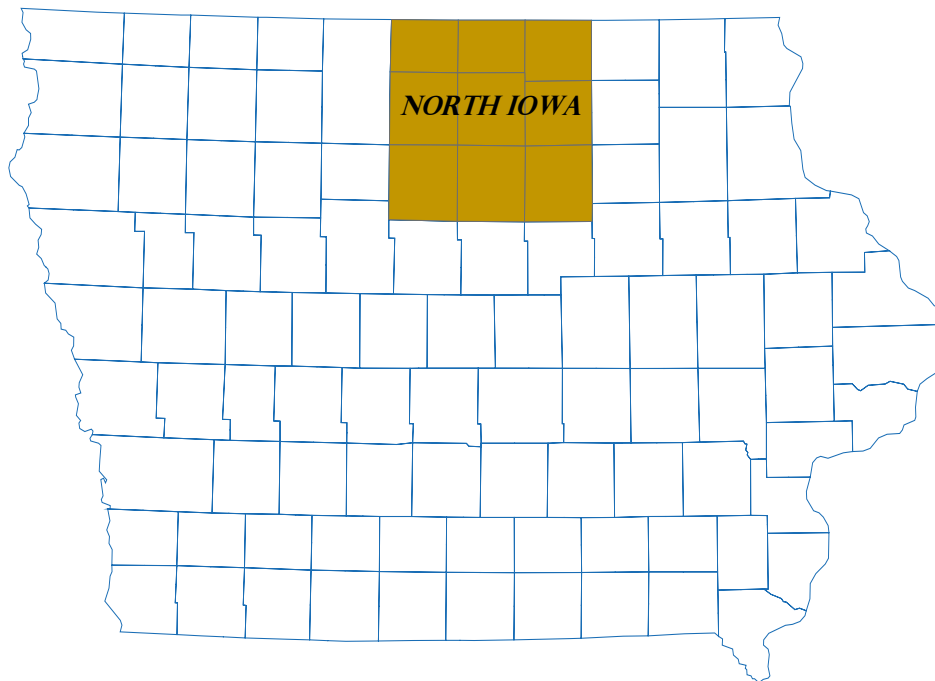


Industry Cluster Analysis 2005



***North Central Iowa
Region***

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SUMMARY OF KEY FINDINGS

The State of Iowa has undergone three state-commissioned studies since the early 1990's to provide Iowa communities and regions a methodology to help identify industries or clusters of industries that would provide a sound return on investments from an economic growth stand point. This analysis, using the latest approach and methodology, provides the North Central Iowa region a foundation from which to begin building Targeted Industry Clusters that will increase the wealth of the region.

Based on data provided from this analysis, there is a strong potential for growth in Motor Driven Products, Heavy Machinery Manufacturing, Construction Materials, Chemical Production, and Plastics as core industry clusters. The area also has great potential to increase the buyer/supplier industries to support the core industries located in the region, while looking outside the Iowa defined region to support other larger regions such as the Upper Midwest Region. These support industries not only supply goods/services but also purchase goods/services from the core industries thus providing additional opportunities to expand and grow the region's economic base.

In addition to Industry Cluster analysis, occupational clusters can also be determined to show where concentrations exist that could provide the labor element of growing clusters. This analysis briefly touches on this component of cluster growth, however the primary focus of this analysis is to concentrate on industries that either exist or could exist.

In order for any cluster to grow and prosper, certain puzzle pieces need to be in place prior to initializing any efforts, these include buildings; location sites; update zoning requirements; documented logistics - such as air, rail, roads, and waterways; educational opportunities; and other local amenities not included in this industry cluster analysis.

RECOMMENDATIONS FOR THE REGION

After reviewing the results of the regional industry analysis, it is recommended that the following actions be adopted:

Recommendation: The region should focus economic recruitment, retention, and growth efforts on five (5) of the mentioned core industry clusters.

1. Motor Driven Products
2. Heavy Machinery Manufacturing
3. Construction Materials
4. Chemical Production
5. Plastics Manufacturing

These core industry clusters were selected because of their strong potential for future growth. The region currently has a presence of each in the area, data shows that these are a good fit since there exists a connection of buyer/supplier industries, skilled labor force, and supporting education/training offerings already in the region.

In order to sustain critical mass in these key clusters, recruit businesses or provide assistance with start-up companies in both core and buyer/supplier industries. This will help alleviate reliance on a small number of firms and assist in growing the cluster.

Recommendation: The region is a centrally located area in the Upper Midwest Region, the North Central Iowa region should examine other areas of the Upper Midwest Region.

The region should look at forming buyer/supplier connections directly related to Core Industry Clusters currently located in other areas within the Upper Midwest Region. The data shows that Chemical Production and Motor Driven Products are heavily concentrated industry clusters in the Upper Midwest Region which the North Central Iowa region could have success establishing more of a presence.

Creating this type of connection will help build a larger area from which this region may affect economies, as well as providing an avenue for businesses to tap into the region's most valuable resource, its labor force. Having a cluster of buyer/supplier industries can be meaningful to a region by supporting core industries already in the area, supporting core industries in other nearby regions, and promoting a presence in those other locations in the Upper Midwest Region.

Recommendation: Use clusters as a context for designing education/training programs.

The region has a curriculum of programs designed to meet the educational requirements that foster knowledge in Automotive Services, Building Trades,

Eletromechanical Systems, Machining, and Mechanical Design. It would be advantageous for the educational institutions in the region to collaborate on developing additional programs to support existing core industries, buyer/supplier industries, and entrepreneurial opportunities that can provide further skills/knowledge base to workers seeking employment opportunities in Chemical Production and Motor Driven Products.

Additional programs of interest may include school-to-work, two-plus-two programs, internships, and other experiential learning opportunities. Create career paths learning by promoting secondary coursework in the math, science and technology related fields.

Recommendation: Promote entrepreneurial enterprise growth.

This is an excellent avenue to utilize in building up organizations that fall into the infrastructure category of cluster development. Entrepreneurial development can be a source to foster buyer/supplier industries.

Recommendation: Examine structural infrastructure before embarking on industry recruitment opportunities.

The region needs to make sure that buildings, sites, modes of transportation, and labor are adequate or in abundance to support any industry recruitment efforts

IOWA'S INDUSTRY CLUSTER INTRODUCTION

An Industry cluster analysis is one of many economic development tools that regions can use to identify strengths and areas of improvement to further foster economic growth and development of industries by related buyers, suppliers, infrastructure, and workforce. This type of analysis can help identify high concentrations - “critical mass” that should be maintained, indicate areas that can be capitalized on for further development, and areas where the region has a presence but might not be a good fit to focus maximum efforts to spur growth. By identifying these clusters, recruitment efforts can be focused on industries that complement existing businesses; capitalize on assets such as natural resources, knowledge base, and workforce; and further strengthen the regions presence as a notable area for future growth.

BACKGROUND OF INDUSTRY CLUSTERS

Industry clusters are a group of geographically 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.”⁶

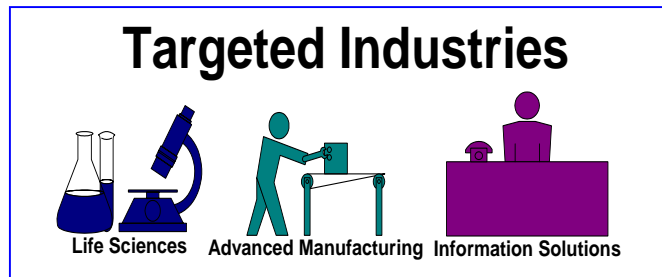
In 1992, the Iowa Department of Economic Development (IDED) and the Wallace Technology Transfer Foundation commissioned the “Batelle Study” to identify industries in which investments would be likely to yield high returns. Industries were selected because they:

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

The primary industries targeted through this initiative include Value-Added Agriculture, Insurance & Financial Services, Plastics, Fabricated & Primary Metals, Pharmaceuticals, Instruments & Measuring Devices, and Software Development. While the list provided a good starting point for the state’s marketing 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 examine targeted industries clusters and where they fit into Iowa’s economic future. This study identified key competitive advantages for Iowa including quality workforce, training capacity, physical infrastructure, and quality of life. Based on these findings, the study ultimately identified three broad industry clusters that the state could focus on for future investments.

- Life Sciences (including production agriculture, value-added processing, and pharmaceuticals)
- Advanced Manufacturing (innovative processes requiring advanced technical skills)
- Information Solutions (including insurance, financial services, and information technology)



More recently, IDED has re-commissioned the Batelle Group to perform additional analysis of the three “Targeted Industry Clusters” to further define specific industries and occupations that fit within the broadly defined Targeted Industry Clusters. Iowa Workforce Development (IWD) has provided input by assisting with this refinement, thus expanding the focus to 42 traded clusters. A “traded” cluster is one that exports goods or services from a region therefore creating a potential wealth base in which to build upon.

Regions that have identified where geographic concentrations exist and/or missing linkages within the clusters can focus on economic policies and marketing research initiatives to provide support to help foster growth in a variety of ways. These efforts can come in the form of investments for research and infrastructure, new cooperative relationships between existing firms within “core” industry sectors, and regional suppliers/customers. To further foster cluster growth, occupations can be identified in the key industries, allowing for education and training institutions to counsel and train students for high-demand, high-wage careers within the identified clusters.

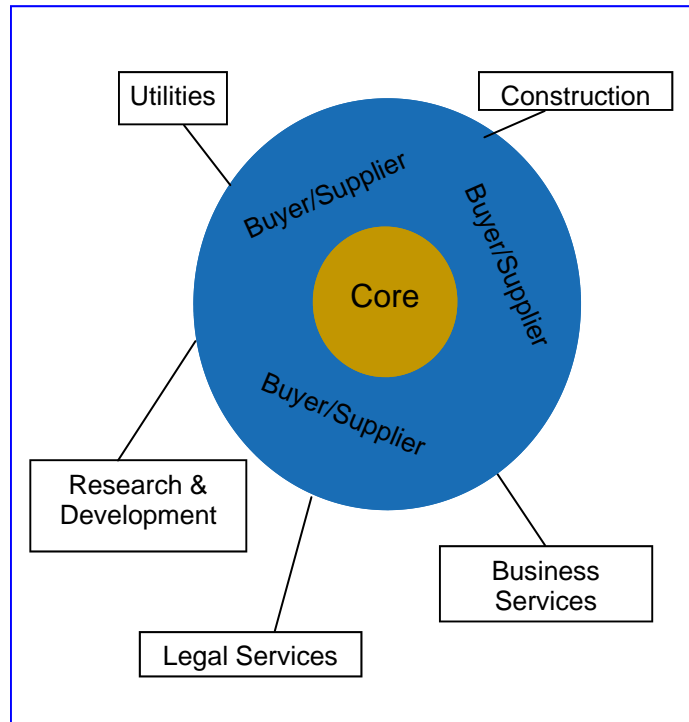
As the three state commissioned studies show, industry cluster analysis is a dynamic and ever changing process. For example, in the late 1990’s the Printing and Publishing cluster was shown to be a vibrant cluster in Iowa. However, with changes in technology, industry reorganization and closures of some of Iowa’s largest printing facilities, employment and wages combined in this cluster have waned 52.2 percent in a ten-year period. This is just one example that shows how on-going analysis is vital to remaining current on industry fluctuations.

The Targeted Industry Cluster theory has three major components that make-up a complete cluster growth initiative:

Core industries are those intrinsic to the cluster. They are the essential elements at the center of the cluster and are necessary for cluster formation.

Buyers/Suppliers are those industries that directly supply goods or services to the core or purchase goods or services directly from the core industries.

Infrastructure industries provide necessary support to the core and buyer/supplier industries. Infrastructure related industries can include utilities, construction, research and testing, legal services, employment services, business services, and other professional services such as architectural, landscaping, and accounting.

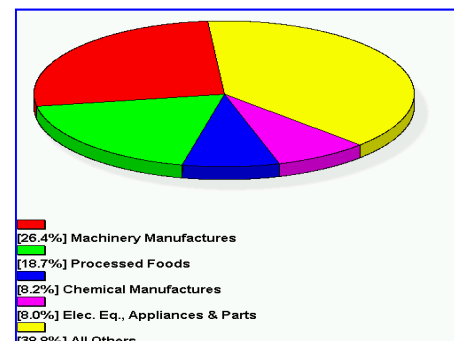


Most industry clusters will share infrastructure industries. Furthermore, the core of one cluster may be a buyer/supplier for another or be part of the infrastructure for other clusters. In addition to industry, other infrastructure elements must be in place in order for a cluster to exist. These might include but are not limited to transportation - including access to air, rail, roads, and waterways; buildings; various natural resources; utility connections; and available skilled labor.

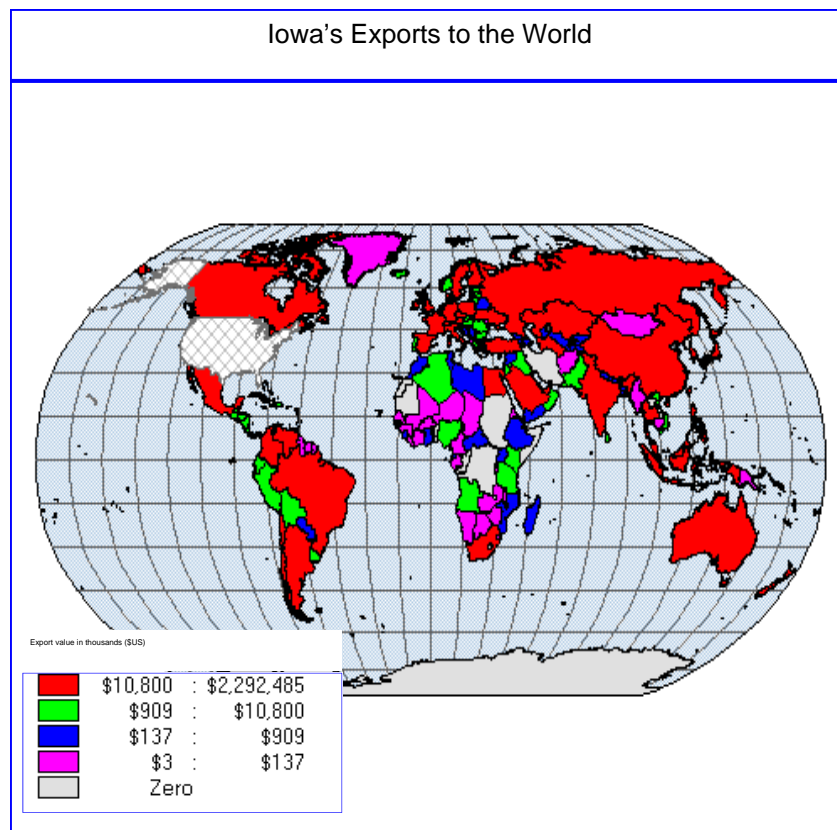
IOWA'S GLOBAL EXPORT INDUSTRIES

Exports play a key role in the viability of a cluster. While region-to-nation export activity may be measured via the location quotient, it is equally vital to have a means of measuring world exports. According to the U.S. Department of Commerce TradeStats Express®, 26.4 percent of Iowa's exports are in Machinery Manufacturing, 18.7 percent in Processed Foods, 8.2 percent in Chemical Production, and 8.0 percent in Electrical Equipment - see chart at right. Iowa exports products globally from these industries - see global map on next page.

Iowa Industries that Export Globally



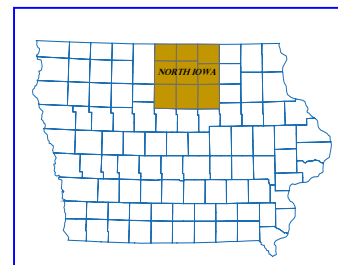
North Central Iowa Region



* Pie chart on previous page and global map shown above are courtesy of TradeStats Express™, U.S. Department of Commerce

KEY OBSERVATIONS OF THE STUDY REGION

The North Central Iowa Region region consists of Butler, Cerro Gordo, Floyd, Franklin, Howard, Mitchell, Winnebago, Worth and Wright counties, as identified on the map to the right. This area is comprised of:



- Land mass: 4,555 square miles¹
- 2002 Population: 141,476
- 2002 Per Capita Income: \$25,670²
- 2004 Third Quarter Employing units: 4,615
- 2004 Third Quarter Employment: 63,117³
- Average Annual Wage: \$27,828³ based on 2004 Third Quarter

This region has a broad spectrum of industry base, however, the analysis shows that there are five clusters that emerge as having a strong presence in the region with great potential for further development. The clusters include Motor Driven Products, Heavy Machinery Manufacturing, Construction Materials, Chemical Production, and Plastics Manufacturing. These industry clusters primarily export goods that build wealth for the region. Additional clusters with a presence in the region include Agricultural Products, Communications Equipment, Pharmaceuticals, and Printing & Publishing all exhibit potential for development in the future.

The region also has the following industry clusters present: Biotechnology, Processed Foods, and Building Fixtures. However, for the purposes of this study they are not included as a focus because in most cases they rely heavily on one industry rather than a cluster of related industries. Biotechnology is included in the analysis of Chemical Production cluster, Building Fixtures is an industry within the Construction Materials cluster, and Processed Foods is touched upon in the Agricultural Products analysis.

EXISTING INDUSTRIES IN THE REGION

The North Central Iowa region has a diverse industry base that includes Retail/ Wholesale Trade (27.0%), Food Services (10.7%), Healthcare (9.5%), Construction (8.3%), Manufacturing (7.6%), Finance/Insurance (4.9%), Educational Services (4.6%), Government (3.8%), Agriculture (3.1%), Transportation/Warehousing (3.1%), Professional Services (3.0%), Administrative Services (2.4%), Information (2.2%), Maintenance/Repair (1.9%), Entertainment (1.8%), Personal Services (1.7%), Real Estate (1.2%), and Utilities (1.1%). Employment for the region during the third quarter 2004⁴ was 63,117, which was down 590 jobs from 2000 third quarter . Wages increased 17.7 percent during the same time period to an average of \$27,828 for all industries, compared to the state average wage of \$31,416.

The following is a list of the top 10 employers in the region based on employment figures without regard to industry cluster designation.

1. Winnebago Industries
2. Mercy Medical Center - North Iowa
3. Curries Manufacturing
4. ABCM Corporation
5. Hy-Vee Food Stores
6. Fleetguard Inc
7. Staff Management
8. Principal Financial Services
9. Woodharbor Molding & Millwork
10. Opportunity Village

TRENDS IN WAGES AND EMPLOYMENT⁵

Historical data from 1990 through 2000 shows the Manufacturing industry comprised 24.4 percent of the total employment which was the largest employing industry in the region. Administrative Services showed the largest percentage increase (139 percent) over the ten-year period, 4,069 jobs. Average wages in this industry sector were \$18,332, below both the regional average of \$27,828 and the state average of \$31,416. The Utility sector was the only industry sector that showed a slight decrease in employment during this time period, slipping 2.0 percent or 30 jobs.

CLUSTER IDENTIFICATION

Several industry clusters have region-to-nation location quotients greater than one, demonstrating cluster growth over the three-year study period. Of the nine industry clusters analyzed, seven had wages greater than the regional average of \$27,828:⁷

Agricultural Products:

- Location quotient for core industry is 1.78
- Average wage of \$25,348

Chemical Production:

- Location quotient for core industry is 3.10
- Average wage of \$47,092

Largest Employers in the Region:

1. Cambrex
2. Fort Dodge Animal Health
3. Iowa Ethanol

Communications Equipment:

- Location quotient for core industry is 1.11
- Average wage of \$25,692

Construction Materials:

- Location quotient for core industry is 5.23
- Average wage of \$33,124
- Largest Employers in the Region:
 1. Allied Construction Company
 2. Dean Snyder Construction
 3. Larson Construction/Ag Builders

Heavy Machinery Manufacturing:

- Location quotient for core industry is 5.70
- Average wage of \$36,980
- Largest Employers in the Region:
 1. Hagie Manufacturing
 2. IMI Cornelius
 3. Iowa Mold Tooling Company
 4. Stellar Industries
 5. Sukup Manufacturing Company
 6. Unverferth Manufacturing Company

Motor Driven Products:

- Location quotient for core industry is 7.50
- Average wage is \$36,956
- Largest Employers in the Region:
 1. Hagie Manufacturing Company
 2. Sukup Manufacturing
 3. Unverferth Manufacturing Company
 4. Winnebago Industries

Pharmaceuticals:

- Location quotient for core industry is 3.46
- Average wage of \$52,532

Plastics Manufacturing:

- Location quotient for core industry is 1.48
- Average wage of \$30,672
- Largest Employers in the Region:
 1. Haigie Manufacturing Company
 2. Sukup Manufacturing
 3. Unverferth Manufacturing Company
 4. Winnebago Industries

Printing & Publishing:

- Location quotient for core industry is 1.29
- Average wage of \$33,952

The remainder of this study will focus on five of the nine industry clusters (Chemical Production, Construction Materials, Heavy Machinery Manufacturing, Motor Driven Products, and Plastics Manufacturing) that have location quotients greater than 1.0 and wages that exceed the average for the region. One of the clusters, Plastics Manufacturing, has wages that fall slightly below the state average of \$31,416 but had moderate growth in employment, adding 64 jobs during the three year study period. In addition, there will be brief outlines on Agricultural Products, Communications

Equipment, Pharmaceuticals, and Printing & Publishing.

BUYER/SUPPLIER SUPPORT INDUSTRIES

The industry clusters in the table below show the location quotients for buyer/supplier industries with a location quotient region-to-state greater than 1.00. Even though Aerospace & Defense has a high buyer/supplier location quotient of 2.45 region-to-state and 2.39 region-to-nation, this does not necessarily imply that cluster development should be encouraged. Other factors such as site availability, production costs, and labor availability may hinder development of this cluster and others in this region.

<i>Industry</i>	<i>LQ Nation (2001Q3)</i>	<i>LQ Iowa 2004 Q3</i>	<i>LQ Iowa 2000 Q3</i>	<i>Cluster Growth</i>	<i>Empl 2000 Q3</i>	<i>Empl 2004 Q3</i>	<i>Wages 2004 Q3</i>
Aerospace & Defense	2.39	2.66	2.45	(197)	2,281	2,084	\$32,404
Agricultural Products	3.25	1.15	1.17	(131)	3,415	3,289	\$38,620
Apparel	1.07	1.24	1.12	(193)	749	586	\$33,664
Automotive	1.45	1.38	1.46	(309)	2,304	1,995	\$35,144
Biotechnology	1.83	1.20	0.89	(921)	7,348	8,631	\$34,524
Communications Equipment	2.34	2.36	2.21	(133)	1,703	1,570	\$33,756
Construction Materials	1.07	2.53	2.36	(186)	3,826	3,640	\$34,332
Distribution	1.13	1.00	0.94	227	6,454	6,681	\$17,996
Furniture	2.34	1.76	1.73	(263)	3,491	3,228	\$32,648
Jewelry, Precious Metals, Collectibles	1.70	1.50	1.38	(199)	2,483	2,283	\$33,172
Lighting & Electrical Equipment	1.16	1.16	1.14	(369)	3,523	3,154	\$38,560
Medical Devices	1.48	1.46	1.43	(683)	4,998	4,315	\$36,276
Motor Driven Products	2.09	1.65	1.60	(508)	11,512	11,004	\$31,328
Prefabricated Enclosures	2.08	1.63	1.55	(123)	3,748	3,625	\$32,256
Processed Food	1.80	1.34	1.27	27	715	742	\$29,268
Production Technology	1.36	1.29	1.14	(81)	2,390	2,309	\$32,492
Textiles	1.04	1.49	1.49	(38)	846	808	\$32,936
Transportation & Logistics	0.83	1.03	0.91	270	2,386	2,356	\$34,728

On the other hand, buyer/supplier industries such as Distribution, Processed Food, and Transportation & Logistics all had employment growth and location quotients greater than one. The issue with Distribution is that wages fall far below the region and state averages. An industry cluster benchmark will help verify buyer/supplier relationships and assist with pinpointing industries that provide promise for further development.

INFRASTRUCTURE INDUSTRIES

Many infrastructure industries have low location quotients, 0.80 or less, in the region. 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 & Testing
- Wholesale Trade
- Financial Services
- Accounting
- Education
- Business Services
- Management
- Legal services

- Employment services

Many of the industries classified as infrastructure have an annual average wage in excess of the regional average of \$27,828; provide for the largest number of jobs; and are areas where the greatest amount of entrepreneurial development exists.

PROJECTIONS

Industry projections indicate that Transportation Equipment Manufacturing (Motor Driven Products) and Chemical Manufacturing (Chemical Production cluster) are projected to have the highest increases employment statewide. The region projections paint a slightly different picture with Transportation Equipment Manufacturing and Machinery Manufacturing projecting to add 1,140 jobs between the two.

STATEWIDE INDUSTRY PROJECTIONS 2002 - 2012					
	Estimated	Projected	Total	Percent	Growth
Industry Description	Employment	Employment	Growth	Change	Rank
Total All Industries (Nonag)	1,580,705	1,793,615	212,910	13.5%	---
Transportation Equipment Manufacturing	18,650	22,780	4,130	22.1%	15
Machinery Manufacturing	32,070	34,985	2,915	9.1%	25
Fabricated Metal Manufacturing	20,690	21,890	1,200	5.8%	37
Chemical Manufacturing	7,235	7,955	720	10.0%	43
IWD REGION 2 PROJECTIONS (2002 - 2012)					
	Estimated	Projected	Total	Percent	Growth
Industry Description	Employment	Employment	Growth	Change	Rank
Total All Industries (Nonag)	58,770	64,410	5,640	9.60%	---
Transportation Equipment Manufacturing	4,205	5,195	990	23.50%	1
Machinery Manufacturing	1,300	1,450	150	11.50%	12
Chemical Manufacturing	620	615	-5	-0.80%	57

Source: Iowa Workforce Development, Industry Projections

OCCUPATIONAL CLUSTERS

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. A knowledge-based cluster refers to a set of occupations that require a similar skill-set. 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:⁹

- 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 services workers
- Skilled laborers and machine operators
- Semi-skilled laborers

The occupational projections and wage and salary information are included with the skill clusters. Wage and salary information is from the Occupational Employment Statistics (OES) program.¹⁰ Occupational projections begin with the base year 2002 and displays projected year 2012. Occupational projections are performed in cooperative agreement with the U.S. Department of Labor, Bureau of Labor Statistics.

“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?"¹¹

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.

UPPER MIDWEST REGION - INDUSTRY CLUSTERS

Looking beyond Iowa defined regions and how the regions within Iowa fit into a more globally effective region, data from surrounding contiguous states were reviewed to provide insight on what connections exist and where there might be opportunities for growing industry clusters in the North Central Iowa region. Due to confidentiality restrictions, data obtained from the other states was analyzed at the three-digit NAICS level versus data from Iowa analyzed at the five-digit level. Having the ability to analyze the data at a more refined level allows for more specific results. Detailed data

is limited from the surrounding states because of this suppression. However, for the purposes of this analysis, broader levels do provide a realistic look at concentration levels by employment in defined “core” industries outside the state, thus showing where concentrations do exist.

ECONOMIC IMPACTS

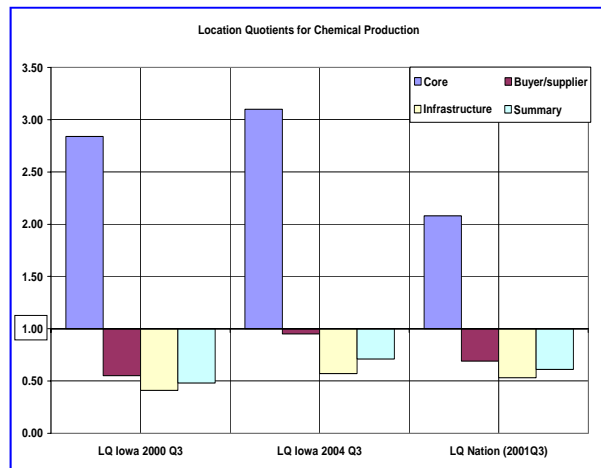
A significant number of jobs will be added in common support industries when adding jobs in an industry cluster core and/or buyer/supplier cluster. The following is a sampling of support industries that typically reap the benefits of added growth:

- Wholesale Trade
- Truck Transportation
- Architectural & Engineering Services
- Food Services & Drinking Establishments
- Monetary Authorities & Credit Intermediation Institutions
- Employment Services
- Accounting & Bookkeeping Services
- Real Estate

Granted, many of these industries typically have annual wages less than the regional and state averages, they do provide the backbone support necessary for a true industry cluster to exist and thrive.

CHEMICAL PRODUCTION

Chemical Production is described as the transformation of organic and inorganic raw materials by a chemical process and the formulation of products. The original analysis of targeted industry cluster groupings puts this traded industry cluster in the Life Sciences group. However, some of the sub-industry groupings in this traded cluster can fall in the Advanced Manufacturing sector. The region-to-state location quotient for core industries is 3.10, the fourth highest for all clusters. The region-to-nation location quotient of 2.08 is also among the highest in the North Central Iowa region.



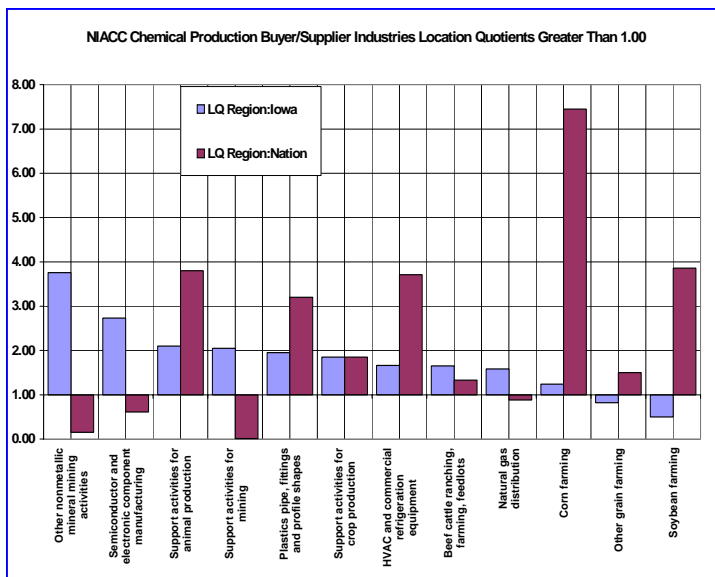
Pharmaceuticals & Medicine Manufacturing make up 80.0 percent of the total employment in this cluster. Pesticide & Other Agricultural Chemical Manufacturing comprise 11.0 percent of the employment, while 6.0 percent is in Other Basic Organic Chemical Manufacturing. The average annual wage of all occupations is \$47,092 in this cluster which is well above both the regional average of \$27,828 and the state average of \$31,416. The following industries were included in the analysis of this core cluster:

- Explosive Manufacturing
- Other Chemical Product & Preparation Manufacturing
- Other Basic Inorganic Chemical Production
- Other Basic Organic Chemical Production - includes Ethanol Production
- Pharmaceuticals & Medicine Manufacturing
- Pesticides & Other Agricultural Chemical Production
- Petro-Chemical Production
- Petroleum Refineries

Total employment in the region within this cluster for the study period was 610 while employment in the state was 4,438. This cluster relies on six firms located in this region with over 91.0 percent of the employment in two employers. Increasing the number of companies in any of the industries, specifically Pesticides & Other Agricultural Chemical Manufacturing and Other Basic Organic Chemical Production would alleviate the reliance on too few firms in the cluster thus providing a stronger base from which the cluster can grow.

BUYER/SUPPLIER INDUSTRIES IN CHEMICAL PRODUCTION

The industries that directly supply goods/services or purchase goods/services directly to/from the core industries included in this analysis are: Other Non-Metallic Mineral Mining Activities, Semiconductor & Electronic Component Manufacturing, Support Activities for Animal Production, Support Activities for Agriculture, Support Activities for Mining, Plastics Pipe, Fittings & Profile Shapes, Support Activities for Crop Production, HVAC & Commercial Refrigeration Equipment, Beef Cattle Ranching/Farming & Feedlots, Natural Gas Distribution, Corn Farming, Other Grain Farming, and Soybean Farming.



Ten of the 24 buyer/supplier industries in the chemical production cluster have region-to-state location quotients greater than 1.00. The industry in this cluster with the second largest location quotient, Semiconductor & Electronic Component Manufacturing, demonstrated a decline of 162 jobs over the three-year period. The buyer/supplier industries that had high region-to-nation location quotients were Support Activities for Agriculture; and farming related activities such as corn and soybean farming. However, these industries tend to employ few. Most buyer/supplier industries in this cluster showed little or no job growth, had less than three employers, or are listed as “family farms”. Those industries with little or no job growth or less than three employers could be starting points for expanding this component of the Chemical Production cluster.

Chemical Production relies heavily on resources such as crop and animal farming. The universe from which this data is extracted excludes most family farms who generally do not have to report employees covered by unemployment insurance (QCEW data), therefore making the data from these industries inconclusive.

PROJECTIONS

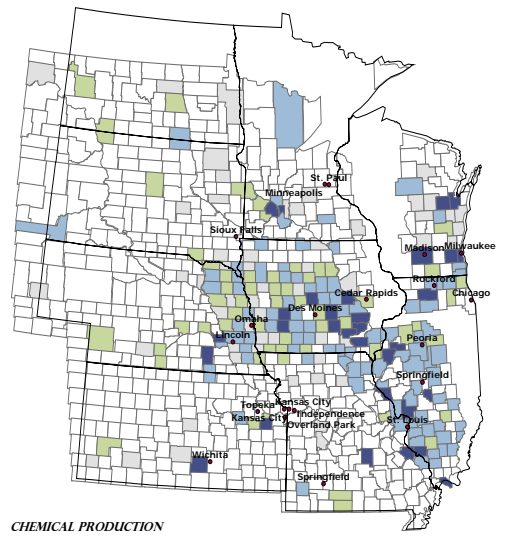
There are approximately eight Occupational Clusters that fall within the Chemical Production industry cluster. Engineers/Technicians/Architects, is the largest in terms of total employment, comprising 30 jobs. Looking at all eight occupational clusters, the salary ranges start with a low of \$33,259 to a high of \$66,518. The projected job opportunities in the Chemical Production industry cluster is thought to be 95 through the year 2012. This translates into a total growth of 10 jobs from the base year 2002. The table below shows each occupational cluster and the projected growth of occupations in each cluster.

Skill Clusters in the Chemical Production Industry Cluster					
	Base Year 2002	Proj. Year 2012	Total Growth	2004 Mean Wage	2004 Annual Salary
Skill Cluster					
Occupation					
Communications systems specialists, technicians					
Computer Support Specialists	0	5	0	\$15.99	\$33,259
Computer engineers and programmers					
Natural Sciences Managers	5	5	0	*	*
Engineers, technicians, architects					
Industrial Engineering Technicians	10	10	0	\$19.26	\$40,061
Chemical Technicians	5	5	0	*	*
Chemical Engineers	5	5	0	*	*
Biological Technicians	10	15	5	*	*
Financial and related personnel					
Financial Managers	5	5	0	\$21.06	\$43,805
Accountants and Auditors	5	5	0	\$20.58	\$42,806
Legal, clerical, and administrative support staff					
Business Operations Specialists, All Other	5	5	0	\$28.22	\$58,698
Life scientists, lab technicians					
Microbiologists	5	10	5	*	*
Natural resources scientists, geoscientists					
Chemists	5	5	0	*	*
Supervisors and management personnel					
Industrial Production Managers	10	10	0	\$31.98	\$66,518
General and Operations Managers	5	5	0	\$28.97	\$60,258
Administrative Services Managers	5	5	0	\$21.06	\$43,805

UPPER MIDWEST REGION - CHEMICAL PRODUCTION

Employment in the Chemical Production industry cluster is primarily concentrated in the larger population areas of the contiguous states. These areas represent potential targets for recruitment efforts as well as areas to conduct further research on the types of industries that make up the Chemical Production core. This research may produce opportunities for the North Central Iowa region to encourage buyer/supplier growth in the region to support the core industries located in these outside locations. Areas to focus recruitment and research would be Milwaukee (WI), Madison (WI), Minneapolis/St. Paul (MN), and Kansas City (MO). Note that both Iowa and the North Central Iowa region are highly competitive in the Midwest region.

CHEMICAL PRODUCTION CORE INDUSTRY EMPLOYMENT 2003



CHEMICAL PRODUCTION
Employment 2003

- Less than 500
- 250 - 499
- 500 - 999
- 1000 - 4999
- 5000 or Higher

Data obtained from states other than Iowa used in this analysis is suppressed due to confidentiality rules governing the publication of identifiable data. Therefore, industries that have fewer than three employers in any one county are not represented in this pictorial analysis of the Upper Midwest Region.

ECONOMIC IMPACTS

If 400 new jobs were added to Chemical Production, including 100 new jobs in Pharmaceutical & Medicine Manufacturing, a total of 970 jobs would be created. Other than the direct impact of adding 200 jobs to Chemical Production and Pharmaceuticals, an additional 200 jobs could be added to Custom Compounding of Purchased Resins & Other Miscellaneous Chemical Production, as well as jobs in Wholesale Trade, Transportation, Architectural & Engineering Services, Management of Companies, and Commercial Machinery Repair & Maintenance. The subsequent tax impact could be expected around \$11,517,600¹⁵, while total value-added could be \$16,561,019.

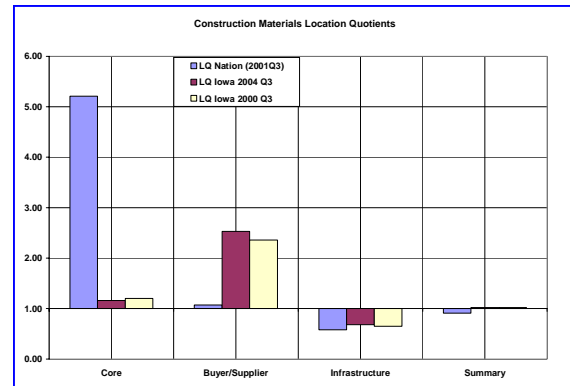
CLUSTER RECOMMENDATIONS

It would be advantageous to the region to increase the number of firms represented in the core, specifically more representation in Pesticides & Other Agricultural Chemical Manufacturing and Other Basic Organic Chemical Production. Both of these two industries currently have well connected links with buyer/supplier industries that are currently located in the region. By increasing the number of firms represented, this will increase the cluster's presence in the region and also alleviate the reliance on too few firms that could possibly hinder the growth of this up and coming cluster.

CONSTRUCTION MATERIALS MANUFACTURING

Construction Materials Manufacturing can be described as a distinct production process related to material inputs and equipment that transforms materials into new products. Initial efforts to define targeted industry clusters in Iowa would place this traded industry cluster under the Advanced Manufacturing realm. This cluster has a region-to-state location quotient of 1.16 and a region-to-nation location quotient of 5.21. Core industries in this cluster consist of:

- Plywood & Engineered Wood Manufacturing
- Millwork
- Asphalt
- Paving & Roofing Materials
- Clay Building Materials & Refractory Manufacturing
- Ready-mix Concrete Manufacturing
- Concrete Pipe, Brick & Block Manufacturing
- Ornamental & Architectural Metal Products
- Construction Machinery Manufacturing
- Cabinet & Countertop Manufacturing.



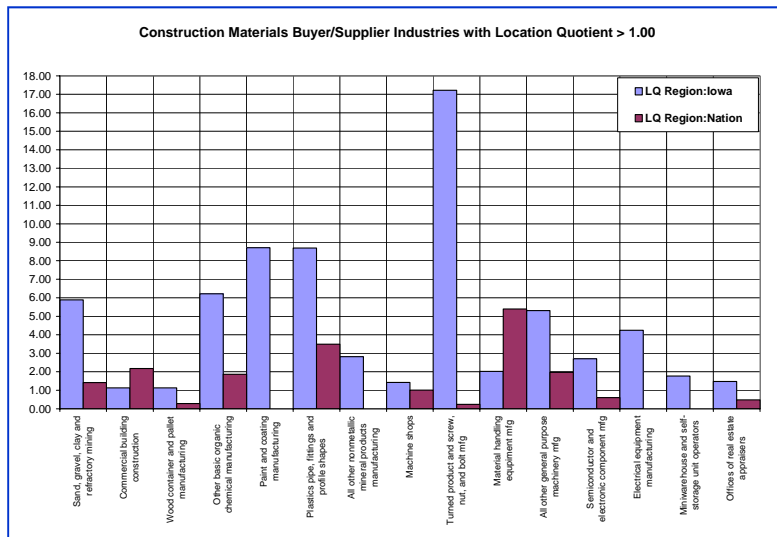
With steadily increasing employment in the region and an average annual wage of \$33,124, this cluster is established and strong.

Total employment in the region within this cluster for 3rd Quarter 2004 was 3,640, total employment in the state was 32,430. Eighteen industries make-up the base of this cluster. Eleven of the eighteen industries included in this analysis are represented in the North Central Iowa Region, and all are represented in the Upper Midwest Region.

BUYER/SUPPLIER INDUSTRIES IN CONSTRUCTION MATERIALS

The industries that directly supply goods/services or purchase goods/services directly to/from the core industries included in this analysis are: logging; oil and gas extraction; stone mining and quarrying; sand, gravel, clay and refractory mining; other nonmetal mining; commercial building construction; carpet mills; sawmills; wood container manufacturing; other wood product manufacturing; refineries; petrochemical manufacturing; industrial gas manufacturing; synthetic dye manufacturing; other basic inorganic chemical manufacturing; other basic organic chemical manufacturing; resin and synthetic rubber manufacturing; artificial fibers and filaments manufacturing; paint and coating manufacturing; adhesive manufacturing; explosives manufacturing; all other chemical preparation manufacturing; plastics packaging materials; plastics pipe fitting and profile shapes; laminated plastics plate, sheet, and shapes; gypsum product manufacturing; abrasive product manufacturing; all other nonmetallic mineral products manufacturing; iron and steel mills; iron from purchased steel; rolling and drawing of

purchasing steel; alumina and aluminum production; ferrous metal foundries; nonferrous metal foundries; forging and stamping; cutlery and hand-tool manufacturing; plate work and fabricated structural products; prefabricated metal buildings and components; ornamental and architectural metal products; power boiler and heat exchanger manufacturing; hardware manufacturing; spring and wire manufacturing; machine shops; turned product and



screw, nut, and bolt manufacturing; coating, engraving, and heat treating metals; metal valve manufacturing; all other fabricated metal product manufacturing; HVAC and commercial refrigeration equipment; metal machinery manufacturing; turbine and power transmission equipment manufacturing; material handling equipment manufacturing; all other general purpose machinery manufacturing; semiconductor and electronic component manufacturing; major appliance manufacturing; electrical equipment manufacturing; wiring device manufacturing; as well as wholesalers and real estate brokers. Fifteen of the 35 buyer/supplier industries in the Construction Materials Manufacturing cluster have region-to-state location quotients greater than 1.00. The industry in this cluster with the highest location quotient, Turned product and screw, nut and bolt manufacturing, demonstrated a decline of 122 jobs over the three-year period.

PROJECTIONS

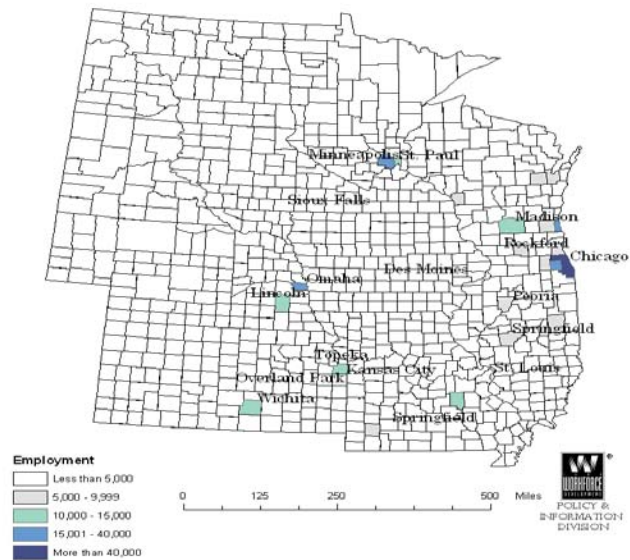
There are approximately eight Occupational Clusters that fall within the Construction Materials Manufacturing industry cluster. Team assemblers had the highest employment at 1,065 in 2002. Looking at all eight occupational clusters, the salary ranges start with a low of \$18,574 to a high of \$67,642. The table to the right shows each occupational cluster and the projected growth.

Occupation	Base Year 2002	Proj. Year 2012	Total Growth	2004 Mean Wage	2004 Annual Salary
Skill Cluster					
Construction workers					
Painters, Construction and Maintenance	20	35	15	\$8.93	\$18,574
Maintenance and Repair Workers, General	85	100	15	\$14.39	\$29,931
Financial and related personnel					
Farm Products	80	100	20	\$17.66	\$36,733
Legal, clerical, and administrative support staff					
Timekeeping	5	15	10	\$11.54	\$24,003
Production, Planning, and Expediting Clerks	40	50	10	\$14.85	\$30,888
Shipping, Receiving, and Traffic Clerks	65	75	10	\$12.38	\$25,750
Semi-skilled laborers					
Machine Feeders and Offbearers	60	75	15	\$10.80	\$22,464
Semi-skilled service workers					
Manufacturing, Except Technical and Scientific Products	50	60	10	\$19.92	\$41,434
Customer Service Representatives	65	85	20	-	-
Skilled laborers and machine operators					
Industrial Truck and Tractor Operators	105	125	20	\$12.73	\$26,478
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	210	235	25	\$11.19	\$23,275
Welders, Cutters, Solderers, and Brazers	260	310	50	\$13.10	\$27,248
Team Assemblers	1065	1105	40	\$12.54	\$26,083
Specialized mechanics, repairers, technicians					
Machinists	135	145	10	\$14.38	\$29,910
Supervisors and management personnel					
Industrial Production Managers	40	50	10	\$32.52	\$67,642
General and Operations Managers	55	70	15	\$28.84	\$59,987
First-Line Supervisors/Managers of Production and Operating Workers	200	240	40	\$19.91	\$41,413

UPPER MIDWEST REGION - INDUSTRY CLUSTER

Employment in the Construction Materials Manufacturing industry cluster is primarily concentrated in the larger population areas of the contiguous states. These areas represent potential targets for recruitment efforts as well as areas to conduct further research on the types of industries that make up the Construction Materials core. This research may produce opportunities for the region to encourage buyer/supplier growth in the region to support the core industries located in these outside locations.

CONSTRUCTION MATERIALS CORE INDUSTRY EMPLOYMENT 2003



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ECONOMIC IMPACTS

If 200 new jobs were added to Construction Materials, a total of 350 jobs would be created either directly or indirectly. Other than the direct impact of adding 200 jobs in the core industries, an additional 150 jobs could be added to in support industries, most notably Power Generation and Supply, Maintenance and Repair of Buildings, Machine Shops, Wholesale Trade, and Truck Transportation. The subsequent tax impact could be expected around \$3,801,679 while total value-added could be \$17,432,464.

CLUSTER RECOMMENDATIONS

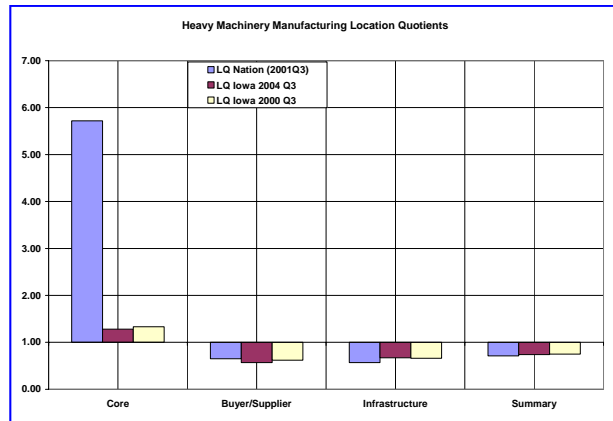
This cluster is heavily reliant upon ready-mix and other concrete manufacturing. To expand this cluster, encourage growth of industries such as millwork and paving and roofing materials.

HEAVY MACHINERY MANUFACTURING

Heavy Machinery Manufacturing create end products that apply mechanical force, for example, the application of gears and levers, to perform work.

The region-to-state location quotient for core industries is 1.28. The region-to-nation location quotient of 5.72 is one of the higher location quotients of analyzed clusters in the region. Industries included in this cluster are Agricultural Implement Manufacturing; Construction Machinery Manufacturing; Mining, Oil & Gas Field Transmission

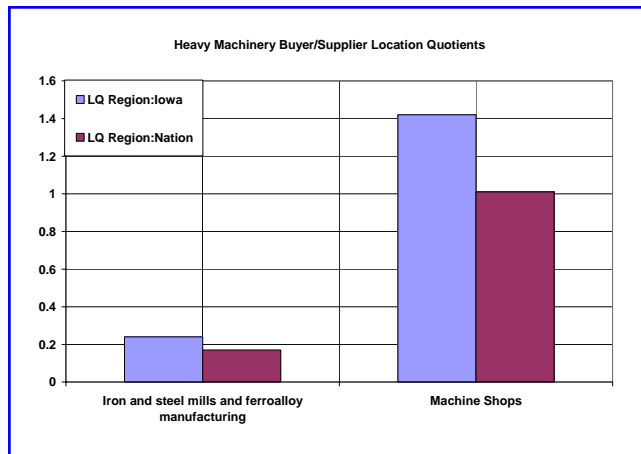
Equipment Manufacturing; Ventilation, Heating, Air Conditioning & Commercial Refrigeration Equipment Manufacturing; and Engine, Turbine & Power Transmission Equipment Manufacturing. This cluster has an average annual wage of \$36,980 which is considerably higher than the regional average (\$27,828) and slightly higher than the state average of \$31,416.



Total employment in the region within core industries in this cluster during 2004 second quarter was 1,241, while employment in the state was 22,822. During the study period, this cluster showed an employment loss of 5.9 percent within the state, and 17.6 percent loss in the region.

BUYER/SUPPLIER INDUSTRIES IN HEAVY MACHINERY MANUFACTURING

The industries that directly supply goods/services or purchase goods/services directly to/from the core industries included in this analysis are: Iron and steel mills and ferroalloy manufacturing; Ferrous metal foundries; Forging and stamping; and Machine shops. Only two of the four industries exist in the region, while one of these two buyer/supplier industries in this cluster have region-to-state location quotients greater than 1.00.



The industry in this cluster with the highest location quotient, Machine Shops, demonstrated an increase of 15 jobs over the three-year period. For the most part, buyer/supplier industries had a location quotient of 0.61 for the region which would indicate a deficiency in presence of support industries for this cluster.

PROJECTIONS

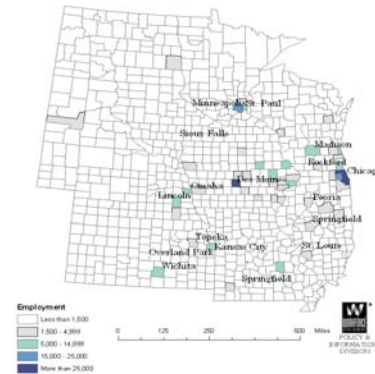
There are approximately eleven Occupational Clusters that fall within the Heavy Machinery Manufacturing industry cluster. “Extruding, forming, pressing and compacting machine setters, operators, and tenders” is the largest in terms of total employment, comprising 45 jobs. Looking at all seven occupational clusters, the salary ranges start with a low of \$17,846 to a high of \$59,987.

	Base Year 2002	Proj. Year 2012	Total Growth	2004 Mean Wage	2004 Annual Salary
Skill Cluster					
Occupation					
Construction workers					
Painters, Construction and Maintenance	0	5	5	\$8.93	\$18,574
Semi-skilled laborers					
Cutters and Trimmers, Hand	0	5	5	*	*
Semi-skilled service workers					
Demonstrators and Product Promoters	0	5	5	\$8.58	\$17,846
Skilled laborers and machine operators					
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	0	5	5	\$9.70	\$20,176
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	0	5	5	*	*
Industrial Truck and Tractor Operators	5	10	5	\$12.73	\$26,478
Foundry Mold and Coremakers	5	10	5	*	*
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	10	15	5	\$11.19	\$23,275
Fiberglass Laminators and Fabricators	10	15	5	*	*
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	20	25	5	*	*
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	35	40	5	\$14.17	\$29,474
Team Assemblers	40	45	5	\$12.54	\$26,083
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	45	50	5	*	*
Specialized mechanics, repairers, technicians					
Foundry Mold and Coremakers	5	10	5	*	*
Machinists	15	20	5	\$14.38	\$29,910
Supervisors and management personnel					
General and Operations Managers	5	10	5	\$28.84	\$59,987
First-Line Supervisors/Managers of Production and Operating Workers	25	30	5	\$19.91	\$41,413

UPPER MIDWEST REGION - INDUSTRY CLUSTER

Employment in the Heavy Machinery Manufacturing industry cluster is primarily concentrated in the larger population areas of the contiguous states. These areas represent potential targets for recruitment efforts as well as areas to conduct further research on the types of industries that make up the Heavy Machinery Manufacturing core. Additional analysis may produce opportunities for the region to encourage buyer/supplier growth in the region to support the core industries located in these outside locations. Areas to focus recruitment and research would be Minneapolis/St. Paul (MN) and Chicago (IL).

HEAVY MACHINERY MANUFACTURING CORE INDUSTRY EMPLOYMENT 2003



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ECONOMIC IMPACTS

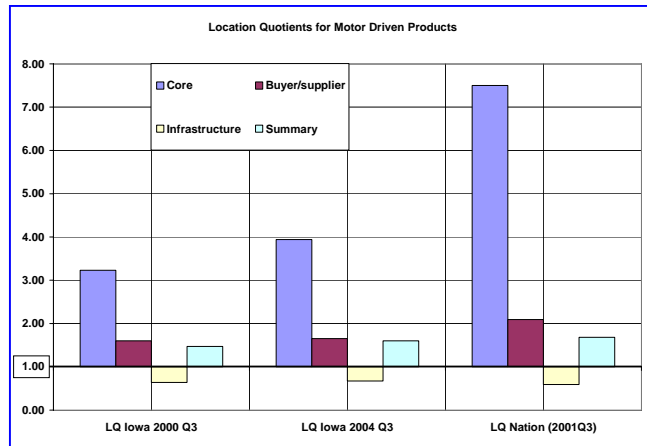
If 100 new jobs were added to in core industries, a total of 205 jobs would be added. Other than the direct impact of adding 100 jobs in core industries, an additional 105 jobs could be added in support industries, most notably Plastics plumbing fixtures, Machine shops, Wholesale trade, Truck transportation, Legal services, and Management of companies and enterprises. The subsequent tax impact could be expected to be \$2,734,943¹⁵, while total value-added could be \$11,906,261.

CLUSTER RECOMMENDATIONS

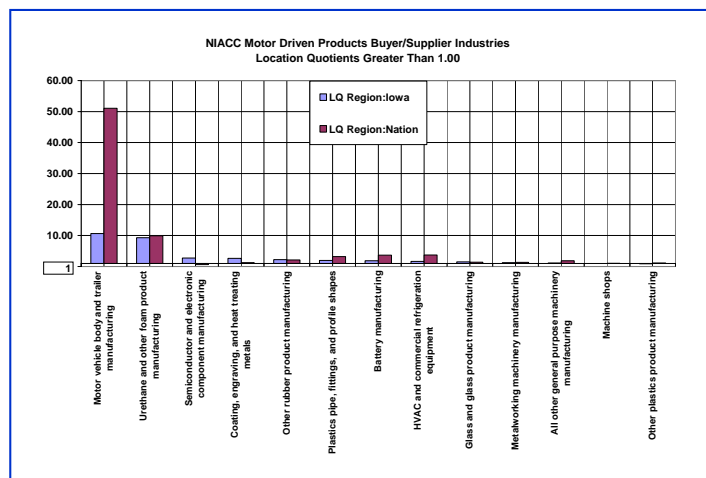
Heavy Machinery Manufacturing has core industries that are highly competitive nationally and within Iowa. However, only two of the buyer/supplier industries exist in the region. By focusing on the supply chains and encouraging entrepreneurship, this cluster could attain critical mass.

MOTOR DRIVEN PRODUCTS MANUFACTURING

Motor Driven Products is described as the manufacture of products that make use of mechanical power. The Motor Driven Products industry cluster had a cluster growth of 506 jobs from 2000 to 2004 (third quarter), up 9.25 percent from the previous ten-year time period of reference. The region-to-state location quotient of 3.94 was the third highest in the region and the region-to-nation location quotient of 7.50 was the second highest in the region, indicating a very strong export activity. Average annual wages of \$36,956 for third quarter 2004 was higher than both the state (\$31,416) and region (\$27,828) average wage for the same quarter. Industries in this cluster include:

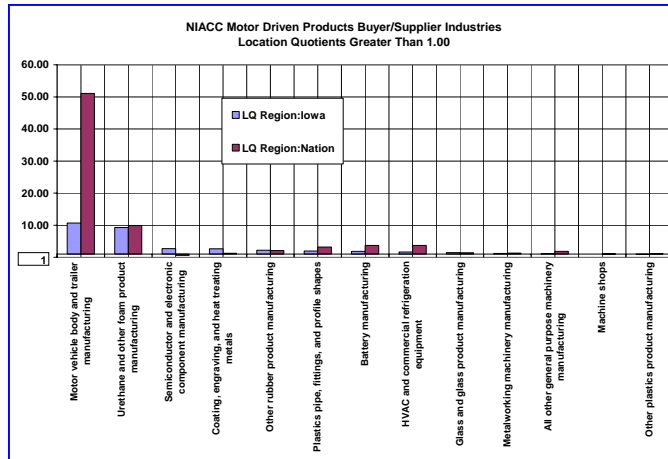


- Agricultural Implement Manufacturing
- Construction Machinery Manufacturing
- Engine, Turbine, & Power Transmission Equipment Manufacturing
- Automobile & Light Duty Motor Vehicle Manufacturing
- Heavy Truck Manufacturing
- Motor Vehicle Body & Trailer Manufacturing
- Motor Vehicle Gasoline Engine & Engine Parts Manufacturing
- Aerospace Product & Parts Manufacturing
- Ship Product & Parts Manufacturing
- Other Vehicle Product & Parts Manufacturing
- Metalworking Machinery Manufacturing



BUYER/SUPPLIER INDUSTRIES IN MOTOR DRIVEN PRODUCTS MANUFACTURING

The location quotients for all 13 buyer/supplier industries in the Motor Drive Products cluster are well above 1.00. This would indicate a particular competitive advantage for the region. Motor Vehicle Body & Trailer Manufacturing; Heating, Ventilation, Air conditioning (HVAC) & Commercial Refrigeration; Battery Manufacturing; and Plastics Pipe, Fittings, & Profile Shapes all have region-to-nation location quotients in excess of 3.00.



PROJECTIONS

There are approximately seven Occupational Clusters that fall within the Motor Driven Products industry cluster. Skilled Laborers & Machine Operators are the largest, in terms of total employment, comprising 2,575 jobs based on 2002 figures. Looking at all seven occupational clusters, the salary ranges start with a low of \$25,854 for Team Assemblers to a high of \$60,258 for General & Operations Managers. Every occupational cluster area analyzed for this industry cluster shows a projected total growth in employment from base year 2002 to 2012. Employment growth through 2012 is expected to be 770 jobs. The table to the right shows each occupational cluster and the projected growth of occupations within each cluster.

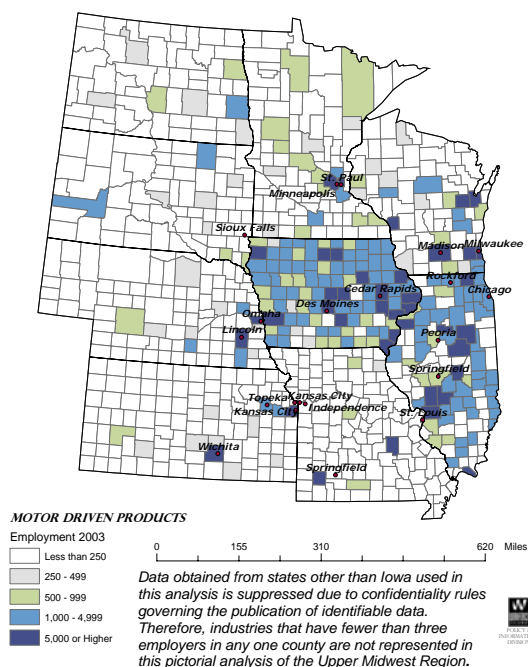
Skill Clusters in the Motor Driven Products Industry Cluster					
	Base Year 2002	Proj. Year 2012	Total Growth	2004 Median Wage	2004 Average Salary
Skill Cluster					
OCCUPATIONAL TITLE					
Construction workers					
Maintenance and Repair Workers, General	55	75	20	\$14.16	\$29,453
Engineers, technicians, architects					
Surveying and Mapping Technicians	30	50	20	*	*
Semi-skilled laborers					
Helpers--Installation, Maintenance, and Repair Workers	35	50	15	\$15.81	\$32,885
Semi-skilled service workers					
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	40	60	15	\$19.61	\$40,789
Sales Managers	30	45	15	\$27.97	\$58,178
Skilled laborers and machine operators					
Fiberglass Laminators and Fabricators	220	275	55	*	*
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	60	75	15	\$12.63	\$26,270
Industrial Truck and Tractor Operators	85	110	25	\$12.93	\$26,894
Welders, Cutters, Solderers, and Brazers	325	465	140	\$13.69	\$28,475
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	200	265	60	*	*
Sewing Machine Operators	50	75	25	*	*
Team Assemblers	1635	1875	240	\$12.43	\$25,854
Specialized mechanics, repairers, technicians					
Industrial Machinery Mechanics	35	50	15	\$14.74	\$30,659
Machinists	215	255	45	*	*
Supervisors and management personnel					
General and Operations Managers	45	60	15	\$28.97	\$60,258
First-Line Supervisors/Managers of Production and Operating Workers	140	190	50	\$19.63	\$40,830
* Data suppressed					

UPPER MIDWEST REGION - INDUSTRY CLUSTER

Employment in the Motor Driven Products industry cluster is primarily concentrated in Illinois, however, there are pockets of high concentration in Omaha (NE), Lincoln (NE), Minneapolis/St. Paul (MN) and Wichita (KS) areas - see map of the Upper Midwest

Region to the right. These areas represent potential targets for recruitment efforts as well as areas to conduct further research on the types of industries that make up the Motor Driven Products core. This research may produce opportunities for the region to encourage buyer/supplier growth in the region to support the core industries located in these outside locations.

MOTOR DRIVEN PRODUCTS CORE INDUSTRY EMPLOYMENT 2003



ECONOMIC IMPACTS

The analysis for employment impacts in Motor Driven Products is not conclusive given that there are six industries in which an addition of 100 jobs would contribute to job growth. Therefore, for each 100 jobs added in any one industry within this cluster would produce 96 jobs indirectly or through induced effects. Wholesale Trade, Truck Transportation, Travel Trailer & Camper Manufacturing, and Motor Vehicle Parts Manufacturing would demonstrate the most job growth.

CLUSTER RECOMMENDATIONS

The North Iowa region is centrally located in the Upper Midwest region. It may be advantageous for this region to consider focusing efforts of expansion in Motor Driven Products Manufacturing buyer/supplier industries to support core industries already present in the Upper Midwest Region such as the two NASCAR speedways located in this larger region and one under construction in Iowa.

PLASTICS MANUFACTURING

Industries in the Plastics cluster make goods by processing plastic materials and raw rubber. This core industry cluster is comprised of:

- Plastic Pipe, Fitting & Profile Shapes
- Plastics Packaging Materials
- Laminated Plastics
- Polystyrene Foam Product
- Urethane & Other Foam Product

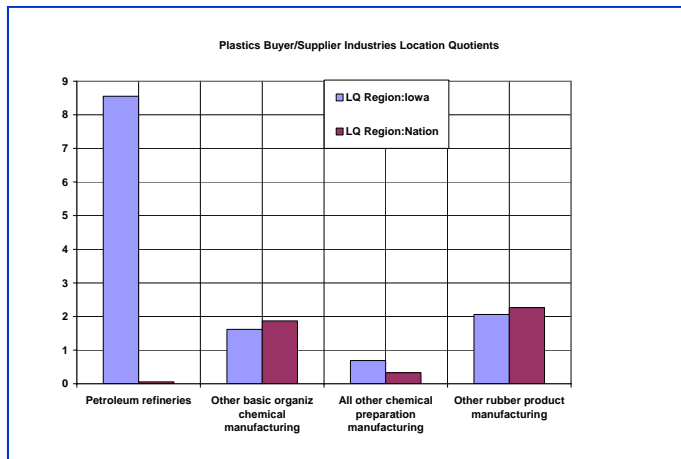
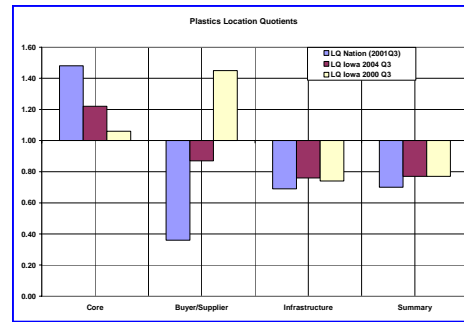
This industry cluster has a region-to-state location quotient of 1.22 and a region-to-

North Central Iowa Region

nation location quotient of 1.48. Average annual wages are \$30,672, which is just under the state average of \$31,416 and marginally higher than the regional average of \$27,828. The industries that comprise the core of this cluster showed a net job growth from 2000 to 2004 of 34 jobs.

BUYER/SUPPLIER INDUSTRIES IN PLASTICS MANUFACTURING

Five of the ten buyer/supplier industries are located in the region. The location quotients for four buyer/supplier industries in the Plastics Manufacturing cluster are above 1.00. Overall, the buyer/supplier industries in this cluster have been gradually declining over the four-year period, declining by 43.13 percent. If growth can be sparked in these supplying/support industries, this cluster has the potential to gain significance in the region's overall economy.



PROJECTIONS

There are approximately seven Occupational Clusters that fall within the Plastics Manufacturing industry cluster. Tenders are the largest in terms of total employment, comprising 50 jobs based on 2002 figures. Looking at these occupational clusters, the salary ranges start with a low of \$17,846 for Demonstrators and Product Promoters to a high of \$59,987 for General & Operations Managers. Every occupational cluster area analyzed for this industry cluster shows a projected total growth in employment from base year 2002 to 2012. The table above shows each occupational cluster and the projected growth of occupations within each cluster.

	Base Year 2002	Proj. Year 2012	Total Growth	2004 Mean Wage	2004 Annual Salary
Skill Cluster					
Occupation					
Construction workers					
Painters, Construction and Maintenance	0	5	5	\$8.93	\$18,574
Semi-skilled laborers					
Cutters and Trimmers, Hand	0	5	5	*	*
Semi-skilled service workers					
Demonstrators and Product Promoters	0	5	5	\$8.58	\$17,846
Skilled laborers and machine operators					
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	0	5	5	\$9.70	\$20,176
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	0	5	5	*	*
Industrial Truck and Tractor Operators	5	10	5	\$12.73	\$26,478
Foundry Mold and Coremakers	5	10	5	*	*
Plastic	10	15	5	\$11.19	\$23,275
Fiberglass Laminators and Fabricators	10	15	5	*	*
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	20	25	5	*	*
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	35	40	5	\$14.17	\$29,474
Team Assemblers	40	45	5	\$12.54	\$26,083
Tenders	45	50	5	*	*
Specialized mechanics, repairers, technicians					
Foundry Mold and Coremakers	5	10	5	*	*
Machinists	15	20	5	\$14.38	\$29,910
Supervisors and management personnel					
General and Operations Managers	5	10	5	\$28.84	\$59,987
First-Line Supervisors/Managers of Production and Operating Workers	25	30	5	\$19.91	\$41,413

UPPER MIDWEST REGION - INDUSTRY CLUSTER

Employment in the Plastics Manufacturing industry cluster is primarily concentrated in Chicago (IL) and Minneapolis-St. Paul (MN). However, there are of high concentrations in Nebraska, Illinois, and Missouri. These areas represent potential targets for recruitment efforts as well as areas to conduct further research on the types of industries that make up the Plastics Manufacturing core. This research may produce opportunities for the region to encourage buyer/supplier growth in the region to support the core industries located in these outside locations.

ECONOMIC IMPACTS

The analysis for employment impacts in Plastics Manufacturing shows is not conclusive given that there are only two industries which currently exist in the region. However, adding 100 jobs in the two core industries would result in an increase of 173 overall. Wholesale trade and Truck transportation would demonstrate the most job growth. The tax impact would be \$1,796,808, while total value added would be \$7,927,023.

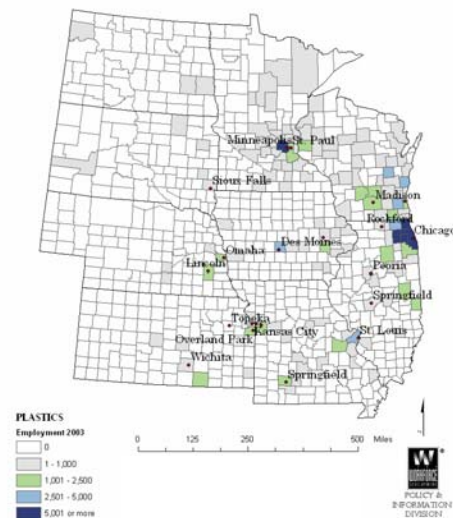
CLUSTER RECOMMENDATIONS

It would be advantageous to the region to increase the number of firms represented in the buyer/supplier industries, By increasing the number of firms represented, this will increase the cluster’s presence in the region and trigger critical mass.

ADDITIONAL CLUSTERS TO CONSIDER

Five additional clusters have location quotients greater than 1.00, showing that they may be areas in which the region might want to consider focusing future efforts to build and expand in order to create a broader base from which the region relies on for economic stability. They include Agricultural Products, Automotive, Communications Equipment, Pharmaceuticals, and Printing & Publishing. Because of their potential for growth, each has been analyzed, however, if the region is considering any one of these clusters to focus on for growth, additional analysis in examining buyer/supplier industries, employment projections, competition in the Upper Midwest Region, and economic impacts should be considered before moving forward.

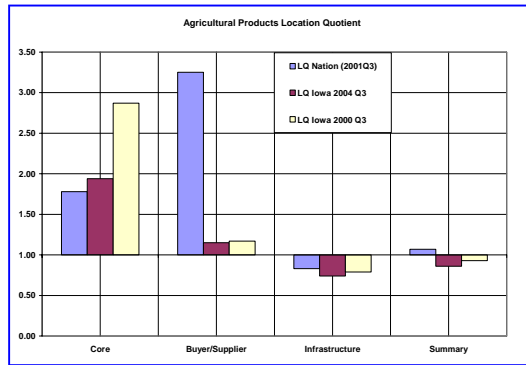
PLASTICS CORE INDUSTRY EMPLOYMENT 2003



Data obtained from states other than Iowa used in this analysis is suppressed due to confidentiality rules governing the publication of identifiable data. Therefore, industries that have fewer than three employers in any one county are not represented in this pictorial analysis

AGRICULTURAL PRODUCTS

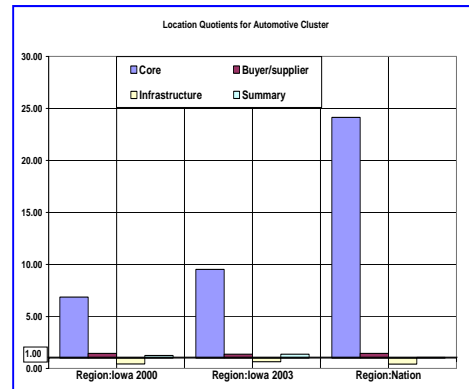
Agricultural Products includes Crop Production, Animal Production, Forestry & Logging, Fishing, Hunting, and Trapping. A valid picture of Agricultural Products as a cluster is difficult to capture because family farms, the backbone of the cluster, are not included in the universe (employees covered by unemployment insurance) from which the data are extracted. Excluding data related to family farms, this core cluster posted employment of 882 for the region.



Furthermore, wages that are captured show that the cluster had average wages of \$25,348, significantly below the state average wage of \$31,416 and moderately below the regional average of \$27,828. Even with low employment growth and lower than average wages, the Agricultural Products cluster is vital to this region, both as a supplying industry providing raw materials for other core clusters and as a traded core cluster.

AUTOMOTIVE

The Automotive industry cluster is comprised of industries that are concerned with vehicles or vehicle parts manufacturing. This cluster can serve as a stand-alone traded industry cluster in the region since it has the highest region-to-nation location quotient (24.14), and a region-to-state location quotient of 9.53. Keep in mind that only two of the five industries that make up this cluster are represented in the region, thus making this industry cluster reliant on too few firms that comprise the core in the region. However, many of the industries that make up this cluster overlap with the Motor Driven Products Manufacturing industry cluster. The Automotive core industry cluster had the greatest job growth in the region from 2000 to 2004, 878 jobs, showing a potential for growth of this core industry cluster. Additionally, average wages of \$34,932 were considerably higher than both the state and region.

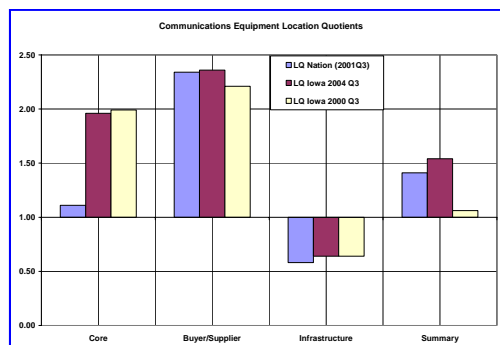


Many of the Occupational Clusters present in this industry cluster are shared with other core industry clusters in the region, particularly the Motor Driven Products Manufacturing industry cluster. This cluster also has sparse representation outside of Iowa when looking at the Upper Midwest region. However, by adding 400 new jobs in the core industries, 280 jobs could potentially be added either indirectly or as a result of industry-to-industry thus creating 680 new jobs.

COMMUNICATIONS EQUIPMENT

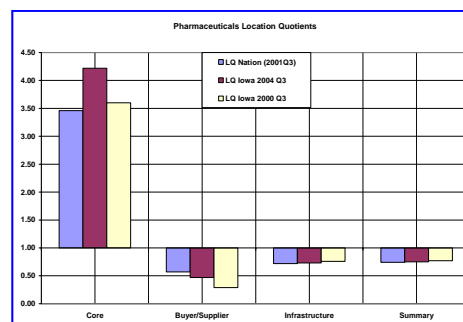
The Communications Equipment cluster has a location quotient in excess of 1.00 for both the region-to-state (1.96) and region-to-nation (1.11). However, the average wage of \$25,692 is well below the state average wage of \$31,416 and moderately below the regional average wage of \$27,828.

Furthermore, the cluster has shown a net job loss of 40 from 2000 to 2004. As a core this cluster does not necessarily have a strong presence in the region, however, the buyer/supplier location quotient exceed 1.00, therefore, showing there is strong potential for growth in this cluster.



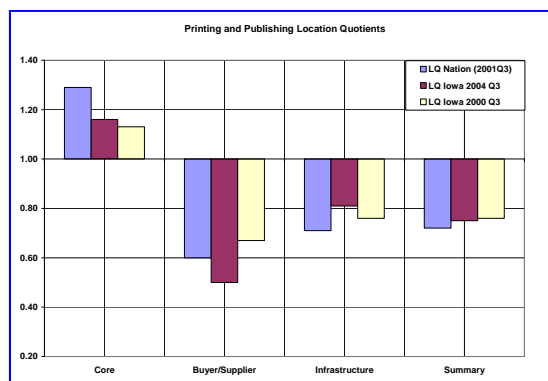
PHARMACEUTICALS

The Pharmaceuticals cluster is represented by only one industry in the region – Pharmaceutical & Medicine Manufacturing. The cluster has a region-to-state location quotient of 4.22 and a region-to-nation location quotient of 3.46, indicating a healthy presence in the region. The cluster showed 37.0 percent job growth from 2000 to 2004, adding 132 jobs. The annual average wage of \$52,532 is well in excess of state and regional averages. As Pharmaceuticals is a subset of Chemical Production, changes in this cluster will also influence Chemical Production. This cluster has been included as part of the analysis and recommendations in the Chemical Production cluster.



PRINTING & PUBLISHING

The Printing and Publishing cluster has location quotients greater than 1.0 for both the region-to-state (1.16) and region-to-nation (1.29) showing there is a presence and potential for growth in the region. This cluster posted net job losses of 145 from 2000 to 2004 but sustained an annual average wage of \$33,952, higher than the state and regional averages. The majority of the employment in this cluster is in the printing industry which includes printing on



North Central Iowa Region

apparel and textile products, paper, metal, glass, plastics, and other materials. The convenience of desk-top publishing and similar technology has caused this particular industry cluster to be unpredictable. Statewide, employment in this cluster has waned, showing a net loss of 3,526 jobs from 2000 to 2004.

CITED SOURCES

¹ Source: State Library of Iowa, State Data Center Program, Regional Economic Profiles

² Source: IMPLAN Professional Version 2.0

³ Source: Iowa Workforce Development, Employment Statistics Bureau, Regional Data Analysis Tool, 2004 Third Quarter (preliminary)

⁴ Source: Iowa Workforce Development, Quarterly Census of Employment and Wages, 2004 Third Quarter (preliminary)

⁵ Source: Bureau of Labor Statistics, Covered Employment and Wages (CEW/ES-202) DBF Disk Number 2, Version 3 County Level

⁶ Clusters and the New Economics of Competition, Porter, Michael E., Harvard Business Review, November-December 1998, p. 78

⁷ Third Quarter 2001 is the most recent national data available as of this writing.

⁸ An industry cluster benchmark will help verify the buyer/supplier relationships and pinpoint industries for further development.

⁹ Feser, Edward J. What regions do rather than make: A proposed set of knowledge-based occupation clusters, Department of City and Regional Planning, Chapel Hill, NC, October 2001, Table 2

¹⁰ For more information on OES, please visit <http://www.bls.gov/oes>

¹¹ Horrigan, Michael W., (2004, February) Employment projections to 2012: concepts and context, *Monthly Labor Review*

¹² Wage and salary information which are not disclosable are indicated by an asterisk (*).

¹³IMPLAN Professional, Version 2.0, Impact Report

¹⁴Ibid

¹⁵Ibid

¹⁶ The 4– 5– or 6– digit NAICS is listed to assist in planning. For more information on NAICS codes, please visit <http://www.census.gov/epcd/www/naics.html>

¹⁷ Feser, Edward J. What regions do rather than make: A proposed set of knowledge-based occupation clusters, Department of City and Regional Planning, Chapel Hill, NC, October 2001

IOWA'S TRADED INDUSTRY CLUSTER METHODOLOGY

Industry clusters as defined by Michael E. Porter were reviewed and used to identify industries within the clusters by matching SIC (Standard Industry Classification) codes 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 the North American Industrial Classification System (NAICS) coding.

Using the NAICS coding system as the numerical representation of industries, industry relationships were then identified through IMPLAN modeling software so that clusters could be identified using Pennsylvania's Regional Data Analysis Tool (RDAT) - a database 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 (BLS) 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 for all quarters 2000 through 2004 third quarter (preliminary), and annual averages for 2000 through 2003.

ISSUES

Confidentiality issues have restricted the use of some of the data downloaded from BLS and the Iowa historical SIC data. Because of these restrictions, data analyzed from states other than Iowa have been suppressed as has the historical data on Iowa.

OCCUPATIONAL ANALYSIS

Occupational analysis was done by matching Feser's Occupational Skill Clusters¹⁷ with Occupational Educational Statistics (OES) Code and the Standard Occupational Code (SOC), 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.

ANALYSIS TOOLS

Four 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). Location quotient and shift/share calculations are built into the Pennsylvania Regional Data Analysis Tool. The calculations for each are included.

The **Location Quotient (LQ)** is a ratio of an industry’s share of the local economy to the industry’s national economy or state economy. In other words, it measures an industry’s concentration in the 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. The LQ is calculated as follows:

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

Where EMP = state or nation

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

Shift/Share demonstrates the region’s competitiveness and cluster growth. Shift/share is comprised of three components plus cluster growth:

1. *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 and is calculated as follows:

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

2. *The proportional shift or industry mix component* measures the net effects of the business cycle—job loss or gain—on a specific industry and is calculated as follows:

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

3. *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. 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

Cluster growth is the sum of the three components – cluster growth that is negative reflects job losses during the specified time period.

IMPLAN input/output modeling software, a product of the Minnesota IMPLAN Group, was used to determine relationships among industries. IMPLAN multipliers demonstrate how industries interact. Input/output modeling shows how industries provide input to and use output from each other to produce goods or services and provides detailed information on the flows of the goods and services that make up the

North Central Iowa Region

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. Occupational Employment Statistics (OES) and Edward J. Feser's occupational clusters were also used in determining occupational cross-walks, projections, and wages.

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 Clusters 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, Feser 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.

135 Great Ideas on Economic Development, Clark, Cal (1999) , Utilitcorp United (pp 73-82).

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.

n.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.

(2002) *Creating Smart Systems A guide to cluster strategies in less favoured regions*, Rosenfeld, Stuart A. 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.

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

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

Traded Clusters - A group of interconnected industries that export goods or services from a region.



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