

Computer and Electronic Products Manufacturing

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DeKalb County Indicators

Employment (2015) = **595**
 Employment Trend (2009–2015) = **-8.3%**
 Location Quotient (2015) = **1.5**
 Average Annual Earnings per Job (2015) = **\$42,411**

DeKalb County Region Indicators

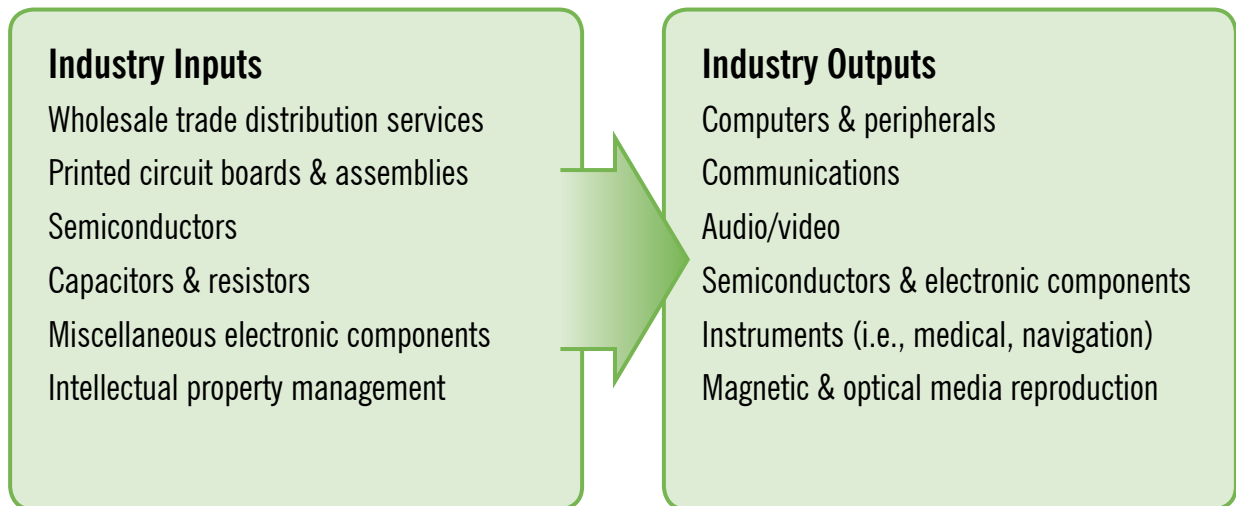
Employment (2015) = **16,819**
 Employment Trend (2009–2015) = **15.1%**
 Location Quotient (2015) = **0.8**
 Average Annual Earnings per Wage (2015) = **\$59,302**

CLUSTER SUMMARY

The computer and electronic products manufacturing cluster contains all businesses related to the manufacturing of electronic products ranging from computers to medical instruments (Figure 1). This cluster includes manufacturers of communications/wireless equipment, audio/video equipment, electronic components, instruments such as navigation systems and measuring equipment, and media recording equipment.

Related to computer and electronic products manufacturing are several supplier industries which provide materials and services necessary for production. According to IMPLAN data, 11.8% of production costs are in wholesale trade distribution services, as many products in this cluster are exported from the region. Electrical components such as capacitors, resistors, and circuit boards represent 30.5% of production costs. Some computer and electronic products manufacturing sub-sectors may be interdependent, such as semiconductor and electronic component manufacturers producing parts for wireless equipment or medical instruments.

Figure 1: Computer and Electronic Products Manufacturing Cluster Input and Output Examples



Source: Adapted from 2015 IMPLAN data and U.S. Bureau of Labor Statistics, *Industries at a Glance*, 2017.

REGIONAL OVERVIEW

The computer and electronic products manufacturing cluster in the region, which includes DeKalb and adjoining counties, had 153 establishments in 2015 and employed 3,803 people at an average wage of \$59,342 (Figure 2). The cluster has a higher than average concentration of business establishments in the region, especially the surrounding Rockford metropolitan area and the northwest suburbs of Chicago, when compared to the nation’s economic activity in this cluster overall.

Location Quotients (LQs) are used to evaluate local business development opportunities. LQs are the ratio of the employment percentage represented by a given industry in the county to the percentage that industry represents in the nation. A ratio greater than 1.0 = higher local concentration and a likelihood of exports from the county; a ratio less than 1.0 may suggest goods or services are imported into the region.

Figure 2: Summary Characteristics of the Computer and Electronic Products Manufacturing Cluster

Indicator	DeKalb County	Reference Region
Number of Firms (2015)	10	153
Firm Change (2009-2015)	-33.3%	-8.3%
Firm Location Quotient (2015)	2.3	1.9
Employment (2015)	418	3,803
Employment Change (2009-2015)	-8.3%	-15.1%
Employment Location Quotient (2015)	1.5	0.8
Average Annual Earnings* per Job (2015)	42,411	59,342

Source: U.S. Bureau of Labor Statistics, *Quarterly Census of Employment and Wages, 2015*.

*Note: Although the words “wages” and “earnings” are often used interchangeably, they are different. Wages refers to compensation paid by an employer on an hourly, weekly or monthly basis. Earnings can include wages paid by an employer but also other sources such as interest, dividends, and contractor or business income.

Between 2009 and 2015, the computer and electronic products cluster lost employment and businesses in both DeKalb County and the region. This trend is consistent with the broader manufacturing sector, which decreased in DeKalb County. Nevertheless, the cluster has potential for further development as a supplier for other emerging manufacturing sectors. Sub-sectors in the computer and electronics cluster represented in DeKalb County include communications equipment, audio/video equipment, electronic components, and electronic instruments (Figure 3).

Figure 3: Concentration of Computer and Electronic Products Manufacturing Sub-Sectors Based in DeKalb County

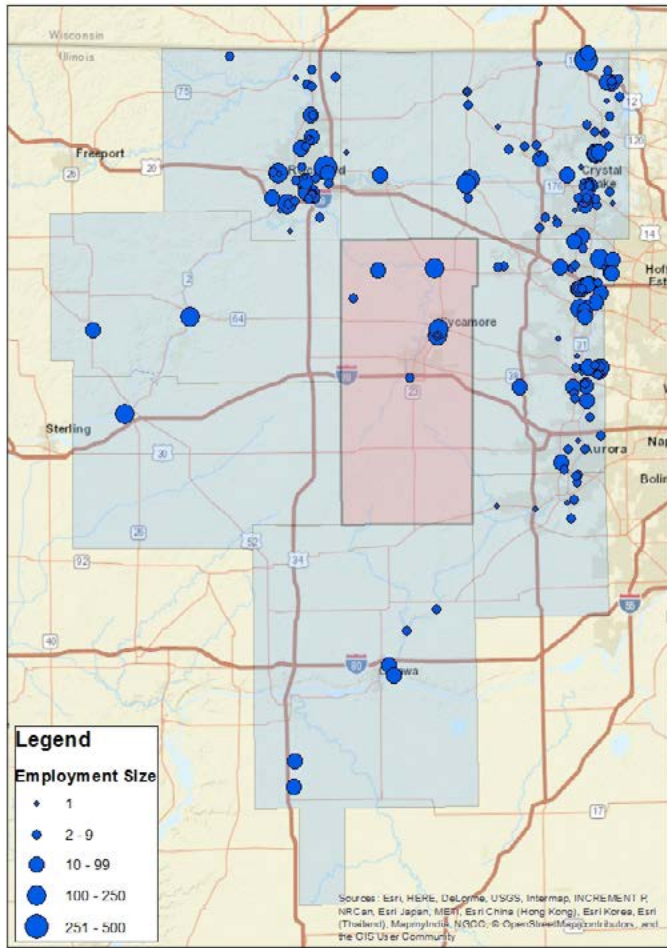
Industry Sub-sector	Establishments LQ	Employment LQ
Industry Cluster Total	2.3	1.5
Communications equipment	3.8	Disclosure
Audio & video equipment	6.0	Disclosure
Semiconductors & electronic components	3.8	2.7
Electronic instruments	1.1	Disclosure

Source: U.S. Bureau of Labor Statistics, *Quarterly Census of Employment and Wages, 2015*.

Data for employment in some manufacturing sub-clusters is suppressed due to having a small number of manufacturers, but the largest sub-sector with published employment data in DeKalb County is semiconductor and electronic component manufacturing. Of the 418 computer and electronic products manufacturing jobs in DeKalb County, 269 jobs (30.1%) are in electronic components.

The computer and electronic products manufacturing cluster in DeKalb County and the region is represented by several mid-size and larger employers (Figure 4). Electronics manufacturers are densely concentrated in Kane, McHenry, and Winnebago counties. In DeKalb County, Ideal Industries and Auto Meter are in Sycamore, with mid-sized manufacturers in other areas such as Greenlee Textron Inc. in Genoa, RB Manufacturing Inc. and Graphic and Industrial Circuits (GIC) in Kirkland.

Figure 4. Computer and Electronic Products Manufacturing Cluster: Firms by Employment Size, DeKalb County and Reference Region



Source: Decisiondata.net, 2017.

The largest electronic products manufacturer in the region is Schneider Electric Buildings LLC, based in Rockford, with 500 employees. Schneider Electric manufactures electrical building control fixtures such as thermostats, smoke detectors, and audio door stations. Other manufacturers with more than 200 employees include Watlow in Richmond and the Danaher Motion Company in Marengo. Watlow makes temperature control systems, including heaters, temperature sensors, and control software. The Danaher Motion Company makes motion sensor equipment for machinery and components that allow machinery to be controlled by computers or mobile devices.

Several large and mid-sized machinery manufacturers are in DeKalb County (Figure 5). Ideal Industries Inc. headquartered in Sycamore, manufactures testing and measuring equipment for electricians, wireless networks, and environmental monitoring. Auto Meter Products Inc. makes dashboards, speedometers, fuel gauges, and related accessories for motor vehicles. Greenlee Textron Inc. in Genoa manufactures electrical and wireless network testing devices. RB Manufacturing Inc. in Kirkland prints custom circuit boards for larger electronics products, such as coin-operated pool dart games. GIC is a contract manufacturer of printed circuit board assemblies for small to mid-sized companies.

Figure 5: Major Employers in the Computer and Electronics Cluster, DeKalb County

Business Name	Employees	City	Industry Description
Ideal Industries Inc.	350	Sycamore	Instrument Manufacturing for Measuring & Testing Electricity & Electrical Signals
Auto Meter Products Inc.	130	Sycamore	Totalizing Fluid Meter & Counting Device Manufacturing
Greenlee Textron Inc.	90	Genoa	Instrument Manufacturing for Measuring & Testing Electricity & Electrical Signals
Graphic and Industrial Circuits (GIC)	80	Kirkland	Printed Circuit Assembly (Electronic Assembly) Manufacturing
RB Manufacturing Inc.	23	Kirkland	Printed Circuit Assembly (Electronic Assembly) Manufacturing

Source: DeKalb County Economic Development Corporation, Illinois Manufacturers Directory, 2018, and Dun & Bradstreet Inc., 2017.

INDUSTRY TRENDS¹

Over the past several decades, computer capacity has proliferated, driving a continuous increase in demand for semiconductors and other electronic components. However, the rate of improvement for computers may decrease unless new materials or manufacturing processes emerge.

Larger electronics product manufacturers typically spend upwards of 15.0% of revenue on research and development. Because technology rapidly advances, product lifecycles have shortened and companies must constantly develop new and improved products to remain competitive. In some cases, products can be improved by adding new functions, such as consolidating several electrical testing operations in one device. Inventory management is critical in this cluster to avoid having an excess of outdated products. Related to the trend of continuous product improvement, larger electronic component companies make equity investments in smaller companies to gain access to new technology.

Electronic testing equipment is often sold to the communications industry, and growth in emerging markets such as China and Brazil create new export opportunities for instrument manufacturers. Approximately 75.0% of output in the national electronics sector is exported.

Historically, electronics manufacturers have primarily sold to customers in the industries of defense, communications, and electronic components. However, new business opportunities exist in supplying components for robotics and internet-enabled household devices. Developing products for these sectors poses unique challenges compared to conventional electronic products, which will require investment in new engineering and design skills.

As computer and electronic products are increasingly being used in more sophisticated products such as autonomous machines, the components also require tighter specifications and more engineering. Manufacturers that invest in new production skills and technology will be well-positioned in the competition to supply the fabricators of advanced products. Smart machines are being adopted in the machinery and fabricated metal products manufacturing clusters, among others.

SUPPLY CHAIN

This analysis examines three aspects of supply chain: the value of supply chain inputs; the amount of inputs being produced outside DeKalb County for the industry segments studied (represented in most cases by the gap between total input purchases and inputs purchased within the region); and stages along the supply chain that are areas of competitive advantage or that provide an opportunity to attract businesses.

Supply Chain

An essential component for an industry sector is the local supply chain. While not all inputs (goods or services) that an industry sector needs can be produced in the local economy, it is desirable to meet as many of the sector's needs locally as possible. This analysis reveals the source and amount of purchases among the unique niches within an industry. Identifying total industry economic outputs and areas outside the region from which goods and services are being purchased helps determine which areas of the industry supply chains are strongest. It also assists in identifying the best growth opportunities for DeKalb County.

Areas with large gaps in the computer and electronics manufacturing supply chain represent opportunities for DeKalb County to capture the most value from a specific stage in the production or delivery of products and services. This may inform strategy by indicating where along the value chain an investment will have the highest impact on the regional economy and may indicate opportunities for business retention or expansion. Conversely, stages along the supply chain that are underperforming also offer opportunities for business attraction and/or entrepreneurship. It is important when reviewing data relating to industry inputs to compare both the supply gap as well as the total value of inputs, as certain services or components that maintain a high percentage may be of low value to the regional economy. Similarly, certain inputs, regardless of the total value purchased outside the region, may be of high strategic importance to the region in efforts to build a stronger industry cluster.

¹ Summarized from industry reports by Hoovers' Inc., a Dun & Bradstreet Company.

INDUSTRY CLUSTER PROFILE

The supply chain information provided in Figure 6 shows the flows of trade both within DeKalb County and from outside the region that support electronic products-related industries. The key sectors that may be appropriate targets for expansion appear as imports (gaps) from outside the county, but still within the industry cluster. These gaps are analyzed in terms of county strengths and potential areas for targeting and support and are placed into a supply chain framework to determine the stages of the supply chain with the strongest presence in DeKalb County. To fully develop the electronic products manufacturing cluster, economic developers in DeKalb County might consider focusing on those sectors without a strong regional presence currently but that have significant potential to develop.

Regional Inputs

The dollar value of production inputs that are purchased from businesses within the DeKalb County region.

Gross Inputs

Total dollar amount of inputs used by the industry within each sector.

Regional Supply Gap

Difference between gross and county inputs: a sizeable gap value indicates that a large amount of inputs are imported into the region, rather than produced within.

Figure 6: DeKalb County Key Supply Chain Gaps, Computer and Electronic Products Manufacturing (\$Millions)

Industry Description	Regional Supply Gap	Regional Inputs	Gross Inputs	Percent Purchased Outside of Region
Other electronic components, i.e., LCD screens	-\$48.4	\$1.2	\$49.6	97.6%
Broadcast & wireless communications equipment	-47.1	<0.1	47.2	99.9
Printed circuit assemblies (electronic assemblies)	-45.5	0.3	45.8	99.3
Semiconductors & related devices	-41.4	0.1	41.5	99.8
Management of companies & enterprises	-35.6	5.8	41.4	86.0
Electricity & signal testing instruments	-18.2	0.2	18.4	98.9
Computer terminals & other computer peripheral equipment	-15.1	0.1	15.3	99.3
Computer storage devices	-12.9	<0.1	12.9	99.9
Bare printed circuit boards	-12.7	0.2	12.8	98.4
Turned products & screws, nuts, & bolts	-11.8	2.8	14.6	80.8

Source: IMPLAN, 2015.

Note: Supply-chain gap and input figures are in millions of dollars.

For example, the computer and electronic products manufacturing cluster requires \$49.6 million in inputs (i.e., the products or services required to create a finished product) from miscellaneous electronic components such as LCD screens. However, only \$1.2 million of this material is produced in the region. This suggests an opportunity for an existing firm or new business to satisfy the local demand for electronics production. Another closely related opportunity is printed circuit assemblies. The electronics sector requires \$45.8 million in printed circuit assemblies, of which only \$300,000 was produced in DeKalb County. For example, RB Manufacturing Inc. in Kirkland manufactures circuit boards and may be able to play a larger role in the local electronic products supply chain.

**Other Electronic Component Manufacturing
(NAICS Sector 334419)**

This industry comprises establishments engaged primarily in making electronic components other than circuit boards; semiconductors, capacitors, resistors, coils, transformers, or connectors. Example products include LCD screens, cathode ray tubes, and power switches.

WORKFORCE REQUIREMENT, SUPPLY AND DEMAND

Retaining a skilled local workforce has been an ongoing issue for manufacturing in general, including in the electronics sector. The challenge of a skilled workforce has gained urgency as a result of the impending retirement of experienced workers in the Baby Boom generation. Even as industry employment has experienced a net decline over the past decades (a trend that is expected to continue), succeeding generations of potential workers are comparatively small in absolute numbers and many of these younger workers have not chosen to pursue careers in manufacturing.

The largest employee age group in the computer and electronic products manufacturing sector in DeKalb County is pre-retirees, ages 45-64, at 57.6% (Figure 7). This age group includes those born toward the end of the Baby Boom generation and represents experienced workers who will need to be replaced in the future. Another 1 in every 10 (11.7%) of electronics employees are currently of retirement age. This sector could face labor shortages as the most experienced employees retire, without a targeted effort to train new workers in this sector.

Figure 7: Computer and Electronic Products Manufacturing Cluster Employment and Earnings by Age Group, DeKalb County

Age Group	Percent of Total Employment	Average Annual Wage
Under 25 Years	3.5%	\$28,225
25-44 Years	27.2	33,241
45-64 Years	57.6	53,160
65 Years & Older	11.7	34,965

Source: U.S. Census Bureau, Quarterly Workforce Indicators, 2015.

Approximately 28.0% of the employment and 18.4% of the wages in the cluster are in production (Figure 8). The next largest employment category is engineering occupations, which represent the largest share of wages in the cluster. Ensuring that appropriately skilled production workers and engineers are available at competitive compensation rates will be critical to maintaining the manufacturing sector in the region.

Figure 8: National Computer and Electronic Products Manufacturing Cluster Staffing Patterns

Occupation Type	Share of Cluster Employment	County Median Wage All Industries	Region Median Wage	Estimated Share of Cluster Wages, County
Production occupations	28.0%	\$33,079	\$34,430	18.4%
Architecture & engineering occupations	22.5	66,903	72,646	29.9
Computer & mathematical occupations	12.9	56,701	67,658	14.5
Management occupations	10.5	81,756	81,279	17.1
Office & administrative support occupations	9.0	31,712	32,235	5.7
Business & financial operations occupations	7.8	51,504	55,661	8.0
Sales & related occupations	3.4	23,246	23,692	1.6
Installation, maintenance, & repair occupations	2.4	43,979	46,192	2.1
All other, i.e., transportation, design, bldg. maintenance	3.5	46,417	44,442	2.7

Source: U.S. Bureau of Labor Statistics and Illinois Department of Employment Security, Occupational Employment Statistics, 2016.

A challenge for employers is the looming demand for replacement workers as older workers retire. The Illinois Department of Employment Security claims that 960 openings for production workers and 160 jobs for architects and engineers will become available per year between 2012 and 2022, with a majority coming from replacements (Figure 9).

INDUSTRY CLUSTER PROFILE

Figure 9: Occupational Employment, Projected Demand by Worker Classification, Workforce Investment Board Region 5*

Occupation Type	Employment		Employment Change 2012-2022		Average Annual Job Openings		
	2012	2022	Number	Percent	Growth	Replacements	Total
Total, All Occupations	282,136	333,489	51,353	18.2%	5,215	6,645	11,860
Office & Administrative Support	38,831	44,430	5,599	14.4	585	876	1,461
Sales & Related	29,095	34,025	4,930	16.9	494	896	1,390
Production	27,431	31,295	3,864	14.1	417	543	960
Management	18,935	21,456	2,521	13.3	271	380	651
Business & Financial Operations	10,482	12,916	2,434	23.2	244	203	447
Installation, Maintenance & Repair	9,150	10,794	1,644	18.0	164	206	370
Computer & Mathematical	5,015	6,450	1,435	28.6	144	83	227
Architecture & Engineering	3,983	4,644	661	16.6	66	93	159

Source: Illinois Department of Employment Security, 2012-2022 Employment Projections.

*Workforce Investment Area 5 includes the counties of DeKalb, Kane, and Kendall. Items do not sum to total because not all occupations are listed.

Because of the competition with surrounding metro areas for workers with specific skills or experience, compensation levels are a concern for local businesses. For example, the projected demand for production workers in the counties of Boone, Winnebago, and McHenry is estimated to be 1,059 openings per year between 2012 and 2022². The estimated average annual wage for production workers is \$33,079 in DeKalb County, almost 4.0% lower than the average of \$34,430 for the region. This could put local employers at a competitive disadvantage relative to other areas offering similar jobs at higher wages. Given the intense competition for skilled workers, companies will need to monitor compensation trends to recruit and retain qualified employees.

ECONOMIC IMPACT

For every 100 jobs created in the computer and electronic products manufacturing cluster in DeKalb County, an additional 55 jobs are supported or created in other industry sectors. This also results in the generation of another \$11.6 million in value-added, as well as an additional \$6.5 million in employee compensation (Figure 10).

For every 100 jobs created in the computer and electronic products manufacturing cluster in Reference Region, an additional 87 jobs are supported or created in other industry sectors. This also results in the generation of another \$19.9 million in value-added, as well as an additional \$10.6 million in employee compensation.

Figure 10. Economic Impact Summary of 100 New Jobs Created in the Computer and Electronic Products Manufacturing Cluster, DeKalb County and Reference Region

Indicator	Direct Effect	Indirect Effect	Induced Effect	Total Effect	Multiplier
Employment (DeKalb County only)	100	25	30	155	1.55
Value-Added (DeKalb County only)	\$8,050,083	\$1,753,449	\$1,817,185	\$11,620,717	1.44
Employee Compensation (DeKalb County only)	\$4,790,457	\$904,498	\$828,839	\$6,523,794	1.36
Employment (Reference Region)	100	41	46	187	1.87
Value-Added (Reference Region)	\$12,980,477	\$3,608,875	\$3,327,354	\$19,916,705	1.53
Employee Compensation (Reference Region)	\$7,119,914	\$1,902,130	\$1,528,431	\$10,550,475	1.48

Source: IMPLAN, 2015.

The industries most affected by job creation in the computer and electronic products manufacturing cluster in DeKalb County include wholesale trade, employment services, restaurants and hospitals (Figure 11). These job impacts are the result of business-to-business purchases by companies within the cluster, as well as by the household spending of their employees.

² Source: Illinois Department of Employment Security, 2012-2022 Employment Projections.

INDUSTRY CLUSTER PROFILE

Figure 11. Employment Impacts of 100 New Jobs Created in the Computer and Electronic Products Manufacturing Cluster on Other Industries, DeKalb County

Industry Impacted in DeKalb County	Jobs
Total, All Affected Industries	55
Wholesale trade	6
Employment services	3
Limited-service restaurants	2
Full-service restaurants	2
Hospitals	2
Truck transportation	2
Real estate	2
Management of companies and enterprises	2
All other industries	34

Source: IMPLAN, 2015.

Similar impacts can be measured in the Reference Region where the industries most affected by job creation in the computer and electronic products manufacturing cluster also include business support services, services to buildings and general merchandise retailers though the number of jobs created or supported differs somewhat (Figure 12).

Figure 12. Employment Impacts of 100 New Jobs Created in the Computer and Electronic Products Manufacturing Cluster on Other Industries, Reference Region

Industry Impacted in Reference Region	Job
Total, All Affected Industries	87
Wholesale trade	11
Employment services	4
Limited-service restaurants	3
Full-service restaurants	3
Real estate	3
Hospitals	3
Truck transportation	2
Business support services	2
Services to buildings	2
Retail - General merchandise stores	2
All other industries	52

Source: IMPLAN, 2015

KEY TAKEAWAYS

- » The computer and electronic products manufacturing cluster in DeKalb County has a concentration of firms that is 2.3 times the national average and an employment concentration 1.5 times the national average. The surrounding region also ranks above the national average in location quotients for this cluster. Employment in the electronic products cluster has decreased slightly in DeKalb and surrounding counties since 2009.
- » The computer and electronic products manufacturing cluster in DeKalb County is specialized in electronic components and testing instruments and has the potential for further development based on their supply chain relationships to other industries in the region and the surrounding metro areas.
- » Opportunities likely exist for electronic components manufacturing shops to work with testing device manufacturers to develop new locally-sourced products. However, additional research and analysis will be necessary to identify and develop those opportunities.
- » The emergence of autonomous, computerized “smart machines” offers opportunities for electronic products manufacturers to develop more advanced products to sell to other manufacturers, but it will require investment in engineers and new technology. This would require further research to determine the viability of such opportunities.
- » The expected wave of retiring Baby Boomers will create most of the demand for new workers, despite static, or even declining, overall employment in the manufacturing industry overall. Since other industries will experience the same challenges, competition for skilled workers will be brisk given the relatively limited number of potential younger workers.
- » The computer and electronic products manufacturing cluster in DeKalb County supports 418 jobs and contributes for \$43.2 million to the county’s economy. In the Reference Region, the cluster supports 3,803 jobs and contributes for \$1.1 billion to the regional economy.

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