

CMAP




Manufacturing in the Golden Corridor

Golden Corridor Advanced Manufacturing Partnership



January 2014

The background of the page is a vibrant yellow. It features several large, stylized gears in various shades of yellow and orange, some overlapping. A network of thin, bright yellow lines crisscrosses the page, resembling a circuit board or a technical diagram. The overall aesthetic is industrial and modern.

This report was prepared for the Golden Corridor Advanced Manufacturing Group by the Chicago Metropolitan Agency for Planning (CMAP) with support from the Chicago Jobs Council (CJC).

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Introduction

Beginning just west of O'Hare International Airport, the Golden Corridor runs along the stretch of Interstate 90 from Bensenville to Elgin and has become home to some of the world's most innovative manufacturers. Many local advantages, including proximity to an unrivaled transportation network and world-renowned universities and research labs, have made the Golden Corridor an ideal location for manufacturers. Manufacturing is the largest segment of the Golden Corridor's economy and provides many local, regional, and national economic benefits. Technology and process innovations have helped manufacturers become more efficient and competitive, an important strength as nations across the world compete for industry. This new era of manufacturing depends on a supply of quality and skilled workers. Manufacturers have struggled to recruit future workers and the impacts of this will likely worsen as a large segment of the current manufacturing workforce is approaching retirement age. To address this problem, a group of employers, education institutions, local government, training providers, and other stakeholders known as the Golden Corridor Advanced Manufacturing Partnership (GCAMP) have prioritized their resources towards strategies to bolster the manufacturing workforce.

This existing conditions report is a planning document created for the GCAMP to guide their work. The goal is to provide a thorough understanding of the leading manufacturing industries, manufacturing jobs, and the training, education, and other workforce development resources already present. With this information, the GCAMP will be able to target their efforts, strengthen existing linkages between education, training providers, and employers, and create new and innovative strategies to fill gaps.

Brief History of the Golden Corridor

In 1986, the Illinois General Assembly passed the Corridors of Opportunity and Development Act. Envisioned as the marketing arm of the state capital program, Build Illinois, it was intended to stimulate economic growth throughout the state in various industries, such as automobile, manufacturing, high technology, agriculture, and tourism. Under Governor James Thompson, the program focused on attracting business. Later, under Governor Jim Edgar, the focus shifted to business retention.

The Golden Corridor Council (GCC) was one of several corridor councils established. It was originally chaired by Ed Kelly, then executive vice president of the Elgin Area Chamber of Commerce. The group published a newsletter ("Opportunity"), conducted business surveys, organized tours for developers, and sponsored business-oriented seminars on topics such as workplace diversity, transportation and health-care costs. More importantly, as Kelly put it in a statement to the Chicago Tribune, the group "built up a dialogue for regional cooperation, from Elgin to O'Hare International Airport, to get towns to work together on common problems and to come up with solutions."

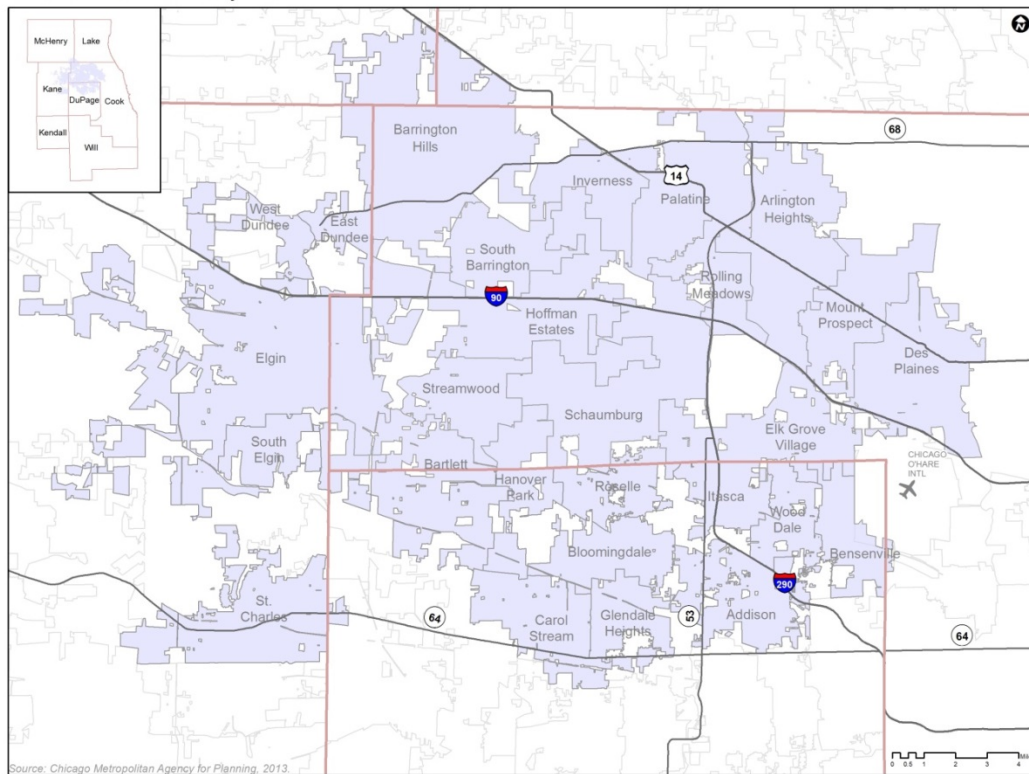


Six years later, amid a fiscal crisis, the program was eliminated from the state’s budget, and funding to the GCC as well as other councils was cut off. Having lost \$30,000 in state funding—roughly half its budget—the GCC could no longer operate. Kelly was quoted in the Chicago Tribune as saying, “I’m very sad about it. The Golden Corridor is a household word. It made its mark as a concept people can identify with.”

Though the Council disbanded, the interest in collaboration, as well as the Golden Corridor’s identity and reputation as a place of growth, innovation, and entrepreneurship in the manufacturing sector remained. In recent years, there has been renewed interest in organizing and mobilizing the municipalities, businesses, schools, and other institutions in the Golden Corridor. A new partnership of companies and organizations called the Golden Corridor Advanced Manufacturing Group was formed in 2009. The group focuses on sparking interest in manufacturing careers, changing negative perceptions of the sector, and linking businesses to the skilled labor force they need. They meet on a quarterly basis and hold events, such as open houses connecting students to employers and showcasing the opportunities for specialized and skilled positions in manufacturing.

The exact geographic area of the Golden Corridor is fairly fluid—instead of using political boundaries, the group has focused on where activity is concentrated and used highway boundaries to define the geography. For the purposes of data analysis, boundaries were required; the following map shows study area:

Golden Corridor Study Area



Profile of Golden Corridor Workers and Residents

According to the 2010 U.S. Census, the Golden Corridor has a population of 944,500. The Golden Corridor residents are mostly white (63 percent), however a significant group is Hispanic or Latino (20.1 percent), and a smaller but also sizeable group is Asian (11.5 percent). The African-American population is quite small, at 3.5 percent. In terms of age, the Golden Corridor's population is evenly spread out across age cohorts and has a median age of 39. According to the 2007-11 American Community Survey, the median household income is \$79,021.

Most Golden Corridor residents who are 25 years and over have a high school diploma or higher (88.5 percent), and about a third (36.5 percent) have a Bachelor's degree or higher—these percentages closely mirror region wide education levels. While a significant percentage (28 percent) of Golden Corridor residents 16 years and over are not in the labor force, the unemployment rate among those in the labor force is 6.8 percent, lower than the region's unemployment rate of 9.8 percent. The top industries in the Golden Corridor are Manufacturing, Health Care and Social Assistance, and Retail Trade, which respectively employ 11.6 percent, 11.2 percent, and 10.7 percent of residents.

Commuting data shows that the number one employment location for Golden Corridor residents is Chicago, which accounts for 14 percent of all work destinations. The other top nine employment locations are within the Golden Corridor, and account for 30 percent of all work destinations. Commuting data for workers in the Golden Corridor follows similar patterns. Chicago is the number one residence location for Golden Corridor workers and the other top residence locations are in the Golden Corridor.

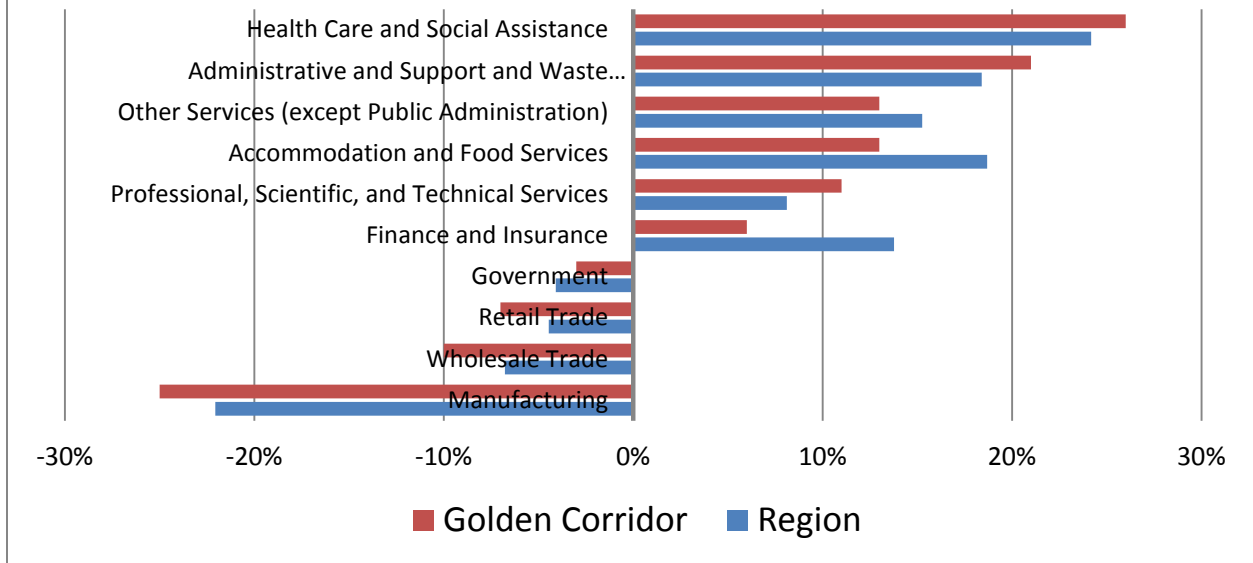
Regional Setting

Looking at the Golden Corridor's employment trends within a regional context clarifies the corridor's strengths. Comparing employment changes over the last decade shows that in most industries, employment increases were lower than regional growth, while declines in the corridor were greater than those regionally. Differences are particularly marked in Finance and Insurance, as well as Accommodation and Food Services. Important exceptions are Health Care and Social Assistance, and Administrative and Support and Waste Management and Remediation Services; these industries had the most growth of all industries in the corridor, but had a greater growth rate in the corridor than in the region.



Employment Changes 2002-12

Source: Economic Modeling Systems Inc.



Overall, manufacturing had the greatest employment decline in the region and the Golden Corridor, but as this report will examine in detail, manufacturing remains a great strength. An analysis of manufacturing sub-sectors shows the Golden Corridor specializes in certain manufacturing industries, for example, the corridor has a uniquely high concentration of Printing and Related Support Activities, Electrical Equipment, Appliance and Component, and Fabricated Metal Product manufacturing.



The Manufacturing Cluster

The Golden Corridor Group focuses on manufacturing industries specifically and that is the focus of this existing conditions report. However, a broader understanding of the industries that are critical to the growth of manufacturing allows for more proactive planning and a comprehensive approach. Therefore, to better understand manufacturing we include a brief description of not only production activities but also the region’s network of manufacturing suppliers, partners, investors, and customers—together these industries comprise the manufacturing *cluster*. This cluster approach reveals relationships between interdependent firms, calling attention to common resources and institutions while providing insights into the broader regional economy.

The region’s manufacturing cluster was defined in the Chicago Metropolitan Agency for Planning (CMAP) manufacturing drill-down report and consists of four components. Core industries transform materials into new products through mechanical, physical, or chemical processes. Support industries provide research and development (R&D) services to the core. Supply industries provide inputs necessary for production. Customer industries move goods through supply chains and into the market.

Manufacturing cluster components

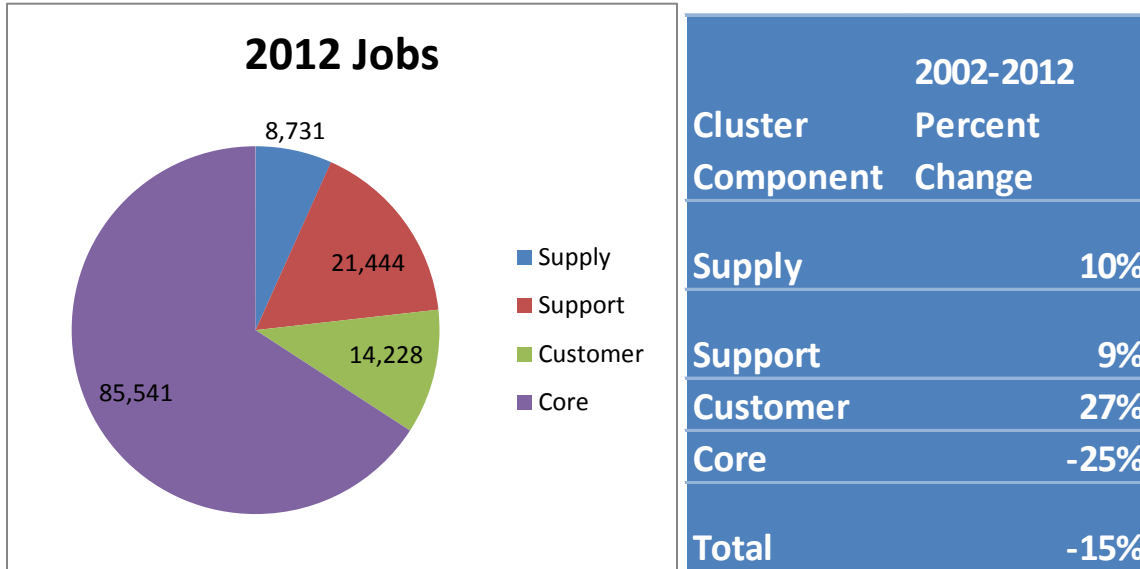


Source: Chicago Metropolitan Agency for Planning analysis.



According to Economic Modeling Systems Inc (EMSI), in 2012 there were nearly 130,000 jobs in the Golden Corridor’s manufacturing cluster, a 15 percent decrease from 2002 employment. Sixty-six percent of jobs are in the core (manufacturing), 16 percent in support industries, 11 percent in customer industries, and seven percent in the supply industries. Over the last decade, employment changes have varied greatly across each segment; customer industries grew by 27 percent while the core of the cluster shrank by 25 percent.

Employment in the Freight and Manufacturing Cluster

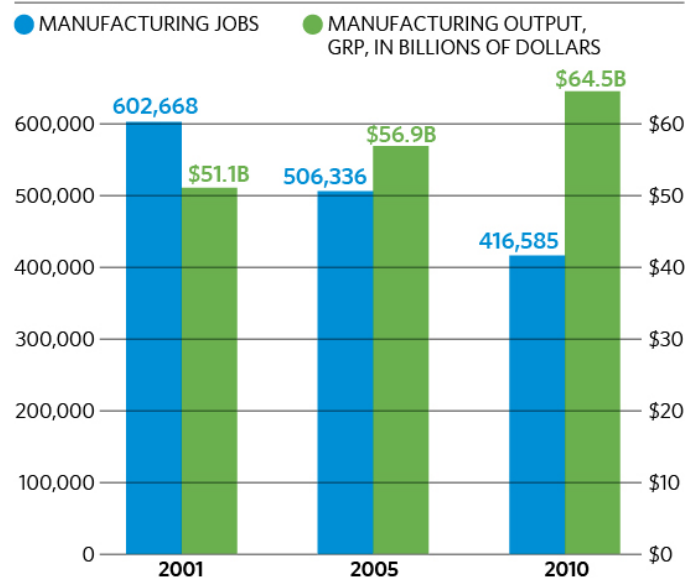


Source: Economic Modeling Systems Inc.

The Advanced Manufacturing Framework

As noted previously, while employment in manufacturing has declined significantly, productivity has increased. The next decade of manufacturing will look fundamentally different from the previous decade. After years of global sourcing, many manufacturers are realizing that production in developing countries can introduce imprudent risks when the marketplace requires greater customization and faster turnarounds between design and production. Moreover, the vulnerability of intellectual property and increasing cost of wages and

Core manufacturing productivity and employment change in the Chicago region, 2001-10



Note: Output measured in nominal dollars.
Source: Bureau of Economic Analysis, EMSI, CMAP analysis for the tri-state region.



energy, especially in China, are erasing some of the cost advantages of producing overseas. As a result, more manufacturers are reinvesting and expanding operations in the U.S., which creates significant opportunities for the economy of metropolitan Chicago.

While many agree that advanced manufacturing will be essential for success in the 21st century economy, few have defined or measured exactly what advanced manufacturing entails. Through an extensive review of national, state, and regional studies on advanced manufacturing as well as interviews with key stakeholders and business leaders, CMAP has developed a "3P approach" -- **Product, Process, and People** -- to define the following characteristics of advanced manufacturing:

- PRODUCT** Advanced manufacturing products are complex, innovative, and difficult to replicate.
- PROCESS** Advanced manufacturing processes (regardless of end product) are continually improved to achieve new efficiencies and cost savings.
- PEOPLE** Advanced manufacturing workers have specialized skills that maximize the commercial impact of these products and processes.

Using these 3P indicators, CMAP has created an Advanced Manufacturing Scorecard to rate the regional cluster's core industries. The Product indicator, based on work from the Brookings Institution, combines five metrics ranging from patent output to R&D intensity to show which industries are innovation leaders. The Process indicator uses the concept of "value added" to assess how much of a product's value comes from the manufacturing process instead of simply from raw materials or intermediate inputs. (A limitation of the Process indicator is that it may not capture all improvements achieved by lean manufacturers operating more as distributors and less as production firms.) Finally, the People indicator uses wages as a proxy for skills to show which industries demand high-skilled workers.

This framework is useful in understanding past trends and the potential future of specific manufacturing industries. This report examines specific manufacturing industries and this scorecard will be referred to in order to bolster the analysis and understanding of past trends the potential future.



Advanced Manufacturing Scorecard

RANK	PRODUCT	PROCESS	PEOPLE	OVERALL RANK
1	COMPUTER/ ELECTRONICS 	PHARMA/ MEDICAL SUPPLY 	PHARMA/ MEDICAL SUPPLY 	PHARMA/ MEDICAL SUPPLY 
2	PHARMA/ MEDICAL SUPPLY 	COMPUTER/ ELECTRONICS 	COMPUTER/ ELECTRONICS 	COMPUTER/ ELECTRONICS 
3	MACHINERY 	FABRICATED METAL 	PRIMARY (METAL, NONMETALIC, PETRO/COAL) 	MACHINERY 
4	CHEMICALS, PLASTICS, RUBBER 	PAPER, PRINTING 	MACHINERY 	CHEMICALS, PLASTICS, RUBBER 
5	PAPER, PRINTING 	FURNITURE, APPAREL, OTHER 	CHEMICALS, PLASTICS, RUBBER 	FABRICATED METAL 
6	FABRICATED METAL 	MACHINERY 	FABRICATED METAL 	PAPER, PRINTING 
7	FURNITURE, APPAREL, OTHER 	FOOD, BEVERAGE 	PAPER, PRINTING 	PRIMARY (METAL, NONMETALIC, PETRO/COAL) 
8	PRIMARY (METAL, NONMETALIC, PETRO/COAL) 	CHEMICALS, PLASTICS, RUBBER 	FOOD, BEVERAGE 	FURNITURE, APPAREL, OTHER 
9	FOOD, BEVERAGE 	PRIMARY (METAL, NONMETALIC, PETRO/COAL) 	FURNITURE, APPAREL, OTHER 	FOOD, BEVERAGE 

Source: CMAP analysis, 2012.

Analysis of manufacturing in the Golden Corridor and use of the advanced manufacturing framework helps identify opportunities for growth in the Golden Corridor. Additionally, while



the analysis focuses on manufacturing, using a cluster approach helps create effective and comprehensive strategies for growth. Significant changes in the global economy have made dramatic impacts on manufacturing and the industry will continue to evolve as the more modern manufacturing industries grow and the support, supply, and customer industries have an important role in this growth. For the Golden Corridor to continue to be a manufacturing center, employers, planners, education institutions, local government, and other stakeholders can use the advanced manufacturing and cluster framework to better recognize opportunities and needs.



The Golden Corridor Economy

With more than 85,000 employees, manufacturing is the Golden Corridor's largest industry but other industries have experienced notable employment gains over the last ten years. The second largest industry in the corridor, administrative and support and waste management and remediation services, has been growing after a steep drop between 2007-09, and it now employs approximately 70,000 people. In contrast to almost all other industries, which had at least a few years of decline in the last decade, health care and social assistance has demonstrated steady growth, and, as of 2012, was the third largest industry in the corridor, employing about 69,000 people.

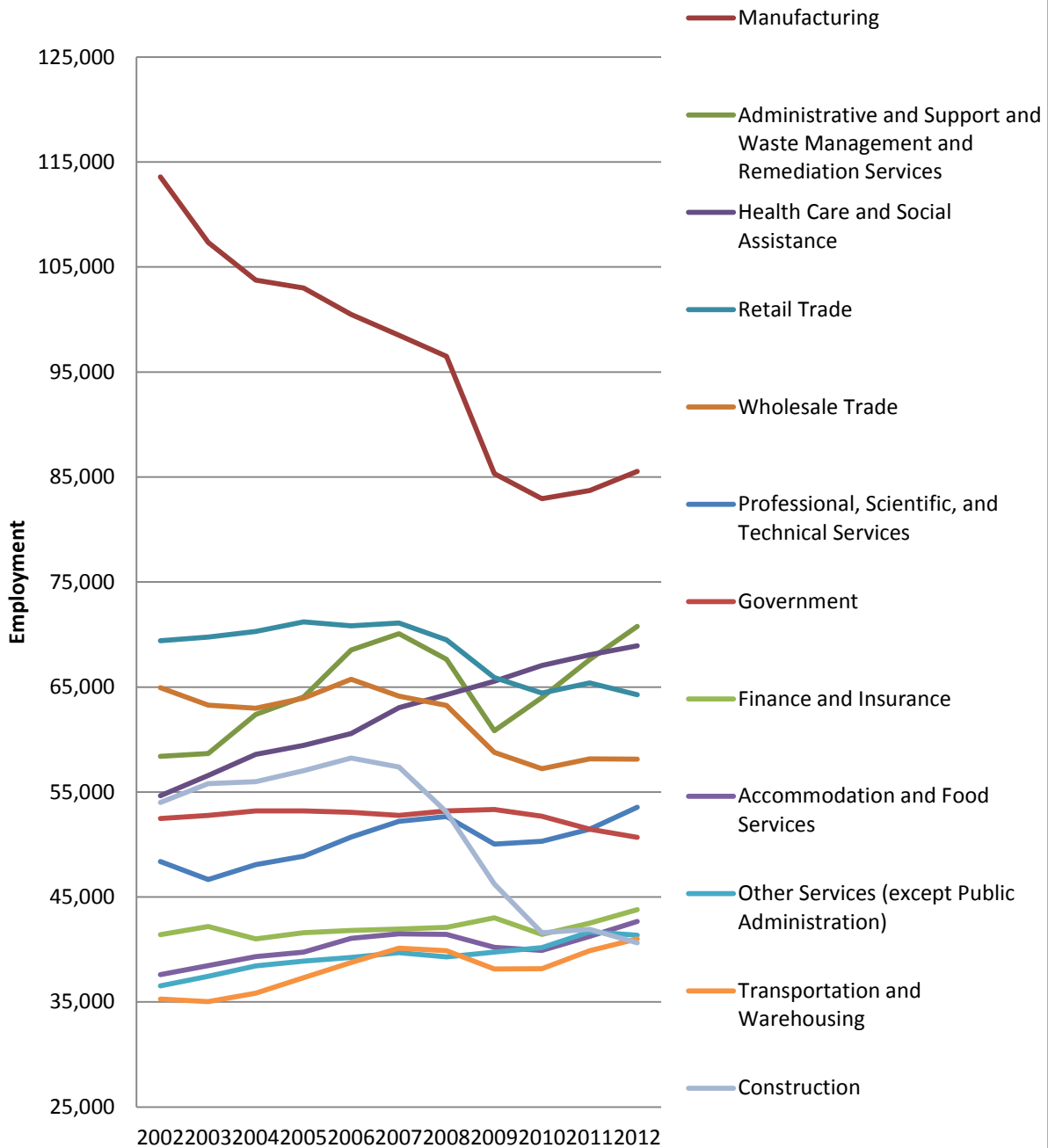
Though manufacturing continues to be the top employer by a notable margin, over the past ten years it has experienced significant decline in employment. In 2002, approximately 113,000 people worked in manufacturing and by 2012, about 28,000 manufacturing jobs were lost, representing a 25 percent decrease. This decline was not unique to the Golden Corridor—manufacturing in the seven county region declined by 22 percent and nationally by 20 percent. This drop in employment is in part due to the impacts of globalization and reorganization, but job loss was exacerbated by the most recent recession—job loss was greatest from 2008-09, with a 11.6 percent decrease. Job loss is also due to the shift towards more advanced manufacturing which, as described previously, utilize more efficient processes and therefore require fewer staff.

The following chart shows how employment levels have changed over the last decade in the major industry groups.



Industry Trends in the Golden Corridor

Source: Economic Modeling Systems Inc.



Manufacturing in the Golden Corridor

Looking more closely at trends within manufacturing, it is clear that the industry has experienced significant changes over the last decade. The top five sub-industries as of 2002—fabricated metal products, computer and electronic products, machinery, printing and related



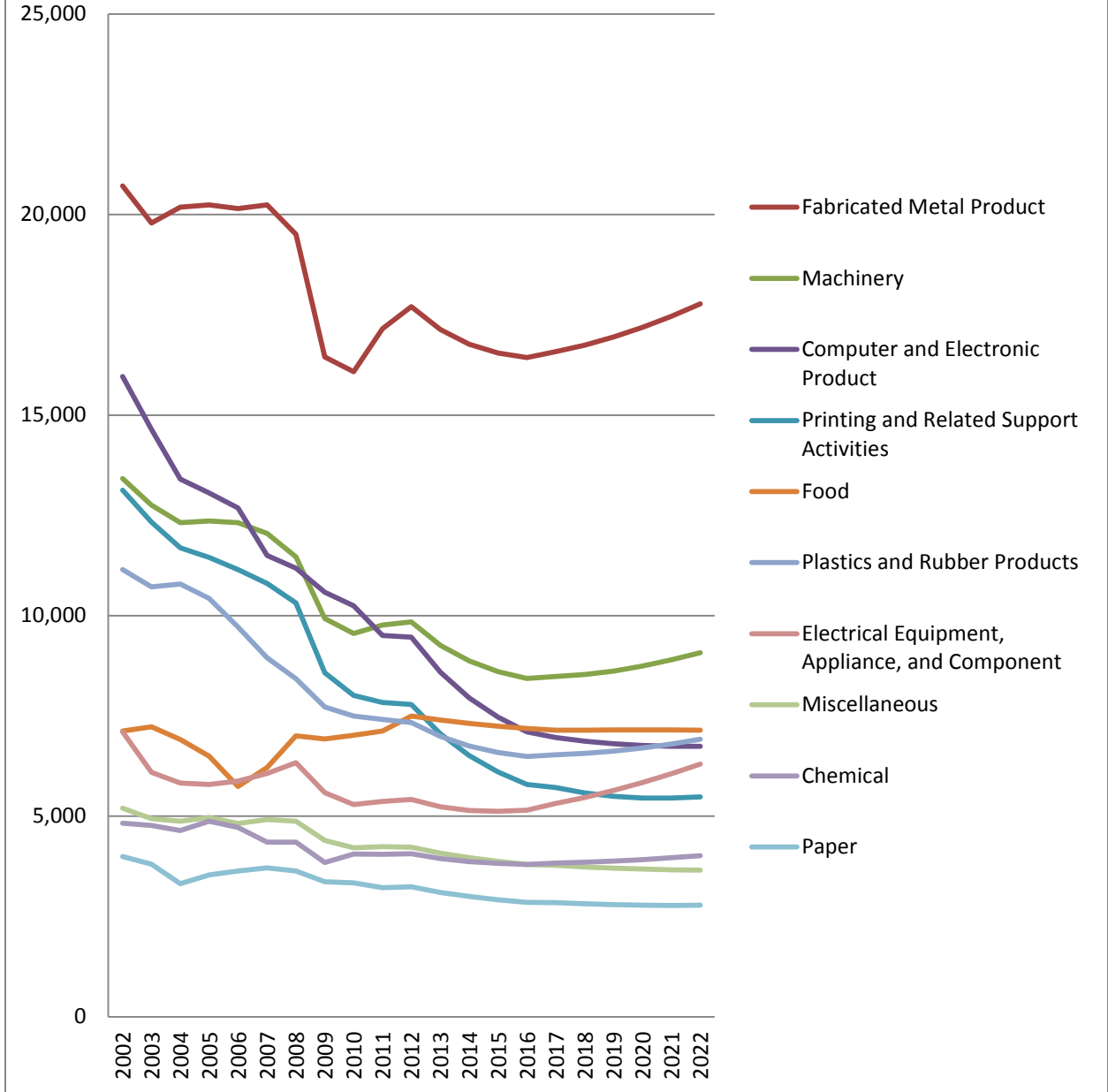
support activity, and chemical manufacturing—all experienced steep declines. Of these, only fabricated metal products has had any significant recovery of jobs, and while it continues to lead manufacturing in the corridor, it employs about 17 percent fewer people than it did in 2002. Over the last decade, food industries have become an important employer in the area, growing steadily since 2006 and now tying with chemical manufacturers for fifth largest employer in the corridor. In fact, it is the only manufacturing industry that had a net gain between 2002-12.

Projections from EMSI estimate that there will be a net leveling off of job losses and even some growth in many manufacturing industries. Fabricated metal products are projected to continue to dominate in terms of employment, and despite some decline over the next few years, the industry is expected to have net growth when looking out to 2022. Machinery is also projected to decline over the next three to five years, but is expected to level off and even grow slightly after that, becoming the second largest industry in the Golden Corridor. The food industry is expected to stay about the same size over the next the next decade and, along with plastics and rubber products, and computer and electronic products, are projected to be the next largest industries in the Golden Corridor. Electrical equipment, appliance and component manufacturing is also expected to grow, coming in as the sixth largest industry in the corridor.



Manufacturing Employment Trends and Projections

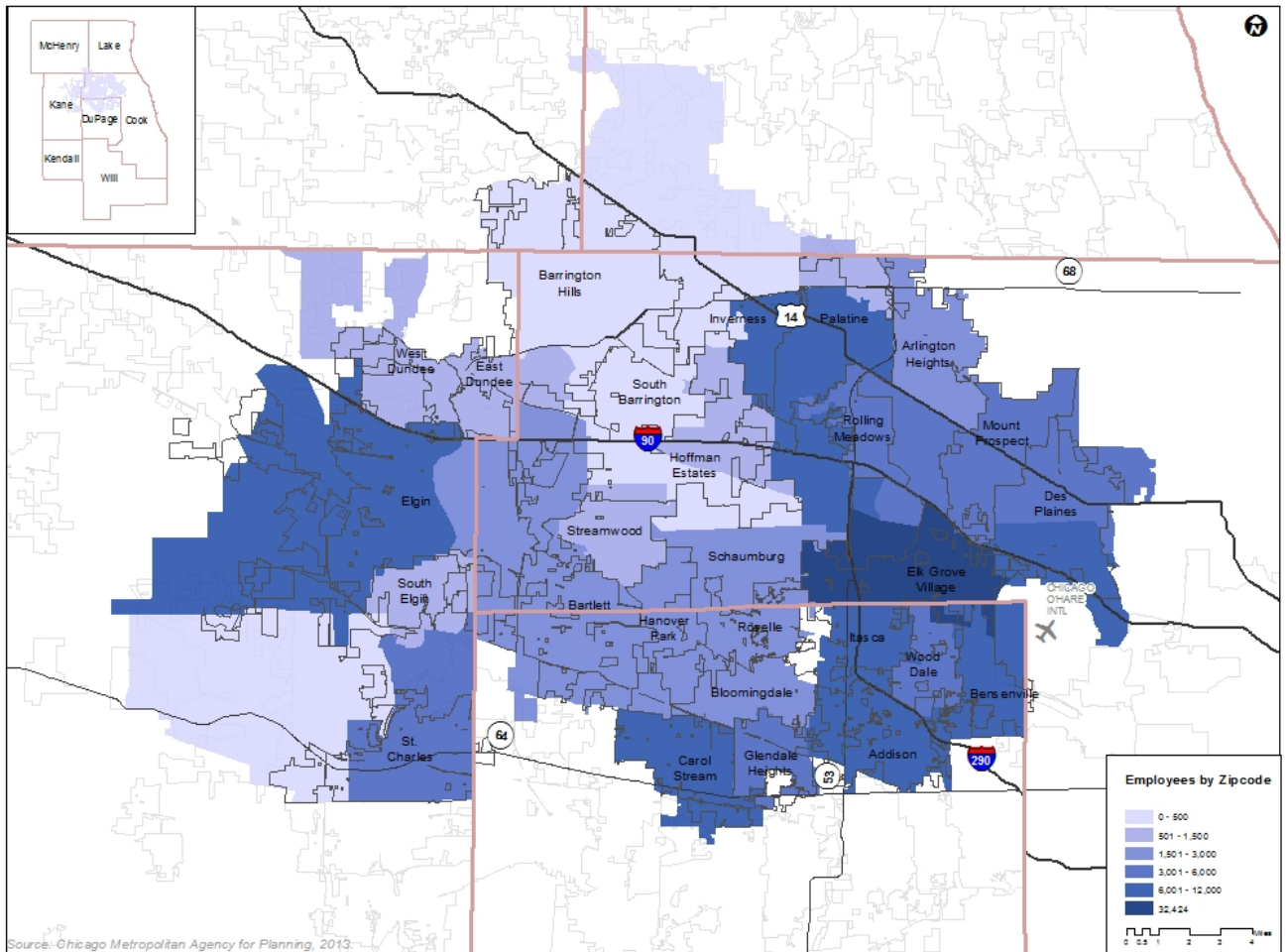
Source: Economic Modeling Systems Inc.



Mapping the location of manufacturing within the Golden Corridor helps further understand where activity is concentrated. The following maps show the concentration of manufacturing based on number of employees.



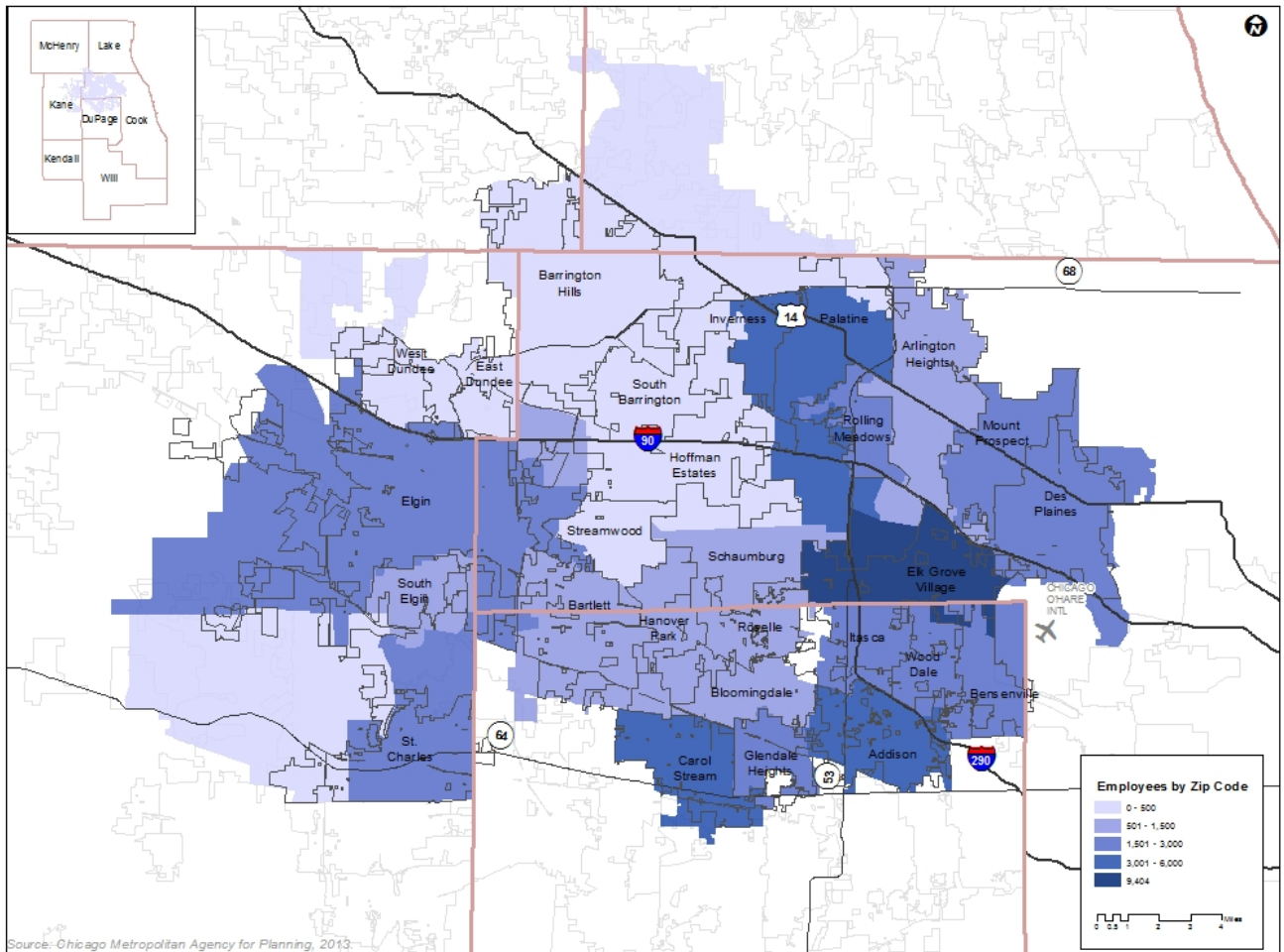
Manufacturing Employment in the Golden Corridor



While manufacturing is strong throughout the corridor, the eastern portion of the corridor is most robust. The dominance of the eastern portion is also evident when taking a closer look at the specific types of manufacturing. The corridor’s three largest manufacturing sub-sectors—fabricated metal product manufacturing, machinery manufacturing, and computer and electronic product manufacturing—are most concentrated in the eastern side, both in terms of number of businesses and number of employees.



Employment in Top Three Manufacturing Industries in the Golden Corridor



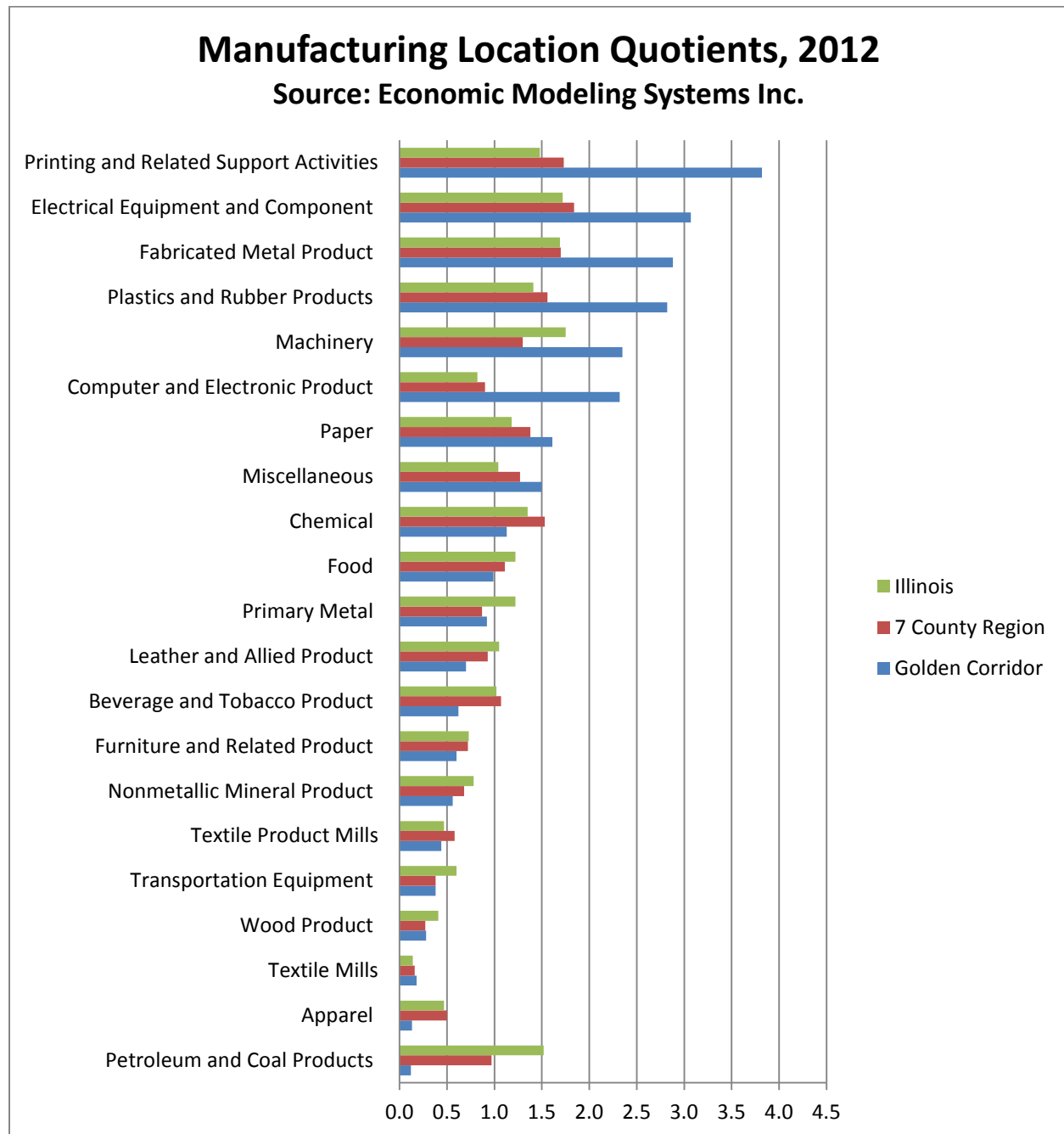
When looking at the different components of the industry cluster—core, supply, customer, and support—again, the eastern side of the corridor is very strong across the board. It is interesting to note that while there geographic overlap in terms of the concentration of core, supply, and customer industries, support industries differ slightly, and are more concentrated north of I-90.

Manufacturing Specializations in the Golden Corridor

Despite the overall declines in manufacturing over the last decade, it continues to be a specialization in the area, as indicated by the location quotient. The location quotient measures how concentrated an industry by comparing to national employment. If a geography has the same percent of employees in an industry as the percentage nationally, the location quotient is one. For example, if 10 percent of the local area’s employment is in food manufacturing, and 10 percent of the nation’s employment is in food manufacturing, the location quotient is one. A location quotient greater than one indicates the industry is more highly concentrated in the area, while a location quotient of less than one indicates the industry is underrepresented. Several types of manufacturing have location quotients much greater than one in the Golden Corridor, showing a significant concentration. The following table shows the 2012 location



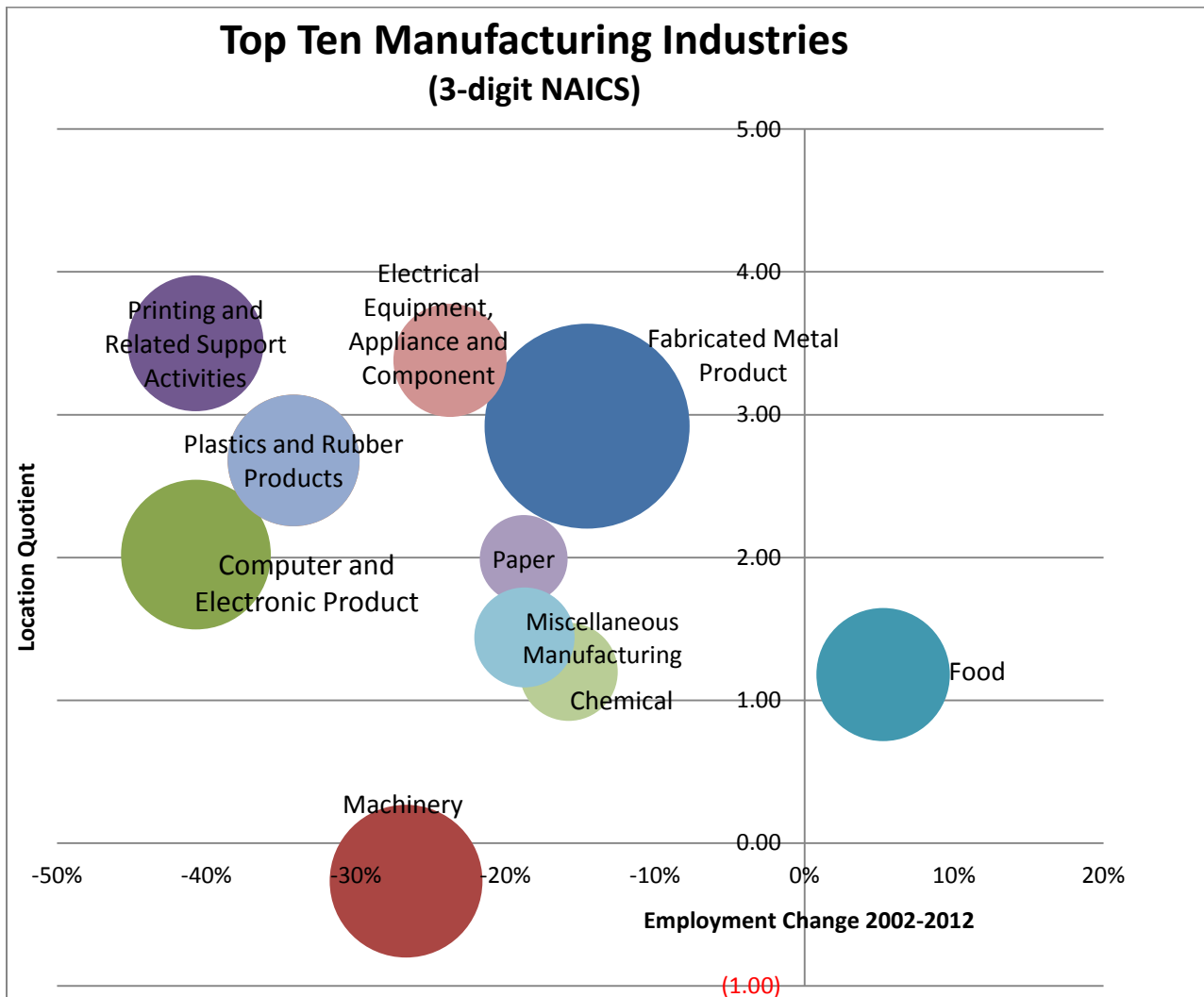
quotient of manufacturing in the Golden Corridor, the seven-county region, and the State of Illinois.



The Golden Corridor dominates by a significant margin in several industries, not just nationally but also compared to the region and the state. Manufacturing in the Golden Corridor is diverse, but there are several specific industries that stand out due to size, notable shifts in employment, and above average representation. The following bubble chart shows the size of the ten largest manufacturing industries, how employment levels have changed over the last decade, and the



location quotients. The size of the industry is shown in the size of the bubble; fabricated metal products, computer and electronic products, and food are the largest. The x-axis shows the percent change in employment from 2002-12; food manufacturing grew by 5 percent and was the only segment to grow. Printing and related support activities and computer and electronic product manufacturing both decreased the most—by 41 percent. The y-axis shows the location quotient; printing and related activities, electrical equipment, and fabricated metal manufacturing are the most specialized compared to national employment.



Source: Economic Modeling Systems Inc.

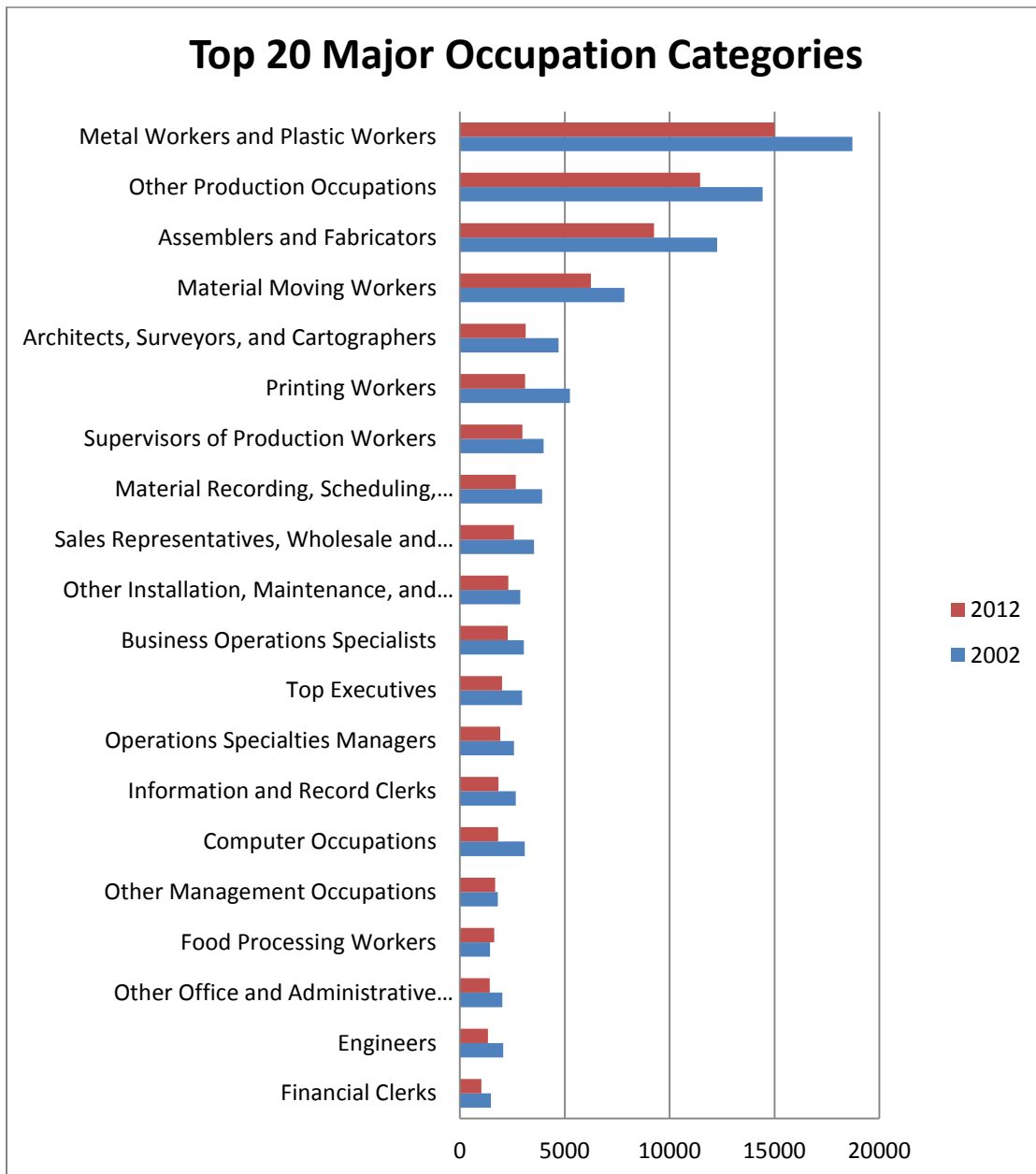
Manufacturing Occupations

There are nearly 450 unique occupations¹ within manufacturing, yet 70 percent of the Golden Corridor’s manufacturing jobs are within 50 occupations, and almost 50 percent are in 20 occupations. Many of these occupations are in numerous manufacturing industries—such as

¹ Six-digit occupation level



team assemblers, machine mechanics, and managers. The following graphic shows the top 20 general occupation groups² and how employment has changed over the last decade. All groups shrank overall, with the exception of food processing workers. Metal workers and plastic workers lost the most—3,710, employees, a 20 percent decline, but computer occupations had the greatest rate of decline—41 percent, a loss of 1,274 . These broad categories include much more specific occupations, some of which have grown. Select specific occupations will be examined in the following section.



Source: Economic Modeling Systems Inc.

² Three-digit occupation level.



One of the most common and looming concerns among manufacturers is the “graying” of the workforce, a term to describe the prevalence of workers who are nearing retirement age. As this segment of workers leave the workforce positions will become open that must be filled. EMSI estimates how many of current jobs will “open,” due to retirement and turnover, for occupations as a whole, not just those within an industry. The following table shows the estimated number of opening from 2012-22 within the 20 largest major occupation groups in manufacturing.

Estimated Job Openings, 20 Largest Major Manufacturing Occupation Groups in the Golden Corridor, 2012-22

Description	Openings from 2012-22	2012 Median Hourly Wage
Top Executives	2,934	\$51.21
Operations Specialties Managers	3,400	\$44.11
Other Management Occupations	7,026	\$28.16
Business Operations Specialists	9,409	\$29.90
Computer Occupations	8,757	\$35.59
Engineers	2,380	\$38.80
Drafters, Engineering Technicians, and Mapping Technicians	787	\$25.51
Sales Representatives, Wholesale and Manufacturing	5,993	\$29.25
Financial Clerks	5,187	\$17.48
Information and Record Clerks	9,651	\$16.31
Material Recording, Scheduling, Dispatching, and Distributing Workers	7,410	\$15.54
Other Office and Administrative Support Workers	5,977	\$15.39
Other Installation, Maintenance, and Repair Occupations	4,092	\$20.84
Supervisors of Production Workers	709	\$28.08
Assemblers and Fabricators	4,336	\$12.59
Food Processing Workers	1,169	\$12.91
Metal Workers and Plastic Workers	5,140	\$17.68
Printing Workers	910	\$18.24
Other Production Occupations	5,222	\$14.13
Material Moving Workers	13,081	\$11.84
Total	103,570	

Source: Economic Modeling Systems Inc

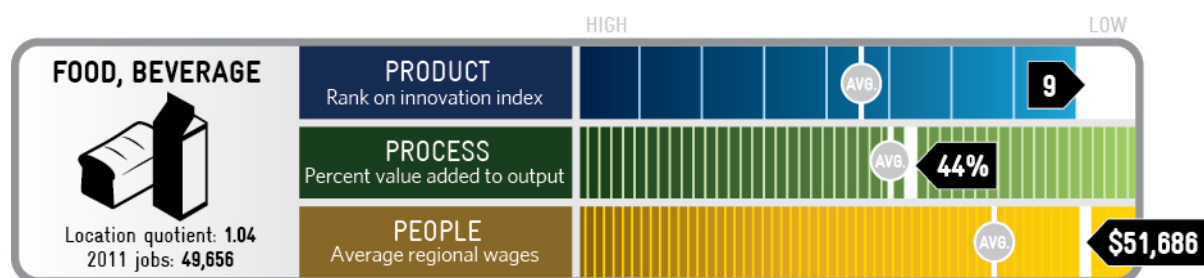


Advanced Manufacturing in the Golden Corridor

As described earlier, CMAP's advanced manufacturing framework is useful to identify opportunities and trends within specific industries, especially in regard to the shifting paradigm of manufacturing becoming more automated, requiring new skill-sets, and the need for collaboration between industry and education and training providers. The following section uses the advanced manufacturing scorecard to examine notable manufacturing sub-sectors in the Golden Corridor. The industries included in this discussion include food manufacturing, due to its unique growth in the Golden Corridor, fabricated metal, since it is the largest sub-sector in the Golden Corridor, and machinery, as it ranks third on the advanced manufacturing scorecard and is the second largest manufacturing sub-sector in the Golden Corridor.

Food Manufacturing

The following graphic shows how food and beverage manufacturing ranks on the 3Ps of the regional advanced manufacturing scorecard. The numbers included in the graphics represent regional statistics.



Food manufacturing ranks last on the regional innovation index. While food manufacturing might not be the most innovative of manufacturing processes, in the Golden Corridor food manufacturing it is growing. Over the last decade this industry shrank nationally, regionally, and at the state level, but it grew by 5 percent in the Golden Corridor. This growth occurred in just one year—375 employees were added at food manufacturers from 2011 to 2012. This growth was distributed across many of the Golden Corridor suburbs, but more than 200 of these jobs were split evenly between Elk Grove Village, West Chicago, Saint Charles, and Schaumburg. EMSI's employment projections show a slight decline in employment from 2012-22, though several sub-sectors are projected to grow, including meat processing and commercial bakeries. The food companies with the most employees include Now Health Group, Colonial Ice Cream Inc., and Swift Process Meat Company.

Food and Beverage					
Region	2002 Jobs	2012 Jobs	Change	% Change	2012 Average Wages
Golden Corridor	7,124	7,499	375	5%	\$52,980
7-County Region	51,230	48,080	(3,150)	(6%)	\$51,686
State	84,186	80,107	(4,079)	(5%)	N/A
Nation	1,581,314	1,515,359	(65,955)	(4%)	N/A

Source: Economic Modeling Systems Inc.



The top food manufacturing occupations are packaging and filling machine operators and tenders, food batchmakers, and packers. These occupations require short or moderate-term on the job training and average \$10-\$14 an hour. Twenty percent of the jobs in these occupations are employed through temporary staffing agencies, demonstrating possible challenges in hiring without assistance, hesitancy from employers to hire long-term employees, or frequent fluctuations in staff needs.

The previous description of occupations examined general occupation groups, but data on more specific jobs gives greater detail. The following table shows the top 10 specific occupations in food manufacturing, the number of jobs in 2002, 2012, median earnings, and the expected number of openings between 2012-22 (openings are for the occupation overall, not just those in food manufacturing).

Occupation	2002 Jobs	2012 Jobs	Change	% Change	2012 Median Hourly Earnings	Projected Openings 2012-22
Packaging and Filling Machine Operators and Tenders	629	619	-10	-2%	\$11.59	539
Food Batchmakers	578	561	-17	-3%	\$14.36	212
Packers and Packagers, Hand	534	591	57	11%	\$9.87	2,592
Bakers	348	360	12	3%	\$12.05	273
Production Workers, All Other	334	391	57	17%	\$12.96	1,045
Helpers--Production Workers	294	295	1	0%	\$9.92	1,027
Laborers and Freight, Stock, and Material Movers, Hand	279	299	20	7%	\$11.72	7,534
First-Line Supervisors of Production and Operating Workers	214	219	5	2%	\$28.08	709
Industrial Truck and Tractor Operators	208	214	6	3%	\$14.55	1,542
Team Assemblers	185	194	9	5%	\$11.88	2,956

Source: Economic Modeling Systems Inc.



Fabricated Metal Manufacturing

The following graphic shows how fabricated manufacturing ranks on the 3Ps of the regional advanced manufacturing scorecard. The numbers included in the graphics represent regional statistics.



Overall, fabricated metal ranks sixth on the regional advanced manufacturing scorecard. The product and wages rank below the average, but it ranks above average on the process indicator, which measures the value added from raw input to final product. The Golden Corridor lost 15 percent of its jobs in fabricated metal in the last decade, but this is a smaller loss than the 20 percent decrease regionally. Some of the largest fabricated metal manufacturers in the Golden Corridor include Thermos, Communications Supply Corp., and Senior Flexionics.

Fabricated Metal					
Region	2002 Jobs	2012 Jobs	Change	% Change	2012 Average Wages
Golden Corridor	20,715	17,703	(3,012)	(15%)	\$52,446
7 County Region	78,389	63,058	(15,331)	(20%)	\$54,552
State	116,961	97,232	(19,729)	(17%)	N/A
Nation	1,586,683	1,446,159	(140,524)	(9%)	N/A

Source: Economic Modeling Systems Inc.

Machinists are by far the largest occupation in fabricated metal jobs. Most work in machine shops, but a notable number are also employed through temporary staffing agencies. On average, machinists earn nearly \$20 an hour median hourly earnings and require long-term on the job training. According to EMSI's projections, the occupations expected to grow the most include machinists, computer-controlled machine tool operators, and welders, cutters, solderers, and brazers. These jobs require specialized training—some is offered on the job and other through training programs.

The following table shows the top ten specific occupations in machinery, the number of jobs in 2002 and 2012, median earnings, and the expected number of openings between 2012-22 (openings are for the occupation overall, not just those in fabricated metal manufacturing).



Occupation	2002 Jobs	2012 Jobs	Change	% Change	2012 Median Hourly Earnings	Openings 2012-22
Machinists	2,089	2,179	90	4%	\$19.56	1,365
Team Assemblers	1,182	937	-245	-21%	\$11.88	2,956
First-Line Supervisors of Production and Operating Workers	885	751	-134	-15%	\$28.08	709
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	972	708	-264	-27%	\$14.08	262
Computer-Controlled Machine Tool Operators, Metal and Plastic	646	700	54	8%	\$17.40	551
Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	732	621	-111	-15%	\$18.52	335
Welders, Cutters, Solderers, and Brazers	603	551	-52	-9%	\$17.67	684
Inspectors, Testers, Sorters, Samplers, and Weighers	610	509	-101	-17%	\$17.10	910
Helpers--Production Workers	551	489	-62	-11%	\$9.92	1,027
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	486	407	-79	-16%	\$27.53	4,587

Source: Economic Modeling Systems Inc.

Machinery Manufacturing

The following graphic shows how machinery manufacturing ranks on the 3Ps of the regional advanced manufacturing scorecard. The numbers included in the graphics represent regional statistics.





Machinery ranks third overall on the regional advanced manufacturing scorecard and is the second largest manufacturing industry in the Golden Corridor. Over the last decade the Golden Corridor lost 23 percent of jobs in machinery, about the same as the regional decrease but notably larger than the 16 percent national decrease. However, the Golden Corridor continues to hold a high concentration of machinery; electrical equipment manufacturing has a location quotient of 3.4 and general machinery has a location quotient of 2.0. The largest machinery companies in the Golden Corridor include Culligan, International Company, Cummins American Corp., and Suzo Happ.

Machinery					
Region	2002 Jobs	2012 Jobs	Change	% Change	2012 Average Wages
Golden Corridor	23,712	18,294	(5,418)	(23%)	\$62,370
7 County Region	95,085	73,820	(21,265)	(22%)	\$64,020
State	182,735	147,595	(35,140)	(19%)	N/A
Nation	3,606,226	3,017,644	(588,582)	(16%)	N/A

Source: Economic Modeling Systems Inc.

The largest occupations in machinery include team assemblers, machinists, and electrical equipment assemblers. According to EMSI, team assemblers are projected to grow by 15 percent from 2012-22 but machinists and electrical equipment assemblers are expected to continue to shrink. Other occupations projected to grow include computer-controlled machine tool operators, mechanical engineers, and welders, cutters, solderers, and brazers—occupations also prevalent in fabricated metal manufacturing. These are high paying jobs that require specialized training. The top ten occupations in machinery are shown in the following table.

Occupation	2002 Jobs	2012 Jobs	Change	% Change	Median Hourly Earnings	2012-22 Openings
Team Assemblers	1,299	956	-343	-26%	\$11.88	2,956
Machinists	1,201	932	-269	-22%	\$19.56	1,365
Tool and Die Makers	627	439	-188	-30%	\$25.45	135
Computer-Controlled Machine Tool Operators, Metal and Plastic	426	345	-81	-19%	\$17.40	551



First-Line Supervisors of Production and Operating Workers	483	338	-145	-30%	\$28.08	709
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	351	269	-82	-23%	\$27.53	4,587
Welders, Cutters, Solderers, and Brazers	344	247	-97	-28%	\$17.67	684
Mechanical Engineers	314	244	-70	-22%	\$36.23	525
General and Operations Managers	336	217	-119	-35%	\$47.15	2,041
Inspectors, Testers, Sorters, Samplers, and Weighers	264	190	-74	-28%	\$17.10	14,462

Source: Economic Modeling Systems Inc.



Education and Training for Manufacturing

Most manufacturing occupations require short or moderate in length, but several require long-term on the job training and some require post-secondary education. This is largely due to the fact that many manufacturers have specialized processes and therefore must provide their own training, rather than employing graduates of a training or education program. However, there are numerous manufacturing related education and training programs provided by high schools, colleges, community based organizations, industry associations, and other providers. The following table shows the education/training required, median hourly earnings, and number of openings for the largest 15 occupations in the Golden Corridor’s manufacturing sector.

As manufacturers shift their processes towards greater automation, employees will need different skill-sets that are specific to each manufacturer. Not all employers are able to provide on-the-job training due to costs and time requirements. This shift presents challenges but also opportunities for both manufacturers and job seekers in the Golden Corridor. The final section of this report describes the current landscape of training and education programs and providers and shows some of the recent shifts and growing needs.

Table 1. Education, Training, and Earnings for 15 Largest Occupations in the Golden Corridor

Job description	2002 Jobs	2022 Jobs	Change	% Change	% of Industry	2012 Median Hourly Earnings	Education Level
Team Assemblers	7,590	5,891	(1,699)	(22%)	7%	\$11.88	Moderate-term on-the-job training
Machinists	4,135	3,896	(239)	(6%)	4%	\$19.56	Long-term on-the-job training
First-Line Supervisors of Production and Operating Workers	3,993	2,802	(1,191)	(30%)	4%	\$28.08	Work experience in a related occupation
Printing Press Operators	3,280	1,513	(1,767)	(54%)	3%	\$17.42	Moderate-term on-the-job training
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	2,871	1,856	(1,015)	(35%)	3%	\$27.53	Moderate-term on-the-job training
Packers and Packagers, Hand	2,698	1,959	(739)	(27%)	2%	\$9.87	Short-term on-the-job training
Helpers--Production Workers	2,588	1,862	(726)	(28%)	2%	\$9.92	Short-term on-the-job training



Inspectors, Testers, Sorters, Samplers, and Weighers	2,517	1,909	(608)	(24%)	2%	\$17.10	Moderate-term on-the-job training
Laborers and Freight, Stock, and Material Movers, Hand	2,505	1,935	(570)	(23%)	2%	\$11.72	Short-term on-the-job training
Electrical and Electronic Equipment Assemblers	2,491	1,313	(1,178)	(47%)	2%	\$14.31	Short-term on-the-job training
General and Operations Managers	2,358	1,276	(1,082)	(46%)	2%	\$47.15	Bachelor's or higher degree, plus work experience
Shipping, Receiving, and Traffic Clerks	2,140	1,147	(993)	(46%)	2%	\$14.55	Short-term on-the-job training
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	2,092	1,353	(739)	(35%)	2%	\$14.08	Moderate-term on-the-job training
Customer Service Representatives	1,911	1,111	(800)	(42%)	2%	\$17.01	Short-term on-the-job training
Production Workers, All Other	1,876	1,519	(357)	(19%)	2%	\$12.96	Moderate-term on-the-job training
Packaging and Filling Machine Operators and Tenders	1,692	1,278	(414)	(24%)	1%	\$11.59	Moderate-term on-the-job training
Office Clerks, General	1,560	1,060	(500)	(32%)	1%	\$14.53	Short-term on-the-job training
Computer-Controlled Machine Tool Operators, Metal and Plastic	1,507	1,584	77	5%	1%	\$17.40	Moderate-term on-the-job training
Maintenance and Repair Workers, General	1,452	1,059	(393)	(27%)	1%	\$19.34	Moderate-term on-the-job training
Industrial Truck and Tractor Operators	1,429	1,159	(270)	(19%)	1%	\$14.55	Short-term on-the-job training

Source: EMSI Complete Employment - 2012.4

Workforce Development Resources and Related Services

Across the region, there has been a widely publicized “skills gap” between what manufacturers are looking for and the skill sets of potential employees. In the Golden Corridor manufacturers



have reported that the gap between their needs and job seeker skills has led to unfilled positions and has motivated employers to become more involved in recruitment and training efforts. This section of the report identifies the entities in the Golden Corridor that seek to address the manufacturing skills gap through workforce development activities.

Workforce development refers to the services, programs, and activities that provide people with education, skill development, and improved access for employment and career advancement in the labor market. Workforce development programs assist a wide range of job seekers, current workers, and employers, by directly increasing the skill-level of workers and in turn, improving business performance. Since the skill level and suitability of the labor force is a major consideration for employers when choosing where to locate,³ maintaining a strong system of workforce programs is an important contributor to economic growth in a given industry sector and region.

There are five major types of entities that help prepare the workforce: post-secondary educational institutions, training providers (both non-profit and for-profit), industry associations, workforce service providers, and employers. While not always neatly defined, this categorization helps explain different opportunities for job seekers and employers. The following describes the categories and specific entities within each serving the Golden Corridor. The information is summarized from interviews, an employer survey, and research from organization websites, workforce boards, and other sources.

Post-Secondary Educational Institutions

The Golden Corridor is home to a range of post-secondary educational institutions with community colleges being the most focused on manufacturing. Four community colleges in the area have established manufacturing programs.

William Rainey Harper College

Harper's main campus is located in Palatine, just north of I-90 in the center of the Golden Corridor. There is an increasing focus on manufacturing at Harper, most recently signified by its leadership in the Illinois Network for Advanced Manufacturing (INAM), a statewide consortium of community colleges with the goal of improving "the delivery of education and career training programs leading to industry-recognized certificates or associate degrees". Currently, the curriculum is designed to offer four programs; Mechatronics, Computer Numeric Controlled Operator, Metal Fabrication (Welding), and Supply Chain & Logistics. Changes to Harper's degree and certificate programs are currently awaiting Illinois Community College Board (ICCB) approval. These changes will expand the programs offered and update existing programs. The college's new advanced manufacturing will leverage partnerships with more than 70 manufacturers and place students in paid internships. Harper College participates in numerous activities to promote its programs and recruit students. In

³ Natalie Cohen, *Business Location Decision-Making in the Cities: Bringing Business Back*, the Brookings Institution, April 2000.



2014, Harper College will assist with student placement related to their manufacturing programs.

Oakton Community College (OCC)

The main campus is located Des Plaines near the eastern edge of the Golden Corridor. While outside of the Golden Corridor, the OCC satellite location in Skokie—the High Tech Pavilion—serves as the hub of the college’s manufacturing program. Ninety percent of the OCC manufacturing classes take place at this location.

Certificates and degrees obtainable through the manufacturing technology department at OCC include: CNC Operations and Programming Preparation; Computer Aided Manufacturing Programming; Manufacturing Technology; Mechanical Design/CAD; and Tool & Die Design and Engineering. There is also a machine technology apprenticeship program. Three quarters of students in the OCC manufacturing department programs are already employed and enroll part-time. Employed manufacturing students are seeking to upgrade skills to advance in a career. Students who are unemployed are looking to upgrade outdated manufacturing skills from previous jobs. The department offers customized training—they help businesses create a customized curriculum to train their workers for specific skill needs.

To remain informed about open positions, skill needs, and the extent which the curriculum is meeting business’ needs, the OCC manufacturing department convenes an advisory group of about 12-15 companies, mostly in manufacturing. The participating companies are almost all located within a ten-mile radius of the OCC Skokie Campus. Like the other community colleges in the region, OCC is involved with INAM. Even before the creation of this network, OCC collaborated with other colleges to discuss employer needs and curriculum changes.

Elgin Community College (ECC)

With two campuses in the Golden Corridor (Streamwood and Elgin), ECC is situated to play a major role in the preparation of the region’s manufacturing workforce. ECC is also a member of the Illinois Network for Advanced Manufacturing (INAM). The college currently offers four programs of study related to manufacturing: Integrated Systems Technology (IST)/Maintenance Technology, Industrial Manufacturing Technology, Welding, and Computer Aided Design. With certificates and associate degrees available in each program of study, the college meets various needs of students and area manufacturers. Associate degrees are available in IST/Maintenance Technology, Computer Integrated Manufacturing, Industrial Manufacturing Technology, Machine Tool Technology, Welding Fabrication Technology, and Computer Aided Design. Notable certificates available include Solidworks, AutoCAD, CNC, Mold Making, Tool & Die Making, and Welding.



College of DuPage (COD)

The College of DuPage has a significant presence in the Golden Corridor with campuses in Addison, Bloomingdale, and Carol Stream—communities along the southern portion of the area. COD is also a member of INAM. The college offers a number of degrees and certificates related to manufacturing available in four program areas: engineering technology, welding, electronics, and manufacturing technology. The manufacturing technology program alone offers four degrees in automated manufacturing systems, drafting and design, manufacturing technology, and manufacturing engineering technology. These programs prepare students in careers in computer-aided manufacturing, robotics, CNC, drafting, design, mechanical drafting, etc. Students can also go on to obtain bachelor's degrees at four-year institutions.

Others

In addition to the community colleges, **Northern Illinois University** has a campus in Hoffman Estates which offers a Bachelors of Science (B.S.) in Industrial and Systems Engineering and a B.S. in Technology with an emphasis in Manufacturing Engineering; Northeastern also offers a Master of Science degree in Industrial Management. This graduate study program aims to prepare students to assume leadership positions in manufacturing industries.

Two colleges outside of the Golden Corridor are worth mentioning for their manufacturing programs. **Wilbur Wright College** is located in the northwest part of Chicago and offers courses in engineering and industrial technology that introduce students to manufacturing design software, CNC machining and programming, and welding. The college also assists in placing individuals in internships at manufacturing companies. **Triton College** is located south and east of O'Hare Airport and is also a member of INAM. They offer degrees and certificates related to engineering technology, including design capabilities and mechatronics.

Training Providers

Training providers offer industry-specific training programs outside of the traditional college model. Though training is also offered through industry associations and employers, the entities highlighted in this category are unique due to their special focus on training. These entities are both for-profit and non-profit organizations and are funded in a variety of ways, including government grants, training fees, and charges for customized training with businesses. All of the entities below serve manufacturing employers within the Golden Corridor, but not all are actually located within the Golden Corridor boundaries.

Fisher/Unitech

Established in 1993, Fisher/Unitech is a reseller of SolidWorks and offers SolidWorks training to companies that use this software. A nationwide company, Fisher/Unitech is headquartered in Schaumburg. The training division offers over 25 courses related to SolidWorks, 3D CAD, Enterprise PDM, and 3DVIA. Training methods include in-classroom training, online training, and on-site training at manufacturers. All courses are instructor-led regardless of the method. SolidWorks certificates are available for anyone who completes the training related to



that technology. Fisher/Unitech trains nearly 1,800 people in a given year and estimates that roughly 20 percent of those trainees stem from the Schaumburg area. Trainees are both job seekers and incumbent workers. The majority of trainees are seeking to become, or improve their skills as, draftsmen or engineers. The company has strong ties to manufacturers in the tool making industry, but did not report any strong ties to other training providers or educational institutions in the area.

Business Electronics Soldering Technology, Inc. (BEST)

Located in Rolling Meadows BEST provides a number of training courses, in addition to selling products and providing services to businesses in the electronics industry. BEST offers IPC-certified trainings (four to five days in length) as a core curriculum. IPC is an association for companies in the electronics industry, and their certification serves as an industry standard. Certified course topics include assembly, soldering, and surface mount technology. BEST also offers non-IPC-certified courses, which are typically shorter, and not necessarily accepted by the employers. In a given year, BEST trains between 150-240 individuals on-site. Class sizes are typically kept small (four to eight students) to allow for direct instruction. Forty percent of the individuals attending on-site trainings are local customers stemming from the Golden Corridor communities (e.g. Elgin, Schaumburg, etc.). BEST trains workers at all levels in a company from the management and engineering level, to the entry-level (e.g. assembly techs). Many of the individuals trained at BEST will take what they have learned back to their own companies where they will train co-workers.

BEST works closely with manufacturers in electronics industry in the area including Motorola, Haas Automation, Otto Engineering, and Creation Technologies. In addition, they partner with the College of DuPage to provide customized training to employers. Currently BEST does not work with any high schools, but is interested in making connections.

Symbol Job Training, Inc.

Symbol Job Training, Inc. evolved out of Symbol Tool, a tool and die shop located in Skokie. Fifty percent of the employers that hire Symbol trainees are located within the Corridor's municipalities. Symbol enrolls about 120 students a year in its four-month program specializing in teaching computer-aided machining, or CNC. Class sizes are small, with no more than five students assigned to a machine at a time. Over 90 percent of Symbol graduates obtain and retain employment, and those not placed in the Golden Corridor find employment at manufacturers across the Midwest. Many Symbol students are recent high school graduates and older adults who were laid off or are switching careers. In addition to training individuals looking to start careers within the industry, Symbol trains current employees looking to move up in manufacturing companies across the Chicago region. In late 2012, Symbol's training program was accredited by the National Institute of Metalworking Skills (NIMS). In addition, Symbol is also certified by the Illinois Board of Higher Education (IBHE) and nationally accredited by the North Central Association Commission on Accreditation and School Improvement (NCA CASI).



Jane Addams Resource Corporation (JARC)

Located on the north side of Chicago, JARC is a job-training and workforce development organization focused on addressing skill gaps in the metal fabricating and manufacturing sectors. JARC's Careers in Manufacturing Program prepares individuals seeking employment for jobs as CNC machinists or welders. JARC has a rolling enrollment system, which allows an individual to begin training at any time, as opposed to waiting for a new session. This flexibility is very beneficial to job seeker and employers, as potential employees can get into the program as soon as there is an opening in the class.

On average, the Careers in Manufacturing program has around 30 participants enrolled at a time. Within this program there are four tracks for individuals, which vary in length. They are as follows:

- CNC Machinist: 20 week, 500 hour program (NIMS certified)
- Welding: 12 week, 240 hour program (Graduates qualify for the American Welding Society)
- Women in Manufacturing: 32 week, 240 hour program
- Manufacturing Bridge: 12 week, 120 hour program preparing individuals for other tracks

In the last six years, 174 individuals have been enrolled in JARC's CNC Machinist track. Ninety-one percent have graduated from the program. Of those graduating, 84 percent received employment at manufacturers in the Chicago region. In addition to on-site training, JARC's Business Services department works with manufacturers across the Chicago region to help develop customized training curriculum and other resources that can assist in business development. JARC works with numerous employers in the Golden Corridor, including ExCell Kaiser and Trelleborg Sealing Solutions.

Symbol and JARC are both loosely connected with high schools, though neither works closely with any at this time.

The BIR Training Center

BIR is modeled more like a school and is NCA accredited and approved by the Illinois State Board of Education (ISBE). BIR has three locations in Chicago offering instruction in CNC machining, part programming, Coordinate Measuring Machines (CMM) precision inspection and measurement, and CAD/CAM technology. One CNC lab is located just east of the Golden Corridor boundaries and BIR has connections with employers in the Golden Corridor. BIR focuses mostly on serving job seekers, and does not offer customized training for companies. They serve around 250 students each year in manufacturing. Students in this program are typically between 30-40 years old. Students are placed in various manufacturing companies as machine operators, tool makers, and part programmers. In 2010-11, 72 percent of the students completing the programs were placed in employment.



Industry Associations

Industry Associations are entities that offer a range of services to employers from networking opportunities to advocacy, but some associations also offer training for its members' current employees as well as job seekers. One advantage of industry associations is their direct connections to employers which facilitates placement of training graduates. The following associations are not all headquartered in the Golden Corridor, but serve the region and work closely with many of the manufacturers within the Corridor's boundaries.

The Tooling and Manufacturing Association (TMA)

TMA is heavily involved in the training of the manufacturing workforce in the Golden Corridor. Although most TMA training used to be theory-based and offered at TMA headquarters in Park Ridge, they now offer lab-based training at the Fred W. Buhrke Training Facility in Arlington Heights. TMA's training center is not yet NIMS accredited, but the trainings are designed to meet either NIMS or MSSC standards. TMA will be NIMS accredited by 2014.

Three courses are offered, including the new 21st Century CNC Training. Also offered are a Manufacturing Skill Standards Council (MSSC) Production Technician training, and a TMA-related theory course. The CNC training course is for incumbent workers at local manufacturing companies. Meeting two nights per week (Monday and Wednesday) for three hours, the course lasts 16 weeks. Individuals learn about the coordinate system, program planning, spindle speeds, tool nose and cutter compensation, threading, and more. The course is taught by industry experts, on Haas machines.

While historically TMA trainings have only been offered to incumbent workers at member companies, the Association recognizes the need to train new workers, based on the workforce needs of member companies. While the TMA is a WIA-certified training provider, they have yet to work with the Illinois WorkNet Center to reach out to dislocated workers or adults seeking to be connected to the labor market.

Precision Metalforming Association (PMA)

Though PMA headquarters are in Ohio, they have at least 18 member companies within Golden Corridor. The PMA's Education Foundation's mission is to develop the manufacturing workforce through the creation and support of training and education programs. They work on this mission in partnership with member companies, educators, businesses, foundations, and other civic leaders.

Illinois Manufacturing Association (IMA)

The IMA offers a range of training courses through the Manufacturing Institute for Training (MIT). Trainings provided through MIT are focused on general workplace skills (e.g.



communication, safety, time management) as opposed to industry-specific skills related to machining, design software, electronics, etc. IMA received an Employer Training Investment Program (ETIP) grant in 2013 which helps businesses offset the cost of IMA training. In addition, the IMA is also the leader of the Manufacturers' Education Initiative, which could provide some lessons learned and opportunities for partnership to stakeholders in the Golden Corridor.

Illinois Manufacturing Excellence Center (IMEC)

IMEC works with small and mid-sized manufacturers across Illinois to help address business challenges. Workforce challenges are included, though IMEC tends to focus on leadership and supervisor development, as opposed to industry-specific skills training. IMEC has a network of regional offices throughout Illinois, with representatives serving in Cook, DuPage, Kane, and McHenry counties.

Chicago Manufacturing Renaissance Council

This is a group of leaders from business, labor, government, and the community interested in the advanced manufacturing sector. They are committed to working to help Chicago lead in this sector. Specific goals include supporting education and training efforts that increase access to manufacturing careers, as well as improving the public's perception of the manufacturing industries—goals that are closely aligned with the goals of Golden Corridor stakeholders.

Workforce Service Providers

Organizations providing training and education to job seekers often offer additional support services to help them in their efforts to find employment. For example, JARC offers income supports and financial coaching to assist job seekers participating in their Careers in Manufacturing program. There are also organizations that only offer support services, and do not offer any training. Some of these organizations might be useful partners for work within the Golden Corridor by introducing individuals to manufacturing, assisting with job seeker recruitment, and getting prospective employees ready for work.

Business & Career Services (BCS) is an example of a service provider located in the Golden Corridor. BCS manages the Arlington Heights Illinois WorkNet Center located at 723 W. Algonquin Road in Arlington Heights, IL. A network of WorkNet Centers is established through federal funding from the Workforce Investment Act (WIA). This WorkNet Center is the only one that falls within the Golden Corridor Boundaries.⁴ Job seekers eligible for WIA services can access services such as computer access, career planning, resume preparation, and job clubs at the WorkNet Center. Training services are also available for WIA jobseekers

⁴ While only one WorkNet Center (i.e. One-Stop) is located within the Golden Corridor boundaries, there are actually three Local Workforce Investment Areas (LWIAs) that serve the Corridor. LWIA 5 (includes Kane County), LWIA 6 (DuPage County), and LWIA 7 (for more information see <http://www.workforceboard.org/job-seekers/workforce-centers/>).

through training providers certified by local workforce investment boards. Many of the training providers mentioned in this report are WIA-Certified. While not a training provider, the Arlington Heights WorkNet Center does assist by referring job seekers to certified training providers serving the Golden Corridor.

In addition to referrals and general workforce services, the center introduces young job seekers to manufacturing industries through the Manufacturing Careers Internship Program (MCIP). BCS and Medusa Consulting have collaborated to create this ten-week program geared toward youth ages 18-21 and designed to offer employment and training opportunities in manufacturing. The training also helps manufacturing companies highlight the changing nature of the sector.

MCIP was initially funded in 2009 with Workforce Investment Act (WIA) Summer Youth funds, and had an inaugural class size of 17. Since the first year the program has served about 20 youth each summer.

Over the years MCIP has gained the support of more than 35 companies, including many manufacturers on the Golden Corridor steering committee. Companies offer paid, eight-week internships to youth who complete the program's initial two-week manufacturing skills boot camp. Felsomat USA in Schaumburg and FANUC Robotics are two companies within the Golden Corridor that have reported being very pleased with the quality of employee they gain from this program.

In the first year, all participants completed an internship with a local manufacturer. Ten participants were offered full-time employment at the end of the program, while the other seven returned to school to continue their education in manufacturing. For the upcoming program year the two-week manufacturing skills boot camp will be extended to three weeks to include OSHA safety training. This will ensure youth receive safety certification before their paid internship.

As funding for WIA has decreased, there has been a need to seek funding from the participating companies and other private or corporate sources. A number of manufacturers have made commitments to help keep the program going this year.

Employers

Employers also contribute to and offer training and education initiatives aimed at preparing the workforce. A survey was distributed to Golden Corridor manufacturers to get information about their internal training and education initiatives. Twenty companies responded—enough to get a general sense of employer practices, but not to make conclusions about manufacturer practices as a whole. The following are highlights of the responses.



- Manufacturers were asked whether or not they provide financial assistance for current employees to obtain education and training from external providers. Twelve out of the 13 employers responding to this question said they do offer financial assistance to their employees. A number of these manufacturers send their employees to the Tooling and Manufacturing Association and various community colleges.
- In addition to external training, the survey attempted to find out the extent to which manufacturers in the Golden Corridor train their own workforce. Nineteen out of 20 manufacturers responding to this question said they offer some sort of internal training to their employees. In a related question, 10 out of 12 companies reported that 50 percent or more of the training their employees receive is provided internally.
- In order to determine what type of training the manufacturing companies offer internally, survey respondents were asked to list specific skills taught in their internal training courses. While a number of respondents reported training workers on safety measures, most employers also train their employees on the technical skills. Skills highlighted include injection molding, plastic process engineering, machinist assembly, equipment maintenance, and blueprint reading.
- Employers were also asked to identify which category of worker receives internal training. Twelve manufacturers answered this question, and all provide training to new and entry-level workers. In addition, a majority of companies said they offer internal trainings to their management level workers and advanced workers. Only five manufacturers suggested they offer internal trainings to temporary workers seeking full-time employment, and just one employer indicated offering internal training to prospective employees.
- Very few companies reported working with external partners to assist in the development or implementation of internal trainings. For those companies that did, the lead partner was the TMA. In addition, Elgin Community College, Harper College, and IMEC were listed as partners companies had worked with to create or implement internal trainings in the past.
- Employers were asked about the types of training methods used for internal training. Of the 17 companies responding, 15 reported using an on-the-job training method. In addition, 12 respondents offered class-based training. Only eight employers use online training methods.
- No survey respondents indicated receiving money from government sources to help offset internal training costs.

One employer that stands out for the training they provide is DMG/Mori Seiki. A global leader in the supply of lathes, machine tools, and turning centers, the company also has a training center, DMG/Mori Seiki University, located in Hoffman Estates. Now a NIMS-accredited training center, this state-of-the-art facility is well-positioned to help turn entry-level machinists into highly skilled managers and leaders in the manufacturing sector.



Middle School and High School Programs

The GCAMG is interested in increasing middle school and high school student awareness of the manufacturing field, improving student contact with manufacturing as a career opportunity, and creating lasting and sustained connections between employers and educational institutions. This section will give an overview of the ways middle school and high school students are exposed to manufacturing-related opportunities. Special emphasis will be placed upon communication strategies that target students, parents and school administrators. Opportunities for students to learn about manufacturing serve as the conduit by which they are introduced to the industry, keep students engaged throughout high school, help them focus on their future, and can be the pipeline to replenishing the manufacturing workforce.

The Golden Corridor area is served by 11 school districts. Within these schools districts, there are 39 high schools and even more middle schools. Several schools offer STEM (Science, Technology, Engineering and Mathematics) courses, including the following courses:

Engineering by Design

Engineering by Design (EbD) is a K–12 engineering and technology curriculum created by the International Technology Education Association (ITEA). EbD has been adopted by twenty states. The EbD program is built on the belief that the ingenuity of children is untapped, unrealized potential that, when properly motivated, will lead to the next generation of technologists, innovators, designers, and engineers.⁵ More information can be found at: <http://www.iteea.org/EbD/ebd.htm>.

Project Lead the Way (PLTW)

Project Lead the Way (PLTW) is a nationally developed curriculum for middle school and high school students that focuses on engineering while utilizing project-based learning. The goal of the program is to increase the number, quality, and diversity of engineers matriculating from United States educational systems. PLTW gives student just enough exposure to the engineering field so that they can determine whether the field is the right career choice for them. Within the PLTW curriculum, there is Gateway to Technology (GTT) for middle schools and Pathway to Engineering (PTE) and Biomedical Sciences Program for high schools. The PLTW curriculum is available to interested schools at no cost; however, schools are financially responsible for program participation fees, classroom equipment, kits for hands-on activities, other supplies and required professional development for teachers. A total of 25 high schools and more than 17 middle schools in the Golden Corridor area have incorporated the PLTW curriculum into their programs of study, specifically the Pathway to Engineering and Gateway to Technology. Because PLTW offers project-based learning, students remain engaged around Engineering throughout high school and have a better idea of what career they want to pursue in the future. Even so, the funding required to support PTLW can be a challenge for school districts. The resources needed to operate such a program can be a barrier to exposing middle

⁵See <http://www.iteaconnect.org/EbD/ebd.htm>.



school and high school students to engineering. More information can be found at <http://www.pltw.org/>.

Illinois Pathways

The Illinois Pathways program was launched in 2011 with the goal to create a new, innovative public-private education infrastructure that can advance college and career readiness in STEM disciplines by coordinating statewide networks of P-20 education partners, business, labor, and other organizations based on career clusters.⁶ Illinois Pathways supports local programs that empower students to explore their academic and career interests while also supporting new statewide, public-private partnerships known as Learning Exchanges that better coordinate investments, resources and planning for those programs.⁷ The Illinois Pathways initiative covers eight career clusters, including manufacturing. The manufacturing career cluster offers several pathways to students throughout their academic careers, from middle school to post-secondary study. High School students interested in manufacturing will have an opportunity to choose from the following pathways: Manufacturing Production Process Development, Production, Automation, and Logistics and Inventory Control. Within each of these pathways, students can pursue coursework, work-based learning and credentials as well as opportunities with shared pathways in other career clusters. Courses for the manufacturing pathways will integrate curriculum from EbD and PLTW.

Each of the career clusters will be supported by a learning exchange that will have a lead entity to coordinate a statewide network of businesses, employer associations, education partners, and other stakeholders. Illinois Manufacturers Association (IMA) Education Foundation will serve as the lead entity for the manufacturing career cluster. Some high schools in the Golden Corridor are looking to incorporate the Illinois pathway for the manufacturing career cluster into their curricula. More information can be found at http://www.illinoisworknet.com/vos_portal/Stem/en/Home/.

⁶ See <http://www.ilpathways.com>.

⁷ See http://www.illinoisworknet.com/vos_portal/STEM/en/Home/.



Communication Strategies

The current state of the manufacturing workforce has inspired relevant curriculum providers, community colleges, and industry associations to execute communication strategies that promote the field of manufacturing. These communication strategies come in the form of printed materials, activities and events, and various media outlets and outreach efforts.

Print Materials

The high schools that incorporate EbD and PLTW into their curricula typically use their programs of study to inform parents, students, and school administrators about these opportunities. Programs of study can be found online, and list courses available to students. PLTW makes brochures available online. Many schools like Wheeling High School print these brochures to distribute to students and parents. These brochures are heavy on graphics, showing students engaged with engineering projects, and outline information about the program.

TMA has created a “Careers in Manufacturing” brochure. It outlines information for students, parents and school counselors, and provides just enough detail about the various manufacturing-related careers along with annual salaries (based on experience), education path that should be taken, whether work experience from another field transfers to manufacturing and on-the-job training opportunities. The brochure features a quiz to help students determine whether manufacturing is the best career choice for them. The brochure concludes with the steps high school students should pursue to enter the manufacturing field.

Community colleges, like Harper College, have one-pagers on how individuals can become an “Advanced Manufacturing Professional.” Such materials can be accessed by high school students online. They, along with other interested individuals, can find out what courses to take to become an advanced manufacturing professional as well as the certificates to acquire. This one-pager immediately gets one’s attention with the graphics and is straight to the point about the benefits of the program (paid internships, good pay and benefits, and lots of job openings).

Events and Activities

Several high schools have robotics clubs and other extra-curricular activities related to science and engineering. At Wheeling High School the robotics club Battlebots serves as a conduit to its PTLW Engineering pathway. Throughout their time at Battlebots, students build robots and participate in robotics competitions. After their experience in Battlebots, some students are inspired to take engineering courses that could lead to NIMS Machining Level One certification as well as National Association for Manufacturing (NAM) credentials—National Career Readiness Certificate (NCRC) and Manufacturing Skills Standards Council (MSCC) Safety Module.



To further expose students to manufacturing, Oakton Community College hosts the annual Advanced Manufacturing Expo. In 2013, more than 300 students attended this event, met industry leaders and participated in some engaging activities. Industry associations like TMA and IMA are involved with organizing this educational event. At this year's Manufacturing Expo, TMA distributed over 300 "Careers in Manufacturing" brochures. OCC also serves on local chamber of commerce boards, joins industry associations, and participates in manufacturing expos for high school students.

Last fall Harper College was the host of Manufacturing Day, a national initiative to change the perception many hold on manufacturing as a dying industry with few opportunities. The event features exhibits from local manufacturers for high school students to tour and obtain information on job opportunities.

TMA organizes several activities that expose students to the manufacturing field. TMA runs a two-week summer camp for students interested in manufacturing. In this program, students participate in classroom learning and testing as well as certification testing in Work Keys Tests for National Career Readiness and MSSC certification. The program is free and provides transportation and lunch to participants, yet, TMA struggles to enroll students. TMA also hosts demonstration days at their training facilities to show high school students the CNC lathe and mill and give them an opportunity to sit in on a CNC training program course. TMA also organizes the Precision Competition where high school students showcase projects. TMA makes these opportunities available to show students firsthand what a precision metalworking career entails, and also as a way to recruit students into the industry.

Golden Corridor member Sandvik Coromant (producer of tools for the metal cutting industry) has partnered for years with Eisenhower Middle School of Rockford, IL to hold the "Surgeons of Steel" program. The program takes place at Sandvik Coromant's Productivity Center in Schaumburg, where students learn about job opportunities and witness firsthand computerized processes including milling, drilling and turning. Although "Surgeons of Steel" does not target students in the Golden Corridor area, this type of program could be replicated between other industry leaders and nearby schools.

Media Outlets

Project Lead the Way has a website with numerous resources, including a video to recruit students. The video focuses on the creativity within manufacturing and encourages students to expand their imagination and how PLTW will teach them to be innovative and solve problems.

Champion Now is an organization that is committed to using video to encourage students to enter the manufacturing industry by showing how work in the field can change the world and be applied to everyday life. Champion Now has partnered with Edge Factor, video producer, to show engaging videos geared towards youth, and depict the current world of manufacturing.



The Chicago Sustainable Industries (CSI) initiative is also developing a comprehensive marketing strategy to promote manufacturing to students, parents, and career counselors. The CSI effort has a goal to coordinate the economic, social and environmental aspects of Chicago's manufacturing sector as part of a comprehensive plan to promote industrial growth.⁸ The proposed "Make it In Chicago" website presents a way for individuals (students, parents, career counselors and job seekers) to connect with the manufacturing industry and learn about the opportunities presented in the future of manufacturing. The website features a personal touch in that it gives testimonies from pictured manufacturers in Chicago. For students, the website provides information about advanced manufacturing and how it can be a promising career. Parents can learn about those pertinent details about an advanced manufacturing career like annual salary, how it compares to other fields, and how advanced manufacturing in the region and the U.S. fares with other cities and countries, respectively. Career counselors can find out that the manufacturing field has advanced and requires a highly-skilled worker. Lastly, job seekers can learn about the latest news about manufacturing as well as educational opportunities at the City Colleges of Chicago.

⁸ See https://www.cityofchicago.org/city/en/depts/dcd/supp_info/chicago_sustainableindustries.html.



Regional and Local Manufacturing Economic Development Initiatives

This section summarizes a selection of regional and local manufacturing economic development initiatives.

Plan for Economic Growth and Jobs

World Business Chicago (WBC) is a non-profit economic development organization that focuses on business retention, attraction, and overall economic growth. Chaired by Mayor Rahm Emanuel, the organization is based in the City of Chicago but many of its strategies are regional. In early 2012, WBC released the Plan for Economic Growth and Jobs, a strategic document that puts forth ten transformative strategies to address challenges and support economic growth. The first strategy is “Become a Leading Hub of Advanced Manufacturing.”

The key components of this strategy are:

- Accelerate growth in advanced manufacturing industries in which Chicago specializes (e.g., those with an LQ greater than 1).
- Help low-growth legacy manufacturers to repurpose assets and adopt advanced technologies.
- Expand workforce training programs to give workers the skills that manufacturers seek (but struggle to find).
- Make a clear commitment to support the region’s manufacturers, in word and deed, through initiatives and more consistent and efficient zoning, permitting, and other business processes.

Implementation is underway and there are several developments relevant to the Golden Corridor Group. In particular, the development of the Illinois Manufacturing Lab and a response to the National Network of Innovation Manufacturing are emerging efforts that will have an impact on manufacturing across the region.

Partnering for Prosperity

Cook County has recently convened the Cook County Council of Economic Advisors (CEA), a group of business, non-profit, and civic leaders charged with the task of identifying how the county can promote economic growth. County President Preckwinkle and the CEA launched a strategy report with nine recommendations on how to do just that; titled Partnering for Prosperity, the report highlights the importance of greater coordination and collaboration between the many partners involved in creating jobs. The plan’s 4th strategy is to “increase productivity of Cook County’s manufacturing clusters.” The plan specifically calls out the fabricated metal cluster and the food processing and packaging cluster. The plan was released in April 2013 and implementation has yet to begin but initial direction calls for partnering with



World Business Chicago's implementation team created for the Plan for Economic Growth and Jobs.



Moving Forward

Manufacturing is and must continue to be a thriving component of the region's broad economy and the Golden Corridor has a leading role in the region's manufacturing activities. The Golden Corridor has many engaged stakeholders from all sectors—industry, education, government, community-based organizations—all of which have demonstrated an interest in working together. With so many stakeholders, it can be difficult to keep track of initiatives and opportunities, as well as leverage resources and sustain and grow successful programs. This report provides a foundation to build on. The information can help develop and implement specific strategies to build a quality and skilled workforce. The data can be used to help inform educators, parents, and students on advanced manufacturing and how it differs from the common but outdated perception of manufacturing. The inventory of existing efforts can be used by the GCAMP to engage new partners, expand successful programs, and develop initiatives to fill gaps.

To address the workforce challenges and recruit more students to manufacturing field, the GCAMP can focus its efforts on leveraging and expanding existing communication and marketing materials and strengthening relationships between education providers and employers. Successful efforts exist, but not all middle school and high school students are exposed to these opportunities. The Illinois Pathways program was designed to increase awareness by students and schools of the opportunities in manufacturing, but ongoing coordination and collaboration between GCAMP and the Illinois Pathways program will be essential. Similarly, the communication strategies and events that promote the manufacturing field are diverse and could be a great benefit if better coordinated so that the message can reach more students, parents, and school administrators. Additionally, interviews with school administrators confirmed the importance of field trips and hands-on experiences where students and parents can see firsthand what today's manufacturing looks like.

There are challenges to organizing and facilitating these types of activities, but CMAP will work with the GCAMP to create a strategic plan that describes activities and resources necessary to create and implement successful strategies. CMAP will also work with the GCAMP to become more structured with a long-term plan for sustainability. A focused work plan and stronger foundation will help the GCAMP become more operational and impactful.







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The Chicago Metropolitan Agency for Planning (CMAP) is the region's official comprehensive planning organization. Its GO TO 2040 planning campaign is helping the region's seven counties and 284 communities to implement strategies that address transportation, housing, economic development, open space, the environment, and other quality of life issues. See www.cmapillinois.gov for more information.