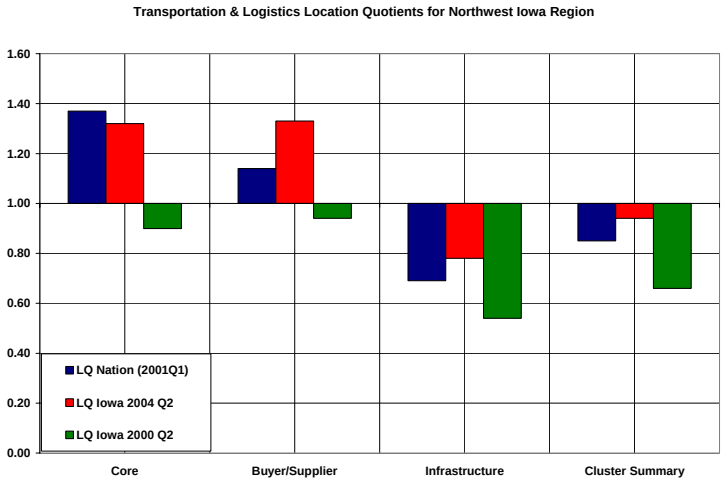
Average annual wages for the Plastics cluster for 2004 second quarter stood at $39,080. Plastics core industries have location quotients of 1.33 region to state and 1.37 region to nation, indicating competitiveness both in the state and in the nation. The core has had a net increase of 149 jobs from 2000 through second quarter 2004 and there is potential for further growth. As the Chemical Production and Plastics clusters are interdependent, by growing the Chemical Production cluster, the supplier industries for the Plastics cluster grow accordingly. The supplier industries in the Plastics cluster are already exporting, showing location quotients of 1.33 region to state and 1.14 region to nation. Industries in the Plastics core include:



- plastics packaging materials and unlaminated film and sheet manufacturing
- plastics pipe, pipe fitting, and unlaminated profile shape manufacturing
- laminated plastics plate, sheet (except packaging), and shape manufacturing
- polystyrene foam product manufacturing; urethane and other foam product (except polystyrene) manufacturing
- plastics bottle manufacturing
- other plastics product manufacturing.

The largest employers in Plastics core industries include Den Hartog Industries and Infinity Plastics.

Transportation and Logistics



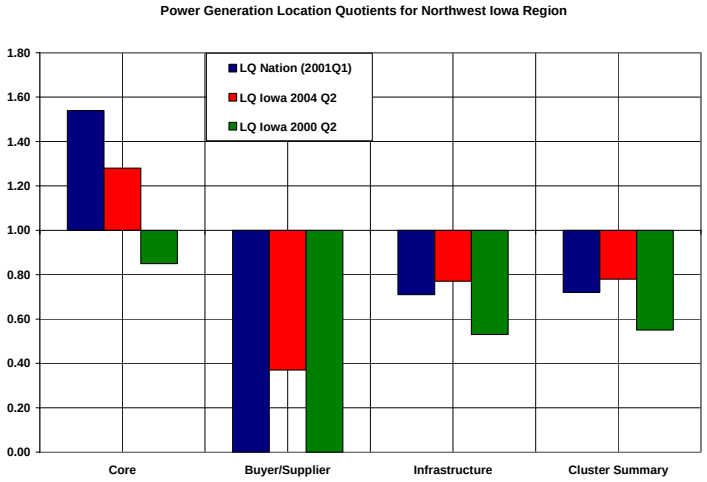
Transportation and Logistics refers to industries providing transportation of cargo, and warehousing and storage for goods. The Transportation and Logistics cluster provides a significant portion of the infrastructure in most other clusters. Core industries in Transportation and Logistics have a location quotient of 1.32 region to state and 1.37 region to nation for second quarter 2004, indicating an elevated concentration in the region. In second quarter 2004, average annual wages of $31,584 in core industries were higher than the state annual average wage of $30,740. Employment stood at 2,094 in core industries, with cluster growth of 149 jobs from second quarter 2000 through second quarter 2004. Industries in Transportation and Logistics include

- scheduled air transportation
- nonscheduled air transportation
- inland water transportation
- rail transportation
- truck transportation,
- warehousing and storage.

Some of the larger employers in the region are: Van Wyck Inc, Le Mars Truck and Tractor Inc, Schuster Grain Co Inc, Heyl Truck Lines Inc, B T Inc, and Midwest Continental Inc.

ADDITIONAL OBSERVATIONS

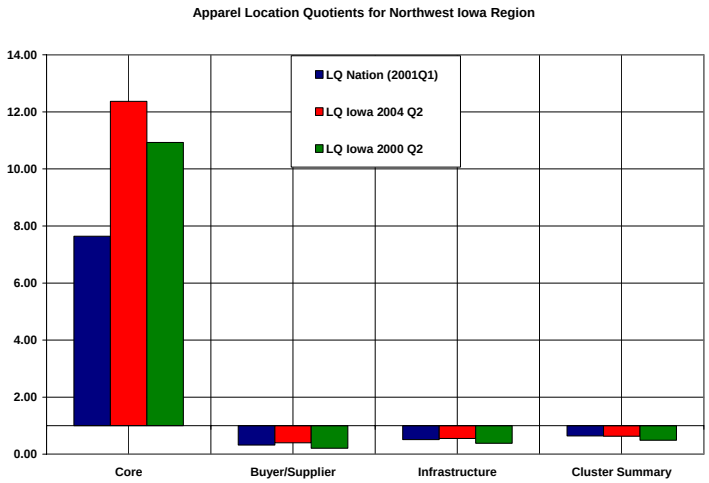
Ten additional clusters have location quotients greater than 1.00, justifying further analysis.



Power Generation

Power generation cluster core industries are comprised of electric power generation, electric power transmission and distribution, natural gas distribution, and electrical equipment manufacturing. The region to state location of 1.28 and region to nation location of 1.54 would indicate a solid existence in the region. Most of the 450 employees are in the electrical equipment manufacturing industry, while 14 of the 19 units are in electric power transmission and distribution. Wages in this cluster exceed both the regional average and the state average. Wages and employment have increased in this cluster since 2000.

Power generation is crucial to other clusters as part of the infrastructure. However, this cluster has the potential to expand significantly if the focus is on wind energy.

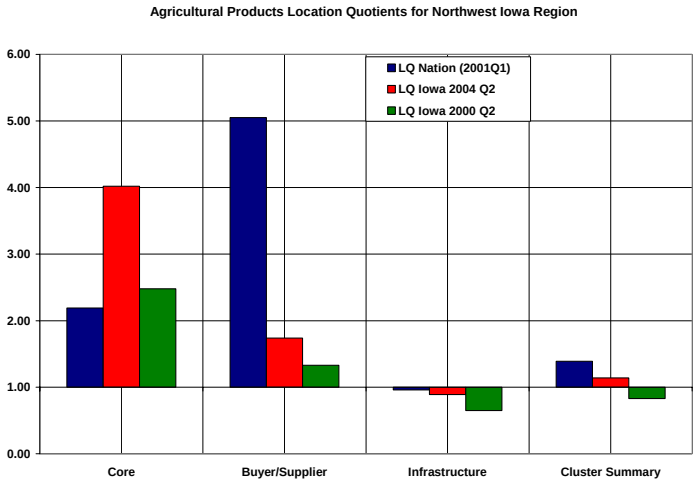


Apparel

The Apparel cluster has an area to state location quotient at 12.37 and a region to nation location quotient of 7.64.

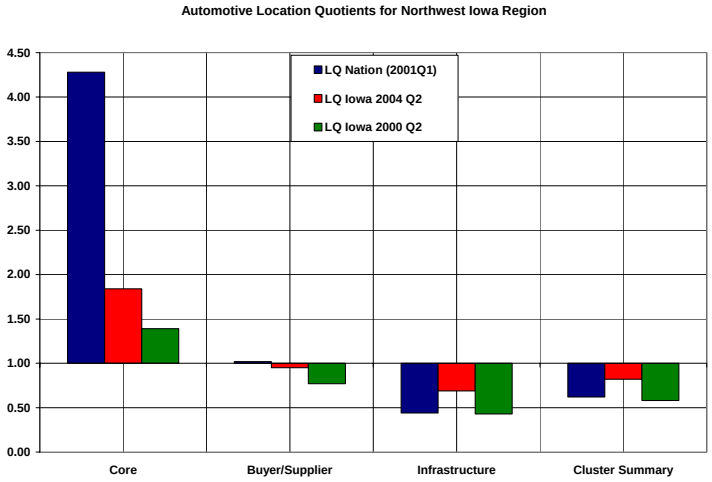
However, the apparel cluster had the largest employment decrease from 2000 to 2004 of 521 employees. The cluster—which includes sewing contractors, clothing manufacturers, and milliners – has been steadily declining since 1997. In 1997, employment for the cluster was at 1,514; in 2004, employment dropped to 864. Furthermore, there is currently only one employer in the core industries in this area, and the buyer/supplier industries have location quotients of 0.40.

Agricultural Products



The agricultural products cluster includes crop production, animal production, forestry and logging, fishing, hunting, and trapping. A valid picture of agricultural products as a cluster is difficult to capture because family farms, the backbone of the cluster, are not included in the universe (employees covered by unemployment insurance) from which the data are taken. The cluster posted employment of 1,132 by 102 units (employers) for the region, clearly excluding the family farms. Furthermore, wages that are captured are significantly below the state average wage of $30,740 at $25,052. Agricultural products are vital to the area, but perhaps more as suppliers providing raw materials for other cluster core industries rather than as an independent cluster.

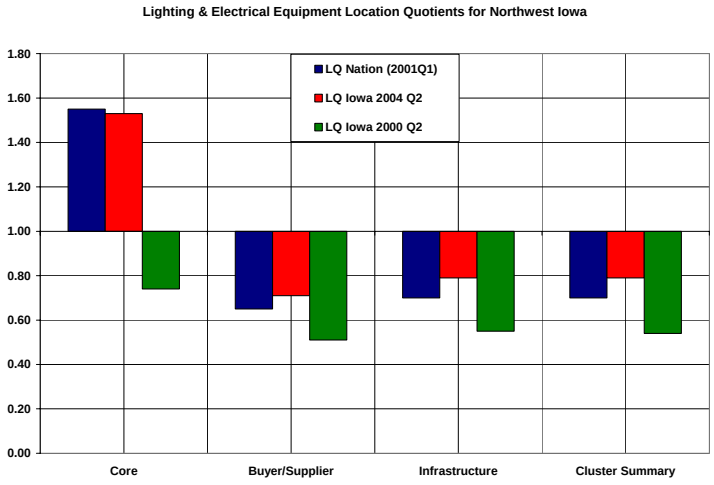
Automotive



Industries in the automotive cluster are motor vehicle body and trailer manufacturing, motor vehicle electric equipment, motor vehicle suspension parts, and motor vehicle brake system manufacturing. The automotive industry cluster may seem to have a healthy presence in the region with a region to state location quotient of 1.84 and a region to nation location quotient of 4.28. However, in this region there are only 9 units and 576 employees, all within motor vehicle body and trailer manufacturing. Average annual wage for this cluster at $29,480 is below the state average annual wage of $30,740.

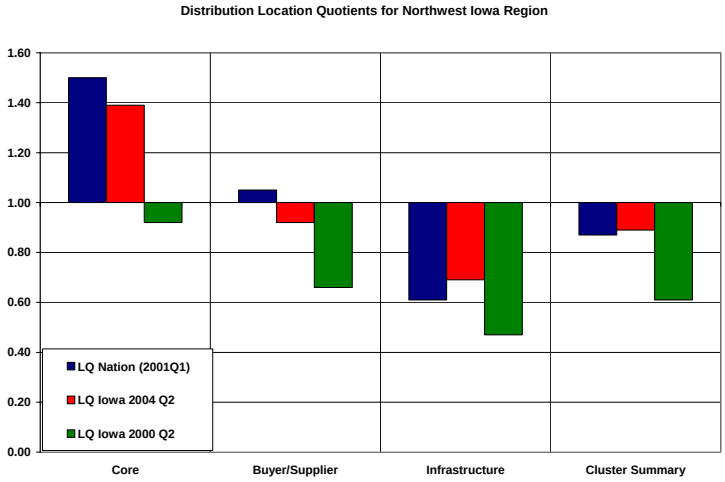
Lighting and Electrical Equipment

Industries in the core include electric lamp bulb and part manufacturing, lighting fixture manufacturing, small electrical appliance manufacturing, electrical equipment manufacturing, and battery manufacturing. With state and nation locations at 1.53 and 1.55 respectively, this cluster would appear to have a strong presence in the region. Employment is at 231 and has been going down since 2000. Additionally, the average annual wage of $24,844 is considerably lower than the state average annual wage of $30,740.



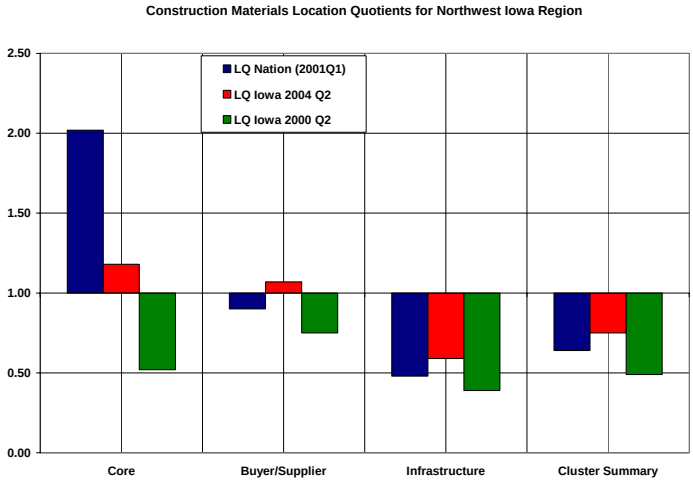
Distribution

The distribution cluster consists primarily of wholesale trade and trucking. Wages in the distribution cluster of $30,947 are above the state average. Employment stood at 5,300 in second quarter 2004. While distribution is a significant part of the regional economy, wholesale trade does not necessarily bring wealth to the region, and trucking is a significant portion of Transportation and Logistics. The cluster is vital to the infrastructure of most other clusters in the region however.



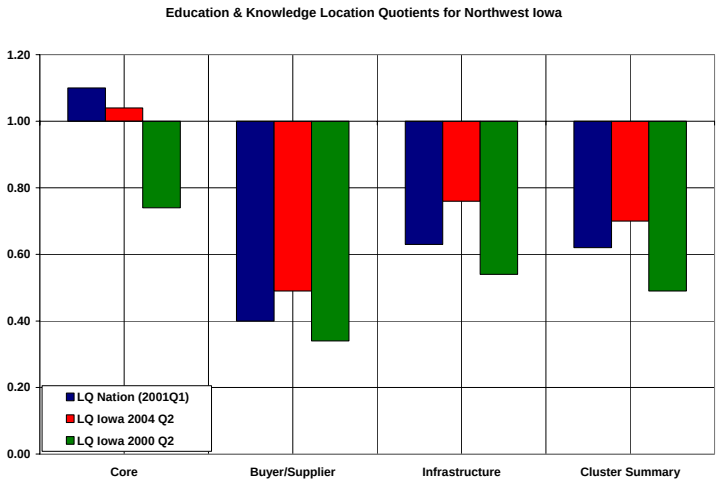
Construction Materials

This cluster has a region to state location quotient of 1.18 and an area to nation location quotient of



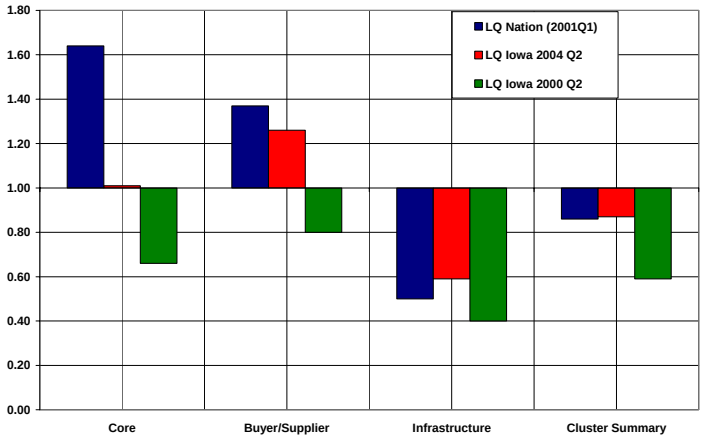
2.02. Core industries in this consist of plywood and engineered wood manufacturing; millwork; asphalt paving and roofing materials; clay building materials and refractories manufacturing; ready-mix concrete manufacturing; concrete pipe, brick and block manufacturing; ornamental and architectural metal products; construction machinery manufacturing; and cabinet and countertop manufacturing. Approximately half the employment in this cluster is in ready-mix concrete manufacturing. With steadily increasing employment and an average annual wage of $34,880, this cluster is strong and healthy. However, most industries in this cluster are essential to other clusters as part of the infrastructure.

Education and Knowledge



Core industries in this include research, elementary and secondary schools, junior colleges, colleges and universities, business and secretarial schools, computer training, management training, technical and trade schools, fine arts schools (including dance schools), sports and recreation instruction. The education and knowledge cluster has strong locations quotients: 1.04 region to state and 1.10 region to nation. However, 3,546 employees of a total of 4,491 are employed in elementary and secondary schools. This heavy concentration in one industry influences the location quotients and skews the results. The average wage of $27,428 is significantly less than the state average of $30,740. Education and knowledge is one of the most critical components of the infrastructure in all clusters. While this cluster may not necessarily generate wealth, it provides crucial support to those industries that do.

Motor Driven Products

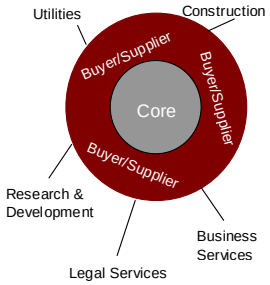


The motor driven products cluster has a region to state location quotient of 1.01 and a region to nation of 1.64, with net cluster loss of 35 jobs since 2000. Wages in this cluster of $27,448 are below the state average. Most of the employment in this cluster is in agricultural implement manufacturing and motor vehicle body and trailer manufacturing.

Other core industries in this cluster are construction machinery manufacturing, metal machinery manufacturing, turbine and power transmission equipment manufacturing, automobile and light truck manufacturing, heavy duty truck manufacturing, aerospace products and parts manufacturing, and ship and boat building.

SUPPORT INDUSTRIES

Buyer/Supplier Layer Industries



The table on the next page shows the location quotients for buyer/supplier industries with a location quotient region to state greater than 1.00. Although many of the buyer/supplier location quotients are quite high, this does not necessarily imply that cluster development should be encouraged.

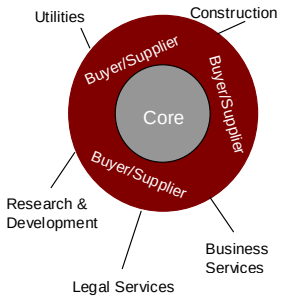
Other factors, such as production costs and labor availability, preclude the further development of some of these clusters. These clusters include furniture, footwear, motor driven products, fishing, textiles, power transmission, leather production and sporting goods.

Infrastructure Layer Industries

Many infrastructure industries have very low location quotients, 0.80 or less, in Northwest Iowa. However, this is not unusual for infrastructure industries. The location quotient measures export activity; and, in general, infrastructure industries do not export goods or services but provide the necessary support for industries that do.

Many of the clusters share the same infrastructure industries.

- Research and testing
- Education
- Wholesale trade
- Business services
- Financial services
- Management
- Accounting
- Legal services
- Employment services



A number of these industries, particularly those in trade and professional and business services have wages in the study region higher than the statewide annual average for 2004 second quarter. This may indicate opportunities for small business development and entrepreneurship in the region.

INDUSTRY PROJECTIONS

Statewide Projections

Industry projections indicate that chemical production, plastics and rubber products, and truck transportation all expect to grow through 2012 statewide. Chemical production is projected to add 723 jobs statewide, plastics and rubber products is expected to add 15.64 percent or 2,231 jobs, and truck transportation is projected to grow by 4,132 jobs. Projections are not available for Biotechnology industries and the pharmaceuticals industry is a sub-sector of chemical production.

Statewide Projections (2002 - 2012)

Industry Description	2002 (Base Year)	2012 (Projection)	Growth	Percent Change
Total All Industries (Nonag)	1,580,704	1,793,614	212,910	13.47%
Heavy and Civil Engineering Construction	9,101	9,735	634	6.97%
Specialty Trade Contractors	39,475	47,444	7,969	20.19%
Food Manufacturing	50,126	52,973	2,847	5.68%
Wood Product Manufacturing	11,728	17,198	5,470	46.64%
Printing and Related Support Activities	8,913	9,466	553	6.20%
Chemical Manufacturing	7,233	7,956	723	10.00%
Plastics and Rubber Products	14,263	16,494	2,231	15.64%
Nonmetallic Mineral Product Manufacturing	7,200	7,748	548	7.61%
Primary Metal Manufacturing	7,494	7,644	150	2.00%
Fabricated Metal Manufacturing	20,692	21,892	1,200	5.80%
Machinery Manufacturing	32,070	34,985	2,915	9.09%
Transportation Equipment Manufacturing	18,648	22,780	4,132	22.16%
Motor Vehicle and Parts Dealers	22,537	26,610	4,073	18.07%
Air Transportation	541	657	116	21.44%
Water Transportation	373	477	104	27.88%
Truck Transportation	26,648	34,119	7,471	28.04%
Transit and Ground Passenger Transport	1,677	2,008	331	19.74%
Support Activities for Transportation	2,604	3,325	721	27.69%
Couriers and Messengers	5,358	7,222	1,864	34.79%
Warehousing and Storage	7,569	10,834	3,265	43.14%
Publishing Industries	10,976	12,539	1,563	14.24%
Telecommunications	10,259	11,204	945	9.21%
Internet Service Providers, Web Search	8,333	12,835	4,502	54.03%
Professional, Scientific, and Technical Services	37,499	46,874	9,375	25.00%
Administrative and Support Services	57,716	79,162	21,446	37.16%
Educational Services	154,968	170,210	15,242	9.84%
Ambulatory Health Care Services	42,078	54,701	12,623	30.00%
Hospitals	60,144	65,939	5,795	9.64%
Nursing and Residential Care Facilities	50,662	64,638	13,976	27.59%
Social Assistance	21,206	29,260	8,054	37.98%
Accommodation	15,264	17,554	2,290	15.00%
Food Services and Drinking Places	88,697	97,307	8,610	9.71%
Repair and Maintenance	13,520	15,370	1,850	13.68%
Personal and Laundry Services	11,990	12,590	600	5.00%
Religious, Grantmaking, Civic, Professional Organizations	31,263	34,257	2,994	9.58%

Source: Iowa Workforce Development, Industry Projections

For more information on industry projections, please visit www.iowaworkforce.org/lmi/publications/indprojhome.html

Regional Projections—Lyon, Osceola, O'Brien, Sioux Counties

Industry Description	NAICS Code	2002 Estimated Employment	2012 Projected Employment	Total Growth	Percent Change	Area Share 2012
Total All Industries	**000**	**31,755**	**35,750**	**3,995**	**12.6%**	**2.0%**
Utilities	221	125	105	-20	-16.0%	1.4%
Construction of Buildings	236	360	385	25	6.9%	2.4%
Heavy and Civil Engineering Construction	237	110	110	0	0.0%	1.1%
Specialty Trade Contractors	238	740	855	115	15.5%	1.8%
Food Manufacturing	311	1,635	1,650	15	0.9%	3.1%
Textile Mills	313	*	*	*	*	*
Textile Product Mills	314	*	*	*	*	*
Apparal Manufacturing	315	600	475	-125	-20.8%	26.8%
Wood Product Manufacturing	321	565	760	195	34.5%	4.4%
Paper Manufacturing	322	335	320	-15	-4.5%	7.1%
Printing and Related Support Activities	323	120	130	10	8.3%	1.4%
Chemical Manufacturing	325	565	745	180	31.9%	9.4%
Plastics and Rubber Products	326	320	395	75	23.4%	2.4%
Nonmetallic Mineral Product Manufacturing	327	270	305	35	13.0%	3.9%
Primary Metal Manufacturing	331	*	*	*	*	*
Fabricated Metal Manufacturing	332	405	445	40	9.9%	2.0%
Machinery Manufacturing	333	810	865	55	6.8%	2.5%
Computer and Electronic Product	334	155	160	5	3.2%	1.3%
Electrical Equipment, Appliance and Component Manufac.	335	235	220	-15	-6.4%	2.0%
Transportation Equipment Manufacturing	336	585	700	115	19.7%	3.1%
Furniture and Related Product	337	60	65	5	8.3%	0.6%
Miscellaneous Manufacturing	339	20	15	-5	-25.0%	0.4%
Air Transportation	481	10	10	0	0.0%	1.8%
Rail Transportation	482	15	10	-5	-33.3%	0.3%
Truck Transportation	484	600	795	195	32.5%	2.3%
Transit and Ground Passenger Transport	485	30	40	10	33.3%	2.0%
Pipeline Transportation	486	*	*	*	*	*
Support Activities for Transportation	488	*	*	*	*	*
Postal Service	491	180	165	-15	-8.3%	1.8%
Couriers and Messengers	492	*	*	*	*	*
Warehousing and Storage	493	*	*	*	*	*
Publishing Industries	511	170	170	0	0.0%	1.3%
Motion Picture and Sound Recording	512	*	*	*	*	*
Broadcasting (except Internet)	515	30	30	0	0.0%	1.0%
Telecommunications	517	80	85	5	6.3%	0.8%
Internet Service Providers, Web Search	518	25	30	5	20.0%	0.2%
Professional, Scientific, and Technical Services	541	645	960	315	48.8%	2.0%
Management of Companies and Enterprises	551	10	60	50	500.0%	0.6%
Administrative and Support Services	561	225	250	25	11.1%	0.3%
Waste Management and Remediation	562	55	55	0	0.0%	2.1%
Educational Services	611	3,640	3,960	320	8.8%	2.3%
Ambulatory Health Care Services	621	465	630	165	35.5%	1.1%
Hospitals	622	1,330	1,430	100	7.5%	2.2%
Nursing and Residential Care Facilities	623	1,540	2,115	575	37.3%	3.3%
Social Assistance	624	605	805	200	33.1%	2.8%
Performing Arts, Spectator Sports, and Related Industries	711	15	20	5	33.3%	0.5%
Amusement, Gambling, and Recreation Industries	713	160	155	-5	-3.1%	0.8%
Accommodation	721	110	135	25	22.7%	0.8%
Food Services and Drinking Places	722	1,525	1,655	130	8.5%	1.7%
Repair and Maintenance	811	315	375	60	19.0%	2.4%
Personal and Laundry Services	812	200	235	35	17.5%	1.9%
Religious, Grantmaking, Civic, Professional Organizations	813	650	720	70	10.8%	2.1%
Private Households	814	20	20	0	0.0%	1.3%
Federal Government	910	85	75	-10	-11.8%	0.8%
State Government, Excluding Education and Hospitals	920	85	85	0	0.0%	0.4%
Local Government, Excluding Education and Hospitals	930	1,430	1,500	70	4.9%	2.5%

* Information for this NAICS suppressed
Totals may not equal due to rounding
Source: Labor Market and Economic Research Bureau, Iowa Workforce Development

Regional Projections—Cherokee, Ida, Plymouth, Monona, Woodbury Counties

Industry Description	NAICS Code	2002 (Base Year)	2012 (Projection)	Growth	Percent Change	Area Share 2012
Total All Industries	**000**	**41,917**	**47,530**	**5,613**	**13.39%**	**4.95%**
Support Activities for Mining	213	*	*	*	*	0.00%
Utilities	221	788	678	-110	-13.96%	8.85%
Construction of Buildings	236	883	965	82	9.29%	5.96%
Heavy and Civil Engineering Construction	237	788	775	-13	-1.65%	7.96%
Specialty Trade Contractors	238	1,843	2,040	197	10.69%	4.30%
Food Manufacturing	311	6,349	6,827	478	7.53%	12.89%
Beverage and Tobacco Product	312	169	180	11	6.51%	14.41%
Textile Mills	313	*	*	*	*	0.00%
Textile Product Mills	314	40	36	-4	-10.00%	4.63%
Apparal Manufacturing	315	199	131	-68	-34.17%	7.43%
Leather and Allied Product Manufacturing	316	32	29	-3	-9.38%	3.37%
Wood Product Manufacturing	321	401	699	298	74.31%	4.06%
Paper Manufacturing	322	330	356	26	7.88%	7.88%
Printing and Related Support Activities	323	148	153	5	3.38%	1.62%
Petroleum and Coal Products Manufacturing	324	36	34	-2	-5.56%	7.38%
Chemical Manufacturing	325	256	227	-29	-11.33%	2.85%
Plastics and Rubber Products	326	174	242	68	39.08%	1.47%
Nonmetallic Mineral Product Manufacturing	327	317	338	21	6.62%	4.36%
Primary Metal Manufacturing	331	*	*	*	*	0.00%
Fabricated Metal Manufacturing	332	561	596	35	6.24%	2.72%
Machinery Manufacturing	333	866	885	19	2.19%	2.53%
Computer and Electronic Product	334	*	*	*	*	0.03%
Electrical Equipment, Appliance and Component Manufac.	335	28	33	5	17.86%	0.29%
Transportation Equipment Manufacturing	336	652	698	46	7.06%	3.06%
Furniture and Related Product	337	86	91	5	5.81%	0.92%
Miscellaneous Manufacturing	339	68	62	-6	-8.82%	1.34%
Air Transportation	481	38	40	2	5.26%	6.09%
Rail Transportation	482	173	163	-10	-5.78%	5.00%
Water Transportation	483	*	*	*	*	0.00%
Truck Transportation	484	1,322	1,704	382	28.90%	4.99%
Transit and Ground Passenger Transport	485	104	111	7	6.73%	5.53%
Pipeline Transportation	486	27	28	1	3.70%	10.45%
Scenic and Sightseeing Transportation	487	*	*	*	*	0.00%
Support Activities for Transportation	488	144	175	31	21.53%	5.26%
Postal Service	491	515	492	-23	-4.47%	5.38%
Couriers and Messengers	492	244	346	102	41.80%	4.79%
Warehousing and Storage	493	995	1,428	433	43.52%	13.18%
Publishing Industries	511	338	341	3	0.89%	2.72%
Motion Picture and Sound Recording	512	76	82	6	7.89%	3.57%
Broadcasting (except Internet)	515	254	234	-20	-7.87%	7.66%
Internet Publishing and Broadcasting	516	23	37	14	60.87%	9.79%
Telecommunications	517	293	332	39	13.31%	2.96%
Internet Service Providers, Web Search	518	19	29	10	52.63%	0.23%
Other Information Services	519	*	*	*	*	2.52%
Professional, Scientific, and Technical Services	541	1,187	1,385	198	16.68%	2.95%
Management of Companies and Enterprises	551	176	227	51	28.98%	2.12%
Administrative and Support Services	561	3,144	3,703	559	17.78%	4.68%
Waste Management and Remediation	562	112	117	5	4.46%	4.36%
Educational Services	611	6,475	6,933	458	7.07%	4.07%
Ambulatory Health Care Services	621	2,797	3,666	869	31.07%	6.70%
Hospitals	622	3,952	4,144	192	4.86%	6.28%
Nursing and Residential Care Facilities	623	3,181	3,980	799	25.12%	6.16%
Social Assistance	624	1,314	1,758	444	33.79%	6.01%

* Data suppressed due to confidentiality

Source: Labor Market and Economic Research Bureau, Iowa Workforce Development

OCCUPATIONS AND INDUSTRY CLUSTERS

Occupational Skill Clusters in Industry Cluster Analysis

While industry cluster analysis is a key factor in economic analysis, occupational cluster analysis may also provide insight into the regional economy.

In Edward J. Feser's report in October 2001 "What regions do rather than make: A proposed set of knowledge-based occupational clusters," he proposed using a knowledge-based occupational cluster system. Feser used elements from the Employment and Training Administration's database Occupational Information Network (O'NET), Bureau of Labor Statistics' Staffing Patterns Matrix (SP), and Occupational Employment Statistics (OES). Feser identified 21 knowledge-based occupation clusters.

Knowledge-based Occupation Clusters

- Engineers, technicians, architects
- Medical scientists, physicians and related
- Computer engineers and programmers
- Natural resource scientists, geoscientists
- Educators, general
- Agricultural scientists, veterinarians, horticulturalists
- Counselors, specialized educators, therapists
- Supervisors and management personnel
- Financial and related personnel
- Life scientists, lab technicians
- Communications systems specialists, technicians
- Transportation, distribution workers
- Specialized health workers, technicians
- Specialized mechanics, repairers, technicians
- Law enforcement and safety workers
- Legal, clerical and administrative support staff
- Artists and performers
- Construction workers
- Semi-skilled service workers
- Skilled laborers and machine operators
- Semi-skilled laborers[9]

In order to use occupational skill clusters within industry cluster analysis, the OES codes have been cross-referenced with the Standard Occupational Classification (SOC) code, which have replaced the OES codes in occupation statistical analysis.

[9] *Feser, Edward J. What regions do rather than make: A proposed set of knowledge-based occupation clusters,*

PROJECTIONS

Occupational projections for the selected industry clusters show the five clusters combined are expected to gain 2,715 jobs by 2010.

> "The BLS projections are based on a long-term view of the U.S. economy that assumes a long-run full-employment economy in which labor markets clear. As a result, BLS projections address the question, "How would employment in industries and occupations grow if the economy were to operate at its full potential a decade from now?"

This presupposes that the occupational and industrial mix remains the same over time. Occupational projections have two major inputs: industry projections and staffing patterns derived from the Occupational Employment Statistics survey. Projections are made with a specific industry and occupational mix at a specific point in time. If the industry mix were to change at any point following the base year, then the projection would not be reflective of changes that actually occur.

High-Wage Occupations

In **Biotechnology**, the occupations with the highest average annual wage appear in the agricultural scientists, veterinarians, and horticulturalists occupational skill cluster. Other high-wage skill clusters include supervisors and management personnel; medical scientists, physicians and related occupations; and, computer engineers and programmers. The five largest occupations within these skill clusters have an average annual wage in excess of $39,000. Of the high-wage skill clusters, most are projected to add at least five employees over the next five years.

High-Wage Occupations and Skill Clusters in Biotechnology

Cluster Title	Occupational Title	Base Year 2000	Proj Year 2010	Average Annual Wage
Agricultural scientists, veterinarians, horticulturalists	Veterinarians	40	60	*
Supervisors and management personnel	General and Operations Managers	275	290	$74,256
Computer engineers and programmers	Computer Systems Analysis	15	20	$56,784
Computer engineers and programmers	Computer Systems Analysts	15	20	$56,784
Legal, clerical, and administrative support staff	Purchasing Agents and Buyers, Farm Products	95	100	$54,163
Financial and related personnel	Financial Managers	55	65	$53,435
Financial and related personnel	First-Line Supervisors/Managers of Non-Retail Sales Workers	45	50	$48,630
Supervisors and management personnel	Industrial Production Managers	95	95	$47,590
Financial and related personnel	Accountants and Auditors	85	90	$39,541

Occupations with the highest average annual wage in the **Chemical Production** industry cluster appear in the supervisors and management personnel occupational skill cluster. The top five skill clusters are agricultural scientists, veterinarians, and horticulturalists; supervisors and management personnel; semi-skilled service workers, computer engineers and programmers; and communications systems specialists and technicians. The top five occupations in these skill clusters have an average annual wage in excess of $57,000.

High-Wage Occupations and Skill Clusters in Chemical Production				
Cluster Title	**Occupational Title**	**Base Year 2000**	**Proj Year 2010**	**Average Annual Wage**
Agricultural scientists, veterinarians, horticulturalists	Veterinarians	5	5	*
Supervisors and management personnel	Chief Executives	45	55	$96,054
Supervisors and management personnel	General and Operations Managers	50	60	$74,256
Semi-skilled service workers	Sales Managers	30	40	$62,442
Computer engineers and programmers	Engineering Managers	5	5	$61,630
Communications systems specialists, technicians	Managers, All Other	5	5	$57,200
Computer engineers and programmers	Managers, All Other	5	5	$57,200
Supervisors and management personnel	Managers, All Other	5	5	$57,200
Semi-skilled service workers	Marketing Managers	10	10	$55,494
Financial and related personnel	Financial Managers	15	15	$53,435

The supervisors and management personnel occupational skill cluster has the highest average annual wage in the **Pharmaceuticals** industry cluster. The top five occupational skill clusters have an average annual wage in excess if $70,000. The top five skill clusters in terms of wages are agricultural scientists, veterinarians, horticulturalists; supervisors and management personnel; communications systems specialists and technicians; computer engineers and programmers; and semi-skill service workers. Please see table on page 26.

High-Wage Occupations and Skill Clusters in Pharmaceuticals				
Cluster Title	**Occupational Title**	**Base Year 2000**	**Proj Year 2010**	**Average Annual Wage**
Agricultural scientists, veterinarians, horticulturalists	Veterinarians	5	5	*
Supervisors and management personnel	Chief Executives	5	5	$96,054
Communications systems specialists, technicians	Managers, All Others	5	5	$79,002
Computer engineers and programmers	Managers, All Others	5	15	$79,002
Supervisors and management personnel	Managers, All Others	5	5	$79,002
Semi-skilled service workers	Marketing Managers	5	5	$74,256
Supervisors and management personnel	General and Operations Managers	10	10	$74,256
Financial and related personnel	Financial Managers	5	5	$53,435
Semi-skilled service workers	Sales Managers	10	10	$41,517

Supervisors and management personnel clusters show the highest average wages in the **Processed Food** industry cluster. The top three occupations in the skill clusters show average annual wages of at least $70,000. However, the occupation expected to show the most growth through 2010, slaughterers and meat packers, has an average annual wage of $21,491, well below the region average and the state average.

High-Wage Occupations and Skill Clusters in Processed Food				
Cluster Title	**Occupational Title**	**Base Year 2000**	**Proj Year 2010**	**Average Annual Wage**
Computer engineers and programmers	Computer & Information Systems Managers	75	100	*
Supervisors and management personnel	Chief Executives	295	325	$96,054
Communications systems specialists, technicians	Managers, All Other	205	215	$79,002
Supervisors and management personnel	General & Operations Manager	1360	1490	$74,256
Computer engineers and programmers	Computer Systems Analysts	65	85	$56,784
Financial and related personnel	Financial Managers	190	210	$53,435
Financial and related personnel	First-Line Supervisors/Managers of Non-Retail Sales Workers	365	400	$48,630
Supervisors and management personnel	Industrial Production Managers	155	165	$47,590
Semi-skilled service workers	Sales Managers	120	155	$41,517

In the **Plastics** industry cluster, the communications systems specialists and technicians; computer engineers and programmers; and supervisors and management personnel occupational skill clusters have the highest average annual wage. The top five occupations within the clusters have average annual wages in excess of $47,000.

High-Wage Occupations and Skill Clusters in Plastics				
Cluster Title	**Occupational Title**	**Base Year 2000**	**Proj Year 2010**	**Average Annual Wage**
Communications systems specialists, technicians	Managers, All Other	5	5	$79,002
Computer engineers and programmers	Managers, All Other	5	5	$79,002
Supervisors and management personnel	Managers, All Other	5	5	$79,002
Supervisors and management personnel	General and Operations Managers	10	10	$74,256
Supervisors and management personnel	Industrial Production Managers	5	5	$47,590
Semi-skilled service workers	Sales Representatives	0	5	$43,326
Semi-skilled service workers	Sales Managers	5	5	$41,517
Financial and related personnel	Accountants and Auditors	5	10	$39,541
Supervisors and management personnel	First-Line Supervisors/Managers of Production and Operating Workers	45	45	$38,126
Engineers, technicians, architects	Electricians	5	5	$32,344

Supervisors and management personnel skill cluster shows the highest average wage in the **Transportation and Logistics** industry cluster. The top five occupations in the skill clusters show average annual wages of at least $50,000.

High-Wage Occupations and Skill Clusters in Transportation				
Cluster Title	**Occupational Title**	**Base Year 2000**	**Proj Year 2010**	**Average Annual Wage**
Supervisors and management personnel	Chief Executives	10	10	$96,054
Supervisors and management personnel	General and Operations Managers	50	60	$74,256
Semi-skilled service workers	Marketing Managers	5	5	$55,494
Computer engineers and programmers	Computer and Information Systems Managers	0	5	$54,642
Financial and related personnel	Financial Managers	5	5	$53,435
Communications systems specialists, technicians	Transportation, Storage, and Distribution Managers	25	30	$51,314
Financial and related personnel	First-Line Supervisors/Managers of Non-Retail Sales Workers	5	10	$48,630
Semi-skilled service workers	Sales Managers	0	5	$41,517
Supervisors and management personnel	Administrative Services Managers	5	5	$38,459
Semi-skilled service workers	Advertising and Promotions Managers	0	5	$38,293

INDUSTRY CLUSTERS IN THE UPPER MIDWEST REGION

Due to confidentiality rules, data obtained from the other states was necessary to review the clusters at the three-digit NAICS level. Because of this suppression, detailed data is limited. For example, data obtained from Iowa records are analyzed at the five-digit level which allows for analysis of more specific industries. Data obtained from other states can not be analyzed at broader levels, which is what has been accomplished in this report. For purposes of this report, the broader levels do provide a realistic look at concentration levels by employment in the defined "core" industries outside the state, thus showing where concentrations do exist.

See maps on the following pages.

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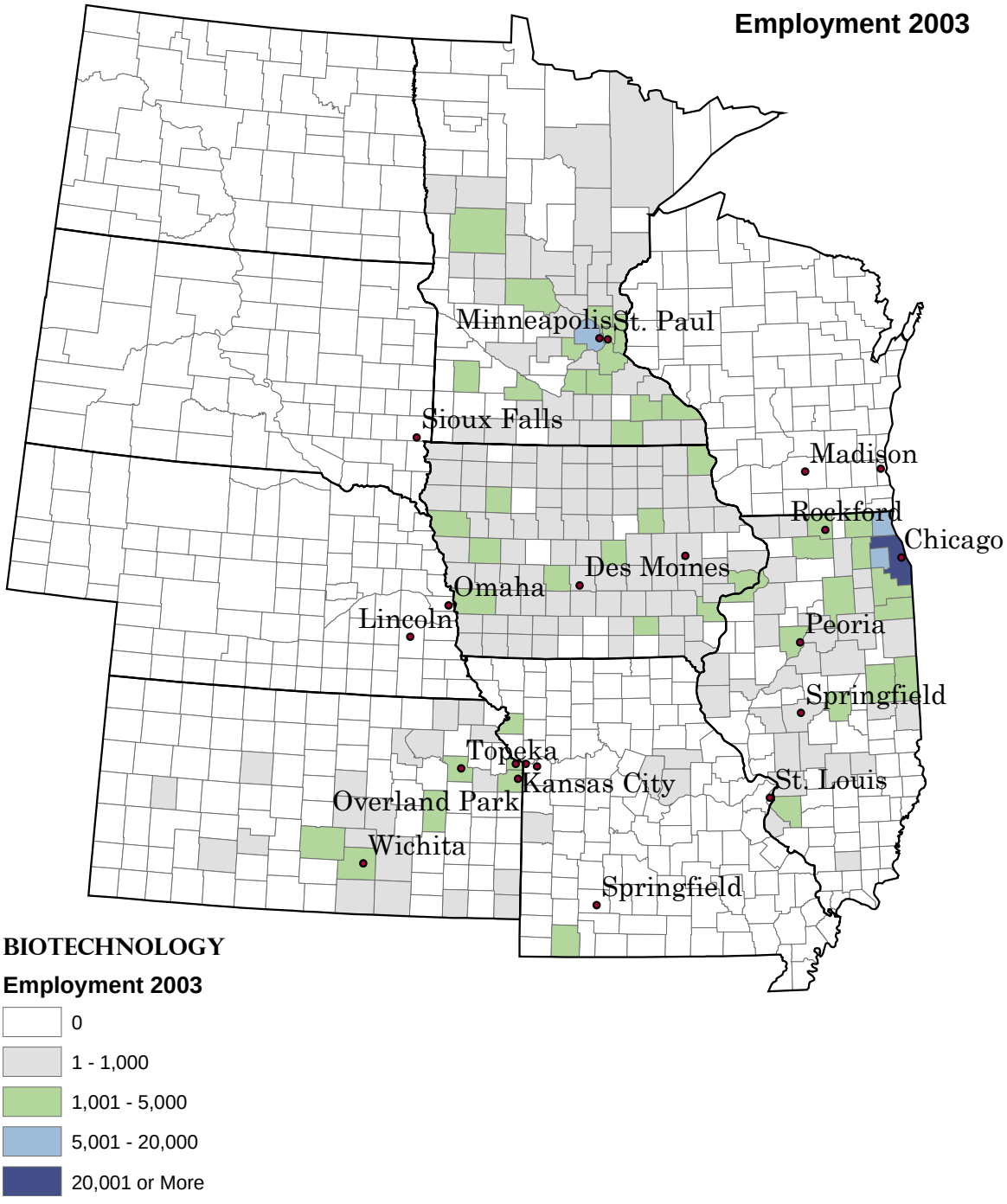
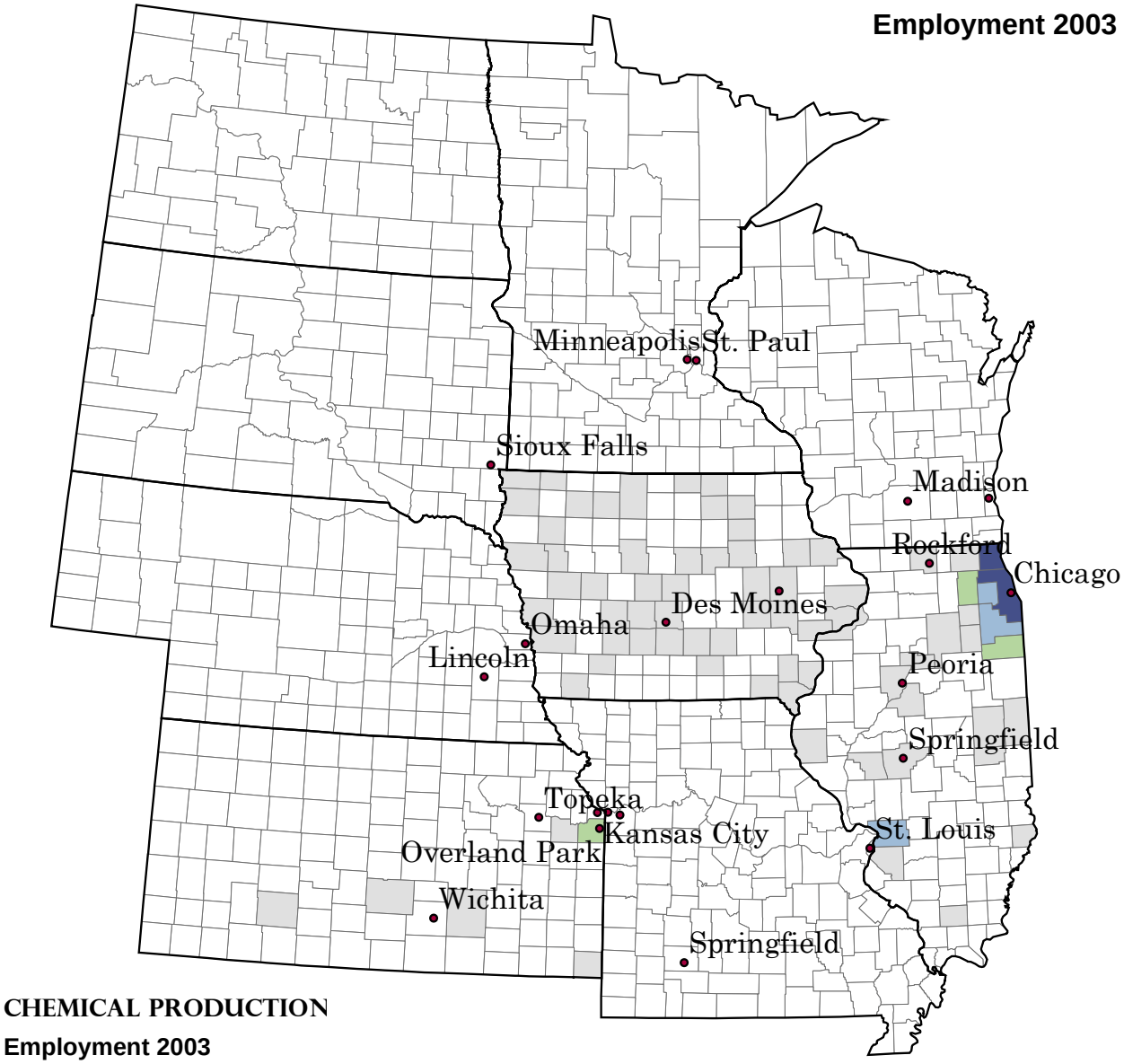
BIOTECHNOLOGY CORE INDUSTRIES



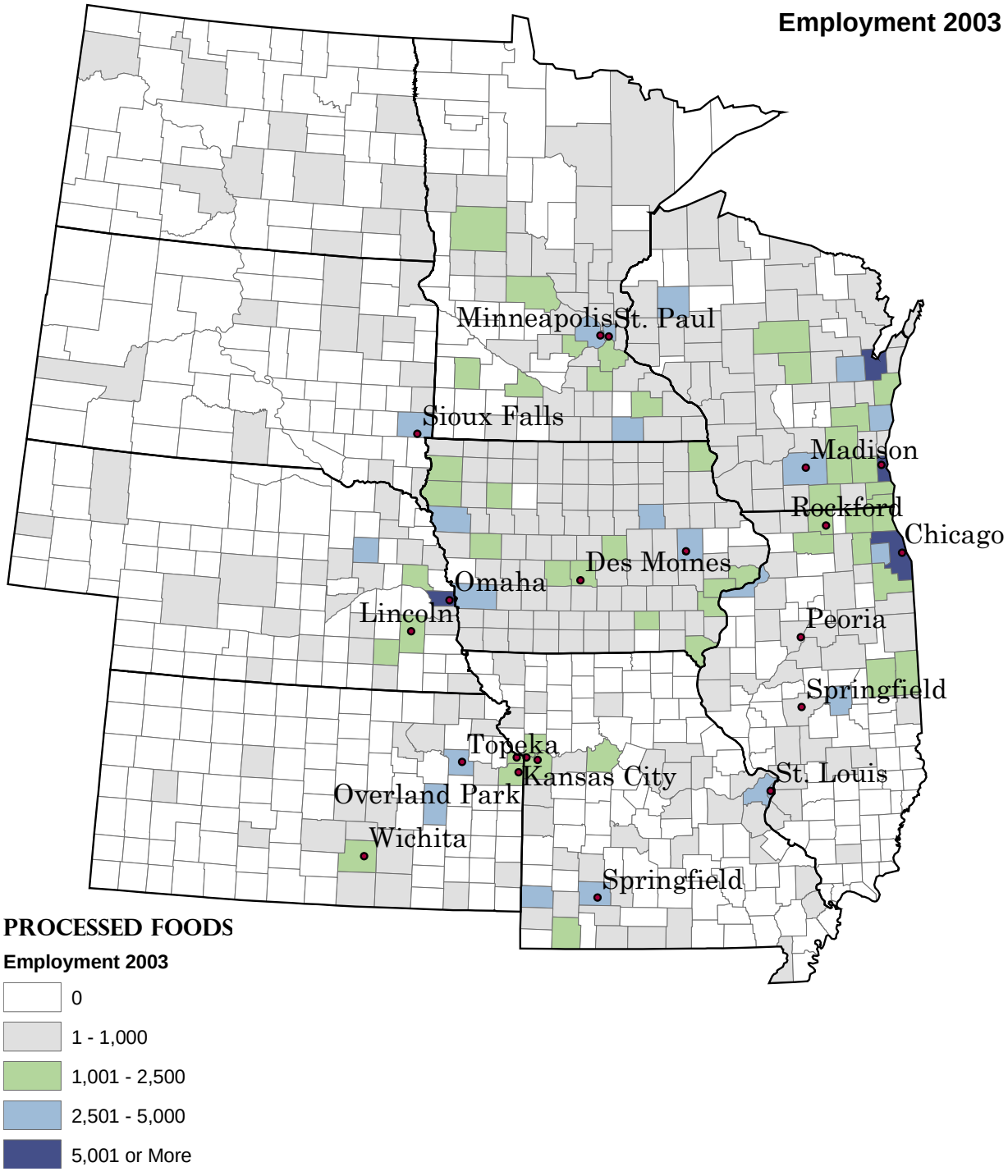
Biotechnology core industries in the Midwest Region are most prevalent in Iowa; however, Chicago and Minneapolis would offer opportunities for recruitment.

CHEMICAL PRODUCTION CORE INDUSTRIES



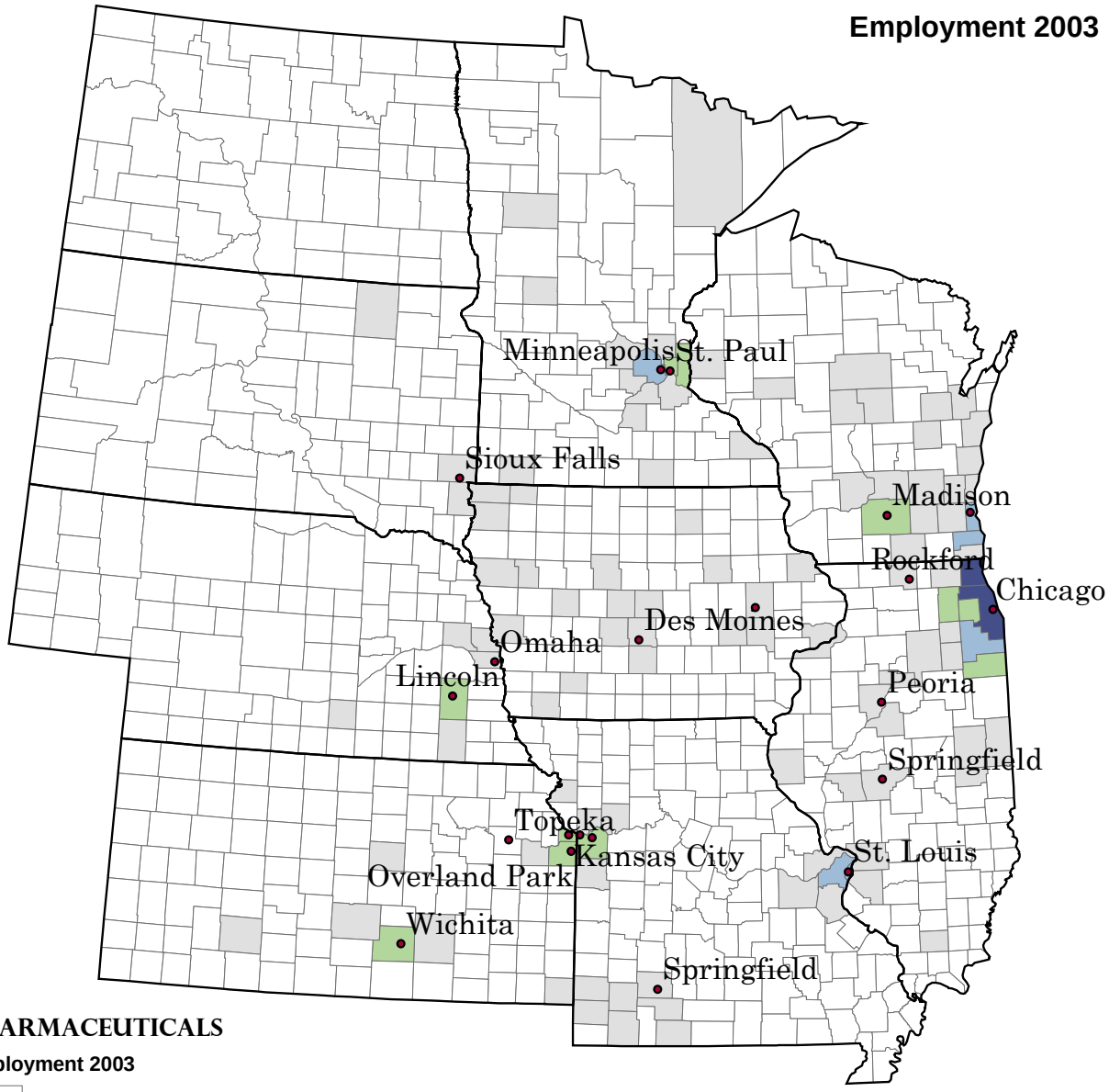
The Chicago-Rockford area and St. Louis emerge as the largest centers of Chemical Production in the Midwest Region, making them prime targets for recruitment.

PROCESSED FOODS CORE INDUSTRIES



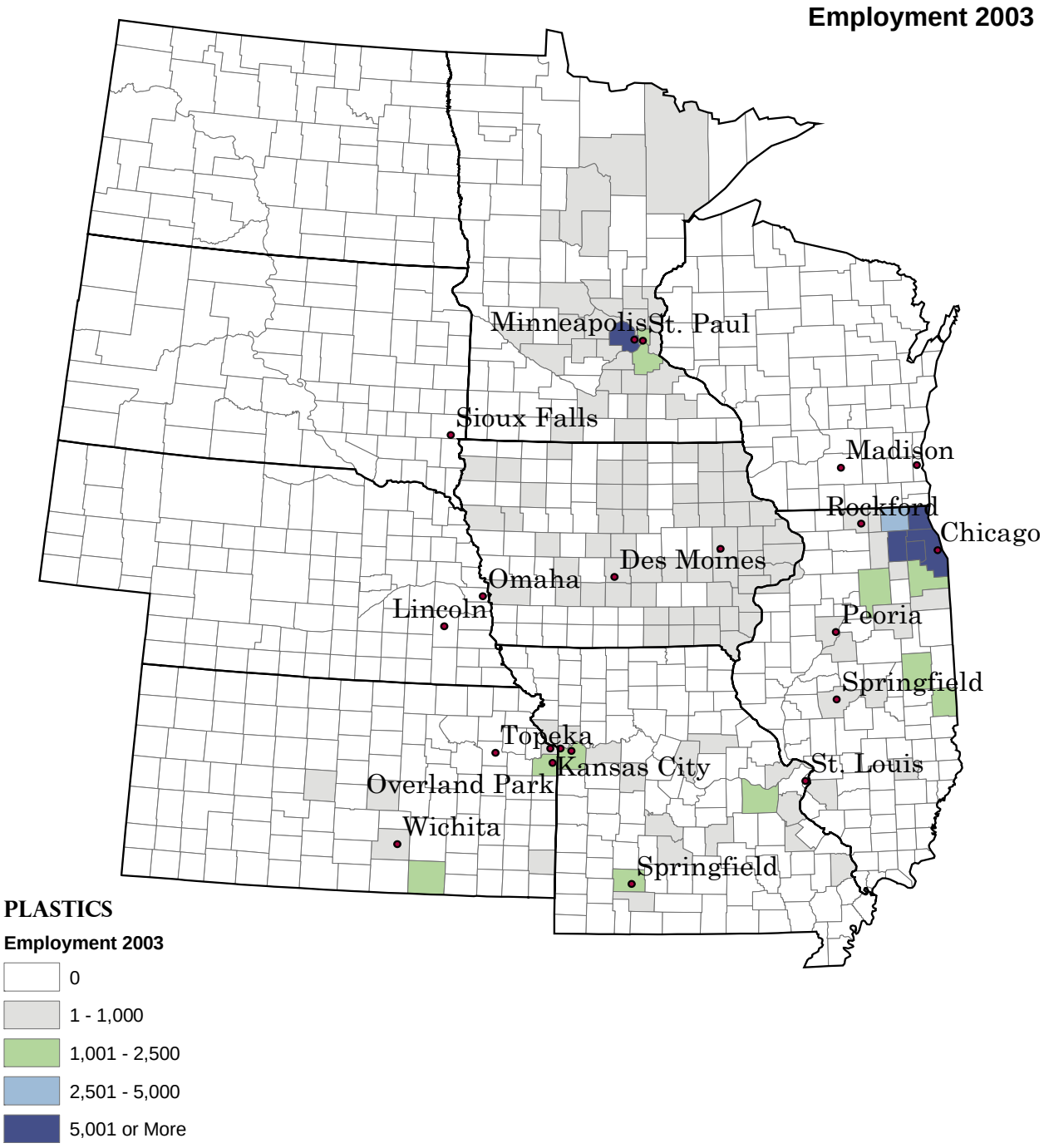
Processed Foods has a strong presence in Iowa. Outside Iowa, the cluster is strongest in Chicago, southeast Wisconsin, and Lincoln, NE.

PHARMACEUTICALS CORE INDUSTRIES



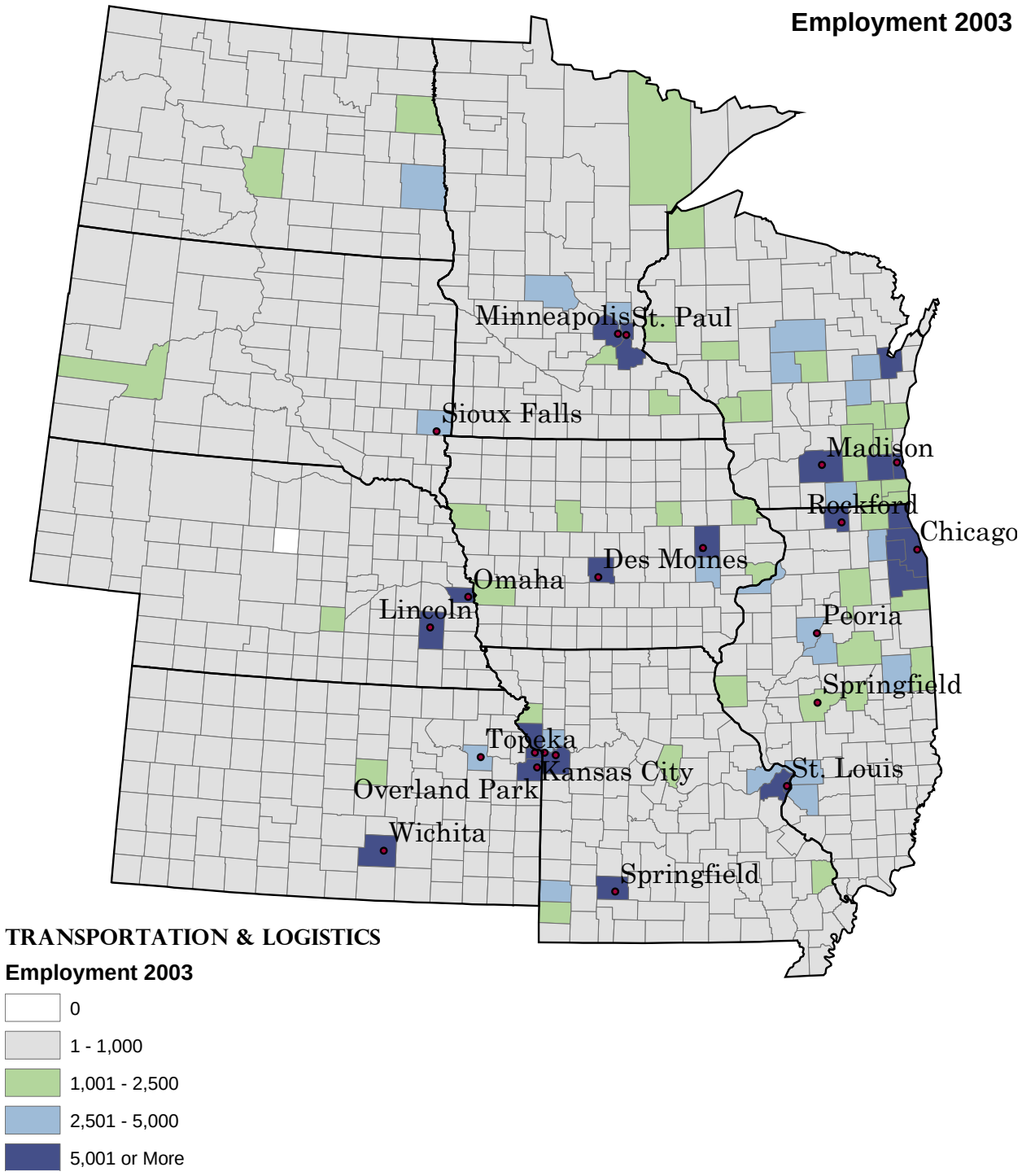
The Pharmaceuticals cluster centers around large population areas such as Minneapolis-St. Paul, Chicago-Rockford-Madison-Milwaukee, and St. Louis.

PLASTICS CORE INDUSTRIES



In the Midwest Region, Plastics core industries are most concentrated in the Chicago-Rockford area and Minneapolis-St. Paul, with lesser activity in Kansas City and Springfield.

TRANSPORTATION & LOGISTICS CORE INDUSTRIES



The Transportation and Logistics cluster has high levels of employment throughout the Midwest Region.

ECONOMIC IMPACTS OF ADDING JOBS IN CLUSTER CORE INDUSTRIES

Biotechnology

By adding just 300 new jobs in the Biotechnology core industries, an additional 950 jobs could potentially be added either indirectly or as a result of industry-to-industry (induced) transactions for a total of 1,450 new jobs. The largest employment gains would be in farming; wholesale trade; truck transportation; warehousing and storage; real estate; architectural and engineering services; management of companies and enterprises; and automotive repair and maintenance. Job creation in this cluster has the capability of generating $15,570,200 in total tax revenue, including federal, state and local government. Value added (employee compensation, proprietor income, other property income, indirect business tax) as a direct result of adding 300 new jobs is $20,567,600, while the total value added including direct, indirect, and induced is $57,032,043.

Chemical Production/Pharmaceuticals

If just 100 new jobs were added to basic organic Chemical Production and 100 new jobs were added in pharmaceutical and medicine manufacturing, a total of 750 jobs would be created. Other than the direct impact of adding 200 jobs to Chemical Production and Pharmaceuticals, jobs would be added in wholesale trade, transportation, architectural and engineering services; management of companies and enterprises; and commercial machinery repair and maintenance. The subsequent tax impact is expected to be $11,517,600, while total value added could be $47,577,000.

RECOMMENDATIONS

Recommendations

The primary recommendation is to organize industry programs around current clusters, such as creating industry cluster associations, in each of the principal clusters to assist with dialogue among industry leaders, economic developers, and government agencies.

Recommendation: Achieve collaboration with existing industry businesses.

- Prepare a needs assessment and benchmark clusters. The data analysis tools, chiefly the input/output modeling software, gave a starting point. However, it is important do a survey of existing businesses to make sure the buyer/supplier industries listed for each of the clusters are valid. When preparing a needs assessment, focus on projected growth and development requirements of existing businesses –with core industries and buyer/supplier industries. Working with industry leaders in a benchmark process will enable developers to help identify the supply chain, education requirements, and workforce requirements.

- Organize industry programs around current clusters, such as creating industry cluster associations or ad hoc committees, in each of the principal clusters to assist with dialogue among industry leaders, economic developers, educators, and government agencies.

- Use the cluster associations to create an achievable vision or development plan for five years, ten years, and twenty years. The Regional Data Analysis Tool (RDAT) that is available through your local Workforce Development Center to track progress in employment and wage growth in specific industry clusters.

Recommendation: Retain, expand, and recruit new businesses to the area, focusing on Biotechnology, Chemical Production, and Pharmaceuticals.

- Develop a strategy for attracting new businesses and target specific businesses for recruitment. Make use of the executive summaries included for each of the six clusters. These summaries have been created for you specifically to market your region and include data potential new businesses will use in making their decision.

  Biotechnology, Chemical Production, and Pharmaceuticals share many of the same core and support industries; therefore, existing supply chains may offer incentives to draw businesses to the region. In order to create and sustain critical mass in these key clusters, recruit businesses in both the core and buyer/supplier industries. Based on multipliers and impact models, focus recruitment efforts on the following industries. The two– and three-digit NAICS codes are listed to assist in planning. For more information on NAICS codes, please visit www.census.gov/epcd/www/naics.html

11	Agriculture
311	Food manufacturing
324	Petroleum and coal products manufacturing
3251	Basic chemical manufacturing
3252	Resin, rubber and artificial fiber manufacturing
3253	Agricultural chemical manufacturing
3254	Pharmaceuticals and medicine manufacturing
3255	Paint, coating, and adhesive manufacturing
3259	All other chemical product and preparation manufacturing

- Invest in a business database such as InfoUSA or Harris Info Source, or collaborate with other regions to purchase the database. Another source of business information can be found at Kompass Business Search, a no-cost tool, at http://www4.kompass.com/kinl/index.php.

- Lessen the impact of imports by also targeting industries supplying to the core. Supplying industries are included in the list of buyer/supplier industries in this report.

- Identify potential sites for new businesses.

- Provide technical and management assistance to start-ups to boost the entrepreneurial spirit, retain current business, and encourage expansion, especially in infrastructure industries like business service and financial services.

Recommendation: Use clusters as the context for educating and training the workforce.

- Form partnerships between educators and cluster associations. The community colleges and four-year colleges and universities in the area already provide courses that support Biotechnology, Pharmaceuticals, Chemical Production and Processed Food. Connect and market these programs to the appropriate existing businesses in the region.
- Collaborate with industry cluster representatives on developing school-to-work, two-plus-two programs, internships, and experiential learning opportunities.
- Create career paths and encourage continuing education.

SUMMARY

Several main industry clusters emerge as either having a strong presence in the region and/or as having the potential for economic expansion. These industry clusters are Biotechnology, Chemical Production, Pharmaceuticals, Processed Food, Plastics, and Transportation and Logistics. An additional cluster, Power Generation, may have potential in the region. Impact statements would indicate that by concentrating efforts to grow Biotechnology and Chemical Production (including pharmaceuticals and medicine), it is possible that 2,100 jobs would be added in the region. Biotechnology, Chemical Production and Pharmaceuticals are all related clusters: Pharmaceuticals is a subset of Chemical Production, which in turn is a subset of Biotechnology. An increase in employment in one may result in an increase of activity of the others. These industry clusters have locations quotients that indicate an elevated concentration of activity in the region, as well as above-average wages. Based on employment and wages, Processed Food, Plastics and Transportation and Logistics not only give strong support to Biotechnology, Chemical Production and Pharmaceuticals, but also have the potential to become dynamic stand-alone clusters. Power Generation, especially wind power, has the potential to become a forceful cluster in the region. The regional economy may benefit most by focusing recruitment and retention efforts among these seven clusters. Support clusters such as agricultural products, production technology, and power transmission provide the natural resources and infrastructure necessary to sustain the principal clusters.

IOWA'S TARGETED CLUSTERS

In 1992, The Iowa Department of Economic Development and (IDED) the Wallace Technology Transfer Foundation commissioned the "Batelle study" to identify industries in which investments would be likely to yield high returns. These industries were selected because they:

- Had high growth potential,
- Paid higher than average wages, and
- Were industries with a good match for the competitive advantages offered by Iowa.

The industries targeted through this initiative included, among others, value-added agriculture, insurance and financial services, plastics, fabricated and primary metals, pharmaceuticals, instruments and measuring devices, and software development. While the list provided a good starting point for the state's marketing and other efforts, it was not intended to exclude firms in other industries that met the criteria for sound public investments.

In 1999, IDED commissioned a study by Stanford Research Institute (SRI) to re-examine targeted industries in light of Iowa's actual experience in the interim, and to update the industry sector analysis. This study also identified key competitive advantages for Iowa (including workforce quality, training capacity, physical infrastructure, quality of life, etc.) and ultimately identified three very broad industry clusters for future investments. They are:

- Life sciences (including production agriculture, value-added processing, pharmaceuticals)
- Advanced manufacturing (involving the rapid introduction of new processes), and
- Information solutions (including insurance, financial services, and information technology).

The "traded industry clusters" discussed in this report generally into these three broad "targeted clusters". Biotechnology, Chemical Production, Pharmaceuticals, and Processed Food all fit into the Life Sciences targeted cluster, and some industries within these clusters may fall into the Advanced Manufacturing targeted cluster, as would Plastics. While Transportation and Logistics does not fall into these any of these three targeted clusters, it does fall into another targeted cluster not in any previous study simply called "Distribution."

IOWA'S TRADED INDUSTRY CLUSTERS METHODOLOGY

Industry clusters, as defined by Michael E. Porter, were reviewed and industries within the clusters were identified by matching SIC's (Standard Industry Classification Code) to cluster definitions.

Once the core industries were defined, Implan (input/output modeling software created by the Minnesota Implan Group) was used to identify relationships among other industries. These relationships were then used to categorize buyer/supplier industries and infrastructure industries using NAICS.

Using the NAICS industry relationships identified through Implan, clusters were then created in Pennsylvania's Regional Data Analysis Tool (RDAT), A data base that allows users to specify clusters and areas for analysis. A separate RDAT was used for SIC-based historical data, and for NAICS-based clusters for other states and the data loaded.

Data for 2003 annual average employment and wages was downloaded from the Bureau of Labor Statistics Quarterly Census of Employment & Wages for, Illinois, Kansas, Wisconsin, Nebraska, South Dakota, Missouri, and Minnesota. Data for Iowa was downloaded from Iowa's Quarterly Census of Employment & Wages, Iowa Workforce Development, Employment Statistics Bureau for all quarters 2000 through 2004 first quarter (preliminary), and annual averages for 2000 through 2003.

ISSUES

Confidentiality issues restricted some of the data downloaded from BLS and Iowa historical SIC data. Some clusters were incomplete due to the lack of data.
Data for some clusters has been suppressed to meet confidentiality standards.
Data for other states is not complete due to suppression.

DATA ANALYSIS TOOLS

Location quotient and shift/share calculations are built into the Pennsylvania Regional Data Analysis Tool. The calculations are as follows:

Shift/Share Analysis

Shift/share analysis is composed of three components:

1. Economic growth or share component measures the aggregate employment changes in the local economy and is calculated as follows:

$$\frac{\text{Comparison Year Employment} - \text{Base Year Employment}}{\text{Base Year Employment}}$$

This is also called the national growth component. It measures the effect of the national growth on the local economy and is especially susceptible to the peaks and valleys of the business cycle.

2. Proportional shift component or industry mix component measure the relative growth or decline of the industries in the local economy when compared to state or national economy (Emp) and is calculated as follows:

$$\frac{\text{Emp Comparison Year Industry Employment}}{\text{Emp Base Year Industry Employment}} - \frac{\text{Area Comparison Year Industry Employment}}{\text{Area Base Year Industry Employment}}$$

This component measures how well a particular industry has grown, or the net effects of the business cycle on an industry.

3. Differential shift component or competitiveness measures the change in the local economy that is not attributable to changes in local economy or the industry mix. Generally, this change is attributable to some local economic advantage such as natural resources, or a disadvantage such as low wages. It is calculated as follows:

$$\frac{\text{Area Comparison Year Industry Employment}}{\text{Area Base Year Industry Employment}} - \frac{\text{Emp Comparison Year Industry Employment}}{\text{Emp Base Year Industry Employment}}$$

Where EMP = state or nation

Location Quotient

Location Quotient measures an area's share of a particular activity. Essentially the location quotient allows analysts to determine the extent to which the local area is exporting an activity. A location of 1.0 indicates that the area has its share of an activity and has the same amount of import/export activity. A location quotient less than 1.0 indicates that the area has less than its share of an activity and is importing more than it exports. A location quotient greater than 1.0 indicates an area has more than its share of an activity and is exporting. Fundamentally, the higher the location quotient (LQ) is above 1.0, the stronger the activity. The LQ is calculated as follows:

$$\frac{\text{Local annual average industry employment/Local annual average total employment}}{\text{EMP annual average industry employment/EMP annual average total employment}}$$

Where EMP = state of nation

The location quotient is a valuable tool for examining traded clusters in the area.

Occupational Analysis

Occupational analysis was done by matching Feser's Occupational Skill Clusters[10] with Occupational Educational Statistics (OES) Code and the Standard Occupational Code, then applying Iowa OES wage estimates and occupational projections from Iowa's occupational projections.

Industry Projections

Industry projections are from Iowa Industry Projections 2000 to 2010.

[10] *Feser, Edward J., What regions do rather than make: A proposed set of knowledge-based occupation clusters, October 2001, University of North Carolina, Chapel Hill, NC*

INDUSTRY CLUSTER LITERATURE REVIEW

"Clusters and the New Economics of Competition", Michael E. Porter, Harvard Business Review November-December 1998

> Michael Porter presents his concept of industry clusters as "geographic concentrations of interconnected companies and institutions in a particular field." Porter suggests that clusters are not reflected in industry classification systems (such as SIC or NAICS) as these systems fail to show relationships. Additionally, clusters help to advance "both competition and cooperation" among its companies and support productivity.

"Industry Cluster in Pennsylvania, Background, Products and Services", Center for Workforce Information and Analysis, August 21, 2002.

> This brief article describes the role of Regional Data Analysis Tool, (RDAT), which contains industry information at the county level that includes units, employment, and wages by year and quarter. The RDAT also allows users to create industry clusters and define a user-specific study area (county, group of counties, or statewide.) Location quotient and shift/share calculations are included in the RDAT.

"Understanding Cluster Analysis" San Diego Association of Governments

> The presentation describes the types of analysis used in industry cluster analysis: employment concentration factor (similar to location quotient); input-output modeling; cluster dependency factor (which measures the "direction and relative strength of the buyer/seller relationships within clusters"); and the economic prosperity factor (similar to the location quotient, used to analyze wages.)

"What regions do rather than make: A proposed set of knowledge-based occupation clusters" Edward J. Feser, Department of City and Region Planning, University of North Carolina, October 2001.

> Edward J Feser presents a "framework and empirical approach to identifying knowledge-based occupation clusters". The article presents Feser's occupation-based clusters with a description of the methodology and application. In it, Fester describes three primary uses of occupation clusters: 1) describe human capital; 2) target efforts to help design workforce development and promote higher wages; and 3) understand the industries in terms of labor requirements.

Clark, Cal (1999) *135 Great Ideas on Economic Development*, Utilitcorp United (pp73-82).

> The chapter entitled "Industry Clusters" provides useful information on the use of industry cluster analysis specifically for economic development.

n.d. Location Quotients (Online), April 10, 2003. http://www-rohan.sdsu.edu/faculty/fstutz/locationquot.html

The Web page provides useful information on the calculation and interpretation of location quotients.

h.d. Shift/share Analysis (Online), April 10, 2003 http://www.public.asu.edu/~subhro/pup622/econanal/sld011.htm

This Web slide show gives easy-to-follow steps on calculating and interpreting shift/share analysis.

Rosenfeld, Stuart A. (2002) *Creating Smart Systems A guide to cluster strategies in less favoured regions* Carrboro, North Carolina, Regional Technology Strategies

This in-depth look at cluster strategies in Europe answers questions about cluster development and sustaining clusters, as well as a "Menu of Actions" for economic developers, government, workforce, etc. This article provides an excellent outline for working with clusters for businesses, government regulatory agencies, economic developers, educators, and workforce development professionals.

Feser, Edward J. and Bergman, Edward M. (2000), National Industry Cluster Templates: A Framework for Applied Regional Cluster Analysis, *Region Studies 34.1* 1-19

This scholarly publication provides an overview to cluster analysis focusing on input/output linkages and relationships within clusters.

GLOSSARY OF TERMS

Buyer/Supplier - Industries that directly support the core industries by purchasing or providing goods required to sustain the cluster

Clusters - Group of geographically connected, interrelated sectors that drive wealth in a region

Core Industries - A group of interconnected companies producing products intrinsic to the cluster

Economic Growth Component *(See Also Shift/Share)* - A measure of the aggregate employment changes in the local economy

Industry Mix Component *(See also Shift/Share)* - A measure of the relative growth or decline of the industries in the local economy when compared to state or national economy.

Infrastructure Industries - Underlying basic buildings, institutions, facilities or other essential elements necessary to sustain and enable growth and development of a cluster

Location Quotient - An analysis tool that measures the extent to which the local area is exporting an activity

Occupational Skill Cluster - Knowledge-based system of identifying related occupations

Proportional Shift Component *(See also Shift/Share)* - A measure of the relative growth or decline of the industries in the local economy when compared to state or national economy.

Share Component *(See Also Shift/Share)* - A measure of the aggregate employment changes in the local economy

Shift/Share - An analysis tool that measures an area's cluster growth

NORTHWEST IOWA
Developers Coalition

"Charting A Course For Success"

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