



**Clusters Employment
and Staffing Pattern
Summary for the
Corridor Alliance**

**The Institute for Decision Making
University of Northern Iowa
and
Iowa Workforce Development**

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I. Project and Report Overview

The overall purpose of the project is to assist the Iowa City Area Development Group, Cedar Rapids Metro Economic Alliance and Kirkwood Community College gain a greater understanding of the workforce characteristics and needs of key industry clusters in their region and therefore enable them to better assist both existing regional businesses and prospective businesses in those clusters. Task I of the project is for the group to gain a clearer understanding of the cluster composition and labor characteristics of each industry cluster in the region. An initial set of ten industry clusters were identified based on key employers in the region and the group's discussion of known cluster interactions among those industries. After several discussions and analysis of preliminary data, the composition of the original ten industry clusters was revised and three additional industry clusters were added.

Task II of the project identified and examined occupational labor clusters in the region and determined the labor impact to the region. Occupational labor clusters are determined using standard occupational classification (SOC) code concentrations through staffing patterns which identify occupations throughout each industry cluster. Each industry cluster hinges on access to the appropriate labor pool to keep it strong and viable.

Based on the research conducted of labor impact, six of the thirteen industry clusters were expanded upon using career ladders for the core occupations illustrating what positions feed into the core, what education or training is needed, wages, and projected growth or decline of each occupation. Both regional and statewide wages are provided for selected occupations within the clusters. Statewide wages are used in the report for averages due to the lack of sufficient sample sizes in some regional occupations.

What follows is a brief examination of the cluster composition and occupational staffing patterns for the 13 industry clusters. A variety of data and information sources were utilized to identify key employers in each cluster, the estimated employment levels for each cluster and the occupational staffing patterns in each industry cluster. Data suppression and data disclosure rules by the U.S. Bureau of Labor Statistics and Iowa Workforce Development required the use of proprietary data sources in order to estimate employment levels in each cluster and for many of the individual employers, as well as for occupational employment patterns in each of the clusters. Additionally, the use of proprietary data sources does allow for the projection of cluster employment and occupational employment levels into the future. However, it is important to note that there are challenges with using proprietary data since they are estimates developed through statistical modeling and are not actual numbers.

II. Corridor Alliance Industry Clusters

The estimated employment levels of the 13 industry clusters in the region ranged from a low of 424 employees to a high of 11,570 employees. The Financial Services and Customer Services cluster has the largest estimated employment at 11,570 followed by the Electronics Engineering

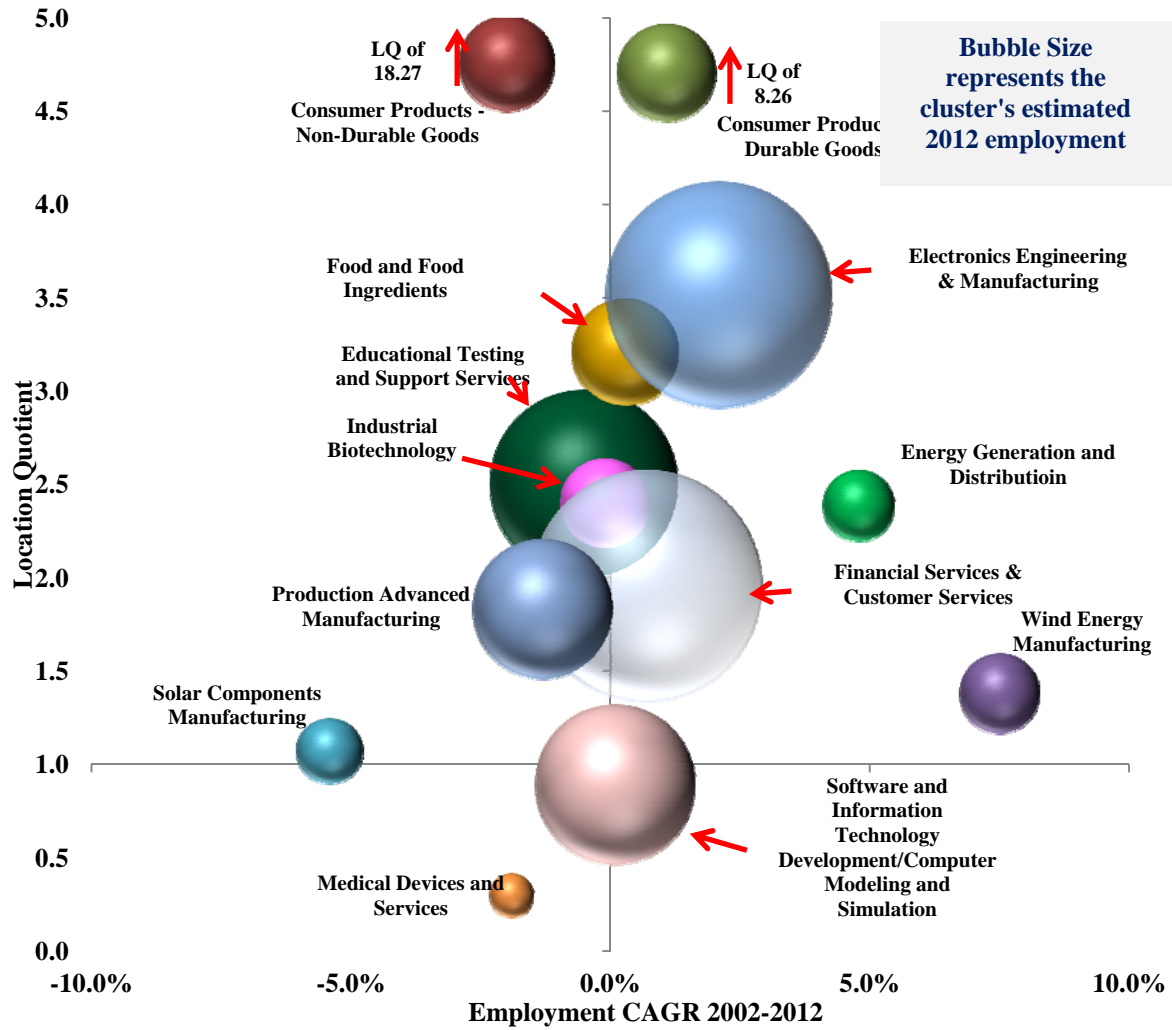
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and Manufacturing cluster with an estimated employment level of 11,095. The Medical Devices and Services Cluster had the lowest estimated employment with 424 employees.

Figure 1 illustrates each industry cluster's employment level, the cluster's relative concentration (location quotient) in the region in relation to the U.S. economy, and the cluster's compounded annual growth in employment from 2002 to 2012. Location quotients can be used to get a sense of the specialization of industries or clusters in a region. A standard rule of thumb is that a location quotient with a value of 1.5 or higher means the region has some level of specialization related to that industry or cluster. A location quotient value of 0.8 to 1.2 indicates that an industry's or cluster's employment concentration is normal and comparable to the U.S. economy. A location quotient less than 0.8 may indicate that an industry's or cluster's employment is underrepresented in the region compared to the U.S. economy.

Nine of the region's 13 industry clusters had location quotients higher than 1.50 with the Consumer Products – Durable Goods cluster having a location quotient of 18.27 which is an extremely high location quotient.

Figure 1 – Corridor Alliance’s Industry Clusters



(Source: EMSI)

Clusters Employment and Staffing Patterns

Table 1 shows that just over half of the 13 industry clusters experienced employment growth from 2002 to 2012. The compounded annual growth rates for the clusters ranged from 7.5 percent to -5.4 percent with the Renewable Energy and Sustainable Technology Products - Wind Manufacturing cluster having the highest rate and the Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing cluster having the lowest rate.

Table 1 – Corridor Alliance’s Industry Clusters

	Location Quotient	Compounded Annual Growth Rate (2002-2012)	2012 Estimated Employment
Educational Testing and Support Services	2.50	-0.5%	7,663
Consumer Products - Durable Goods	18.27	-2.0%	1,979
Consumer Products - Non-Durable Goods	8.26	1.1%	2,084
Food and Food Ingredients	3.21	0.3%	2,484
Industrial Biotechnology	2.40	-0.1%	1,767
Financial Services and Customer Services	1.96	0.7%	11,570
Electronics Engineering and Manufacturing	3.52	2.1%	11,095
Software and Information Technology Development/Computer Modeling and Simulation	0.89	0.1%	5,524
Energy Generation and Distribution	2.38	4.8%	1,108
Renewable Energy and Sustainable Technology Products - Wind Manufacturing	1.38	8.7%	1,397
Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing	1.07	-5.4%	932
Medical Devices and Services	0.29	-1.9%	424
Production Advanced Manufacturing	1.83	-1.3%	4,221

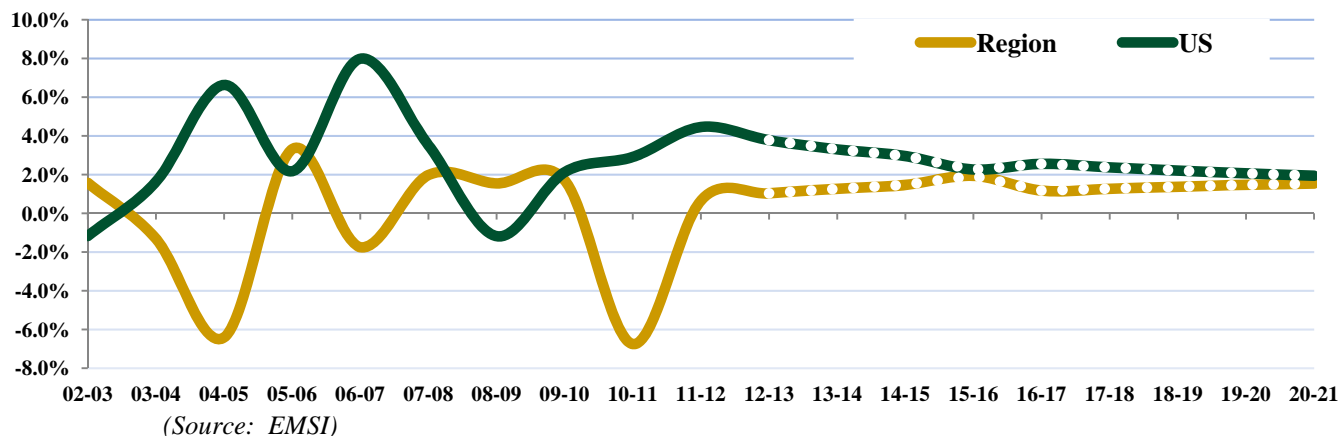
(Source: EMSI)

III. Individual Industry Clusters

Educational Testing and Support Services Cluster

A total of seven industries were identified as part of the Educational Testing and Support Services cluster. Each cluster includes employers the group identified as providing products and services related to educational testing. The cluster’s total estimated employment is 7,663. The cluster in the region had a compounded annual growth rate of -0.5 percent from 2002 to 2012. Nationally the cluster had 2.6 percent compounded annual growth during the same time period. In the region the cluster is projected to grow at an annual rate of 1.3 percent from 2012 through 2021 while it is projected to grow 2.3 percent annually at a national level. Figure 2 illustrates the estimated annual employment in the Educational Testing and Support Services cluster in the region and nationally from 2002 to 2012 and the projected employment from 2013 to 2021.

Figure 2 – Annual Percentage Change in Educational Testing and Support Services Cluster Employment



Among the seven industries which encompass the Educational Testing and Support Services cluster, three industries had the majority of the cluster’s employment in 2012. Telemarketing bureaus and other contact centers accounts for 39.1 percent of the cluster’s employment. The data processing, hosting and related services cluster accounts for another 30.8 percent of the cluster’s employment and the educational support services cluster accounts for 20.7 percent.

Table 2- Industries in the Educational Testing and Support Services Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
511199	All Other Publishers	183	14.3%	6.01
511210	Software Publishers	212	-4.6%	0.41
518210	Data Processing, Hosting, and Related Services	2,361	-2.0%	4.35
541613	Marketing Consulting Services	267	-3.0%	0.42
541618	Other Management Consulting Services	56	-5.9%	0.22
561422	Telemarketing Bureaus and Other Contact Centers	3,000	-2.9%	4.29
611710	Educational Support Services (Private)	1,584	24.7%	4.13
Cluster Total		7,663	-0.5%	2.50

Figure 3 contains a listing of key employers in the seven industries which make up the Educational Testing and Support Services cluster. Employer size ranges from a few dozen employees to over 1,000 employees. The average establishment size is 53.6 employees

Figure 3- Key Employers in the Educational Testing and Support Services Cluster

• Eagle Tech (511199)	• SmartLead (541613)
• Stamats (511199)	• Ruffalo Cody (561422)
• Riverdeep (511210)	• Vangent (561422)
• Leepfrog Technologies (518210)	• ACT (611710)
• Pearson (518210)	• Noel-Levitz (611710)
• Epley Marketing Services Inc (541613)	• Patient Education Institute Inc (611710)
• Infinity Contact (541613)	

Clusters Employment and Staffing Patterns

Table 3 shows that nearly 30 percent of the employment in the Educational Testing and Support Services cluster is in two types of occupations: customer service representatives (17.6 percent) and telemarketers (12.2 percent). There are an additional 25 occupations with employment levels of 81 or higher, which represents 1.0 percent or higher of the cluster's employment

Table 3 – Most Common Occupations in the Educational Testing and Support Services Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
43-4051	Customer Service Representatives	1,351	1,311	-40	-3.0%	17.6%
41-9041	Telemarketers	932	702	-230	-24.7%	12.2%
15-1031	Computer Software Engineers, Applications	316	347	31	9.8%	4.1%
43-9061	Office Clerks, General	287	336	49	17.1%	3.7%
13-1111	Management Analysts	217	235	18	8.3%	2.8%
13-1199	Business Operations Specialists, All Other	197	223	26	13.2%	2.6%
15-1041	Computer Support Specialists	183	207	24	13.1%	2.4%
25-3099	Teachers and Instructors, All Other	148	180	32	21.6%	1.9%
39-9011	Child Care Workers	146	189	43	29.5%	1.9%
43-5061	Production, Planning, and Expediting Clerks	139	158	19	13.7%	1.8%
15-1021	Computer Programmers	129	128	-1	-0.8%	1.7%
43-1011	First-Line Supervisors/Managers of Office and Administrative Support Workers	128	137	9	7.0%	1.7%
25-3021	Self-Enrichment Education Teachers	125	156	31	24.8%	1.6%
15-1071	Network and Computer Systems Administrators	122	149	27	22.1%	1.6%
43-9021	Data Entry Keyers	117	136	19	16.2%	1.5%
15-1051	Computer Systems Analysts	115	141	26	22.6%	1.5%
11-3021	Computer and Information Systems Managers	103	117	14	13.6%	1.3%
41-3099	Sales Representatives, Services, All Other	102	109	7	6.9%	1.3%
43-2011	Switchboard Operators, Including Answering Service	100	81	-19	-19.0%	1.3%
25-9041	Teacher Assistants	98	129	31	31.6%	1.3%
25-9031	Instructional Coordinators	96	131	35	36.5%	1.3%
11-1021	General and Operations Managers	89	101	12	13.5%	1.2%
43-6011	Executive Secretaries and Administrative Assistants	88	103	15	17.0%	1.1%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	85	97	12	14.1%	1.1%
43-6014	Secretaries, Except Legal, Medical, and Executive	85	96	11	12.9%	1.1%
13-1073	Training and Development Specialists	83	92	9	10.8%	1.1%
15-1032	Computer Software Engineers, Systems Software	81	76	-5	-6.2%	1.1%

(Source: EMSI)

Consumer Products - Durable Goods

As the name implies, the Consumer Products – Durable Goods cluster consists of industries that manufacture consumer products with a normal life expectancy of three years or more. The 2012 estimated employment for the cluster is 1,979 divided between two industries. Nearly all of the employment in the cluster, nearly 94 percent, is in the household refrigerator and home freezer manufacturing industry. The average establishment size for the cluster in 2012 is 329.8 employees. The cluster has a location quotient (LQ) of 18.27, which is extremely high, and points to significant specialization in the region. Even more significant is the LQ of 78.96 for the household refrigerator and home freezer manufacturing industry (see Table 4). The cluster in the region is dominated by two manufacturers: ACP Inc. (33-3319) and Whirlpool - Amana Refrigeration (33-5222).

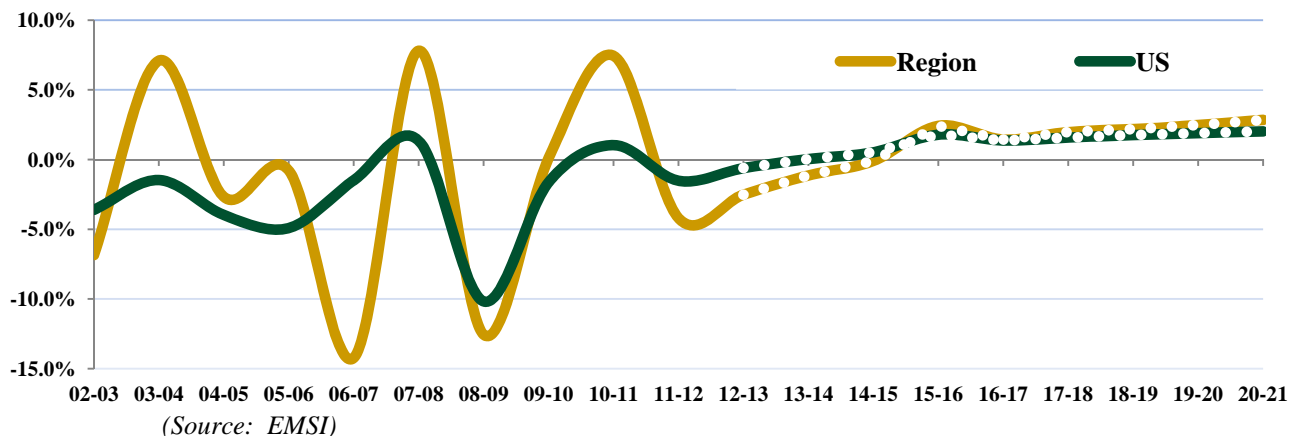
Table 4 – Industries in the Consumer Products – Durable Goods Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
333319	Other Commercial and Service Industrial Machinery Manufacturing	123	6.7%	1.45
335222	Household Refrigerator and Home Freezer Manufacturing	1,856	-2.3%	78.96
Cluster Total		1,979	-2.0%	18.27

(Source: EMSI)

From 2002 to 2012, the compounded annual growth rate for the cluster in the region was -2.0 percent (see Figure 4). The cluster at the U.S. level had a compounded annual growth rate of -2.4 percent. The cluster in the region is projected to grow at an annual rate of 1.3 percent from 2012 through 2021 and grow at an even faster rate of 2.3 percent annually at the national level.

Figure 4 - Annual Percentage Change in Consumer Products - Durable Goods Cluster Employment



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Nearly a third of the cluster's employment in 2012 (32.4 percent) is in the team assemblers occupation. Another 6.6 percent of the cluster's total employment is all other metal workers and plastic workers occupation, and another 6.6 percent is industrial truck and tractor operators. Over all, the Consumer Products – Durable Goods cluster has 20 occupations that have at least 1.0 percent of the cluster's employment (see Table 5)

Table 5 – Most Common Occupations in the Consumer Products – Durable Goods Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
51-2092	Team Assemblers	642	636	-6	-0.9%	32.4%
51-4199	Metal Workers and Plastic Workers, All Other	131	128	-3	-2.3%	6.6%
53-7051	Industrial Truck and Tractor Operators	130	127	-3	-2.3%	6.6%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	71	67	-4	-5.6%	3.6%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	58	57	-1	-1.7%	2.9%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	48	48	0	0.0%	2.4%
51-4121	Welders, Cutters, Solderers, and Brazers	42	41	-1	-2.4%	2.1%
49-9042	Maintenance and Repair Workers, General	39	40	1	2.6%	2.0%
51-2099	Assemblers and Fabricators, All Other	38	37	-1	-2.6%	1.9%
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	32	31	-1	-3.1%	1.6%
17-2141	Mechanical Engineers	31	32	1	3.2%	1.6%
51-2041	Structural Metal Fabricators and Fitters	31	29	-2	-6.5%	1.6%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	28	26	-2	-7.1%	1.4%
51-9199	Production Workers, All Other	27	25	-2	-7.4%	1.4%
51-2023	Electromechanical Equipment Assemblers	23	23	0	0.0%	1.2%
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	22	21	-1	-4.5%	1.1%
51-9121	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	22	22	0	0.0%	1.1%
17-2112	Industrial Engineers	22	23	1	4.5%	1.1%
51-2022	Electrical and Electronic Equipment Assemblers	19	19	0	0.0%	1.0%
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	19	19	0	0.0%	1.0%

(Source: EMSI)

Consumer Products - Non-Durable Goods

The Consumer Products – Non-Durable Goods cluster had an estimated employment of 2,084 in 2012. The cluster in the region consists of employers in three industries. Over half of the cluster’s employment is in the toilet preparation manufacturing industry and another 31.6 percent of the cluster’s employment is in the corrugated and solid fiber box manufacturing industry. The cluster has three key employers in the region: International Paper (322211), Proctor and Gamble Hair Care (325620) and Oral B Labs (339994). With a LQ of 8.26, the Consumer Products – Non-Durable Goods cluster has significant concentration and specialization in the region compared to the cluster nationally.

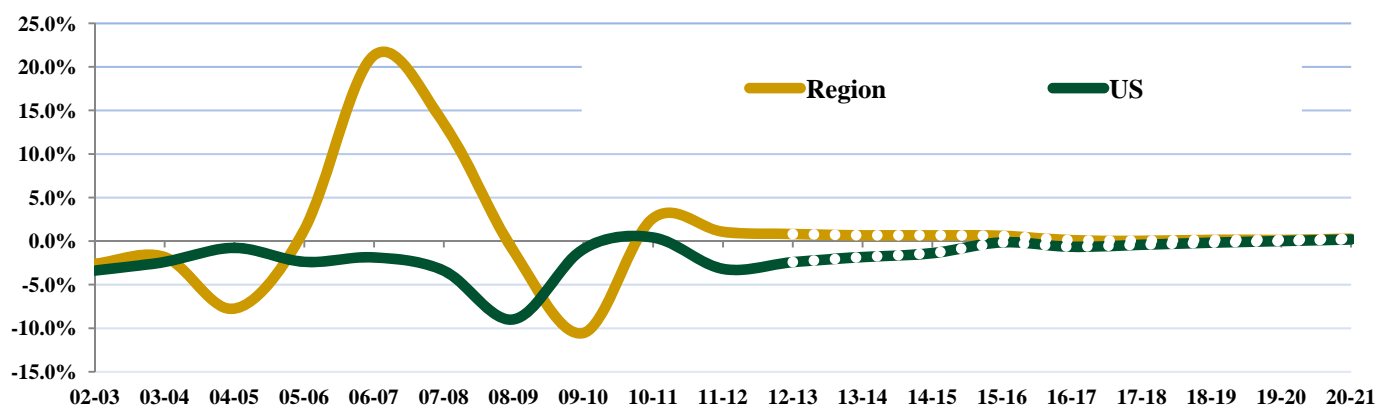
Table 6 – Industries in the Consumer Products – Non-Durable Goods Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
322211	Corrugated and Solid Fiber Box Manufacturing	658	-1.3%	4.38
325620	Toilet Preparation Manufacturing	1,085	5.9%	12.47
339994	Broom, Brush, and Mop Manufacturing	341	-3.6%	22.68
Cluster Total		2,084	1.1%	8.26

(Source: EMSI)

From 2002 to 2012, the Consumer Products – Non-Durable Goods cluster had a compounded annual growth rate of 1.1 percent. This positive growth was counter to the cluster’s growth pattern at the U.S. level with the cluster having a compounded annual growth rate of -2.5 percent. The cluster is projected to continue to have negative annual growth (-0.7 percent annually) at the U.S. level through 2021 while the cluster in the region is projected to have an annual growth rate of 0.3 percent.

Figure 5 – Annual Percentage Change in Consumer Products – Non-Durable Goods Cluster Employment



(Source: EMSI)

Like the Consumer Products – Durable Goods cluster, the team assembler occupation has the highest employment levels of all of the occupations in the Consumer Products – Non-Durable Goods cluster. Team assembler positions account for 12.3 percent of the cluster’s employment in the region. Two other production occupations, paper goods machine setters, operators and

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tenders occupation and mixing and packaging and filling machine operators and tenders, each had employment levels that were over seven percent of the cluster's employment. There are 21 other occupations which had employment levels that were 1.0 percent or more of the cluster's employment.

Table 7 – Most Common Occupations in Consumer Products – Non-Durable Goods Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
51-2092	Team Assemblers	256	271	15	5.9%	12.3%
51-9196	Paper Goods Machine Setters, Operators, and Tenders	182	163	-19	-10.4%	8.7%
51-9111	Packaging and Filling Machine Operators and Tenders	149	154	5	3.4%	7.1%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	96	107	11	11.5%	4.6%
53-7051	Industrial Truck and Tractor Operators	95	99	4	4.2%	4.6%
43-5061	Production, Planning, and Expediting Clerks	72	76	4	5.6%	3.5%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	60	61	1	1.7%	2.9%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	55	56	1	1.8%	2.6%
51-5023	Printing Machine Operators	52	49	-3	-5.8%	2.5%
49-9041	Industrial Machinery Mechanics	52	55	3	5.8%	2.5%
53-7064	Packers and Packagers, Hand	47	46	-1	-2.1%	2.3%
19-2031	Chemists	39	40	1	2.6%	1.9%
49-9042	Maintenance and Repair Workers, General	37	38	1	2.7%	1.8%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	36	37	1	2.8%	1.7%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	31	31	0	0.0%	1.5%
43-9061	Office Clerks, General	30	32	2	6.7%	1.4%
51-9199	Production Workers, All Other	28	29	1	3.6%	1.3%
43-4051	Customer Service Representatives	28	30	2	7.1%	1.3%
17-2112	Industrial Engineers	24	27	3	12.5%	1.2%
43-5071	Shipping, Receiving, and Traffic Clerks	24	23	-1	-4.2%	1.2%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	23	23	0	0.0%	1.1%
51-9198	Helpers--Production Workers	21	22	1	4.8%	1.0%
53-7011	Conveyor Operators and Tenders	20	22	2	10.0%	1.0%
51-9011	Chemical Equipment Operators and Tenders	20	20	0	0.0%	1.0%

(Source: EMSI)

Food and Food Ingredients

The Food and Food Ingredients cluster in the region has an estimated employment of 2,484 in 2012 and is composed of six food manufacturing industries. Roughly three-fourths of the cluster’s employment in 2012 is in the breakfast cereal manufacturing industry. The spice and extract manufacturing industry account for 16.1 percent of the cluster’s total employment in 2012. Establishments in the Food and Food Ingredients cluster in the region have an average size of 310.5 employees. The cluster in the region has a LQ of 3.21 in 2012 which is significant and the breakfast cereal manufacturing industry has a LQ of 75.74.

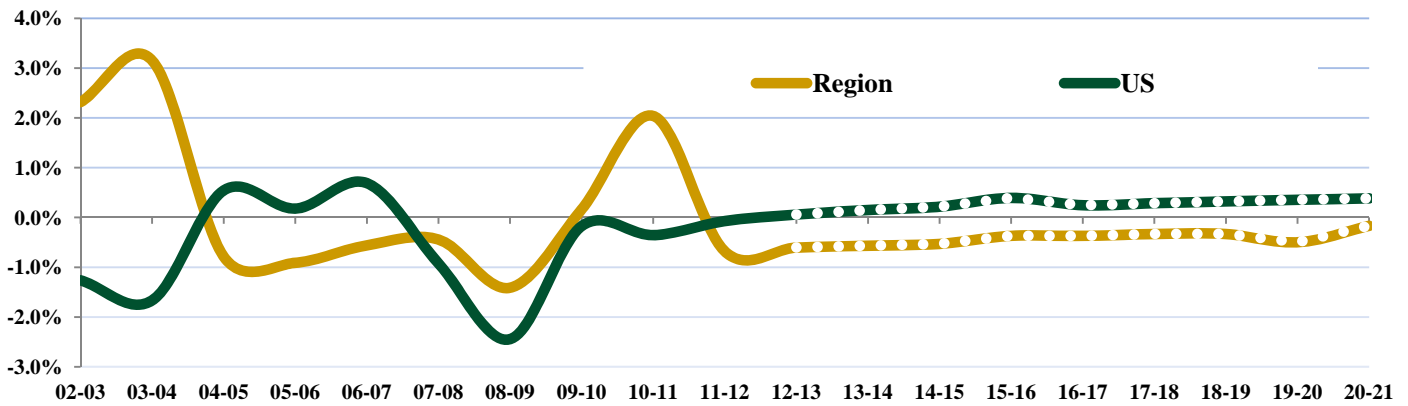
Table 8 – Industries in the Food and Food Ingredients Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
311211	Flour Milling	59	-10.7%	2.82
311230	Breakfast Cereal Manufacturing	1,845	-0.7%	75.74
311412	Frozen Specialty Food Manufacturing	130	0.0%	1.34
311615	Poultry Processing	5	0.0%	0.01
311812	Commercial Bakeries	45	-4.7%	0.20
311942	Spice and Extract Manufacturing	400	48.9%	10.87
Cluster Total		2,484	0.3%	3.21

(Source: EMSI)

From 2002 to 2012, the Food and Food Ingredients cluster in the region had a compounded annual growth rate of 0.3 percent while the cluster at the U.S. level had a rate of -0.5 percent. The trend for the cluster is projected to be reversed from 2012 through 2021 with the cluster growing nationally at an annual rate of 0.2 percent but having negative growth in the region at an annual rate of -0.4 percent.

Figure 6 - Annual Percentage Change in Food and Food Ingredients Cluster Employment



(Source: EMSI)

Figure 7 lists eight key employers that were identified in the six industries that make up the Food and Food Ingredients cluster in the region.

Figure 7- Key Employers in the Food and Food Ingredients Cluster

• Quaker Foods and Beverages (311211)	• H.J. Heinz - Quality Chef Foods (311412)
• SunOpta Ingredients (311211)	• Coles Quality Foods (311812)
• General Mills (311230)	• FlowersFood (311812)
• Ralston Foods (311230)	• Frontier Natural Products Coop (311942)

Table 9 shows that nearly 13 percent of the cluster’s employment is in packaging and filling machine operators and tenders occupations. Another 10.9 percent of the cluster’s employment is food batchmakers occupations. A total of 25 occupations had employment levels that were 1.0 percent or more of the Food and Food Ingredients cluster’s employment.

Table 9 – Most Common Occupations in Food and Food Ingredients Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
51-9111	Packaging and Filling Machine Operators and Tenders	318	307	-11	-3.5%	12.8%
51-3092	Food Batchmakers	270	274	4	1.5%	10.9%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	122	125	3	2.5%	4.9%
49-9041	Industrial Machinery Mechanics	106	108	2	1.9%	4.3%
51-3023	Slaughterers and Meat Packers	95	91	-4	-4.2%	3.8%
51-9021	Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	84	80	-4	-4.8%	3.4%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	80	77	-3	-3.8%	3.2%
53-7051	Industrial Truck and Tractor Operators	80	78	-2	-2.5%	3.2%
49-9042	Maintenance and Repair Workers, General	73	71	-2	-2.7%	2.9%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	67	63	-4	-6.0%	2.7%
51-9011	Chemical Equipment Operators and Tenders	61	58	-3	-4.9%	2.5%
11-3051	Industrial Production Managers	52	49	-3	-5.8%	2.1%
51-9198	Helpers--Production Workers	45	43	-2	-4.4%	1.8%
51-9199	Production Workers, All Other	42	40	-2	-4.8%	1.7%
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	42	42	0	0.0%	1.7%
53-7064	Hand Packers and Packagers	40	40	0	0.0%	1.6%
53-3032	Truck Drivers, Heavy and Tractor-Trailer	40	39	-1	-2.5%	1.6%
51-3091	Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders	32	31	-1	-3.1%	1.3%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	30	29	-1	-3.3%	1.2%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	30	30	0	0.0%	1.2%
53-7061	Cleaners of Vehicles and Equipment	29	28	-1	-3.4%	1.2%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	27	26	-1	-3.7%	1.1%
51-2092	Team Assemblers	24	24	0	0.0%	1.0%
43-5071	Shipping, Receiving, and Traffic Clerks	24	22	-2	-8.3%	1.0%
43-4051	Customer Service Representatives	24	24	0	0.0%	1.0%

(Source: EMSI)

Stepping up the career ladder

The career ladder for the Food and Food Ingredients Cluster, Figure 8 on the next page, is characterized by lower wages and employment growth (2012 to 2016) when compared to the other five clusters that have had a career ladder analysis included in this report. However, there is still significant opportunity within the cluster for workers, in that many of the jobs require minimal training or additional education to move up to the next higher group of occupations. Further, many of the occupations within the cluster share common skills and education with the Advanced Manufacturing and Industrial Biotechnology clusters. This makes it easier for workers as well as employers to transition across industries and clusters. The average projected annual growth in employment for jobs in the cluster is 0.96 percent, below the statewide average of 1.30 percent for all jobs.

Regional wages within the cluster range from above \$40.00 an hour for managers to around \$10.00 per hour for entry-level food preparation and store clerks. The 2012 statewide average median hourly wage across all jobs in the cluster was \$17.68 making it the lowest paying cluster of the six analyzed. The distribution of median wages around the average is lower than that within all except the Financial and Consumer Services Cluster. The difference between wages within the cluster is not as large when compared to other clusters and that workers can expect a more gradual increase in income as they progress to higher skilled occupations.

Entry-level occupations offer an overall statewide median hourly wage of \$11.61 and do not require a worker to have a high school degree or previous experience. The most important educational sets within the group are production and processing, English language and customer and personal service. The most important skill sets within the group are getting information, communicating with people inside the organization and operating vehicles or equipment.

With a high school degree or equivalent and the necessary skills, workers advance to the second rung of the career ladder: **cluster-specific occupations** which have an overall statewide median wage of \$14.18 per hour. The most important educational sets within the group are production and processing, mechanics and mathematics. The most important skill sets within this group are controlling machines and processes, getting information, handling and moving objects.

No formal education is required to progress to **specialization occupations**, with an overall statewide median wage of \$19.61 per hour and an annual growth rate in employment from one to almost four percent. The most important educational sets within the group are production and processing, customer and personal service and mathematics. The most important skill sets within the group are getting information, organizing and prioritizing work and communicating with people inside the organization.

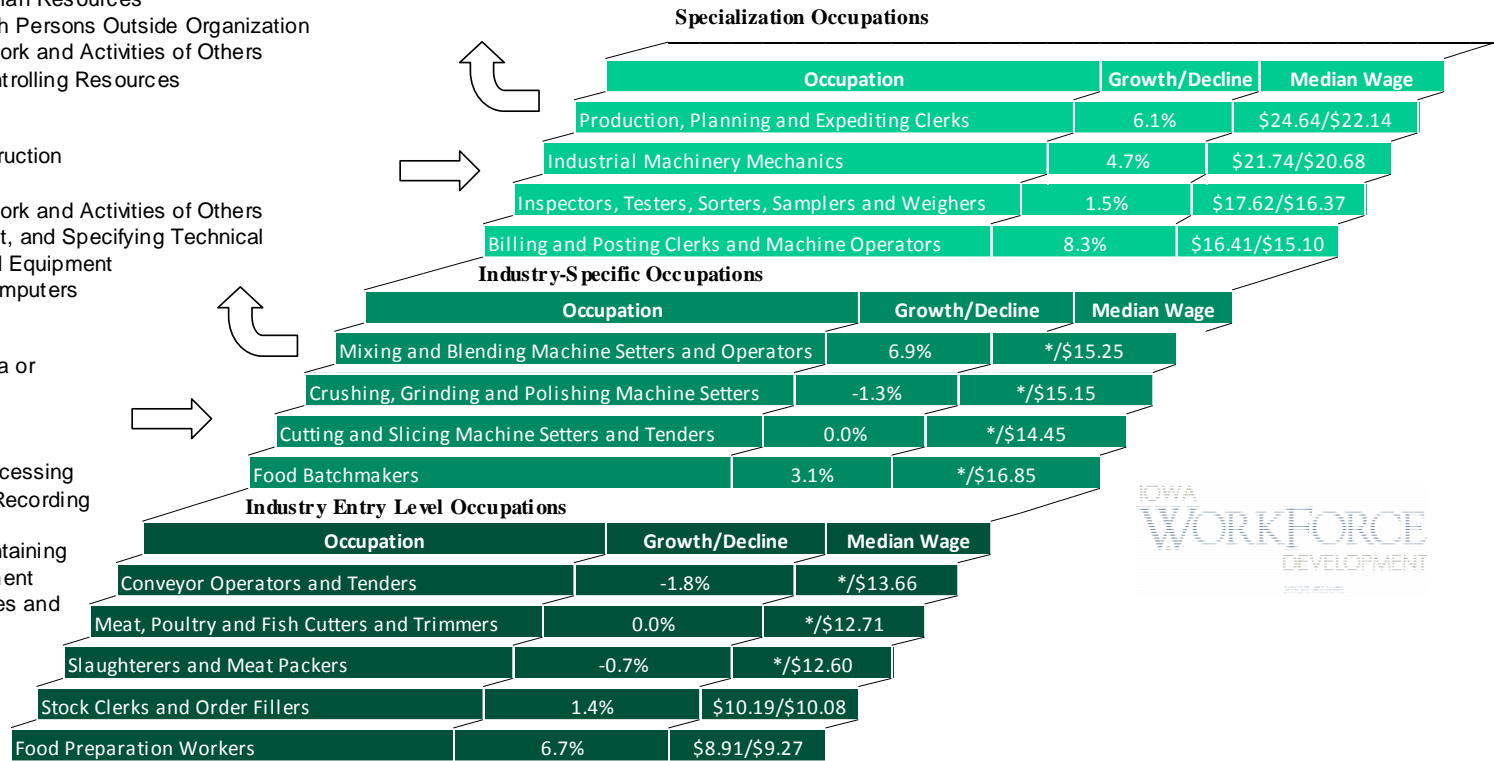
The final group of jobs within the cluster, **target occupations**, typically require some post-secondary degree or certification and earns an overall statewide median wage of \$29.90 per hour. The most important educational sets within the group are production and processing, customer and personal service and computers and electronics. The most important skill sets within the group are getting information, making decisions and communicating with people inside the organization.

Figure 8 – Career Ladder, Food & Food Ingredients Cluster

Target Occupations	2012-2016 Projected Employment Growth	2012 Regional/Statewide Median Wage
General and Operations Managers	4.6%	\$43.32/\$40.38
Industrial Engineers	9.4%	\$33.54/\$32.90
First-Line Supervisors/Managers of Production and Operating Workers	0.2%	\$27.07/\$24.46
Agricultural and Food Science Technicians	0.0%	*/\$15.66

Education and Skills Needed for Advancement to Next Level

- Post-Secondary Degree or Certification
 - Clerical
 - Personnel and Human Resources
 - Communicating with Persons Outside Organization
 - Coordinating the Work and Activities of Others
 - Monitoring and Controlling Resources
-
- Building and Construction
 - Design
 - Coordinating the Work and Activities of Others
 - Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment
 - Interacting With Computers
-
- High school diploma or equivalent
 - Chemistry
 - Food Production
 - Production and Processing
 - Documenting and Recording Information
 - Repairing and Maintaining Mechanical Equipment
 - Controlling Machines and Processes



Wage data is from the 2010-2020 Iowa Occupational Projections published by Iowa Workforce Development. An asterisk indicates no data available for the region or state. Projected employment growth is provided by EMSI Complete Employment and estimated for the years 2012 to 2016.

Table 10 shows overlapping skills and education between the entry-level jobs within the cluster and target occupation (see Figure 8) at the higher end of the career ladder. The table also includes skills and education where additional training may be required to perform the targeted jobs. The most commonly shared skills across jobs in the cluster are production and processing and monitoring and controlling resources. The most common areas where additional skills or education training are needed are in engineering and technology; administration and management; and in organizing, planning and prioritizing work. The analysis of skills between two jobs within the cluster is important on an individual-level to assess needs for progress up the career ladder. For a regional analysis, a comparison between the skills possessed by the general population and those skills most needed within the cluster is more useful.

Table 10 – Overlapping Skills & Education, Related Occupations

Related Occupations		Median Wages	Overlapping Skills and Education	Required Areas for Improvement
Food and Food Ingredients	Emerging Occupation: Industrial Engineers	\$ 33.54		
	Career Pathways			
	Inspectors, Testers, Sorters, Samplers and Weighers	\$ 17.62	Production & Processing; Evaluating Information to Determine Compliance	Engineering & Technology; Mathematics; Communicating with Persons inside the Organization
	Mixing and Blending Machine Setters and Operators	\$ 15.25	Production & Processing; Monitoring and Controlling Resources	Engineering & Technology; Organizing, Planning, and Prioritizing Work; Thinking Creatively
	Meat, Poultry and Fish Cutters and Trimmers	\$ 12.71	Production & Processing; Monitoring and Controlling Resources	Engineering & Technology; Design; Processing Information
	Emerging Occupation: General and Operations Managers	\$ 43.32		
	Career Pathways			
Billing and Posting Clerks and Machine Operators	\$ 16.41	Establishing & Maintaining Relationships; Clerical; Economics & Accounting	Customer Service; Monitoring and Controlling Resources; Selling or Influencing Others	
Cutting and Slicing Machine Setters and Tenders	\$ 14.45	Mathematics; Getting Information	Customer Service; Administration & Management; Personnel & Human Resources	
Stock Clerks and Order Fillers	\$ 10.19	Establishing & Maintaining Relationships; Mathematics	Monitoring and Controlling Resources; Administration & Management; Communicating with Persons Outside the Organization	

*Skills data available through O*Net (www.onetcenter.org)*

Using information provided by the Online Information Network (O*NET), allows for a comparison of the skills needed for individual jobs as well as entire industries and clusters. O*NET surveys managers in each cluster to assess the importance and level required to perform the responsibilities within each occupation. The information is then aggregated for 41 work-related skills, like documenting and recording information or communicating with persons inside the organization, and 33 knowledge skills, like mathematics or chemistry. Each skill within each job is given a score for the level of skill required to perform responsibilities. By using these scores, either individually for each job or by averaging them across an cluster, we can measure a gap in training or education.

The Laborshed Study for the region provides the distribution of jobs across the workforce. By using the information from O*NET, allows for a translation of the occupations currently held by the workforce into a set of skills potentially available to current and prospective employers. By understanding which skills are available in the current workforce, it becomes easier to attract those employers that need those skills or to design training programs to build upon the current base.

While every occupation generally needs some level of each skill and educational attribute, focusing on those attributes with higher levels required helps to target the most important within

Clusters Employment and Staffing Patterns

an occupation. A level of three or higher in a work-related skill generally requires at least six months of training and is considered important to the occupation. A level of three or higher in a knowledge attribute generally requires some secondary education in the field and is considered important to the occupation.

Table 11 shows those attributes important to the occupations within the Food and Food Ingredients Cluster. The table compares the average skill level attained by the region's workforce, in aggregate, against the average level needed for occupations within the cluster. A positive gap, as in customer and personal service critical skill and knowledge category, describes an attribute where the population in general has the required level of skill to meet the needs of occupations within the cluster. A negative gap, as with the attribute of mechanics, describes an attribute where more training may be necessary for the workforce to meet the needs of the cluster. Those critical skill or knowledge areas with a high positive gap may represent competitive advantages possessed by the workforce within the region. It shows that workers possess a skill level well above that required by the cluster. Often, the attributes where the highest gap is measured are technically required for occupations within the cluster. For the Food and Food Ingredients Cluster, those attributes in which additional training may be required are mechanics and production and processing.

Table 11 – Critical Skill & Knowledge Needs

Critical Skill & Knowledge Needs	Population Cluster	Average Level Needed	Gap
Customer & Personal Service	4.19	2.87	1.32
Organizing and Prioritizing Work	4.41	3.75	0.66
Communicating with People Inside the Organization	4.21	3.75	0.46
Computers & Electronics	2.86	2.49	0.37
Getting Information	3.35	3.21	0.14
Making Decisions & Problem Solving	3.47	3.48	-0.01
Production & Processing	2.21	3.24	-1.03
Mechanics	1.88	3.11	-1.23
<i>Average Critical Variables</i>	3.32	3.24	
<i>Average all Variables</i>	2.55	2.31	
<i>Average Knowledge Variables</i>	2.79	2.93	
<i>Average Work Activity Variables</i>	3.86	3.55	

Industrial Biotechnology

The Industrial Biotechnology cluster in the region is made up a diverse group of nine industries that have combined employment of 1,767 in 2012. Over 62 percent of the cluster’s employment is in the wet corn milling industry which has just over 1,100 jobs. Other animal food manufacturing is the second largest industry in the cluster in the region accounting for 18.7 percent of the cluster’s employment. Employers in the cluster have an average size of 58.9 employees per establishment. The cluster has a LQ of 2.40 in the region which means there is some specialization and the wet corn milling industry has a LQ of 52.95 which signifies significant specialization.

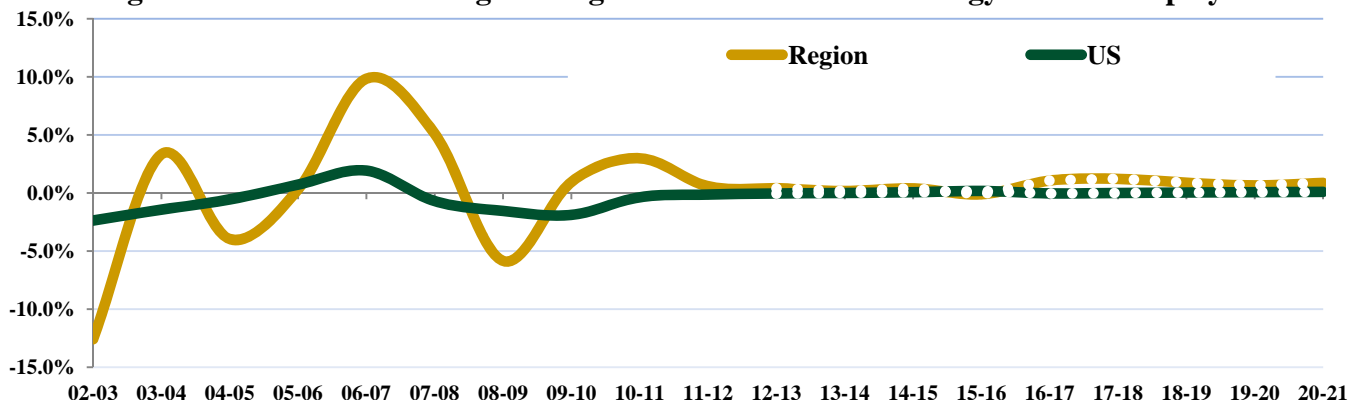
Table 12 – Industries in the Industrial Biotechnology Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
311119	Other Animal Food Manufacturing	330	-2.0%	5.99
311211	Flour Milling	59	-10.7%	2.82
311221	Wet Corn Milling	1,102	5.7%	52.95
311222	Soybean Processing	5	-30.6%	0.49
311999	All Other Miscellaneous Food Manufacturing	128	-4.6%	2.69
325199	All Other Basic Organic Chemical Manufacturing	5	-17.0%	0.09
325412	Pharmaceutical Preparation Manufacturing	13	-9.3%	0.04
325414	Biological Product (except Diagnostic) Manufacturing	125	34.0%	2.66
Cluster Total		1,767	-0.1%	2.40

(Source: EMSI)

The Industrial Biotechnology cluster experienced an employment decline from 2002 to 2012 both in the region and nationally. The cluster in the region had a compounded annual growth rate of -0.1 percent and the cluster nationally had an annual rate of -0.6 percent. The cluster is projected to grow in the region at an annual rate of 0.6 percent from 2012 to 2021 while Figure 8 shows the cluster’s employment nationally is projected to remain level.

Figure 9 – Annual Percentage Change in Industrial Biotechnology Cluster Employment



(Source: EMSI)

Clusters Employment and Staffing Patterns

Figure 9 provides a listing of 13 key employers that were identified in the industries that make up the Industrial Biotechnology cluster. They range in size from under 25 employees to over 500 employees.

Figure 10 – Key Employers in the Industrial Biotechnology Cluster

• Diamond V Mills (311119)	• Red Star Yeast (311999)
• J. Rettenmaier USA LP JRS (311211)	• Bio Springer North America (311999)
• Archer Daniels Midland Corn Processing (311211)	• Iowa Renewable Energy (324110)
• Cargill (311211)	• Fiberight (325199)
• Penford Products (311221)	• Integrated DNA Technologies (325412)
• Cargill (311222)	• JRS Pharma LP (325412)
	• DuPont Genencor (325414)

In the Industrial Biotechnology cluster, there is only one occupation, packaging and filling machine operators and tenders, which has a share of the cluster's employment in the region that was over ten percent (see Table 11). There are a total of 24 occupations that have employment levels that make up 1.0 percent or more of the cluster's employment in the region.

Clusters Employment and Staffing Patterns

Table 13 – Most Common Occupations in Industrial Biotechnology Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
51-9111	Packaging and Filling Machine Operators and Tenders	199	199	0	0.0%	11.3%
51-3092	Food Batchmakers	149	154	5	3.4%	8.4%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	109	116	7	6.4%	6.2%
49-9041	Industrial Machinery Mechanics	69	73	4	5.8%	3.9%
53-7051	Industrial Truck and Tractor Operators	62	60	-2	-3.2%	3.5%
51-9021	Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	61	61	0	0.0%	3.5%
51-3023	Slaughterers and Meat Packers	59	59	0	0.0%	3.3%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	57	56	-1	-1.8%	3.2%
53-3032	Truck Drivers, Heavy and Tractor-Trailer	51	50	-1	-2.0%	2.9%
49-9042	Maintenance and Repair Workers, General	49	49	0	0.0%	2.8%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	49	46	-3	-6.1%	2.8%
51-9011	Chemical Equipment Operators and Tenders	42	43	1	2.4%	2.4%
11-3051	Industrial Production Managers	35	34	-1	-2.9%	2.0%
51-9199	Production Workers, All Other	32	31	-1	-3.1%	1.8%
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	27	28	1	3.7%	1.5%
51-9198	Helpers--Production Workers	27	26	-1	-3.7%	1.5%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	26	25	-1	-3.8%	1.5%
51-2092	Team Assemblers	24	24	0	0.0%	1.4%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	23	23	0	0.0%	1.3%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	21	20	-1	-4.8%	1.2%
53-7064	Hand Packers and Packagers	20	19	-1	-5.0%	1.1%
43-4051	Customer Service Representatives	17	18	1	5.9%	1.0%
51-3091	Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders	17	17	0	0.0%	1.0%
43-5071	Shipping, Receiving, and Traffic Clerks	17	16	-1	-5.9%	1.0%

(Source: EMSI)

Stepping up the career ladder

The career ladder for the Industrial Biotechnology Cluster, see Figure 11, is very similar to that of the Advanced Manufacturing Cluster. Most of the occupations could transition from one cluster to the other with a small period of industry-specific training. The core difference is in the need for a level of education in biology and chemistry within the Industrial Biotechnology Cluster, but even this requirement may only apply to certain occupations or certain career ladders within the cluster. The average projected annual growth in employment for jobs in the cluster is 1.40 percent, which is above the statewide average of 1.30 percent for all jobs.

Regional wages within the cluster range from above \$45.00 per hour for industrial production managers to around \$10.00 per hour for entry-level production and stocking jobs. The 2012 regional average median wage across all jobs in the cluster was \$17.85 per hour which makes it the lowest paying cluster of the clusters that have had a career ladder analysis included in this report. While this average median wage is lower than the other clusters, workers in the cluster still have significant opportunity in job demand and higher wages at the top positions. The distribution of median wages around the average is higher than all other clusters except Medical Devices and Information Technology. The difference between wages within the cluster is larger than in other clusters. While workers may start out at low wages, they have the opportunity to make significantly higher wages for jobs at the higher end of the cluster.

The **entry level positions** in the Industrial Biotechnology Cluster, as with those in Advanced Manufacturing, are characterized by a greater use of manual labor rather than machine. The occupational group offers an overall statewide median hourly wage of \$12.74 and does not require a worker to have a high school degree or previous experience. The greatest hurdle for workers within the group is once again beginning an educational or training program after possibly many years out of school. Once the momentum for learning has been established, there is relatively little training or education needed to advance to the next level of occupations. The most important educational sets within the group are production and processing, safety and the English language. The most important skill sets within the group are performing general physical activities, moving objects and communicating with people inside the organization.

With a high school degree or equivalent and the necessary skill or educational sets, workers advance to **cluster-specific occupations** with an overall statewide median wage of \$15.32 per hour. Occupations may start to show a bias toward either the industrial career path with an emphasis on engineering and mechanics or toward the scientific side of the cluster with an emphasis on biology and chemistry. Whichever path is chosen, there will be overlap in skills and education needed throughout the cluster. The most important educational sets within the group are production and processing, mathematics and mechanics. The most important skill sets within the group are getting information, communicating with people inside the organization and identifying objects, actions and events.

No formal education is required to progress to the next rung of the career ladder, **specialization occupations**. These positions have a regional average median wage of \$19.16 per hour and an annual growth rate in employment from one to almost four percent. The most important educational sets within the group are chemistry, customer and personal service and mathematics.

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The most important skill sets within the group are getting information; communicating with people inside the organization and inspecting equipment, structures or material.

The final group, within the cluster, the target occupations, typically requires some post-secondary degree or certification and earns an overall statewide median wage of \$39.42 per hour. The most important educational sets within the group are production and processing, mathematics and mechanics. The most important skill sets within the group are getting information, making decisions and communicating with people inside the organization.

Figure 11 – Career Ladder, Biotechnology Cluster

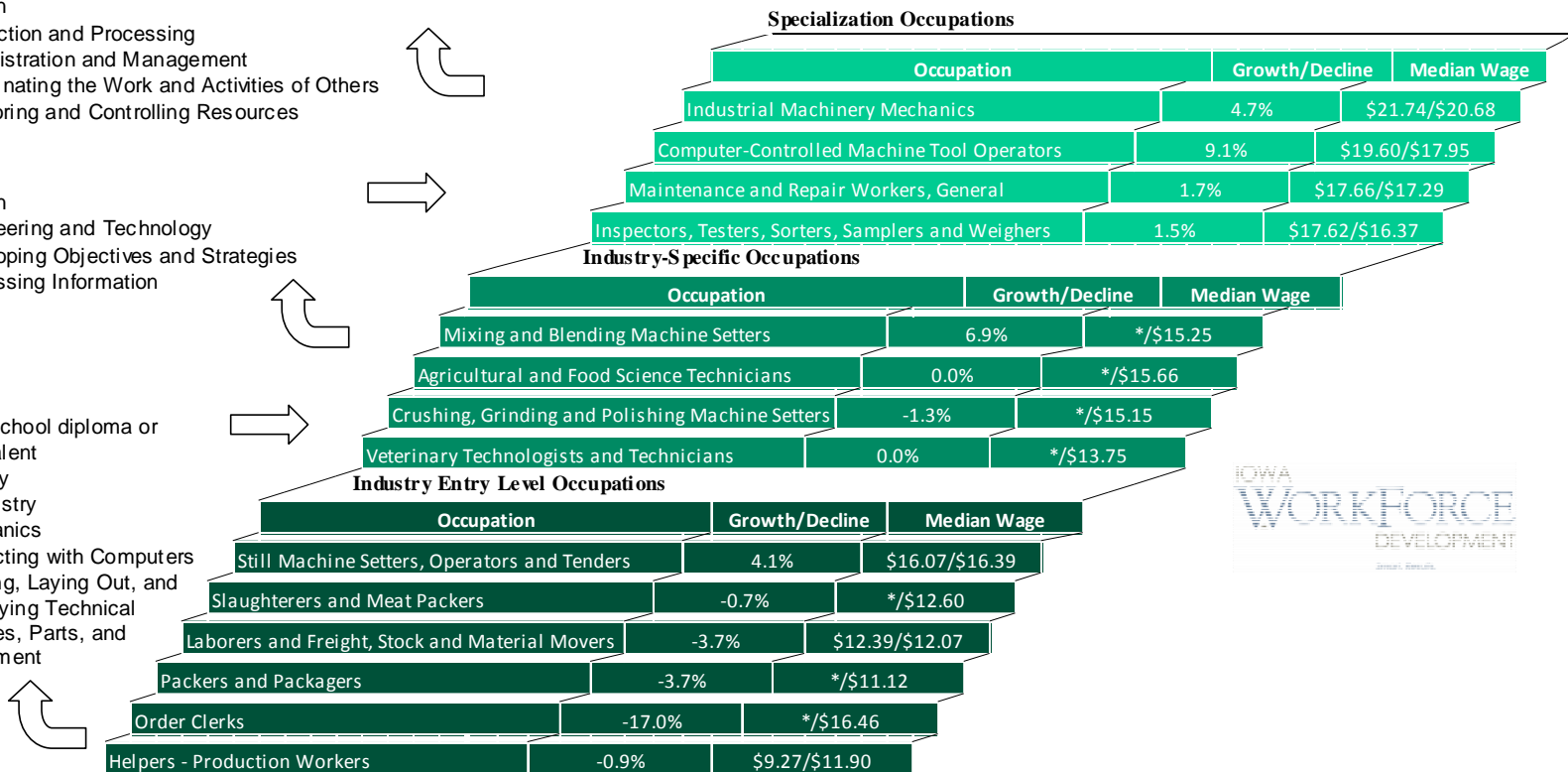
Target Occupations	2012-2016 Projected Employment Growth	2012 Regional/Statewide Median Wage
Industrial Production Managers	-0.9%	\$45.29/\$38.38
Industrial Engineers	9.4%	\$33.54/\$32.90

Education and Skills Needed for Advancement to Next Level

- Post-Secondary Degree or Certification
- Design
- Production and Processing
- Administration and Management
- Coordinating the Work and Activities of Others
- Monitoring and Controlling Resources

- Design
- Engineering and Technology
- Developing Objectives and Strategies
- Processing Information

- High school diploma or equivalent
- Biology
- Chemistry
- Mechanics
- Interacting with Computers
- Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment



Wage data is from the 2010-2020 Iowa Occupational Projections published by Iowa Workforce Development. An asterisk indicates no data available for the region or state. Projected employment growth is provided by EMSI Complete Employment and estimated for the years 2012 to 2016.

Table 14 shows overlapping skills and education between the entry-level jobs within the cluster and target jobs at the higher end of the career ladder. The table also includes skills and education where additional training may be required to perform the targeted jobs. The most commonly shared skills across jobs in the cluster are processing information and monitoring processes, materials, or surroundings. The most common areas where additional skills or education training are needed are in engineering and technology and communicating with persons inside the organization. The analysis of skills between two jobs within the cluster are important on an individual-level to assess needs for progress up the career ladder. For a regional analysis, a comparison between the skills possessed by the general population and those skills most needed within the cluster is more useful.

Table 14 – Overlapping Skills & Education, Related Occupations

Related Occupations		Median Wages	Overlapping Skills and Education	Required Areas for Improvement
Emerging Occupation: Industrial Production Managers		\$ 45.29		
Industrial Biotechnology Career Pathways	Industrial Machinery Mechanics	\$ 21.74	Monitoring Processes, Materials, or Surroundings; Processing Information	Guiding, Directing, and Motivating Subordinates; Production & Processing; Administration & Management
	Agricultural and Food Science Technicians	\$ 15.66	Monitoring Processes, Materials, or Surroundings; Processing Information	Resolving Conflicts and Negotiating with Others; Staffing Organizational Units
	Still Machine Setters, Operators and Tenders	\$ 16.07	Monitoring Processes, Materials, or Surroundings; Education & Training	Guiding, Directing, and Motivating Subordinates; Production & Processing; Administration & Management
Emerging Occupation: Industrial Engineers		\$ 33.54		
Industrial Biotechnology Career Pathways	Inspectors, Testers, Sorters and Weighers	\$ 17.62	Establishing & Maintaining Relationships; Documenting Information	Engineering & Technology; Mathematics; Communicating with Persons Inside the Organization
	Mixing and Blending Machine Setters	\$ 15.25	Evaluating Information to Determine Compliance; Monitoring and Controlling Resources	Engineering & Technology; Processing Information; Organizing, Planning and Prioritizing Work
	Helpers - Production Workers	\$ 9.27	Getting Information; Monitoring and Controlling Resources	Computers & Electronics; Engineering & Technology; Communicating with Persons Inside the Organization

*Skills data available through O*Net (www.onetcenter.org)*

Table 15, on the next page, shows those attributes important to the occupations within the Industrial Biotechnology Cluster. The table compares the average level attained by the region’s workforce, in aggregate, against the level generally required by occupations within the cluster. A positive gap, as in communicating with people inside the organization above, describes an attribute where the population in general has the required level of skill to meet the needs of occupations within the cluster. A negative gap, as with the attribute of mechanics, describes an attribute where more training may be necessary for the workforce to meet the needs of the cluster. Those critical skill or knowledge areas with a high positive gap may represent competitive advantages possessed by the workforce within the region. It shows that workers possess a skill level well above that required by the cluster. Often, the attributes where the highest gap is measured are technically required for occupations within the cluster. For Industrial Biotechnology Cluster, those attributes in which additional training may be required are mechanics; chemistry; inspecting equipment, structures or materials; and production and processing.

Table 15 – Critical Skill & Knowledge Needs

Critical Skill & Knowledge Needs	Population Cluster	Average Level Needed	Gap
Communicating with People Inside the Organization	4.21	3.78	0.43
Getting Information	3.35	3.35	0.00
Mathematics	2.95	3.14	-0.19
Making Decisions & Problem Solving	3.47	3.80	-0.33
Production & Processing	2.21	3.11	-0.90
Inspecting Equipment, Structures or Materials	2.53	3.61	-1.08
Chemistry	1.35	2.44	-1.09
Mechanics	1.88	3.42	-1.54
<i>Average Critical Variables</i>	<i>2.74</i>	<i>3.33</i>	
<i>Average all Variables</i>	<i>2.55</i>	<i>2.41</i>	
<i>Average Knowledge Variables</i>	<i>2.10</i>	<i>3.03</i>	
<i>Average Work Activity Variables</i>	<i>3.39</i>	<i>3.64</i>	

Financial Services and Customer Services

The Financial Services and Customer Services Cluster is the largest of the 13 clusters in 2012 with 11,570 employees. Among the ten industries which make up the cluster in the region, **Table 12** shows that the insurance sector is dominant. Employment by the direct life insurance carriers accounts for 36.7 percent of the cluster's employment and direct property and casualty insurance carriers account for 8.7 percent. The cluster has a LQ of 1.96 which shows slight specialization and the directory and mailing list publishers cluster has an LQ of 16.28 which mean significant concentration of the cluster in the region. The average establishment size in the region for the cluster is 46.1 employees.

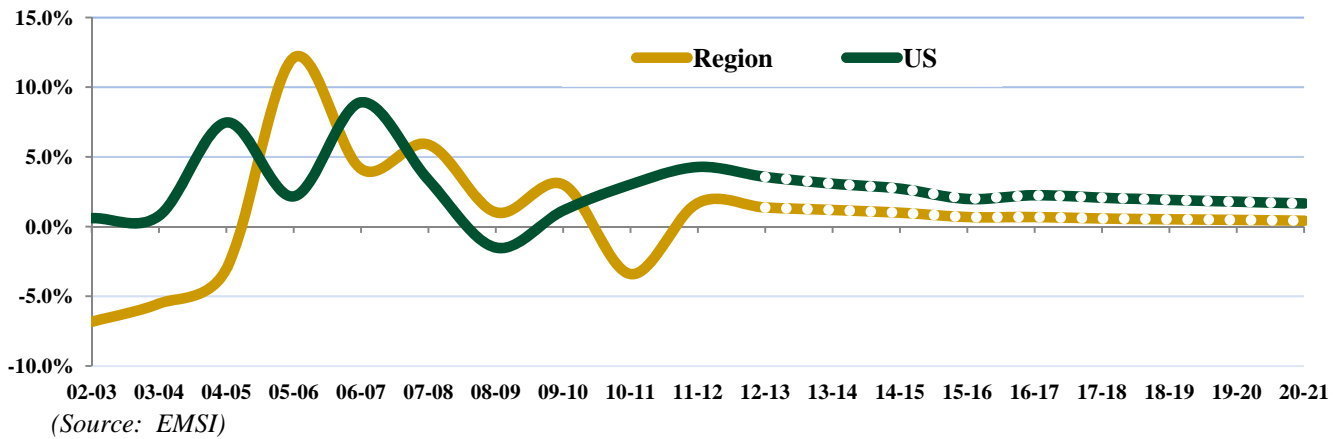
Table 16 – Industries in the Financial Services and Customer Services Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
511140	Directory and Mailing List Publishers	1,067	-0.6%	16.28
522220	Sales Financing	541	0.1%	3.50
524113	Direct Life Insurance Carriers	4,242	4.6%	8.81
524114	Direct Health and Medical Insurance Carriers	278	2.8%	0.45
524126	Direct Property and Casualty Insurance Carriers	1,001	1.7%	1.24
541611	Administrative Management and General Management Consulting Services	825	2.9%	0.53
541613	Marketing Consulting Services	267	-3.0%	0.42
541614	Process, Physical Distribution, and Logistics Consulting Services	78	-5.1%	0.31
541690	Other Scientific and Technical Consulting Services	271	5.1%	0.42
561422	Telemarketing Bureaus and Other Contact Centers	3,000	-2.9%	4.29
Cluster Total		11,570	0.7%	1.96

(Source: EMSI)

The Financial Services and Customers Services Cluster has grown in the region and nationally from 2002 to 2012. The cluster's compounded annual growth rate in the region was 0.7 percent and 2.7 percent at the U.S. level. The cluster is projected to have a similar annual growth rate in the region through 2021 and is projected to grow at an annual rate of 2.1 percent nationally.

Figure 12 – Annual Percentage Change in Financial Services and Customer Services Cluster Employment



With the diversity of industries making up the Financial Services and Customer Services cluster in the region there were a considerable number of key employers identified in those ten industries. Figure 11 is a list of 18 employers that range in size from under 10 employees to over 3,000 employees.

Figure 13 – Key Employers in the Financial Services and Customer Services Cluster

- | | |
|--|---|
| • Yellow Book USA (511140) | • GE Vendor Financial Services (532310) |
| • Toyota Financial Services (522220) | • Great America Leasing Corp. (532420) |
| • Geico Direct (524210) | • Precision Revenue Strategies (541611) |
| • Holmes Murphy and Associates Inc. (524210) | • TM One (541611) |
| • Mercer Administration (524210) | • MediRevv (541611) |
| • Transamerica Life Insurance (524210) | • Meta Communications Inc. (541613) |
| • True North Companies (524210) | • Griffith Ballard and Co (541614) |
| • United Fire Group (524210) | • Vangent (541614) |
| • WFLA - Western Fraternal Life (524210) | • Mercer Health and Benefits (541690) |

Nearly a fifth, 18 percent, of employment in the Financial Services and Customer Services cluster are customer service representative occupations. Another 8.5 percent of the employment is in telemarketers occupations. There are 22 other occupations that have employment levels which make up at least 1.0 percent of the cluster’s employment in the region.

Clusters Employment and Staffing Patterns

Table 17 – Most Common Occupations in the Financial Services and Customer Services Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
43-4051	Customer Service Representatives	2,077	2,108	31	1.5%	18.0%
41-9041	Telemarketers	989	759	-230	-23.3%	8.5%
13-1111	Management Analysts	770	855	85	11.0%	6.7%
41-3021	Insurance Sales Agents	514	563	49	9.5%	4.4%
43-9061	Office Clerks, General	286	304	18	6.3%	2.5%
15-1031	Computer Software Engineers, Applications	284	333	49	17.3%	2.5%
43-9041	Insurance Claims and Policy Processing Clerks	244	276	32	13.1%	2.1%
13-1031	Claims Adjusters, Examiners, and Investigators	231	264	33	14.3%	2.0%
13-1199	Business Operations Specialists, All Other	231	246	15	6.5%	2.0%
43-1011	First-Line Supervisors/Managers of Office and Administrative Support Workers	221	230	9	4.1%	1.9%
13-2053	Insurance Underwriters	209	224	15	7.2%	1.8%
13-2011	Accountants and Auditors	195	213	18	9.2%	1.7%
43-6011	Executive Secretaries and Administrative Assistants	185	200	15	8.1%	1.6%
15-1051	Computer Systems Analysts	175	204	29	16.6%	1.5%
41-3099	Sales Representatives, Services, All Other	169	177	8	4.7%	1.5%
11-9199	Managers, All Other	166	183	17	10.2%	1.4%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	164	175	11	6.7%	1.4%
11-3021	Computer and Information Systems Managers	136	154	18	13.2%	1.2%
19-3021	Market Research Analysts	127	138	11	8.7%	1.1%
11-3031	Financial Managers	121	133	12	9.9%	1.0%
29-1111	Registered Nurses	117	129	12	10.3%	1.0%
15-1021	Computer Programmers	114	110	-4	-3.5%	1.0%
15-1041	Computer Support Specialists	111	115	4	3.6%	1.0%
43-6014	Secretaries, Except Legal, Medical, and Executive	111	115	4	3.6%	1.0%

(Source: EMSI)

Stepping up the career ladder

The career ladder for the Financial and Consumer Services Cluster, **Figure 14** on the next page, is characterized by lower growth (2012 to 2016) and wages in entry-level jobs but above average employment growth and high wages in occupations at the upper end of the career ladder. While many of the jobs within the cluster share common skills and education requirements, there is a distinct difference between those occupations within consumer services cluster and those within the financial services cluster.

Regional wages within the cluster range from above \$33.00 per hour for a financial examiner position to around \$10.00 per hour for an entry-level production or custodial job. The average median wage across all jobs in the cluster was \$20.48 per hour which puts it at the second-highest paying cluster of the six targeted occupational clusters. The distribution of median wages around the average is the lowest among the six clusters studied. The difference between wages within the cluster is not as large as compared to other clusters and that workers can expect a more gradual increase in income as they progress to higher skilled occupations.

Entry-level occupations, the first rung of the ladder, offer an overall statewide median hourly wage of \$12.65 with some jobs requiring the worker to have a high school degree or previous experience. The most important educational sets within the group are customer and personal service, English language and clerical. The most important skill sets within the group are interacting with computers, getting information and communicating with people inside the organization.

With a high school degree or equivalent and the necessary skills, workers may advance to the second rung of the career ladder, **cluster-specific occupations**. These positions have an overall statewide median wage of \$18.29 per hour. The most important educational sets within the group are customer and personal service, English language and clerical. The most important skill sets within the group are interacting with computers, getting and processing information.

No formal education is required to progress to **specialization occupations**, with an overall statewide median wage of \$25.68 per hour and an annual growth rate in employment from one to almost four percent. The most important educational sets within the group are customer and personal service, English language and mathematics. The most important skill sets within this group are interacting with computers, processing information and making decisions.

The final group of jobs within the cluster, **target occupations**, typically requires some post-secondary degree or certification and earns an overall statewide median wage of \$28.38 per hour. The most important educational sets within the group are customer and personal service, English language and administration and management. The most important skill sets within this group are processing information, making decisions, establishing and maintaining interpersonal relationships.

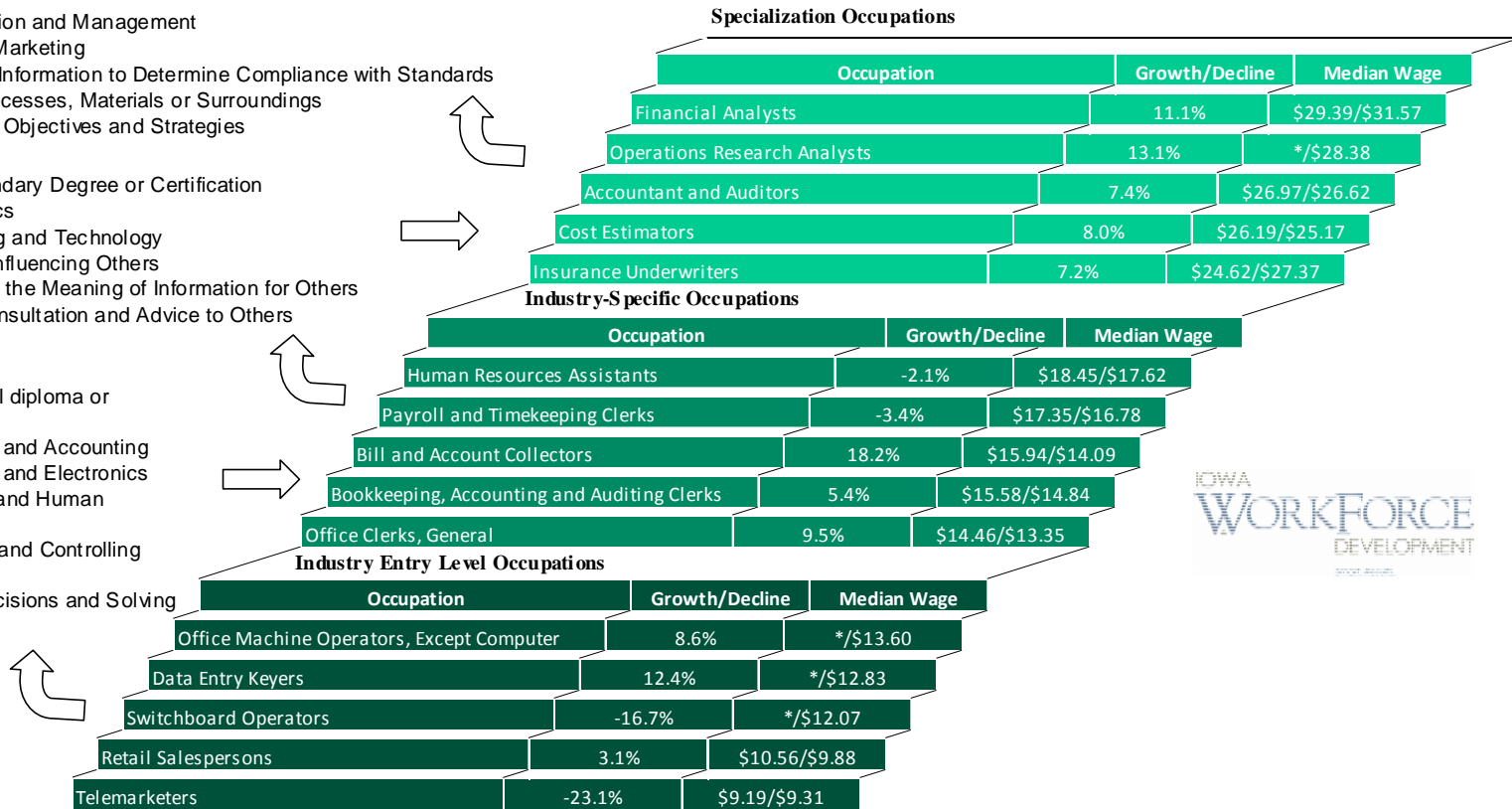
The average projected annual growth in employment for jobs in the financial and consumer services cluster is 1.57 percent, well above the statewide average of 1.30 percent for all jobs and the second-highest for the six targeted industries.

Figure 14 – Career Ladder, Financial Services & Customer Services Cluster

Target Occupations	2012-2016 Projected Employment Growth	2012 Regional/Statewide Median Wage
Financial Examiners	0.0%	*/\$33.81
Management Analysts	10.5%	*/\$31.43
Personal Financial Advisors	13.5%	*/\$27.98
Credit Analysts	14.3%	*/\$26.77
Market Research Analysts	8.8%	\$21.44/\$21.92

Education and Skills Needed for Advancement to Next Level

- Administration and Management
 - Sales and Marketing
 - Evaluating Information to Determine Compliance with Standards
 - Monitor Processes, Materials or Surroundings
 - Developing Objectives and Strategies
-
- Post-Secondary Degree or Certification
 - Mathematics
 - Engineering and Technology
 - Selling or Influencing Others
 - Interpreting the Meaning of Information for Others
 - Provide Consultation and Advice to Others
-
- High school diploma or equivalent
 - Economics and Accounting
 - Computers and Electronics
 - Personnel and Human Resources
 - Monitoring and Controlling Resources
 - Making Decisions and Solving Problems



Wage data is from the 2010-2020 Iowa Occupational Projections published by Iowa Workforce Development. An asterisk indicates no data available for the region or state. Projected employment growth is provided by EMSI Complete Employment and estimated for the years 2012 to 2016.

Clusters Employment and Staffing Patterns

Table 18 shows overlapping skills and education between the entry-level jobs within the cluster and target jobs at the higher end of the career ladder. The table also includes skills and education where additional training may be required to perform the targeted jobs. The most commonly shared skills across jobs in the cluster are communicating with persons inside the organization and customer service. The most common areas where additional skills or education training are needed are in guiding, directing, and motivating subordinates and personnel and human resources. The analysis of skills between two jobs within the cluster is important on an individual-level to assess needs for progress up the career ladder. For a regional analysis, a comparison between the skills possessed by the general population and those skills most needed within the cluster is more useful.

Table 18 – Overlapping Skills & Education, Related Occupations

		Related Occupations	Median Wages	Overlapping Skills and Education	Required Areas for Improvement
Financial and Customer Service	Emerging Occupation: Financial Examiners		\$ 33.81		
	Career Pathways	Accountants and Auditors	\$ 26.97	Processing Information; Making Decisions and Problem Solving	Establishing & Maintaining Relationships; Customer Service; Clerical
		Bookkeeping, Accounting and Auditing Clerks	\$ 15.58	Establishing & Maintaining Relationships; Customer Service	Scheduling Work and Activities; Evaluating Information; Personnel & Human Resources
		Data Entry Keyers	\$ 12.83	Communicating with Persons Inside the Organization; Evaluating Information	Monitoring and Controlling Resources; Administration & Management; Providing Consultation and Advice to Others
	Emerging Occupation: Management Analysts		\$ 31.43		
	Career Pathways	Operations Research Analysts	\$ 28.38	Establishing & Maintaining Relationships; Processing Information	Thinking Creatively; Guiding, Directing, and Motivating Subordinates
		Human Resources Assistants	\$ 18.45	Getting Information; Communicating with Persons Inside the Organization	Developing & Building Teams; Guiding, Directing, and Motivating Subordinates
		Retail Salespersons	\$ 10.56	Mathematics; Communicating with Persons Inside the Organization	Evaluating Information to Determine Compliance; Monitoring and Controlling Resources

*Skills data available through O*Net (www.onetcenter.org)*

Clusters Employment and Staffing Patterns

The table below (**Table 19**) shows those attributes important to the occupations within the Financial and Customer Service cluster. The table compares the average level attained by the region's workforce, in aggregate, against the level generally required by occupations within the cluster. A negative gap, as with the attribute of clerical above, describes an attribute where more training may be necessary for the workforce to meet the needs of the cluster. Those critical skill or knowledge areas with a high positive gap may represent competitive advantages possessed by the workforce within the region. It shows that workers possess a skill level well above that required by the cluster. Often, the attributes where the highest gap is measured are technically required for occupations within the cluster. For Financial and Customer Service Cluster, those attributes in which additional training may be required are clerical, processing information, mathematics, interacting with computers, and making decisions and problem solving.

Table 19 – Critical Skill & Knowledge Needs

Critical Skill & Knowledge Needs	Population Cluster	Average Level Needed	Gap
Establishing and Maintaining Interpersonal Relationships	4.60	4.77	-0.17
Customer & Personal Service	4.19	4.41	-0.22
English Language	3.53	3.87	-0.34
Making Decisions & Problem Solving	3.47	3.93	-0.46
Interacting with Computers	2.93	3.53	-0.60
Mathematics	2.95	3.62	-0.67
Processing Information	3.65	4.34	-0.69
Clerical	3.46	4.38	-0.92
<i>Average Critical Variables</i>	<i>3.60</i>	<i>4.11</i>	
<i>Average all Variables</i>	<i>2.55</i>	<i>2.27</i>	
<i>Average Knowledge Variables</i>	<i>3.53</i>	<i>4.07</i>	
<i>Average Work Activity Variables</i>	<i>3.66</i>	<i>4.14</i>	

Electronics Engineering and Manufacturing

The Electronics Engineering and Manufacturing Cluster has an estimated employment level of 11,095 in 2012, making it the second largest of the 13 clusters. The cluster in the region is dominated by the search, detection, navigation, guidance, aeronautical, and nautical system and instrument manufacturing cluster and more specifically by Rockwell Collins. This cluster's employment represents 82.7 percent of the cluster's total employment in the region. The cluster's average establishment size in the region is 57.8 employees. The cluster has a LQ of 3.52 which shows concentration and the search, detection, navigation, guidance, aeronautical, and nautical system and instrument manufacturing cluster has an LQ of 38.21 which is significant specialization.

Table 20 – Industries in the Electronics Engineering and Manufacturing Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
334111	Electronic Computer Manufacturing	286	-5.0%	1.89
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	29	-3.7%	0.27
334310	Audio and Video Equipment Manufacturing	95	9.5%	2.65
334413	Semiconductor and Related Device Manufacturing	56	-2.7%	0.18
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing	151	15.5%	1.73
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	9,181	2.2%	38.21
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	5	NA	0.10
336411	Aircraft Manufacturing	70	27.1%	0.17
541511	Custom Computer Programming Services	1,164	2.4%	0.77
541711	Research and Development in Biotechnology	58	-0.9%	0.22
Cluster Total		11,095	2.1%	3.52

(Source: EMSI)

The Electronics Engineering and Manufacturing Cluster in the region had a compounded annual growth rate of 2.1 percent from 2002 to 2012 and is projected to grow at an annual rate of 0.8 percent going forward through 2021. The cluster at the U.S. level had a compounded annual growth rate of 0.5 percent from 2002 to 2012 and is projected to grow 1.2 percent annually.

Figure 15 – Annual Percentage Change in the Electronics Engineering and Manufacturing Cluster Employment

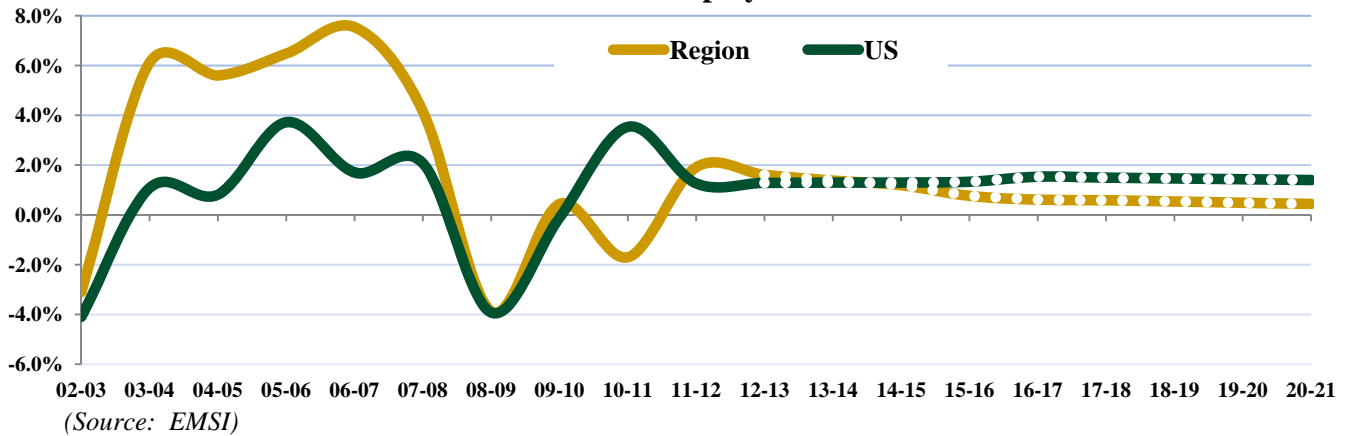


Figure 13 lists 15 key employers identified in the industries which make up the cluster in the region. These employers range in size from less than ten employees to over 7,500 employees.

Figure 16 – Key Employers in the Electronics Engineering and Manufacturing Cluster

- | | |
|---------------------------------|--|
| • Ajile Systems (334111) | • Rockwell Printed Circuit Division (334412) |
| • Crystal Group Inc. (334111) | • mCube (334413) |
| • Mobile Demand (334111) | • Skyworks Solutions (334413) |
| • Intermec (334111) | • Schneider Electric Square D (335999) |
| • CSR Technology Inc. (334220) | • AirCover Integrated Solutions (336411) |
| • SIRF Technology Inc. (334220) | • Trapeze Software (541511) |
| • Rockwell Collins (334511) | • Wabtech Railway Electronics (541711) |
| • RF Micro Devices (334310) | |

There are 30 occupations which have employment levels in the Electronics Engineering and Manufacturing Cluster that make up 1.0 percent or higher of the cluster’s regional employment. Table 15 shows that the two most common occupations are related to computer software engineering.

Table 21 – Most Common Occupations in Electronics Engineering and Manufacturing Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
15-1032	Computer Software Engineers, Systems Software	815	859	44	5.4%	7.3%
15-1031	Computer Software Engineers, Applications	785	852	67	8.5%	7.1%
51-2092	Team Assemblers	768	796	28	3.6%	6.9%
17-2071	Electrical Engineers	553	568	15	2.7%	5.0%
17-3023	Electrical and Electronic Engineering Technicians	491	501	10	2.0%	4.4%
11-9041	Engineering Managers	290	298	8	2.8%	2.6%
17-2112	Industrial Engineers	285	313	28	9.8%	2.6%
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	225	228	3	1.3%	2.0%
11-3051	Industrial Production Managers	213	218	5	2.3%	1.9%
43-4051	Customer Service Representatives	206	222	16	7.8%	1.9%
17-2141	Mechanical Engineers	194	208	14	7.2%	1.7%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	191	199	8	4.2%	1.7%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	190	197	7	3.7%	1.7%
15-1021	Computer Programmers	161	164	3	1.9%	1.5%
51-2022	Electrical and Electronic Equipment Assemblers	158	173	15	9.5%	1.4%
51-4041	Machinists	146	152	6	4.1%	1.3%
11-3021	Computer and Information Systems Managers	146	152	6	4.1%	1.3%
13-2011	Accountants and Auditors	144	153	9	6.3%	1.3%
15-1051	Computer Systems Analysts	141	152	11	7.8%	1.3%
43-9061	Office Clerks, General	139	146	7	5.0%	1.3%
43-5061	Production, Planning, and Expediting Clerks	138	142	4	2.9%	1.2%
15-1041	Computer Support Specialists	136	149	13	9.6%	1.2%
43-6011	Executive Secretaries and Administrative Assistants	135	142	7	5.2%	1.2%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	133	139	6	4.5%	1.2%
13-1199	Business Operations Specialists, All Other	130	136	6	4.6%	1.2%
11-1021	General and Operations Managers	122	126	4	3.3%	1.1%
17-2011	Aerospace Engineers	122	128	6	4.9%	1.1%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	120	123	3	2.5%	1.1%
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	119	129	10	8.4%	1.1%
17-2061	Computer Hardware Engineers	116	115	-1	-0.9%	1.0%

(Source: EMSI)

Software and Info Tech Development/Computer Modeling and Simulation

The Software and Information Technology Development/Computer Modeling and Simulation Cluster in the region is made up of seven industries with a combined employment of 5,524 in 2012. The largest cluster is the data processing, hosting and related services cluster with an estimated employment level of 2,361 which accounts for 42.7 percent of the cluster’s employment. The cluster has the smallest average establishment size (12.0 employees) among the 13 clusters. It also has one of the lowest location quotients among the clusters. Its LQ is 0.89 and only the data processing, hosting and related services cluster had a LQ over 1.00 (see Figure 21).

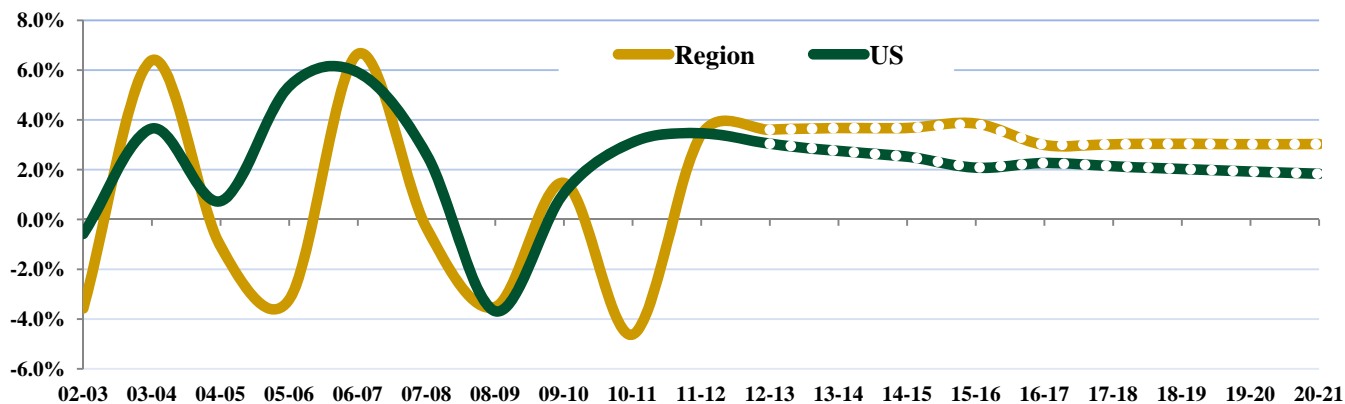
Table 22 – Industries in the Software and Info Tech Development/Computer Modeling and Simulation Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
518210	Data Processing, Hosting, and Related Services	2,361	-2.0%	4.35
541330	Engineering Services	917	2.9%	0.53
541511	Custom Computer Programming Services	1,164	2.4%	0.77
541512	Computer Systems Design Services	631	2.6%	0.40
541513	Computer Facilities Management Services	91	-2.6%	0.80
561621	Security Systems Services (except Locksmiths)	32	0.3%	0.13
561990	All Other Support Services	328	0.0%	0.69
Cluster Total		5,524	2.4%	0.89

(Source: EMSI)

The Software and Information Technology Development/Computer Modeling and Simulation Cluster had slight growth from 2002 to 2012 with an annual compounded annual growth rate of 0.1 percent while the cluster grew 1.9 percent annually at the national level. From 2012 through 2021, the cluster is projected to grow at an annual rate of 3.0 percent in the region which is above the cluster’s projected annual growth rate of 2.1 percent at the national level.

Figure 17 – Annual Percentage Change in Software and Info Tech Development/Computer Modeling and Simulation Cluster Employment



(Source: EMSI)

Clusters Employment and Staffing Patterns

With an average establishment size of 12.0 employees, it is not surprising that Figure 15 identified 22 key employers in the cluster. These key employers ranged in size from under 5 employees to over 500 employees.

Figure 18 – Key Employers in the Software and Info Tech Development/Computer Modeling and Simulation Cluster

• Informatics Inc (518210)	• Roberts Technology Solutions (541511)
• Ovation Networks (518210)	• Smart Insight LLC (541511)
• Leepfrog Technologies (518210)	• StoneRiver (541511)
• Esco Automation (541330)	• Tektivity Inc. (541511)
• C D Technical Inc. (541511)	• Cramer Development (541512)
• Fastek International (541511)	• Decisionmark Corp. (541512)
• Go Daddy Software, Inc. (541511)	• Geonetric (541512)
• Infinite Computer Systems (541511)	• Informatics Inc. (541512)
• Innovative Software Engineering (ISE) (541511)	• Lightwaves Systems (541512)
• Involta (541511)	• Enseva (541513)
• Quintrex Data Systems Corp. (QDS) (541511)	• Security Coverage (561621)

Not surprising, the five most common occupations in the software and Information technology development/computer modeling and simulation cluster in the region are computer –related occupations (see Table 17). There are ten other occupations with employment levels that amount to 1.0 percent or higher of the cluster’s total employment.

Table 23 – Most Common Occupations in the Software and Info Tech Development/Computer Modeling and Simulation Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
15-1031	Computer Software Engineers, Applications	601	705	104	17.3%	5.4%
15-1021	Computer Programmers	296	307	11	3.7%	2.7%
15-1032	Computer Software Engineers, Systems Software	238	274	36	15.1%	2.1%
15-1051	Computer Systems Analysts	236	276	40	16.9%	2.1%
15-1041	Computer Support Specialists	219	268	49	22.4%	2.0%
43-4051	Customer Service Representatives	193	233	40	20.7%	1.7%
43-9061	Office Clerks, General	176	205	29	16.5%	1.6%
15-1081	Network Systems and Data Communications Analysts	155	179	24	15.5%	1.4%
11-3021	Computer and Information Systems Managers	147	172	25	17.0%	1.3%
15-1071	Network and Computer Systems Administrators	144	183	39	27.1%	1.3%
43-5061	Production, Planning, and Expediting Clerks	126	146	20	15.9%	1.1%
17-2051	Civil Engineers	122	153	31	25.4%	1.1%
13-1199	Business Operations Specialists, All Other	122	142	20	16.4%	1.1%
43-9021	Data Entry Keyers	114	134	20	17.5%	1.0%
41-3099	Sales Representatives, Services, All Other	110	123	13	11.8%	1.0%

(Source: EMSI)

Stepping up the career ladder

The career ladder for the Software and Information Technology Cluster, **Figure 19** on the next page, is characterized by the highest wages among the six occupational clusters, including among entry-level positions. In contrast to the other clusters, there are few jobs within the IT career ladder where a minimum of a high school education by a worker is not required. Some form of post-secondary education or certification is required for most occupations within the cluster. The average projected annual growth in employment for jobs in the software and information technology cluster is 1.71 percent, giving it the highest projected growth rate of the six industries.

Wages within the cluster range from almost \$50.00 per hour for managers to above \$10.00 per hour for entry-level jobs. The overall statewide median wage across all jobs in the cluster was \$22.35 per hour making it the highest paying cluster of the six targeted. The distribution of median wages around the average is higher than all other industries except Medical Devices and Services.

The first rung of the ladder, **entry-level occupations**, offer a regional median hourly wage of \$13.60 and may require a high school degree or experience. The most important educational sets within the group are clerical, computers and electronics, customer and personal service. The most important skill sets within the group are communicating with people inside the organization, getting and documenting information.

With a post-secondary degree or certificate and the necessary skills, workers advance to **cluster-specific occupations**, which have an overall statewide median wage of \$20.78 per hour. The most important educational sets within the group are computers and electronics, design and the English language. The most important skill sets within this group are communicating with people inside the organization, getting information and interacting with computers.

No formal education is required to progress to **specialization occupations**, which have an overall statewide median wage of \$30.78 per hour and an annual growth rate (2012 to 2016) in employment from one to almost four percent. The most important educational sets within the group are computers and electronics, customer and personal service and telecommunications. The most important skill sets within the group are interacting with computers, making decisions and problem solving and communicating with people inside the organization.

The final group of jobs within the cluster, **target occupations**, earns an overall statewide median wage of \$35.03 per hour. The most important educational sets within the group are computers and electronics, mathematics and the English language. The most important skill sets within the group are getting information, making decisions and problem solving and updating relevant knowledge.

**Figure 19 – Career Ladder, Software and Info Tech Development/
Computer Modeling and Simulation Cluster**

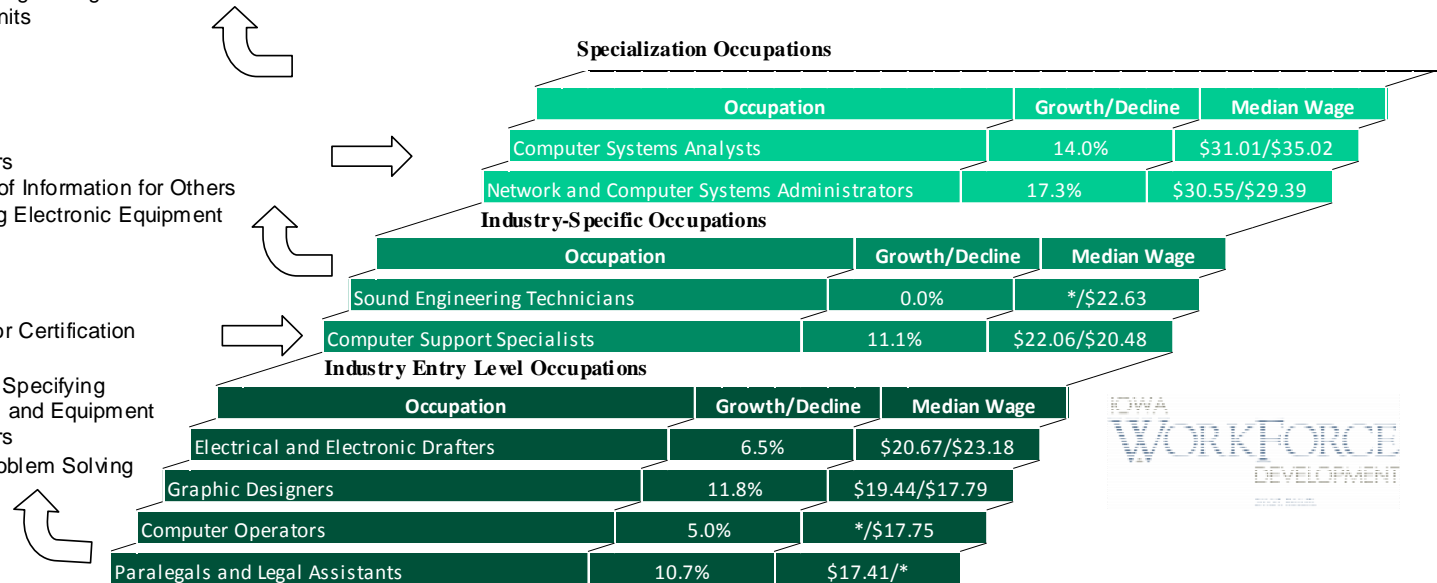
Target Occupations	2012-2016 Projected Employment Growth	2012 Regional/Statewide Median Wage
Computer and Information Systems Managers	10.0%	\$48.53/\$50.60
Computer Software Engineers, Applications	10.2%	\$31.94/\$34.98
Database Administrators	16.7%	\$30.41/\$35.11
Computer Programmers	-1.0%	\$29.23/\$31.50

Education and Skills Needed for Advancement to Next Level

- Mathematics
- Personnel and Human Resources
- Coaching and Developing Others
- Resolving Conflicts and Negotiating with Others
- Staffing Organizational Units

- Design
- Mathematics
- Interacting with Computers
- Interpreting the Meaning of Information for Others
- Repairing and Maintaining Electronic Equipment

- Post-Secondary Degree or Certification
- Mechanical
- Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment
- Interacting with Computers
- Making Decisions and Problem Solving



Wage data is from the 2010-2020 Iowa Occupational Projections published by Iowa Workforce Development. An asterisk indicates no data available for the region or state. Projected employment growth is provided by EMSI Complete Employment and estimated for the years 2012 to 2016.

Clusters Employment and Staffing Patterns

Table 24 shows overlapping skills and education between the entry-level jobs within the cluster and target jobs at the higher end of the career ladder. The table also includes skills and education where additional training may be required to perform the targeted jobs. The most commonly shared skills across jobs in the cluster are interacting with computers and mathematics. The most common areas where additional skills or education training are needed are in computers and electronics and processing information. The analysis of skills between two jobs within the cluster is important on an individual-level to assess needs for progress up the career ladder. For a regional analysis, a comparison between the skills possessed by the general population and those skills most needed within the cluster is more useful.

Table 24 – Overlapping Skills & Education, Related Occupations

Related Occupations		Median Wages	Overlapping Skills and Education	Required Areas for Improvement
Software and Information Technology	Emerging Occupation: Computer Software Engineers	\$ 31.94		
	Computer Systems Analysts	\$ 31.01	Computers & Electronics; Interacting with Computers; Customer Service	Mathematics; Clerical; Judging the Qualities of Services or People
	Sound Engineering Technicians	\$ 22.63	Mathematics; Interacting with Computers; Customer Service	Evaluating Information to Determine Compliance; Clerical; Computers & Electronics
	Electrical and Electronic Drafters	\$ 20.67	Interacting with Computers; Thinking Creatively; Mathematics	Computers & Electronics; Processing Information; Interacting with Computers
	Emerging Occupation: Database Administrators	\$ 30.41		
	Computer Support Specialists	\$ 22.06	Organizing, Planning and Prioritizing Work; Customer Service	Engineering & Technology; Computers & Electronics; Thinking Creatively; Design
	Paralegals and Legal Assistants	\$ 17.41	Computers & electronics; Organizing, Planning and Prioritizing Work	Interacting with Computers; Engineering & Technology; Judging the Qualities of Services or People
Computer Operators	\$ 17.75	Interacting with Computers; Customer Service	Processing Information; Mathematics; Documenting and Recording Information	

*Skills data available through O*Net (www.onetcenter.org)*

Clusters Employment and Staffing Patterns

Table 25 shows those attributes important to the occupations within the software and information technology cluster. The table compares the average level attained by the region's workforce, in aggregate, against the level generally required by occupations within the cluster. A negative gap, as with the attribute of computers and electronics, describes an attribute where more training may be necessary for the workforce to meet the needs of the cluster. Often, the attributes where the highest gap is measured are technically required for occupations within the cluster. For software and information technology, those attributes in which additional training may be required are computers and electronics, interacting with computers, telecommunications, updating relevant knowledge, making decisions and problem solving, getting information, and mathematics.

Table 25 – Critical Skill & Knowledge Needs

Critical Skill & Knowledge Needs	Population Cluster	Average Level Needed	Gap
Customer & Personal Service	4.19	4.21	-0.02
Mathematics	2.95	3.47	-0.52
Getting Information	3.35	4.42	-1.07
Making Decisions & Problem Solving	3.47	4.55	-1.08
Updating Relevant Knowledge	4.10	5.24	-1.14
Telecommunications	1.35	2.98	-1.63
Interacting with Computers	2.93	4.82	-1.89
Computers & Electronics	2.86	5.12	-2.26
<i>Average Critical Variables</i>	3.15	4.35	
<i>Average all Variables</i>	2.55	2.58	
<i>Average Knowledge Variables</i>	2.84	3.95	
<i>Average Work Activity Variables</i>	3.46	4.76	

Energy Generation and Distribution

The Energy Generation and Distribution Cluster had an estimated employment level of 1,108 in 2012. The cluster in the region consists of two industries with the nuclear electric power generation industry accounting for 57.6 percent of the cluster’s employment and the electric power distribution industry accounting for 42.4 percent. The cluster has a LQ of 2.38 which signifies some concentration.

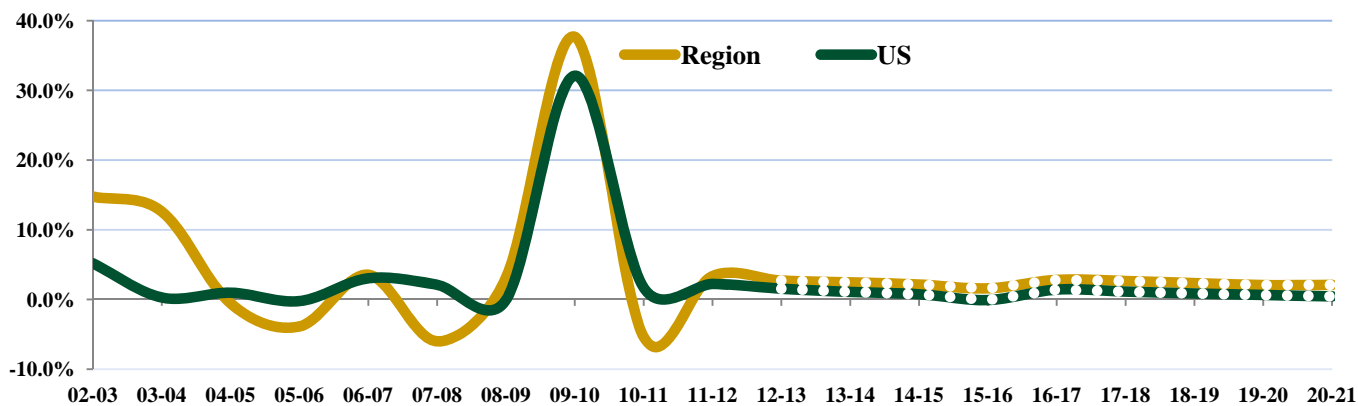
Table 26 – Industries in the Energy Generation and Distribution Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
221113	Nuclear Electric Power Generation	638	1.3%	7.10
221122	Electric Power Distribution	470	13.8%	1.25
Cluster Total		1,108	4.8%	2.38

(Source: EMSI)

The Energy Generation and Distribution Cluster had a compounded annual growth rate of 4.8 percent from 2002 to 2012 in the region and nationally had a rate of 4.0 percent annually. The cluster is projected to grow in the region at an annual rate of 2.1 percent annually through 2021. At the U.S. level the cluster is projected to grow at an annual rate of 0.8 percent.

Figure 20 – Annual Percentage Change in Energy Generation and Distribution Cluster Employment



(Source: EMSI)

As would be expected, the key employers in the Energy Generation and Distribution Cluster are utility companies. They range in size from having fewer than 20 employees to over 500 employees in the region

Figure 21 – Key Employers in the Energy Generation and Distribution Cluster

• Nextera Energy (221113)	• Duane Arnold Energy Center (221122)
• Alliant Energy (221122)	• ITC Midwest (221122)
• BFC Electric (221122)	• Mid America Energy Co (221122)
• Central Iowa Power Co-Op (221122)	

Electrical power-line installers and repairers are the most common occupation in the region for the Energy Generation and Distribution Cluster, accounting for 13.4 percent of the cluster’s total employment. Employment in power plant operators occupations accounted for 8.8 percent of the cluster’s employment.

Table 27 – Most Common Occupations in the Energy Generation and Distribution Cluster

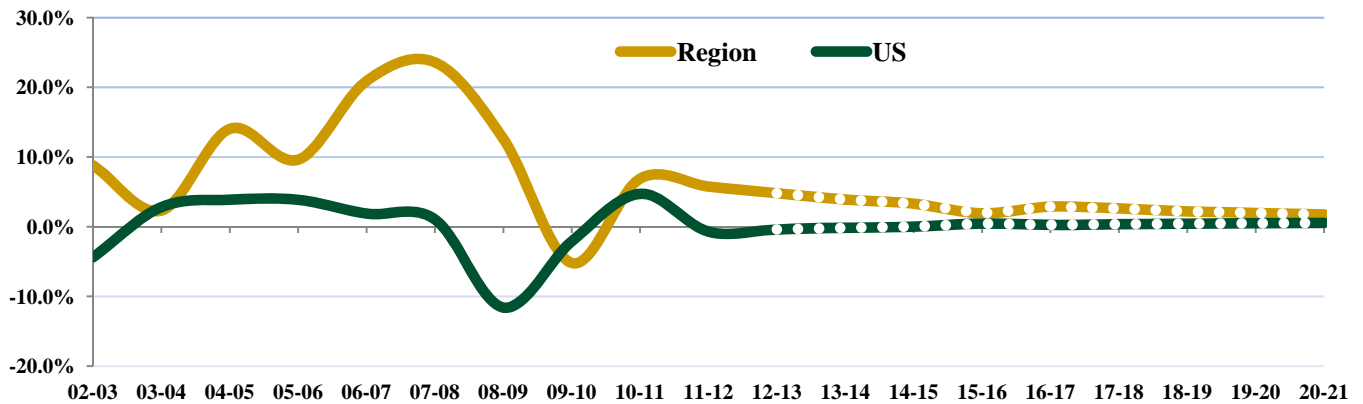
SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
49-9051	Electrical Power-Line Installers and Repairers	148	157	9	6.1%	13.4%
51-8013	Power Plant Operators	97	110	13	13.4%	8.8%
17-2071	Electrical Engineers	53	60	7	13.2%	4.8%
43-4051	Customer Service Representatives	48	54	6	12.5%	4.3%
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	46	56	10	21.7%	4.2%
43-5041	Meter Readers, Utilities	42	40	-2	-4.8%	3.8%
17-2161	Nuclear Engineers	39	46	7	17.9%	3.5%
99-9999	Unclassified Occupation	37	45	8	21.6%	3.3%
17-3023	Electrical and Electronic Engineering Technicians	28	30	2	7.1%	2.5%
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	24	26	2	8.3%	2.2%
49-9041	Industrial Machinery Mechanics	24	27	3	12.5%	2.2%
49-1011	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	20	22	2	10.0%	1.8%
47-2111	Electricians	19	20	1	5.3%	1.7%
51-8012	Power Distributors and Dispatchers	17	20	3	17.6%	1.5%
49-9042	Maintenance and Repair Workers, General	15	16	1	6.7%	1.4%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	14	15	1	7.1%	1.3%
13-1199	Business Operations Specialists, All Other	14	15	1	7.1%	1.3%
13-2011	Accountants and Auditors	14	15	1	7.1%	1.3%
43-6011	Executive Secretaries and Administrative Assistants	13	14	1	7.7%	1.2%
51-8011	Nuclear Power Reactor Operators	13	15	2	15.4%	1.2%
11-9041	Engineering Managers	12	12	0	0.0%	1.1%
43-9061	Office Clerks, General	11	12	1	9.1%	1.0%

(Source: EMSI)

Renewable Energy and Sustainable Tech Products - Wind Manufacturing

As Figure 18 shows, the Renewable Energy and Sustainable Tech Products - Wind Manufacturing Cluster in the region had tremendous employment growth from 2002 to 2012. Its compounded annual growth rate was 8.7 percent while the cluster declined at the U.S. level at an annual rate of -0.2 percent. The cluster is projected to continue to grow in the region at an annual rate of 2.5 percent through 2021. Nationally, the cluster is projected to grow at an annual rate of 0.2 percent.

Figure 22 – Annual Percentage Change in the Renewable Energy and Sustainable Tech Products - Wind Manufacturing Cluster Employment



(Source: EMSI)

In 2012, the estimated employment for the Renewable Energy and Sustainable Tech Products - Wind Manufacturing Cluster is 1,397. The cluster consists of six industries with the largest industry being the turbine and turbine generator set units manufacturing industry with just over 500 employees. This employment accounts for 36.4 percent of the cluster’s employment in the region. The second largest industry is the machine shop industry with 29 percent of the cluster’s employment. There is a challenge with the inclusion of machine shops since not all machine shops in the region supply parts into the wind manufacturing supply chain. The cluster’s LQ is 1.38 which indicates the cluster’s share of the regional economy is similar to the cluster’s share in the U.S. economy. However, the turbine and turbine generator set units manufacturing industry has a LQ of 10.49 showing that the region does have specialization related to the end segment of the cluster’s supply chain.

Table 28 – Industries in the Renewable Energy and Sustainable Tech Products - Wind Manufacturing Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
331511	Iron Foundries	26	-2.9%	0.41
332312	Fabricated Structural Metal Manufacturing	85	3.4%	0.62
332710	Machine Shops	405	5.3%	0.85
333611	Turbine and Turbine Generator Set Units Manufacturing	509	NA	10.49
335313	Switchgear and Switchboard Apparatus Manufacturing	5	NA	0.10
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers	367	4.2%	1.53
Cluster Total		1,397	8.7%	1.38

(Source: EMSI)

The average establishment size in the region for the cluster is 22.9 employees, which is one of the smaller averages among the 13 clusters. Figure 19 contains a list of 17 employers which have been identified among the six industries. These employers range in size from 10 employees to over 300 employees.

Figure 23 – Key Employers in the Renewable Energy and Sustainable Tech Products - Wind Manufacturing Cluster

• NADICOM (331511)	• Clipper Windpower (333611)
• Russelloy Foundry (331511)	• Carbon-Free Energy (333611)
• Barnes Mfg. Service (332312)	• Electro Hydraulic Auto. (333611)
• Iowa Specialties (332312)	• MH Equipment Co. (333611)
• Pickwick Mfg. Service (332312)	• PNE Wind USA (333611)
• Tri State Tower Inc. (332312)	• Crescent Electric Supply (335999)
• United Tower Solutions (332312)	• Timberline Mfg. Co. (335999)
• Dowding Industries (332715)	• Van Meter, Inc. (423610)
• Acciona Windpower (333611)	

Machinists are the most common occupation in the cluster in the region. Machinists account for 12.1 percent of the cluster’s total estimated employment in 2012. There is a total of 27 different occupations that have employment levels that are at least 1.0 percent of the cluster’s total employment.

Table 29 – Most Common Occupations in the Renewable Energy and Sustainable Tech Products - Wind Manufacturing Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
51-4041	Machinists	169	192	23	13.6%	12.1%
51-2092	Team Assemblers	93	111	18	19.4%	6.7%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	75	83	8	10.7%	5.4%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	46	52	6	13.0%	3.3%
51-4121	Welders, Cutters, Solderers, and Braziers	39	45	6	15.4%	2.8%
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	36	43	7	19.4%	2.6%
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	32	35	3	9.4%	2.3%
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	28	30	2	7.1%	2.0%
43-9061	Office Clerks, General	28	32	4	14.3%	2.0%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	28	32	4	14.3%	2.0%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	25	28	3	12.0%	1.8%
49-9042	Maintenance and Repair Workers, General	25	29	4	16.0%	1.8%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	24	26	2	8.3%	1.7%
43-4051	Customer Service Representatives	23	27	4	17.4%	1.6%
11-9199	Managers, All Other	22	28	6	27.3%	1.6%
43-5071	Shipping, Receiving, and Traffic Clerks	21	23	2	9.5%	1.5%
51-4035	Milling and Planning Machine Setters, Operators, and Tenders, Metal and Plastic	20	22	2	10.0%	1.4%
11-3051	Industrial Production Managers	20	22	2	10.0%	1.4%
17-2141	Mechanical Engineers	19	25	6	31.6%	1.4%
11-1021	General and Operations Managers	19	21	2	10.5%	1.4%
51-2031	Engine and Other Machine Assemblers	18	23	5	27.8%	1.3%
51-2041	Structural Metal Fabricators and Fitters	17	20	3	17.6%	1.2%
49-9041	Industrial Machinery Mechanics	16	19	3	18.8%	1.1%
51-9198	Helpers--Production Workers	15	18	3	20.0%	1.1%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	15	16	1	6.7%	1.1%
43-5081	Stock Clerks and Order Fillers	15	17	2	13.3%	1.1%
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	14	15	1	7.1%	1.0%

(Source: EMSI)

Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing

The Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing cluster was added after discussion by the group since solar components manufacturing was identified as a target cluster for the region's attraction efforts. At the present time, there are no employers in the region that are manufacturing solar panels or like products. However, there are several industries in the region which could potentially be part of a supply chain for manufacturing solar components. Those industries, six in total, had an estimated employment of 932 in the region in 2012. The average establishment size for these industries in 2012 is 25.9 employees.

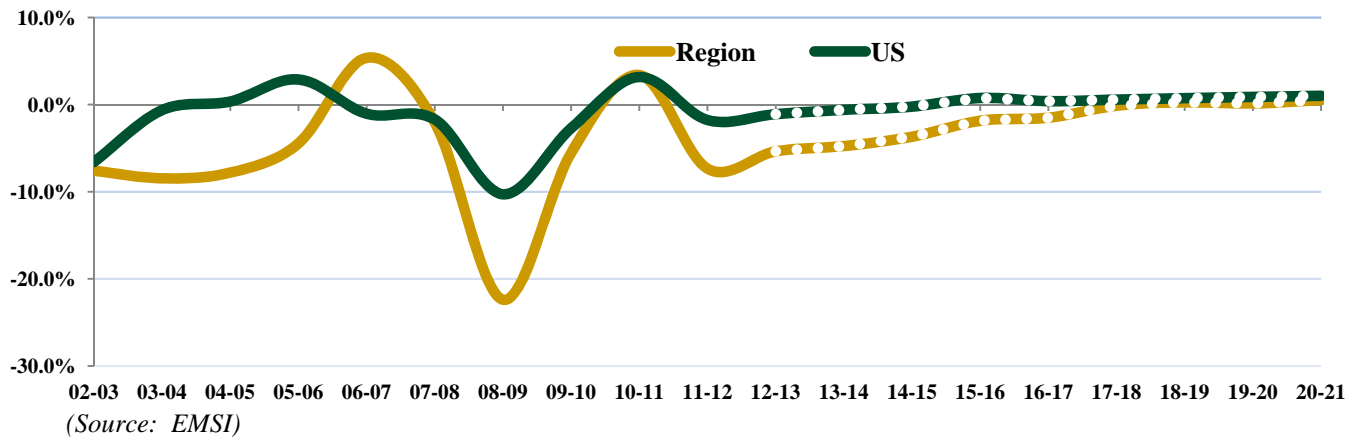
Table 30 – Industries in the Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing	59	-15.9%	0.95
332322	Sheet Metal Work Manufacturing	245	-0.4%	1.48
334413	Semiconductor and Related Device Manufacturing	56	-2.7%	0.18
335313	Switchgear and Switchboard Apparatus Manufacturing	200	-11.5%	4.18
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	5	NA	0.10
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers	367	4.2%	1.53
Cluster Total		932	-5.4%	1.07

(Source: EMSI)

In aggregate, the six industries had a compounded annual growth rate of -5.4 percent from 2002 to 2012. The cluster at the national level declined at an annual rate of -1.7 percent. Two of the industries, unlaminated plastics film and sheet (except packaging) manufacturing industry and switchgear and switchboard apparatus manufacturing industry, had significant employment declines from 2002 to 2012 as a percent of their employment. The cluster is projected to continue to experience employment declines at an annual rate of -1.7 percent through 2021. While it is projected to grow by 0.2 percent annually at the U.S. level. The potential of growing a solar components manufacturing cluster could reverse those employment decline trends.

Figure 24 – Annual Percentage Change in Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing Cluster Employment



Nine key employers were identified among the six industries. These businesses range in size from 10 employees to over 300 employees.

Figure 25 – Key Employers in the Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing Cluster

- | | |
|-----------------------------------|--|
| • American Profol Inc. (326113) | • Crescent Electric Supply (335999) |
| • Climate Engineers (332322) | • Schneider Electric Square D (335999) |
| • Engel Industries Inc. (332322) | • Timberline Mfg. Co. (335999) |
| • Ilten’s Inc. (332322) | • Van Meter, Inc. (423610) |
| • Midwest Metal Products (332322) | |

Table 23 shows that the most common occupations in the Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing cluster are sales related occupations and production related occupations. Overall, based on the cluster’s total employment, there is no one dominant occupation or occupations from a numerical stand point.

Table 31 – Most Common Occupations in the Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	73	77	4	5.5%	7.8%
51-2092	Team Assemblers	61	44	-17	-27.9%	6.5%
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	34	36	2	5.9%	3.6%
51-4121	Welders, Cutters, Soldiers, and Brazers	33	31	-2	-6.1%	3.5%
51-2041	Structural Metal Fabricators and Fitters	23	23	0	0.0%	2.5%
43-4051	Customer Service Representatives	23	23	0	0.0%	2.5%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	23	21	-2	-8.7%	2.5%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	23	16	-7	-30.4%	2.5%
17-3023	Electrical and Electronic Engineering Technicians	20	13	-7	-35.0%	2.1%
43-9061	Office Clerks, General	20	19	-1	-5.0%	2.1%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	19	18	-1	-5.3%	2.0%
43-5071	Shipping, Receiving, and Traffic Clerks	16	14	-2	-12.5%	1.7%
17-2071	Electrical Engineers	16	5	-11	-68.8%	1.7%
47-2211	Sheet Metal Workers	15	15	0	0.0%	1.6%
51-2022	Electrical and Electronic Equipment Assemblers	15	5	-10	-66.7%	1.6%
11-1021	General and Operations Managers	13	11	-2	-15.4%	1.4%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	13	10	-3	-23.1%	1.4%
43-5081	Stock Clerks and Order Fillers	13	12	-1	-7.7%	1.4%
49-9042	Maintenance and Repair Workers, General	13	5	-8	-61.5%	1.4%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	12	5	-7	-58.3%	1.3%
43-4151	Order Clerks	12	5	-7	-58.3%	1.3%
11-3051	Industrial Production Managers	12	5	-7	-58.3%	1.3%
13-2011	Accountants and Auditors	12	10	-2	-16.7%	1.3%
53-7051	Industrial Truck and Tractor Operators	11	5	-6	-54.5%	1.2%
15-1032	Computer Software Engineers, Systems Software	11	11	0	0.0%	1.2%
15-1031	Computer Software Engineers, Applications	11	5	-6	-54.5%	1.2%

(Source: EMSI)

Medical Devices and Services

The Medical Devices and Services cluster has the smallest employment level of the 13 clusters with an estimated employment of 424 in 2012. The cluster in the region had a compounded annual growth rate of -1.9 percent from 2002 to 2012 while the cluster at the U.S. level had an annual growth rate of 1.9 percent over the same time period. With a location quotient of 0.29, the cluster has no concentration or specialization in the region and none of the four industries which make up the cluster in region have a LQ over .70.

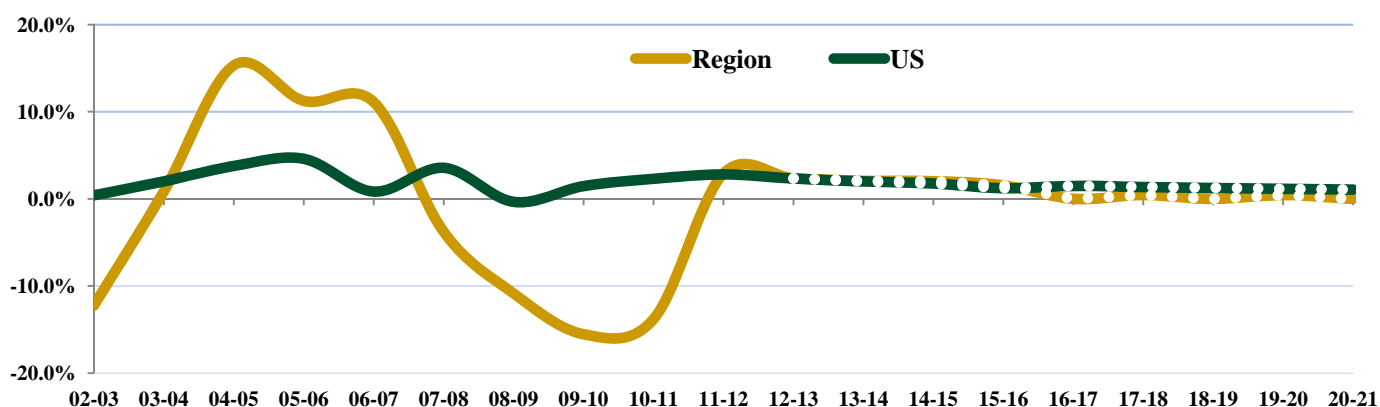
Table 32 – Industries in the Medical Devices and Services Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
339112	Surgical and Medical Instrument Manufacturing	60	-9.9%	0.30
339113	Surgical Appliance and Supplies Manufacturing	117	5.8%	0.69
541711	Research and Development in Biotechnology	58	-0.9%	0.22
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)	189	-0.8%	0.23
Cluster Total		424	-1.9%	0.29

(Source: EMSI)

The Medical Devices and Services cluster is projected to grow in the region between 2012 and 2021. The annual growth rate for the cluster in the region is projected to be 0.9 percent and at the national level the projected growth rate is 1.4 percent per year.

Figure 26 – Annual Percentage Change in Medical Devices and Services Cluster Employment



(Source: EMSI)

In the region, the cluster has the second smallest establishment size among the 13 clusters with an average size of 13.3 employees per establishment. The key employers identified in Figure 23 range in size from fewer than 10 employees to over 100 employees.

Figure 27 – Key Employers in the Medical Devices and Services Cluster

• Civco Medical Solutions (339112)	• Iowa Clinical Research Corp. (541711)
• CompleteWare Corp. (339112)	• JMI Laboratories (541711)
• Lloyd Table Co. (339112)	• Siouxland Labs (541711)
• Medical Imaging Applications (339112)	• Bio-Research Products Inc. (541711)
• Protek Medical Products (339112)	

Table 25 shows that there is no one occupation that dominates the workforce employed by the cluster in the region. There are only 6 occupations with 10 or more workers in the cluster in the region.

Table 33 – Most Common Occupations in the Medical Devices and Services Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
51-9081	Dental Laboratory Technicians	35	35	0	0.0%	3.8%
51-2092	Team Assemblers	29	37	8	27.6%	3.1%
19-1042	Medical Scientists, Except Epidemiologists	16	17	1	6.3%	1.7%
51-9082	Medical Appliance Technicians	16	21	5	31.3%	1.7%
19-4021	Biological Technicians	11	12	1	9.1%	1.2%
11-9199	Managers, All Other	11	11	0	0.0%	1.2%

(Source: EMSI)

Stepping up the career ladder

The career ladder for the Medical Devices and Service Cluster, **Figure 28** on the next page, is characterized by lower employment growth and wages at the lower end of the career ladder and much higher employment growth and wages at the upper end of the ladder. While occupations throughout the cluster share common skills and education required, there does seem to be a difference between those occupations on the medical side and those occupations on the production side of the cluster. The average projected annual growth in employment for jobs in the Medical Devices and Services Cluster is 1.30 percent, comparable with the statewide average of 1.30 percent for all jobs.

Regional wages within the cluster range from above \$45.00 per hour for computer software engineers to around \$10.00 per hour for entry-level production jobs. The 2012 overall statewide median wage across all jobs in the cluster was \$19.16 per hour which puts it at just below the average of the six targeted industries. While this overall statewide median wage is lower than some of the other targeted industries, it is still above the average median hourly wage of \$18.90 for all jobs in the state. The distribution of median wages around the average is higher than that within the Financial Services, Food Ingredients and Advanced Manufacturing industries but lower than the other two industries. The difference between regional wages within the cluster is not as large compared to other industries and that workers can expect a more gradual increase in income as they progress to higher skilled occupations.

Entry-level occupations offer an overall statewide median hourly wage of \$13.55 and do not require a worker to have a high school degree or previous experience. The most important educational sets within the group are production and processing, mechanics and the English language. The most important skill sets within the group are operating vehicles and equipment, moving objects and controlling machines and processes.

With a high school degree or equivalent and the necessary skills, workers advance to the **cluster-specific occupations** with an overall statewide median wage of \$15.61 per hour. The most important educational sets within the group are production and processing, mathematics and mechanics. The most important skill sets within the group are getting information, controlling machines and processes and making decisions.

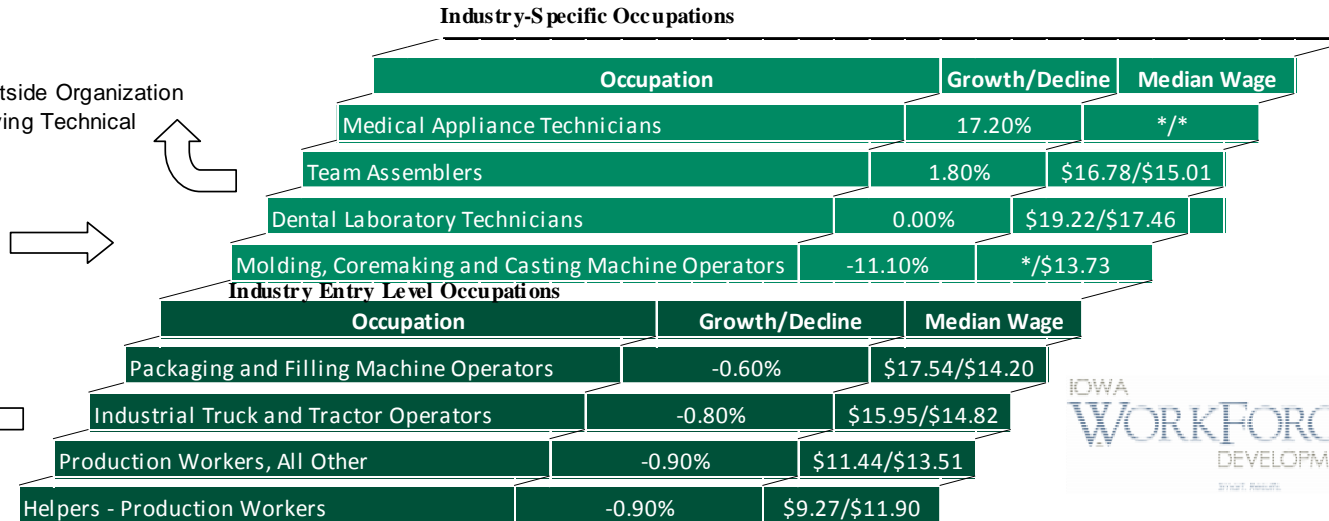
The final group of jobs within the cluster, **target occupations**, typically requires some post-secondary degree or certification and earns an overall statewide median wage of \$28.39 per hour. The most important educational sets within the group are computers and electronics, mathematics and the English language. The most important skill sets within the group are getting information, interacting with computers and making decisions.

Figure 28 – Career Ladder, Medical Devices & Services Cluster

Target Occupations	2012-2016 Projected Employment Growth	2012 Regional/Statewide Median Wage
Biological Technicians	9.1%	*/\$20.37
Computer Software Engineers, Applications	10.2%	\$31.94/\$34.98
Medical Scientists, except Epidermiologists	9.5%	*/*
Electrical and Electronic Engineering Technicians	6.5%	\$20.67/\$23.18

Education and Skills Needed for Advancement to Next Level

- Post-Secondary Degree or Certification
 - Computers and Electronics
 - Design
 - Engineering and Technology
 - Communicating with Persons Outside Organization
 - Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment
 - Interacting With Computers
-
- High school diploma or equivalent
 - Mathematics
 - Production and Processing
 - Documenting and Recording Information
 - Inspecting Equipment, Structures, or Material
 - Interpreting the Meaning of Information for Others



Wage data is from the 2010-2020 Iowa Occupational Projections published by Iowa Workforce Development. An asterisk indicates no data available for the region or state. Projected employment growth is provided by EMSI Complete Employment and estimated for the years 2012 to 2016.

Clusters Employment and Staffing Patterns

Table 34 shows overlapping skills and education between the entry-level jobs within the cluster and target jobs at the higher end of the career ladder. The table also includes skills and education where additional training may be required to perform the targeted jobs. The most commonly shared skills across jobs in the cluster are communicating with persons inside the organization and controlling machines and processes. The most common areas where additional skills or education training are needed are in repairing and maintaining electronics and interacting with computers. The analysis of skills between two jobs within the cluster is important on an individual-level to assess needs for progress up the career ladder. For a regional analysis, a comparison between the skills possessed by the general population and those skills most needed within the cluster is more useful.

Table 34 – Overlapping Skills & Education, Related Occupations

Related Occupations		Median Wages	Overlapping Skills and Education	Required Areas for Improvement	
Medical Devices and Services	Emerging Occupation: Electrical and Electronic Engineering Technicians		\$ 20.67		
	Career Pathways	Team Assemblers	\$ 16.78	Monitoring and Controlling Resources; Controlling Machines and Processes	Repairing & Maintaining Electronics; Telecommunications
		Packaging and Filling Machine Operators	\$ 17.54	Handling & Moving Objects; Communicating with Persons Inside the Organization	Interacting with Computers; Repairing & Maintaining Electronics
		Production Workers, All Other	\$ 11.44	Handling & Moving Objects; Controlling Machines and Processes	Computers & Electronics; Telecommunications; Updating & Using Relevant Knowledge
	Emerging Occupation: Biological Technicians		\$ 20.37		
	Career Pathways	Dental Laboratory Technicians	\$ 19.22	Processing Information; Communicating with Persons Inside the Organization	Biology; Mathematics; Performing & Working Directly with the Public
		Molding, Coremaking and Casting Machine Operators	\$ 13.73	Inspecting Equipment, Structures, or Material; Handling & Moving Objects	Biology; Customer Service; Performing & Working Directly with the Public
Helpers - Production Workers		\$ 9.27	Handling & Moving Objects; Performing General Physical Activities	Biology; Monitoring Processes, Materials, or Surroundings; Performing & Working Directly with the Public	

*Skills data available through O*Net (www.onetcenter.org)*

Clusters Employment and Staffing Patterns

Table 35 shows those attributes important to the occupations within the Medical Devices and Services Cluster. The table compares the average level attained by the region’s workforce, in aggregate, against the level generally required by occupations within the cluster. A positive gap, as in English language above, describes an attribute where the population in general has the required level of skill to meet the needs of occupations within the cluster. A negative gap, as with the attribute of controlling machines and processes, describes an attribute where more training may be necessary for the workforce to meet the needs of the cluster. Often, the attributes where the highest gap is measured are technically required for occupations within the cluster. For Medical Devices and Services Cluster, those attributes in which additional training may be required are controlling machines and processes and production and processing.

Table 35 – Critical Skill & Knowledge Needs

Critical Skill & Knowledge Needs	Population Cluster	Average Level Needed	Gap
English Language	3.53	3.10	0.43
Interacting with Computers	2.93	2.72	0.21
Computers & Electronics	2.86	2.79	0.07
Getting Information	3.35	3.53	-0.18
Mathematics	2.95	3.16	-0.21
Making Decisions & Problem Solving	3.47	3.70	-0.23
Production & Processing	2.21	2.78	-0.57
Controlling Machines & Processes	2.13	3.69	-1.56
<i>Average Critical Variables</i>	2.93	3.18	
<i>Average all Variables</i>	2.55	2.26	
<i>Average Knowledge Variables</i>	2.89	2.96	
<i>Average Work Activity Variables</i>	2.97	3.41	

Production Advanced Manufacturing

The Production Advanced Manufacturing Cluster was the last cluster added by the group following several discussions. The cluster is made up of 18 industries in the region with the majority of them producing durable goods. One of the reasons for the inclusion of these industries is the belief by the group that employers within the industries have common workforce needs. Total employment for the cluster in 2012 is estimated at 4,221 with a quarter of the cluster's employment being in the farm machinery and equipment manufacturing industry (25.4 percent). The cluster has a LQ of 1.83 which shows slight concentration in the region. The copper rolling, drawing, and extruding industry has a LQ of 24.59, which shows significant specialization and the farm machinery and equipment manufacturing industry has a LQ of 10.78, which also points to significant specialization.

Table 36 – Industries in the Production Advanced Manufacturing Cluster

NAICS	Description	2012 Emp.	CAGR '02-'12	LQ
326160	Plastics Bottle Manufacturing	298	45.0%	5.50
326199	All Other Plastics Product Manufacturing	400	-12.6%	0.96
331421	Copper Rolling, Drawing, and Extruding	442	2.8%	24.59
332311	Prefabricated Metal Building and Component Manufacturing	122	-1.2%	2.62
332312	Fabricated Structural Metal Manufacturing	85	3.4%	0.62
332313	Plate Work Manufacturing	12	-8.3%	0.15
332322	Sheet Metal Work Manufacturing	245	-0.4%	1.48
332710	Machine Shops	405	5.3%	0.85
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	42	0.7%	0.46
332912	Fluid Power Valve and Hose Fitting Manufacturing	24	15.3%	0.45
333111	Farm Machinery and Equipment Manufacturing	1,074	5.9%	10.78
333120	Construction Machinery Manufacturing	242	-5.1%	9.60
333319	Other Commercial and Service Cluster Machinery Manufacturing	123	6.7%	0.87
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	207	40.3%	3.44
333511	Industrial Mold Manufacturing	154	0.7%	5.12
333993	Packaging Machinery Manufacturing	226	-3.4%	8.21
333995	Fluid Power Cylinder and Actuator Manufacturing	115	-7.4%	2.59
336212	Truck Trailer Manufacturing	5	-29.8%	0.02
Cluster Total		4,221	-1.3%	1.83

(Source: EMSI)

Employment in the region in the Production Advanced Manufacturing Cluster declined from 2002 to 2012 at a compounded annual rate of -1.3% which was slightly worse than the cluster's rate of -1.2 percent per year at the U.S. level. The cluster in the region and nationwide is projected to continue to experience employment declines through 2021 with an annual growth rate of -0.1 percent.

Figure 29 – Annual Percentage Change in the Production Advanced Manufacturing Cluster Employment

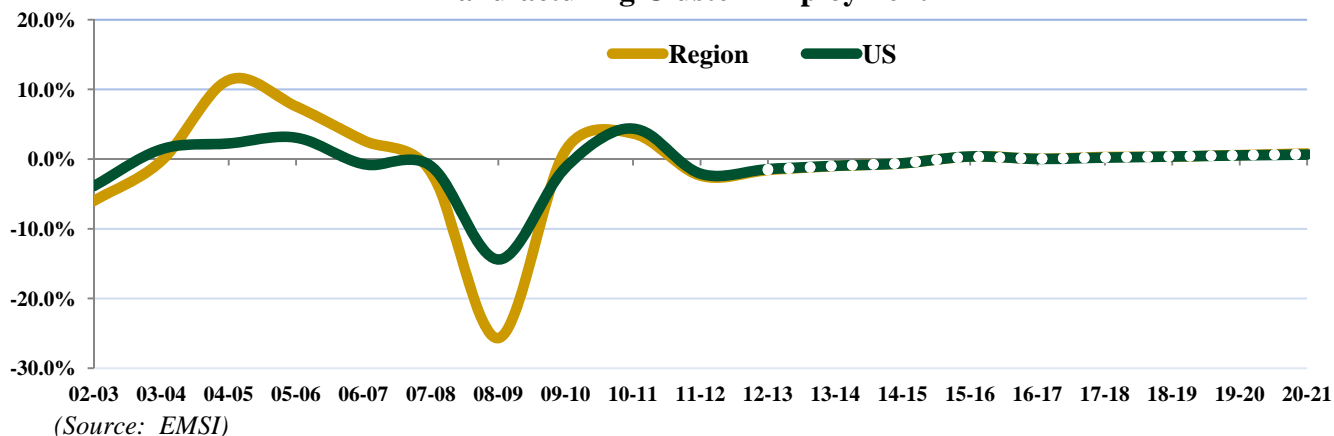


Figure 25 contains a diverse list of key employers in the cluster. The average establishment size in 2012 in the cluster is 58.6 employees. The key employers included in Figure 41 range in size from fewer than 20 employees to well over 500 employees.

Figure 30 – Key Employers in the Production Advanced Manufacturing Cluster

• ALPLA (326160)	• Bennett Machine and Fabricating (332712)
• DKM Manufacturing (326199)	• D W Products Inc. (332714)
• Associated Materials (326199)	• Sadler Machine (332812)
• Centro (326199)	• Parker Hannifin (332912)
• PMX (331421)	• Kinze Manufacturing (333111)
• Ideal Industries (332310)	• Highway Equipment (333120)
• Barnes Manufacturing Services (332312)	• AMTek (333319)
• Midwest Metal Products (332322)	• Modine Manufacturing (333415)
• Pickwick Manufacturing Services (332322)	• MSI Mold Builders (333511)
• Acro Manufacturing Corp (332710)	• Evergreen Packaging Equipment (333993)
• In Tolerance (332710)	• Energy Manufacturing (333995)
• Dowding Industries (332710)	• CEI Equipment (336212)
• Advanced Manufacturing Svc (332711)	

As expected, a significant number of the most common occupations in the cluster in the region are production related occupations. The four occupations that have employment levels over 100 workers are production occupations. Team assemblers account for 10.8 percent of the cluster’s total employment. Machinists account for 6.0 percent of the cluster’s total employment followed by welders, cutters, solderers, and brazers occupations which account for 5.7 percent. Thirty different occupations had employment levels in the cluster which were at least 1.0 percent of the cluster’s total employment.

Clusters Employment and Staffing Patterns

Table 37 – Most Common Occupations in the Production Advanced Manufacturing Cluster

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16	% of Cluster Emp.
51-2092	Team Assemblers	456	454	-2	-0.4%	10.8%
51-4041	Machinists	253	261	8	3.2%	6.0%
51-4121	Welders, Cutters, Solderers, and Brazers	242	241	-1	-0.4%	5.7%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	166	161	-5	-3.0%	3.9%
53-7051	Industrial Truck and Tractor Operators	95	93	-2	-2.1%	2.3%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	90	85	-5	-5.6%	2.1%
51-2041	Structural Metal Fabricators and Fitters	90	90	0	0.0%	2.1%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	88	84	-4	-4.5%	2.1%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	87	85	-2	-2.3%	2.1%
49-9041	Industrial Machinery Mechanics	85	82	-3	-3.5%	2.0%
51-4021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	84	88	4	4.8%	2.0%
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	80	87	7	8.8%	1.9%
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	80	66	-14	-17.5%	1.9%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	74	68	-6	-8.1%	1.8%
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	66	63	-3	-4.5%	1.6%
49-9042	Maintenance and Repair Workers, General	66	64	-2	-3.0%	1.6%
11-3051	Industrial Production Managers	65	61	-4	-6.2%	1.5%
51-9121	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	61	62	1	1.6%	1.4%
51-9198	Helpers--Production Workers	58	56	-2	-3.4%	1.4%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	54	53	-1	-1.9%	1.3%
43-9061	Office Clerks, General	54	53	-1	-1.9%	1.3%
17-2141	Mechanical Engineers	53	53	0	0.0%	1.3%
43-5061	Production, Planning, and Expediting Clerks	53	53	0	0.0%	1.3%
51-2099	Assemblers and Fabricators, All Other	52	52	0	0.0%	1.2%
17-2112	Industrial Engineers	52	54	2	3.8%	1.2%
43-5071	Shipping, Receiving, and Traffic Clerks	52	47	-5	-9.6%	1.2%
11-1021	General and Operations Managers	47	44	-3	-6.4%	1.1%
47-2211	Sheet Metal Workers	43	43	0	0.0%	1.0%
43-4051	Customer Service Representatives	42	41	-1	-2.4%	1.0%
51-9199	Production Workers, All Other	42	39	-3	-7.1%	1.0%

(Source: EMSI)

Stepping up the career ladder

The career ladder for the Advanced Manufacturing Cluster, next page, is characteristic of the changing landscape in workforce demand. Entry-level jobs may require little formal education or experience. Requirements to proceed to the next higher occupations generally involve job-specific skills and some formal educational achievement. For example, as the worker progresses toward the highest-paid and in-demand set of occupations, they must fulfill requirements for computer literacy as well as in managing other people and resources.

Regional wages within the cluster range from nearly \$10.00 per hour for entry-level production and custodial jobs to above \$36.00 per hour for engineering positions. The 2012 average median wage across all jobs in the cluster was \$20.48 per hour which is the second-highest paying cluster of the six targeted. The distribution of median wages is higher than those within the Financial Services and Food Ingredients industries but lower than the other three targeted industries. The difference between wages within the cluster is not as large compared to other industries and that workers can expect a more gradual increase in income as they progress to higher skilled occupations. The average projected annual growth in employment for jobs in the cluster is 1.45 percent, well above the statewide average of 1.30 percent for all jobs.

The **entry level positions** in the Advanced Manufacturing Cluster offer an overall statewide median hourly wage of \$11.94 and most positions do not require a worker to have a high school degree or previous experience. While these jobs require little or no formal education or training, workers will need to make a considerable investment in time to reach the next level and may have difficulty proceeding up the ladder. Helping workers get started in their career path through educational and skill resources may make it easier for them to build the momentum to continue up the ladder. The most important educational sets within the group are production and processing, safety and the English language. The most important skill sets within this group are performing general physical activities and moving objects.

With a high school degree or equivalent and the necessary skills, workers advance to **cluster-specific occupations** with an overall statewide median wage of \$16.12 per hour. At this level, skills needed are highly specific to the cluster or operation of a particular machine for the occupation. Workers may need help in subject areas outside of cluster or job-specific skills in order to advance up the career ladder. The most important educational sets within this group are production and processing, mathematics and mechanics. The most important skill sets within the group are controlling machines and processes, getting information and moving objects.

Though formal education is not required to progress to the next step, it is recommended. These **specialization occupations** have an overall statewide median wage of \$21.79 per hour and an annual growth rate in employment from one to almost four percent. This is the first step in which workers need significant training in interpersonal skills and management as well as interacting with computers. The development of these skills will be even more important as the worker progresses to the final group of jobs within the cluster. The most important educational sets within the group are production and processing, mathematics and mechanics. The most important skill sets within the group are controlling machines and processes, getting information and moving objects.

Clusters Employment and Staffing Patterns

The **target jobs** within the cluster typically require some post-secondary degree or certification and earn an overall statewide median wage of \$34.52 per hour. The group includes two principal career paths: management and professional. While there is overlap in skills and education needed, there is a difference between the two groups. From prior steps, workers will need to decide if they want to pursue management related occupations or if they want to invest in the formal education necessary for the professional track, i.e. engineering positions. The most important educational sets within the group are engineering and technology, mathematics and design. The most important skill sets within the group are communicating with people inside the organization, making decisions and solving problems.

Figure 31 – Career Ladder, Production Advanced Manufacturing Cluster

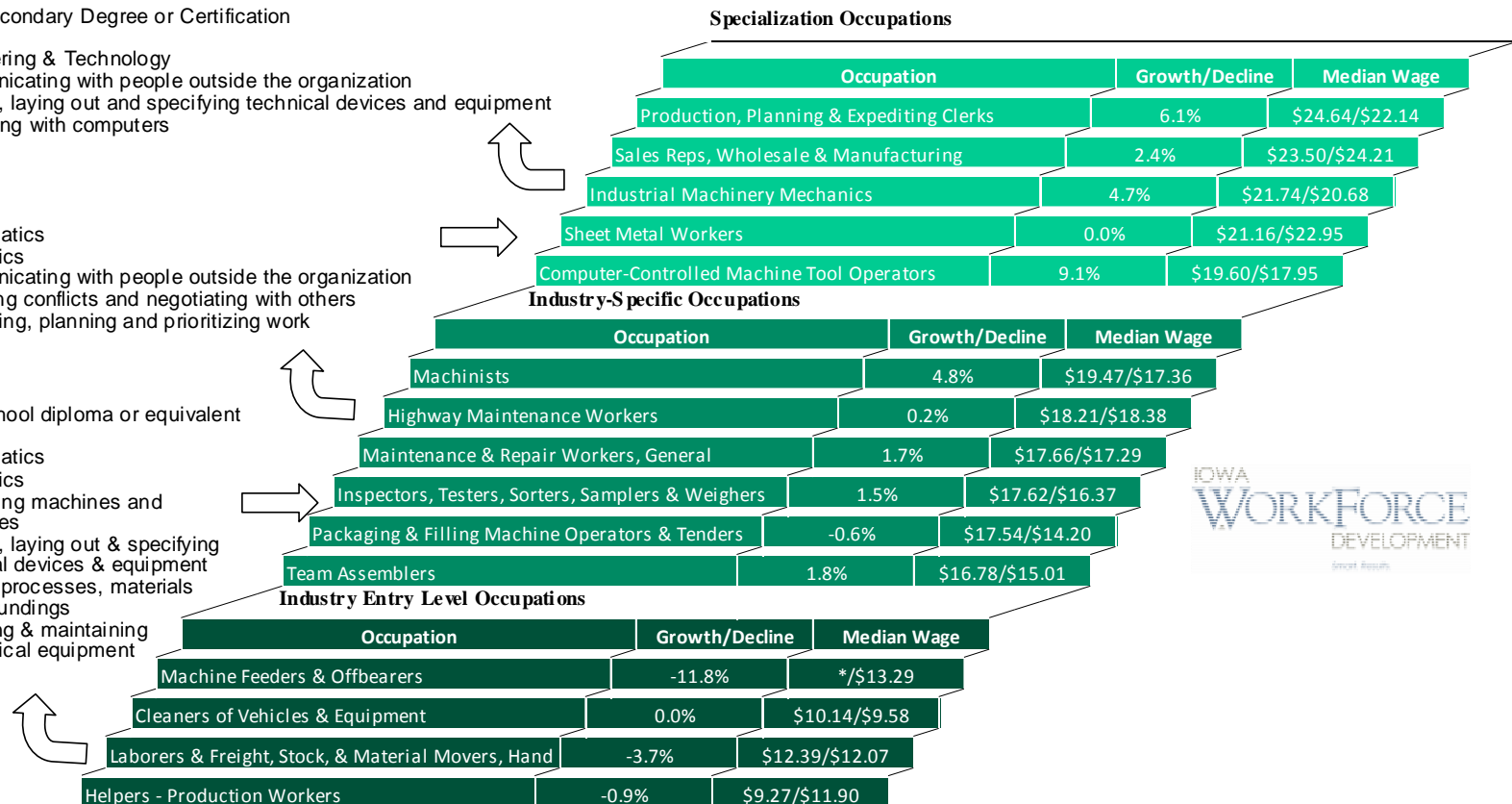
Target Occupations	2012-2016 Projected Employment Growth	2012 Regional/Statewide Median Wage
Industrial Production Managers	-0.9%	\$45.29/\$38.38
Civil Engineers	23.5%	\$36.82/\$36.19
Mechanical Engineers	7.8%	\$36.01/\$35.57
Industrial Engineers	9.4%	\$33.54/\$32.90
Mechanical Drafters	0.6%	*/\$20.94

Education and Skills Needed for Advancement to Next Level

- Post-Secondary Degree or Certification
- Design
- Engineering & Technology
- Communicating with people outside the organization
- Drafting, laying out and specifying technical devices and equipment
- Interacting with computers

- Mathematics
- Mechanics
- Communicating with people outside the organization
- Resolving conflicts and negotiating with others
- Organizing, planning and prioritizing work

- High school diploma or equivalent
- Design
- Mathematics
- Mechanics
- Controlling machines and processes
- Drafting, laying out & specifying technical devices & equipment
- Monitor processes, materials or surroundings
- Repairing & maintaining mechanical equipment



Wage data is from the 2010-2020 Iowa Occupational Projections published by Iowa Workforce Development. An asterisk indicates no data available for the region or state. Projected employment growth is provided by EMSI Complete Employment and estimated for the years 2012 to 2016.

Clusters Employment and Staffing Patterns

Table 38 shows overlapping skills and education between the entry-level jobs within the cluster and target jobs at the higher end of the career ladder. The table also includes skills and education where additional training may be required to perform the targeted jobs. The most commonly shared skills across jobs in the cluster are making decisions and problem solving and production and processing. The most common areas where additional skills or education training are needed are in engineering and technology and interacting with computers. The analysis of skills between two jobs within the cluster is important on an individual-level to assess needs for progress up the career ladder. For a regional analysis, a comparison between the skills possessed by the general population and those skills most needed within the cluster is more useful.

Table 38 – Overlapping Skills & Education, Related Occupations

Related Occupations		Median Wages	Overlapping Skills and Education	Required Areas for Improvement	
Advanced Manufacturing	Emerging Occupation: Mechanical Engineers		\$ 36.01		
	Career Pathways	Industrial Machinery Mechanics	\$ 21.74	Monitoring Processes, Materials, or Surroundings; Mechanics; Drafting	Making Decisions & Problem Solving; Engineering & Technology; Interacting with Computers
		Machinists	\$ 19.47	Production & Processing; Computers & Electronics	Design; Communicating with Persons Outside the Organization; Interacting with Computers
		Machine Feeders and Offbearers	\$ 13.29	Mathematics; Monitoring Processes, Materials, or Surroundings	Communicating with Persons Outside the Organization; Physics; Administration & Management
	Emerging Occupation: Mechanical Drafters		\$ 20.94		
	Career Pathways	Computer-Controlled Machine Tool Operators	\$ 19.60	Mathematics; Making Decisions & Problem Solving; Computers & Electronics	Design; Building & Construction; Processing Information
		Packaging and Filling Machine Operators and Tenders	\$ 17.54	Establishing and Maintaining Relationships; Customer Service	Design; Building & Construction; Interacting with Computers
Helpers - Production Workers		\$ 9.27	Making Decisions & Problem Solving; Organizing, Planning, and Prioritizing Work	Design; Engineering & Technology; Documenting and Recording Information	

*Skills data available through O*Net (www.onetcenter.org)*

Clusters Employment and Staffing Patterns

Table 39 shows those attributes important to the occupations within the advanced manufacturing cluster. The table compares the average level attained by the region’s workforce, in aggregate, against the level generally required by occupations within the cluster. A positive gap, as in communicating with people inside the organization above, describes an attribute where the population in general has the required level of skill to meet the needs of occupations within the cluster. A negative gap, as with the attribute of controlling machines and processes, describes an attribute where more training may be necessary for the workforce to meet the needs of the cluster. Often, the attributes where the highest gap is measured are technically required for occupations within the cluster. For advanced manufacturing, those attributes in which additional training may be required are controlling machines and processes, engineering and technology, design, production and processing, and mathematics.

Table 39 – Critical Skill & Knowledge Needs

Critical Skill & Knowledge Needs	Population Cluster	Average Level Needed	Gap
Communicating with People Inside the Organization	3.93	3.77	0.16
Getting Information	3.35	3.26	0.09
Making Decisions & Problem Solving	3.47	3.62	-0.15
Mathematics	2.95	3.50	-0.55
Production & Processing	2.21	3.15	-0.94
Design	1.49	2.91	-1.42
Engineering & Technology	1.54	2.99	-1.45
Controlling Machines & Processes	2.13	4.19	-2.06
<i>Average Critical Variables</i>	2.63	3.42	
<i>Average all Variables</i>	2.55	2.29	
<i>Average Knowledge Variables</i>	2.05	3.14	
<i>Average Work Activity Variables</i>	3.22	3.71	

Table 40 – Skills Gap across Six Targeted Industry Clusters

Critical Skill & Knowledge Needs	Advanced Manufacturing	Financial and Customer Service	Food Ingredients	Industrial Biotechnology	Medical Devices and Services	Software and Information Technology
Chemistry	-	-	-	Yes	-	-
Clerical	-	Yes	-	-	-	-
Communicating with People Inside the Organization	-	-	-	-	-	-
Computers & Electronics	-	-	-	-	-	Yes
Controlling Machines & Processes	Yes	-	-	-	Yes	-
Customer & Personal Service	-	-	-	-	-	-
Design	Yes	-	-	-	-	-
Engineering & Technology	Yes	-	-	-	-	-
English Language	-	Yes	-	-	-	-
Establishing and Maintaining Interpersonal Relationships	-	-	-	-	-	-
Getting Information	-	-	-	-	-	Yes
Inspecting Equipment, Structures or Materials	-	-	-	Yes	-	-
Interacting with Computers	-	Yes	-	-	-	Yes
Making Decisions & Problem Solving	-	Yes	-	Yes	Yes	Yes
Mathematics	Yes	Yes	-	-	-	Yes
Mechanics	-	-	Yes	Yes	-	-
Organizing and Prioritizing Work	-	-	-	-	-	-
Processing Information	-	Yes	-	-	-	-
Production & Processing	Yes	-	Yes	Yes	Yes	-
Telecommunications	-	-	-	-	-	Yes
Updating Relevant Knowledge	-	-	-	-	-	Yes

Common Skills and Experience Needed

Table 40, above, shows the skills and educational areas where workforce training may be needed to satisfy the demands of each cluster. While individual workers will need to assess their own level of skills to determine specific training needs, it can be helpful to look at needs on a regional basis to better allocate resources where the most training may be needed. The most common skills or experience where additional training may be needed to fulfill the needs of employers across the six industries are: interacting with computers, making decisions and problem solving, mathematics, and production and processing.

Just as it is helpful to detail the areas in which the region's workforce may need additional training, it can also be beneficial to determine those skills or educational areas in which the region's workforce is particularly adept. The most common skills or experience possessed that satisfy the needs of employers across the six industries are: communicating with people inside the organization, getting information, and customer and personal service.

Identifying those skills and knowledge areas that are important to multiple industries across the region can be an effective and efficient way to target training programs. As an important skill or knowledge area, the region may want to schedule opportunities for workers to regularly update their ability in these attributes whether the current workforce is able to satisfy the required level of skill in these areas or not. This will help ensure that the region's workforce remains competitive within the industries targeted for growth. The most common skills or knowledge required across industries are: making decisions and problem solving (6 industries), mathematics (5 industries), getting information (5 industries), and production and processing (5 industries).

Common Occupations across Industry Clusters

The most common occupations across industry clusters are typically those with administrative functions needed in any company. These include jobs like accountants and auditors, bookkeeping clerks, business operations specialists, customer service representatives, administrative assistants, supervisors of office and administrative support workers, and office clerks.

Other occupations common to the six industry clusters are more specific to the region's targeted sectors. These include maintenance and repair workers, market research analysts, stock clerks and order fillers, supervisors of production and operating workers, and computer software engineers.

IV. Cross-Industry Clusters Staffing Patterns

There are 77 industries that are in one or more of the 13 clusters. The total employment of all of these industries is estimated at just over 47,000 in 2012. This employment is divided between 538 different occupations. Figure 26 shows that 22.0 percent of the estimated employment is in production occupations. Over 18 percent of the estimated employment is in office and administrative support occupations. The computer and mathematical occupational group is the only other group with over 10 percent of the aggregate employments

Figure 32 – Cross-Cluster Employment by Occupational Group

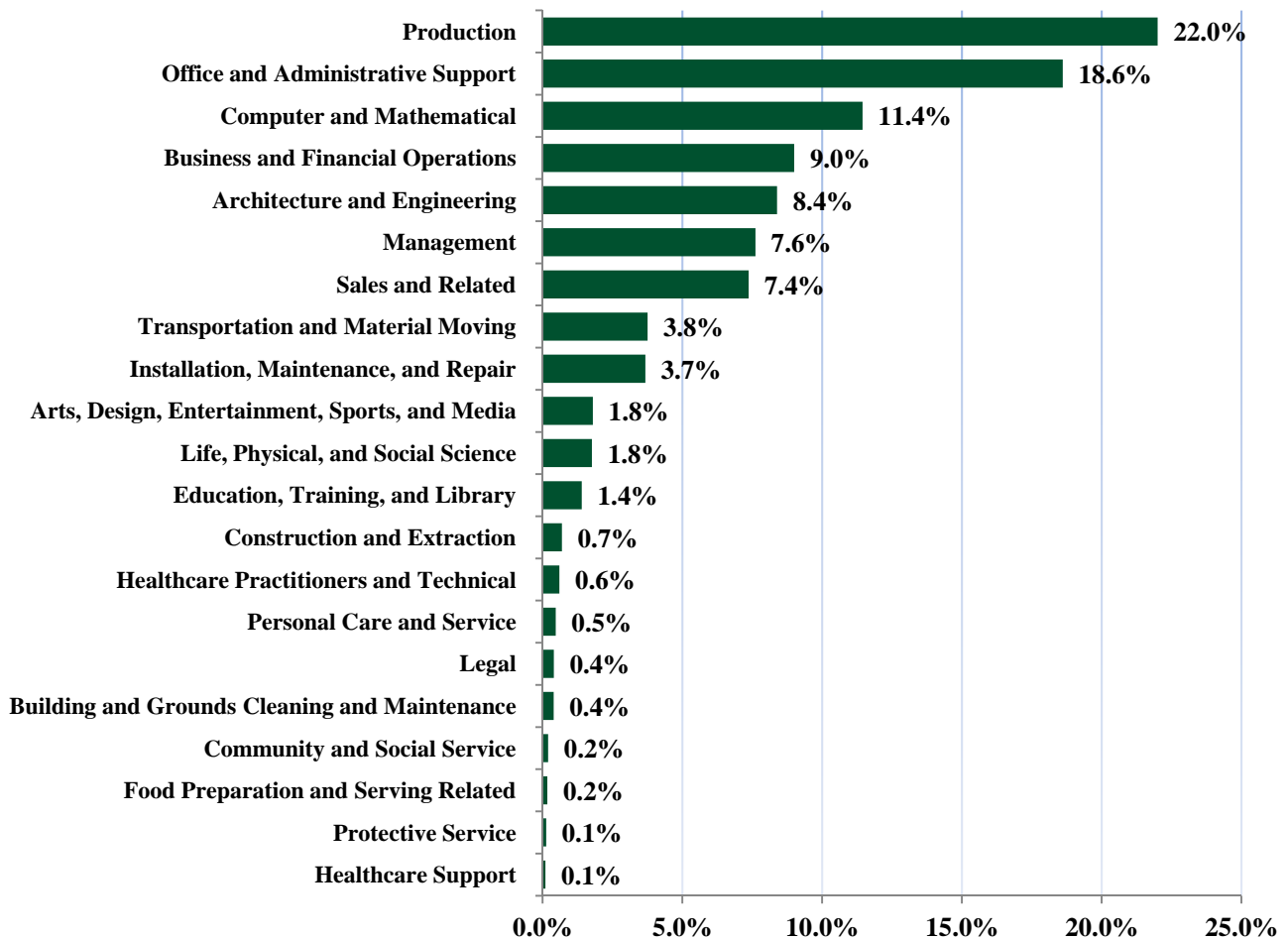


Table 41 lists all of the occupations which have an estimated employment level of 100 or more in 2012; which is 102 occupations. There are five occupations that have employment levels of 1,000 or higher. Two of those occupations are in the computer and mathematical occupational group, one is a production occupation, one is in the office and administrative support occupational group and one is in the sales occupational groups.

Clusters Employment and Staffing Patterns

Table 41 – Occupations with Employment of 100 or Higher

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16
43-4051	Customer Service Representatives	2,716	2,828	112	4.1%
51-2092	Team Assemblers	2,299	2,341	42	1.8%
15-1031	Computer Software Engineers, Applications	1,571	1,731	160	10.2%
15-1032	Computer Software Engineers, Systems Software	1,084	1,142	58	5.4%
41-9041	Telemarketers	1,003	771	-232	-23.1%
13-1111	Management Analysts	942	1,041	99	10.5%
43-9061	Office Clerks, General	877	960	83	9.5%
51-9111	Packaging and Filling Machine Operators and Tenders	708	704	-4	-0.6%
17-2071	Electrical Engineers	685	702	17	2.5%
51-1011	First-Line Supervisors/Managers of Production and Operating Workers	656	657	1	0.2%
13-1199	Business Operations Specialists, All Other	620	673	53	8.5%
17-3023	Electrical and Electronic Engineering Technicians	589	598	9	1.5%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	556	586	30	5.4%
13-2011	Accountants and Auditors	527	566	39	7.4%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	517	525	8	1.5%
41-3021	Insurance Sales Agents	514	563	49	9.5%
43-6011	Executive Secretaries and Administrative Assistants	512	555	43	8.4%
15-1051	Computer Systems Analysts	508	579	71	14.0%
15-1021	Computer Programmers	495	490	-5	-1.0%
53-7051	Industrial Truck and Tractor Operators	489	485	-4	-0.8%
43-5061	Production, Planning, and Expediting Clerks	489	519	30	6.1%
51-4041	Machinists	479	502	23	4.8%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	476	483	7	1.5%
11-9199	Managers, All Other	460	495	35	7.6%
11-1021	General and Operations Managers	456	477	21	4.6%
17-2112	Industrial Engineers	456	499	43	9.4%
15-1041	Computer Support Specialists	449	499	50	11.1%
11-3021	Computer and Information Systems Managers	430	473	43	10.0%
49-9041	Industrial Machinery Mechanics	428	448	20	4.7%
11-3051	Industrial Production Managers	422	418	-4	-0.9%
49-9042	Maintenance and Repair Workers, General	414	421	7	1.7%
51-3092	Food Batchmakers	413	426	13	3.1%
43-1011	First-Line Supervisors/Managers of Office and Administrative Support Workers	408	436	28	6.9%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	404	389	-15	-3.7%
11-9041	Engineering Managers	389	403	14	3.6%
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	377	386	9	2.4%
51-4121	Welders, Cutters, Solderers, and Brazers	355	354	-1	-0.3%
17-2141	Mechanical Engineers	348	375	27	7.8%
43-6014	Secretaries, Except Legal, Medical, and Executive	338	358	20	5.9%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	333	356	23	6.9%
41-3099	Sales Representatives, Services, All Other	306	329	23	7.5%
15-1071	Network and Computer Systems Administrators	306	359	53	17.3%
11-3031	Financial Managers	294	312	18	6.1%

Clusters Employment and Staffing Patterns

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16
19-3021	Market Research Analysts	262	285	23	8.8%
43-5071	Shipping, Receiving, and Traffic Clerks	251	245	-6	-2.4%
43-9041	Insurance Claims and Policy Processing Clerks	245	277	32	13.1%
51-9199	Production Workers, All Other	234	232	-2	-0.9%
13-1031	Claims Adjusters, Examiners, and Investigators	232	264	32	13.8%
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	227	246	19	8.4%
15-1081	Network Systems and Data Communications Analysts	227	268	41	18.1%
53-7064	Packers and Packagers, Hand	219	211	-8	-3.7%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	217	208	-9	-4.1%
13-1073	Training and Development Specialists	212	235	23	10.8%
51-9198	Helpers--Production Workers	211	209	-2	-0.9%
43-5081	Stock Clerks and Order Fillers	210	213	3	1.4%
51-9196	Paper Goods Machine Setters, Operators, and Tenders	209	191	-18	-8.6%
13-2053	Insurance Underwriters	209	224	15	7.2%
51-2022	Electrical and Electronic Equipment Assemblers	202	216	14	6.9%
13-2051	Financial Analysts	189	210	21	11.1%
43-4151	Order Clerks	182	151	-31	-17.0%
51-2099	Assemblers and Fabricators, All Other	180	184	4	2.2%
27-1024	Graphic Designers	169	189	20	11.8%
25-3099	Teachers and Instructors, All Other	165	199	34	20.6%
11-2021	Marketing Managers	164	175	11	6.7%
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	164	179	15	9.1%
15-1099	Computer Specialists, All Other	164	172	8	4.9%
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	162	144	-18	-11.1%
43-9021	Data Entry Keyers	161	181	20	12.4%
11-2022	Sales Managers	160	177	17	10.6%
27-3041	Editors	158	177	19	12.0%
17-3013	Mechanical Drafters	155	156	1	0.6%
51-9021	Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	152	150	-2	-1.3%
51-3023	Slaughterers and Meat Packers	151	150	-1	-0.7%
49-9051	Electrical Power-Line Installers and Repairers	148	157	9	6.1%
11-3011	Administrative Services Managers	147	155	8	5.4%
39-9011	Child Care Workers	147	190	43	29.3%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	146	145	-1	-0.7%
53-3032	Truck Drivers, Heavy and Tractor-Trailer	145	141	-4	-2.8%
51-4199	Metal Workers and Plastic Workers, All Other	144	141	-3	-2.1%
17-2061	Computer Hardware Engineers	140	141	1	0.7%
51-2041	Structural Metal Fabricators and Fitters	136	134	-2	-1.5%
41-1012	First-Line Supervisors/Managers of Non-Retail Sales Workers	135	140	5	3.7%
43-3021	Billing and Posting Clerks and Machine Operators	133	144	11	8.3%
17-2011	Aerospace Engineers	133	142	9	6.8%
17-2051	Civil Engineers	132	163	31	23.5%
11-1011	Chief Executives	131	136	5	3.8%

Clusters Employment and Staffing Patterns

SOC Code	Description	2012 Emp.	2016 Emp.	Change '12-'16	% Change '12-'16
51-9011	Chemical Equipment Operators and Tenders	130	129	-1	-0.8%
13-1072	Compensation, Benefits, and Job Analysis Specialists	129	139	10	7.8%
25-3021	Self-Enrichment Education Teachers	128	159	31	24.2%
43-4171	Receptionists and Information Clerks	127	137	10	7.9%
51-5023	Printing Machine Operators	127	125	-2	-1.6%
29-1111	Registered Nurses	126	140	14	11.1%
43-9011	Computer Operators	119	125	6	5.0%
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	119	115	-4	-3.4%
27-3042	Technical Writers	118	126	8	6.8%
13-1079	Human Resources, Training, and Labor Relations Specialists, All Other	115	123	8	7.0%
51-9121	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	111	112	1	0.9%
43-2011	Switchboard Operators, Including Answering Service	108	90	-18	-16.7%
51-8013	Power Plant Operators	105	123	18	17.1%
25-9031	Instructional Coordinators	102	138	36	35.3%
27-3031	Public Relations Specialists	102	114	12	11.8%
51-4021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	100	102	2	2.0%

(Source: EMSI)

Table 42 lists the 102 occupations that have an estimated employment of 100 or more in 2012 and identifies with an “X” whether the employment level in a cluster is 10 or more jobs. As an example, all 13 clusters had employment levels of 10 or higher for the customer service representative occupation, SOC 43-4051.

Table 42 - Occupations with Employment of 100 or Higher by Cluster

SOC Code	2012 Emp.	Educational Testing and Support Services	Consumer Products - Durable Goods	Consumer Products - Non-Durable Goods	Food and Food Ingredients	Industrial Biotechnology	Financial Services and Customer Services	Electronics Engineering and Manufacturing	Software and Information Technology Development/Computer Modeling and Simulation	Energy Generation and Distribution	Renewable Energy and Sustainable Technology Products - Wind Manufacturing	Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing	Medical Devices and Services	Production Advanced Manufacturing
43-4051	2,716	X	X	X	X	X	X	X	X	X	X	X	X	X
51-2092	2,299	X	X	X	X	X		X	X		X	X	X	X
15-1031	1,571	X		X	X	X	X	X	X	X	X	X	X	X
15-1032	1,084	X					X	X	X	X	X	X	X	X
41-9041	1,003	X	X				X	X	X		X	X		X
13-1111	942	X	X				X	X	X			X	X	X
43-9061	877	X	X	X	X	X	X	X	X	X	X	X	X	X
51-9111	708	X	X	X	X	X	X	X	X	X	X	X	X	X
17-2071	685	X	X	X	X	X	X	X	X	X	X	X	X	X
51-1011	656	X	X	X	X	X	X	X	X	X	X	X	X	X
13-1199	620	X	X	X	X	X	X	X	X	X	X	X	X	X
17-3023	589	X		X			X	X	X	X	X	X	X	X
43-3031	556	X	X	X	X	X	X	X	X	X	X	X	X	X
13-2011	527	X	X	X	X	X	X	X	X	X	X	X	X	X
41-4012	517	X	X	X	X	X	X	X	X	X	X	X	X	X
41-3021	514	X					X		X					
43-6011	512	X	X	X	X	X	X	X	X	X	X	X	X	X
15-1051	508	X			X	X	X	X	X	X	X	X	X	X
15-1021	495	X			X	X	X	X	X	X			X	X
43-5061	489	X	X	X	X	X	X	X	X	X	X	X		X
53-7051	489		X	X	X	X	X	X			X	X	X	X
51-4041	479		X	X		X	X	X			X	X	X	X

Clusters Employment and Staffing Patterns

SOC Code	2012 Emp.	Educational Testing and Support Services	Consumer Products - Durable Goods	Consumer Products - Non-Durable Goods	Food and Food Ingredients	Industrial Biotechnology	Financial Services and Customer Services	Electronics Engineering and Manufacturing	Software and Information Technology Development/Computer Modeling and Simulation	Energy Generation and Distribution	Renewable Energy and Sustainable Technology Products - Wind Manufacturing	Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing	Medical Devices and Services	Production Advanced Manufacturing
51-9061	476	X	X	X	X	X	X	X	X	X	X	X	X	X
11-9199	460	X	X	X	X	X	X	X	X	X	X	X	X	X
17-2112	456	X	X	X	X	X	X	X	X		X	X	X	X
11-1021	456	X	X	X	X	X	X	X	X			X	X	X
15-1041	449	X	X	X	X	X	X	X	X		X	X		X
11-3021	430	X		X	X	X	X	X	X	X	X		X	X
49-9041	428		X	X	X	X		X	X	X	X	X	X	X
11-3051	422	X	X	X	X	X	X	X	X	X	X	X	X	X
49-9042	414	X	X	X	X	X	X	X	X	X	X	X	X	X
51-3092	413				X	X		X	X					
43-1011	408	X	X	X	X	X	X	X	X		X	X	X	X
53-7062	404	X	X	X	X	X	X	X	X		X	X	X	X
11-9041	389	X	X		X	X	X	X	X	X	X	X	X	X
41-4011	377	X	X	X		X	X	X	X	X	X	X	X	X
51-4121	355		X	X				X			X	X		X
17-2141	348	X	X	X			X	X	X		X			X
43-6014	338	X	X	X	X	X	X	X	X	X	X	X	X	X
51-9023	333			X	X	X			X				X	X
15-1071	306	X	X	X	X	X	X	X	X	X	X	X	X	X
41-3099	306	X	X	X			X	X	X	X	X	X	X	X
11-3031	294	X	X	X	X	X	X	X	X	X	X	X	X	X
19-3021	262	X	X	X	X	X	X	X	X	X	X	X	X	X
43-5071	251	X	X	X	X	X	X	X	X		X	X	X	X
43-9041	245	X					X	X	X					

Clusters Employment and Staffing Patterns

SOC Code	2012 Emp.	Educational Testing and Support Services	Consumer Products - Durable Goods	Consumer Products - Non-Durable Goods	Food and Food Ingredients	Industrial Biotechnology	Financial Services and Customer Services	Electronics Engineering and Manufacturing	Software and Information Technology Development/Computer Modeling and Simulation	Energy Generation and Distribution	Renewable Energy and Sustainable Technology Products - Wind Manufacturing	Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing	Medical Devices and Services	Production Advanced Manufacturing
51-9199	234		X	X	X	X	X	X	X		X	X	X	X
13-1031	232						X							
13-1023	227	X	X	X	X	X	X	X	X		X	X	X	X
15-1081	227	X	X				X	X	X		X	X		X
53-7064	219	X	X	X	X	X	X	X	X		X	X	X	X
51-4031	217		X	X				X			X	X		X
13-1073	212	X	X	X	X	X	X	X	X	X	X	X	X	X
51-9198	211	X	X	X	X	X	X	X	X		X	X	X	X
43-5081	210	X	X	X	X	X	X	X	X		X	X	X	X
51-9196	209	X		X	X	X	X	X				X	X	X
13-2053	209	X					X	X	X					
51-2022	202		X								X	X		X
13-2051	189	X		X	X	X	X	X	X		X	X	X	X
43-4151	182	X	X	X	X	X	X	X	X	X	X	X	X	X
51-2099	180		X	X				X	X		X			X
27-1024	169	X	X	X			X	X	X	X		X		X
25-3099	165	X					X	X	X	X				
51-4011	164		X	X	X	X		X			X	X		X
11-2021	164	X		X		X	X	X	X					X
15-1099	164	X					X	X	X				X	
51-4072	162		X	X				X	X		X	X	X	X
43-9021	161	X					X	X	X		X	X		
11-2022	160	X	X	X	X	X	X	X	X		X	X	X	X
27-3041	158	X					X	X	X			X	X	

Clusters Employment and Staffing Patterns

SOC Code	2012 Emp.	Educational Testing and Support Services	Consumer Products - Durable Goods	Consumer Products - Non-Durable Goods	Food and Food Ingredients	Industrial Biotechnology	Financial Services and Customer Services	Electronics Engineering and Manufacturing	Software and Information Technology Development/Computer Modeling and Simulation	Energy Generation and Distribution	Renewable Energy and Sustainable Technology Products - Wind Manufacturing	Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing	Medical Devices and Services	Production Advanced Manufacturing
17-3013	155	X	X	X				X	X	X	X	X	X	X
51-9021	152			X	X	X								X
51-3023	151				X	X								
49-9051	148	X					X	X	X	X				
11-3011	147	X		X	X	X	X	X	X	X	X			X
39-9011	147	X		X	X		X							
37-2011	146	X	X	X	X	X	X	X	X	X	X	X	X	X
53-3032	145		X	X	X	X	X	X	X	X	X	X	X	X
51-4199	144		X	X							X			X
17-2061	140	X					X	X	X	X				
51-2041	136		X					X			X			X
41-1012	135	X	X		X	X	X	X	X		X	X	X	X
43-3021	133	X	X	X	X	X	X	X	X	X	X	X		X
17-2011	133							X						
17-2051	132	X					X	X	X	X	X	X		X
11-1011	131	X	X	X	X	X	X	X	X			X	X	X
51-9011	130				X	X		X			X			X
13-1072	129	X			X	X	X	X	X	X	X			X
25-3021	128	X					X		X					
43-4171	127	X	X	X	X	X	X	X	X	X	X	X	X	X
51-5023	127	X	X	X			X	X	X		X	X		X
29-1111	126	X	X	X	X	X	X	X	X	X		X	X	X
43-9011	119	X			X	X	X	X	X	X				
51-4033	119		X	X				X			X	X		X

Clusters Employment and Staffing Patterns

SOC Code	2012 Emp.	Educational Testing and Support Services	Consumer Products - Durable Goods	Consumer Products - Non-Durable Goods	Food and Food Ingredients	Industrial Biotechnology	Financial Services and Customer Services	Electronics Engineering and Manufacturing	Software and Information Technology Development/Computer Modeling and Simulation	Energy Generation and Distribution	Renewable Energy and Sustainable Technology Products - Wind Manufacturing	Renewable Energy and Sustainable Technology Products - Solar Components Manufacturing	Medical Devices and Services	Production Advanced Manufacturing
27-3042	118	X		X			X	X	X		X	X	X	X
13-1079	115	X	X	X	X	X	X	X	X	X	X	X		X
51-9121	111		X	X	X	X		X			X	X	X	X
43-2011	108	X					X							
51-8013	105			X						X	X			X
27-3031	102	X	X	X	X	X	X	X	X	X	X	X	X	X
25-9031	102	X					X	X	X				X	
51-4021	100			X		X		X			X	X		X

(Source: EMSI)

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