1-1-2012

Akron Regional Analysis: Demographics, Economy, Entrepreneurship and Innovation

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January 2012

AKRON REGIONAL ANALYSIS:

DEMOGRAPHICS, ECONOMY, ENTREPRENEURSHIP AND INNOVATION

CENTER FOR ECONOMIC DEVELOPMENT

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EXECUTIVE SUMMARY

This report has been prepared for JumpStart Community Advisors by the Center for Economic Development at Cleveland State University. The objective of this study is to provide background analysis of the Akron region[1] for JumpStart Community Advisors as they conduct interviews and other qualitative research to create a Regional Entrepreneurial Action Plan for the Akron area.

This report is organized into three chapters: Demographics, Economy and Industry, and Entrepreneurship and Innovation. Each chapter contains the same structure: a summary of findings based on a review of other studies and an analysis conducted by the Center for Economic Development. In most instances in the Center's analysis, a graphic or table is displayed, followed by bullet points that highlight the observations of data collected and studied. In order to create a benchmarking system, we compared the Akron region and its counties to the state of Ohio and the United States.

DEMOGRAPHICS

The demographic information gathered on the Akron region revealed interesting trends and snapshots about the population. Overall, from 2000 to 2010, the 4-county Akron region has seen a marginal increase in population (0.73%). Most of this population increase occurred in Portage County, which recorded a 6.15% population increase during this 10-year period. Summit County, the largest county in the region and the county where the city of Akron is located, remained virtually unchanged over the 10-year period (-0.21%). This is in staunch comparison to the significant national population gain (9.71%) during this period.

The workforce of Akron is moderately educated and skilled. When comparing educational attainment among the population greater than 25 years old, the Akron region has, on average, a lower educational attainment than the state of Ohio and the United States. A closer look at educational attainment reveals that the Akron region exceeds the state of Ohio and the United States for *High School/GED* (36.37% versus 35.22% in the state of Ohio and 28.50% in the United States), but falls behind for the percentage of graduate or professional degrees (8.51% versus 8.94% in the state of Ohio and 10.44% in the United States).

Indicators of economic prosperity are a high per capita income and a low poverty rate. From 2000 to 2009, per capita income decreased by 1.87% in the Akron region, which is significantly larger than the decline in the state of Ohio (-0.95%) and the growth seen in the United States (4.94%) over this period. In addition, the Akron region and its counties lag behind the United States' per capita income level ($39,635 in the United States in 2009, compared to $35,012 in the Akron 4-county region). On the other hand, in 2010 the poverty rate in the Akron region (14.76%) was lower than the state of Ohio (15.85%) and the United States (15.33%). Therefore, even with a low per capita income, this region continues to stay above the poverty line.

The Akron region can be said to be average when compared with the nation in many indicators. The region experienced a small population gain, but it has lower educational attainment than the United States. Moreover, the region has experienced a decline in per capita income, an indicator of the region's standard of living, while the average per capita income in the United State increased. This report and

[1] The Akron region is defined for this study as Portage, Stark, Summit, and Wayne counties.

several other studies suggest that the Akron region has a significant workforce skills gap problem and that a strain exists on the economy from an education gap.

INDUSTRY AND ECONOMY

Over the last 30 years, the Akron region has not been competitive with the state of Ohio and the United States in measures of economic growth (employment, gross product, and average wage). Examining employment, gross product, and average wage shows a widening gap between the performance of the Akron region and the United States, so much so that between 1979 and 2010 the growth rate of gross product in the United States (94.5%) was 77.1 percentage points higher than in the Akron region (17.4%). This widening gap shows the significant economic problems of the Akron economy.

Manufacturing, Public Administration, and Healthcare and Social Services are important components of the Akron economy. Manufacturing accounted for the highest share of gross product, comprising 20.4% of total gross product in the Akron region; however, output in this sector shrank by 27.4% over the last decade. Public Administration accounted for 10.7% of all gross product output while Healthcare and Social Services reported the third highest gross product between 2000 and 2010 (6.8%).

The economic drivers in the Akron region are polymers, plastics, and chemicals; advanced manufacturing; advanced energy; and biomedical. Many of these industries (polymers, plastics, and chemicals; and advanced manufacturing) have had a long history in the Akron regional economy. While Akron faced severe economic issues in the past, it has found some success in re-focusing its energy and effort on new initiatives and taking advantage of assets in the community such as public-private partnerships and leveraging economic assets.

In addition to industry clusters, this report's analysis focuses on industries that outperform others and are considered "winning industries." There are ten (Tier I) winning industries and eight (Tier II) winning industries in the Akron region. These industries vary in size and scope, but they have in common growing gross products, regional specialization, and livable wages.

Of the Tier I industries, one is in the Construction Industry (Highway, Street, and Bridge Construction), three are in Manufacturing (Other Food Manufacturing; Soap, Cleaning Compound, and Toilet Preparation Manufacturing; and Boiler, Tank, and Shipping Container Manufacturing), three are in Wholesale Trade (Motor Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers; Grocery and Related Product Merchant Wholesalers; and Specialized Freight Trucking), one is in the Professional, Scientific, and Technical Services (Accounting, Tax Preparation, Bookkeeping, and Payroll Services), one is in Management of Companies and Enterprises, and one is in Health Care and Social Assistance (Offices of Physicians).

Of the Tier II industries, five are in the Manufacturing sector (Fruit and Vegetable Preserving and Specialty Food Manufacturing; Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing; Steel Product Manufacturing from Purchased Steel; Other Fabricated Metal Product Manufacturing; and Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing), two are in the Wholesale Trade sector (Furniture and Home Furnishing Merchant Wholesalers; and Petroleum and Petroleum Products Merchant Wholesalers), and one is in Finance and Insurance (Agencies, Brokerages, and Other Insurance-Related Activities).

ENTREPRENEURSHIP AND INNOVATION

Most existing entrepreneurship and innovation literature focuses on the universities and research centers in the Akron region and their role in helping to foster innovation, technology transfer, and start-up companies. The literature indicates the Akron region and the Northeast Ohio region are ahead of the curve in providing start-up capital to small firms. No such activity existed in other REAP regions (Northern Indiana, Greater Duluth, and Upstate New York) studied by the Center for Economic Development, so the very presence of capital is an advantage for the Akron region.

In this analysis, patent data is used as a proxy for innovation. There were 3,679 patents (already granted and applications) in Akron between January 2007 and October 12, 2011. To be counted, a patent had to include at least one inventor or an assignee from the Akron region. Of the 3,679 patents, only 25% had an assignee from Akron, indicating that businesses within Akron are **not** a major driver of local patents; individual owners of patents accounted for 43% of all patents. Examining the assignee information of patents in the Akron region revealed interesting information. The largest holder of patents in the Akron region is Goodyear Tire & Rubber Company.

CONCLUDING COMMENTS

There are significant challenges to overcome—structural and cultural—in the Akron economy for the region to become a leader in innovation and entrepreneurship. In comparison to the United States, the region also has significant ground to cover to become a national economic leader. The leadership of the region has had the foresight to address these declining trends by creating regional organizations focused on increasing early-stage professional capital and helping facilitate deal flows. There is still, however, a need for investment firms to provide greater risk capital.

CHAPTER 1: DEMOGRAPHICS

The analysis in this chapter, conducted by the Center for Economic Development at Cleveland State University's Maxine Goodman Levin College of Urban Affairs, examines the demographic profile of the Akron region. This section describes the socio-demographic characteristics of the region and includes analysis of population; population distribution by race, income, poverty; and educational attainment.

The Akron region is defined for this study as a 4-county region that includes Portage, Stark, Summit, and Wayne counties. In order to create a benchmarking system, we compared the Akron region (and its components) to the greater 21-county Northeast Ohio region,[2] the state of Ohio, and the United States. For the 21-county Northeast Ohio region, some of the counties included in the region are not classified within a metropolitan or micropolitan statistical area, limiting the data available.[3]

[2] The 21-county Northeast Ohio region includes: Ashland, Ashtabula, Carroll, Crawford, Columbiana, Cuyahoga, Erie, Geauga, Holmes, Huron, Lake, Lorain, Mahoning, Medina, Portage, Richland, Stark, Summit, Trumbull, Tuscarawas, and Wayne Counties.
[3] In these cases, U.S. Census Bureau American Community Survey 3-year annual average data was substituted when necessary.

DEMOGRAPHIC ANALYSIS

POPULATION & GROWTH

Table 1. Population Trends, 2000 & 2010

Area	2000 [A]	2010 [B]	Difference (2000-2010)	Percent Change (2000-2010)
Portage County	152,061	161,419	9,358	6.15%
Stark County	378,098	375,586	-2,512	-0.66%
Summit County	542,899	541,781	-1,118	-0.21%
City of Akron	217,074	199,110	-17,964	-8.28%
Wayne County	111,564	114,520	2,956	2.65%
Akron Region (4 Counties)	***1,184,622***	***1,193,306***	***8,684***	***0.73%***
Northeast Ohio (21 Counties)	4,556,311	4,450,906	-105,405	-2.31%
Ohio	11,353,140	11,536,504	183,364	1.62%
United States	281,421,906	308,745,538	27,323,632	9.71%

Source: [A] U.S. Census Bureau, 2000 Decennial Census; [B] U.S. Census Bureau, 2010 Decennial Census

- The population of the Akron region increased slightly from 1,184,622 residents in 2000 to 1,193,306 residents in 2010, a marginal growth of 0.73%. The region's growth was less than the state of Ohio (1.62%) and drastically smaller than the United States' growth (9.71%). However, the small population growth in the Akron region is a contrast to the decline in Northeast Ohio (-2.31%) (Table 1).

- The population of Portage County grew by 6.15% from 2000 to 2010. This rate of growth was significantly higher than any other county in the Akron region and the state of Ohio.

- The two largest and more urban counties, Stark County (-0.66%) and Summit County (-0.21%), reported small population declines from 2000 to 2010. In contrast, Wayne County grew modestly (2.65%).

- Summit County is the largest county in this region with a population of over 540,000. It is the home of the city of Akron. Wayne County is the smallest county in the region with more than 114,000 residents.

- While the Akron region gained population (8,684) between 2000 and 2010, the Northeast Ohio region lost more than 100,000 people, a 2.31% decrease.

Race Distribution

Table 2. Population by Race Distribution, 2010

		White Alone		Black or African American Alone		Asian Alone		Two or More Races		Some Other Race		American Indian & Alaska Native Alone		Native Hawaiian & Other Pacific Islander Alone	
Area	2010 Total Population	Total	Percent of Total Population	Total	Percent of Total Population	Total	Percent of Total Population	Total	Percent of Total Population	Total	Percent of Total Population	Total	Percent of Total Population	Total	Percent of Total Population
Portage County	161,419	148,936	92.27%	6,687	4.14%	2,305	1.43%	2,742	1.70%	413	0.26%	296	0.18%	40	0.02%
Stark County	375,586	333,191	88.71%	28,537	7.60%	2,764	0.74%	8,328	2.22%	1,720	0.46%	961	0.26%	85	0.02%
Summit County	541,781	436,487	80.57%	78,120	14.42%	11,885	2.19%	11,539	2.13%	2,602	0.48%	1,015	0.19%	133	0.02%
City of Akron	199,110	123,879	62.22%	62,648	31.46%	4,218	2.12%	6,284	3.16%	1,543	0.77%	486	0.24%	52	0.03%
Wayne County	114,520	109,543	95.65%	1,712	1.49%	874	0.76%	1,615	1.41%	567	0.50%	183	0.16%	26	0.02%
Akron Region (4 Counties)	***1,193,306***	***1,028,157***	***86.16%***	***115,056***	***9.64%***	***17,828***	***1.49%***	***24,224***	***2.03%***	***5,302***	***0.44%***	***2,455***	***0.21%***	***284***	***0.02%***
Northeast Ohio (21 Counties)	4,450,906	3,627,661	81.50%	613,152	13.78%	63,985	1.44%	86,693	1.95%	49,406	1.11%	8,891	0.20%	1,118	0.03%
Ohio	11,536,504	9,539,437	82.69%	1,407,681	12.20%	192,233	1.67%	237,765	2.06%	130,030	1.13%	25,292	0.22%	4,066	0.04%
United States	308,745,538	223,553,265	72.41%	38,929,319	12.61%	14,674,252	4.75%	9,009,073	2.92%	19,107,368	6.19%	2,932,248	0.95%	540,013	0.17%

Source: U.S. Census Bureau, 2010 Decennial Census

- The majority of people in the Akron region identify themselves as *White* (Table 2). The share of the *White* population in the Akron region (86.16%) is slightly smaller than the share in the state of Ohio (82.69%), but higher than in the United States (72.41%) (Table 2).
- Among the four counties in the Akron region, Summit County has the highest percent of *Black or African American Alone* (14.42%). Summit County is the home of the city of Akron, which has the highest percent of *Black or African American Alone* (31.46%) among the geographies listed in Table 2. These percentages are higher than in Ohio (12.20%) and the United States (12.61%).
- The Akron region is slightly less diversified than Northeast Ohio, especially as it relates to *Black or African American Alone*; Northeast Ohio has a higher proportion of *Black or African American Alone* (13.78%) than the Akron region (9.64%).

Per Capita Income

Table 3. Per Capita Personal Income, 2000 & 2009

Area	2000	2009	Difference (2000-2009)	Percent Change (2000-2009)
Portage County	$33,164	$33,849	$685	2.07%
Stark County	$34,148	$32,790	-$1,358	-3.99%
Summit County	$38,562	$38,001	-$561	-1.45%
Wayne County	$30,261	$29,808	-$453	-1.50%
Akron Region (4 Counties)	***$35,679***	***$35,012***	***-$667***	***-1.87%***
Northeast Ohio (21 Counties)	$36,255	$35,799	-$456	-1.26%
Ohio	$35,748	$35,408	-$340	-0.95%
United States	$37,771	$39,635	$1,864	4.94%

Note: Per capita income adjusted for inflation to 2009 dollars
Source: U.S. Bureau of Economic Analysis

- Per capita income in the Akron region shrank by 1.87% between 2000 and 2009, after adjusting for inflation. Three counties in the Akron region experienced a decrease in per capita income from 2000 to 2009; only Portage County showed growth (2.07%) (Table 3).

- Per capita income in the state of Ohio decreased by 0.95% between 2000 and 2009. Per capita income in Stark (-3.99%), Summit (-1.45%), and Wayne Counties (-1.50%) all fell at a faster rate than the state of Ohio.

- Summit County had the highest level of per capita income in the region in 2009 ($38,001). Per capita income in Summit County was greater than per capita income in Ohio ($35,408), but was smaller than the United States ($39,635). Wayne County had the lowest per capita income in the region ($29,808).

- The Akron region and the Northeast Ohio region both experienced a decrease in per capita income between 2000 and 2009. Per capita income in the Akron region shrank by 1.87% while Northeast Ohio saw a decrease of 1.26%.

Poverty Level

Table 4. Population below Poverty Level, 2010

Area	2010 Total Population Below Poverty Level	Percent of Total Population Below Poverty Level	Male Population Below Poverty Level	Percent Population Below Poverty Level (Male)	Female Population Below Poverty Level	Percent Population Below Poverty Level (Female)
Portage County	24,749	16.03%	11,361	14.85%	13,388	17.18%
Stark County	52,422	14.32%	23,192	13.03%	29,230	15.54%
Summit County	81,629	15.32%	36,506	14.23%	45,123	16.34%
City of Akron	57,312	29.38%	27,402	29.49%	29,910	29.28%
Wayne County	13,214	11.77%	4,778	8.64%	8,436	14.80%
Akron Region (4 Counties)	***172,014***	***14.76%***	***75,837***	***13.39%***	***96,177***	***16.05%***
Northeast Ohio (21 Counties)[A]	636,217	14.61%	76,312	13.13%	359,905	15.99%
Ohio	1,779,032	15.85%	794,921	14.58%	984,111	17.05%
United States	46,215,956	15.33%	20,850,219	14.15%	25,365,737	16.46%

Note: Percentage of population below poverty level = Total population below poverty level/population for whom poverty status is determined.
[A] U.S. Census Bureau, 2008 - 2010 American Community Survey 3-year average used to calculate the Northeast Ohio 21-county region due to limited data availability
Sources: U.S. Census Bureau, 2010 American Community Survey 1-year Estimate; U.S. Census Bureau, 2008 - 2010 American Community Survey 3-year average

- The Akron region has a lower poverty rate (14.76%) than the state of Ohio (15.85%) and the United States (15.33%) (Table 4).
- Wayne County had the lowest poverty rate of all counties in the Akron region for total population (11.77%), male population (8.64%), and female population (14.80%).
- The city of Akron had the highest poverty rate (almost 30%) of all geographies in Table 4.
- Using the 3-year annual average from 2008 to 2010 indicates that the Northeast Ohio region has a poverty rate (14.61%) similar to that of the Akron region (14.76%).

EDUCATION MEASURES

Table 5. Educational Attainment, 2010

		Less Than 9th Grade		9th to 12th Grade No Diploma		High School Graduate, GED, or Alternative		Some College, No Degree		Associate's Degree		Bachelor's Degree		Graduate or Professional Degree	
Area	Total Population Over 25 Years Old	Total	% Population 25 Years and Older	Total	% Population 25 Years and Older	Total	% Population 25 Years and Older	Total	% Population 25 Years and Older	Total	% Population 25 Years and Older	Total	% Population 25 Years and Older	Total	% Population 25 Years and Older
Portage County	103,068	2,566	2.49%	8,163	7.92%	41,070	39.85%	19,337	18.76%	7,405	7.18%	16,083	15.60%	8,444	8.19%
Stark County	257,180	6,377	2.48%	20,265	7.88%	101,691	39.54%	54,561	21.22%	21,524	8.37%	34,464	13.40%	18,298	7.11%
Summit County	368,591	9,342	2.53%	30,338	8.23%	117,485	31.87%	72,017	19.54%	29,450	7.99%	72,991	19.80%	36,968	10.03%
City of Akron	126,070	5,212	4.13%	15,139	12.01%	41,737	33.11%	27,029	21.44%	10,167	8.06%	17,998	14.28%	8,788	6.97%
Wayne County	73,810	5,155	6.98%	5,839	7.91%	31,714	42.97%	12,462	16.88%	3,996	5.41%	10,064	13.64%	4,580	6.21%
Akron Region (4 Counties)	***802,649***	***23,440***	***2.92%***	***64,605***	***8.05%***	***291,960***	***36.37%***	***158,377***	***19.73%***	***62,375***	***7.77%***	***133,602***	***16.65%***	***68,290***	***8.51%***
Northeast Ohio (21 Counties) [A]	3,036,038	107,161	3.53%	266,554	8.78%	1,093,050	36.00%	631,041	20.79%	220,073	7.25%	456,279	15.03%	261,880	8.63%
Ohio	7,720,849	254,513	3.30%	660,580	8.56%	2,718,983	35.22%	1,583,538	20.51%	602,445	7.80%	1,210,527	15.68%	690,263	8.94%
United States	204,288,933	12,452,952	6.10%	17,010,063	8.33%	58,225,602	28.50%	43,469,168	21.28%	15,553,106	7.61%	36,244,474	17.74%	21,333,568	10.44%

Note: [A] U.S. Census Bureau, 2008 - 2010 American Community Survey 3-year average used to calculate the Northeast Ohio 21-county region due to limited data availability
Source: U.S. Census Bureau, 2010 American Community Survey 1-year Estimate; U.S. Census Bureau, 2008 - 2010 American Community Survey 3-year average

- The Akron region has higher educational attainment than the state of Ohio. However, both regions lag behind the United States. Among the population 25 years and older, 16.65% have a bachelor's degree in the Akron region while only 15.68% in the state of Ohio have obtained a bachelor's degree. However, of the U.S. population greater than 25 years old, 17.74% have a bachelor's degree (Table 5).

- The Akron region has a lower proportion of people 25 years and older (8.51%) with a graduate or a professional degree than the state of Ohio (8.94%) and the United States (10.44%).

CHAPTER 2: ECONOMY AND INDUSTRY

This report, a product of the Center for Economic Development at Cleveland State University's Maxine Goodman Levin College of Urban Affairs, examines the economic profile of the Akron region. First, it summarizes information from other studies that were conducted on the Akron regional economy. Second, it describes the major findings of an analysis conducted by the Center for Economic Development.

The analytical section includes an analysis of trends in total employment, gross product, and average wage. It identifies high-performing (winning) industries, unemployment, occupations, top employers, fast-growth firms, economic inclusion, and economic development organizations.

The Akron region is defined for this study as a 4-county region that includes Portage, Stark, Summit, and Wayne counties. In order to create a benchmarking system, we compared the Akron region (and its components) to the greater 21-County Northeast Ohio region,[4] the state of Ohio, and the United States.

[4] The 21-County Northeast Ohio region includes: Ashland, Ashtabula, Carroll, Crawford, Columbiana, Cuyahoga, Erie, Geauga, Holmes, Huron, Lake, Lorain, Mahoning, Medina, Portage, Richland, Stark, Summit, Trumbull, Tuscarawas, and Wayne Counties

REVIEW OF OTHER STUDIES: ECONOMY

ECONOMIC CLIMATE

Dr. Benjamin Franklin Goodrich moved his rubber company from New York to Akron in the 1890s and began to make fire hoses and rubber tubing in the Akron area. At the turn of the century, as the automobile assembly line started and demand for rubber products resulting from the First World War began, Akron became the center of the rubber manufacturing industry.[5] Since then, this industry has had a long history in the Akron region with economic booms and busts, especially as an automotive supplier. By the late 20th Century, the rubber industry had shed a significant amount of its workforce, which caused a population flight from the city of Akron.[6] In an attempt at resiliency, Akron transitioned from focusing on producing rubber to the science, chemistry, and polymers behind the products. The region is now includes a world-class polymer cluster.[7]

Although Akron faced severe economic issues in the past, it appears to have found some success in re-focusing its energy on new initiatives; consequently, in 2008, the Brookings Institution commissioned an in-depth analysis into what put this weak market back on the road to economic recovery. They identified several findings:[8]

1. **Strong leadership**
   - Long-term leadership of the mayor "appears to have been an essential catalyst" to achieve economic development goals.[9]
   - Partnerships between the city of Akron and the University of Akron and the state of Ohio have created innovation and technology areas such as the Akron Global Business Accelerator.
2. **Vision and planning**
   - Public and private investment in research and development.
3. **Identifying that "we're all in it together"**
   - Created districts with adjacent townships in order to allow companies to expand while using city water and sewage
   - Regional collaboration through collective philanthropy, and advocacy organizations to help build the economic clusters
4. **Place matters and the community should capitalize on it**
   - Efforts to revitalize downtown through civic and commercial development.
   - Creating institutional development around infrastructure development (this was led mostly by the education and health care institutions).

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[5] Ledebur, Larry and Jill Taylor. "A Restoring Prosperity Case Study: Akron, Ohio" September 2008
[6] International Economic Development Council. " Case: Building on Economic Assets in Akron, Ohio after the Decline of the Tire Industry" 2010
[7] Ledebur, Larry and Jill Taylor. "A Restoring Prosperity Case Study: Akron, Ohio" September 2008
[8] Ledebur, Larry and Jill Taylor. "A Restoring Prosperity Case Study: Akron, Ohio" September 2008
[9] Ledebur, Larry and Jill Taylor. "A Restoring Prosperity Case Study: Akron, Ohio" September 2008. P. 25

INDUSTRY CLUSTERS

The four main industry clusters in the Akron region are listed below:

1. Polymers, Plastics, and Chemicals
2. Advanced Manufacturing
3. Advanced Energy
4. Biomedical

POLYMERS, PLASTICS, AND CHEMICALS

- It is anticipated that there will be significant growth in polymers because the industries that use polymers in their production process are expected to grow (electronics, biomedical applications, and alternative/renewable energies).[10]
- Ohio ranks #1 in employment in the polymer industry, #1 in new capital expenditures for polymers (investments in building and equipment), and ranks #1 in plastics and rubber products GDP.[11]
- The Ohio Polymer Strategic Council has identified over 30 NAICS codes that define the polymer industry at the 6-digit NAICS level.[12] For more information on the polymer cluster, see Appendix A – Polymer Industry Cluster.
- Organizations involved in the polymer industry:
    - Ohio Department of Development
    - Ohio Polymer Strategic Council
    - Ohio BioProducts Innovation Center
    - Center for Multifunctional Polymer Nanomaterials and Devices
    - The National Composite Center
    - PolymerOhio – An Edison Technology Center

Six Main Polymer Market Areas[13]

The six main markets for the polymer industry, as well as a brief description of the types of products found in each, are listed below.

1. **Alternative/renewable energy**: Products such as nanocoatings for increased solar cell efficiency, high strength-to-weight-ratio composite wind blades (although costs must be reduced), weather resistant coatings and erosion resistant adhesives to maximize productivity, and “smart“ polymer materials and coatings to be used for blade reliability.
2. **Automobile, aerospace and defense:** Products such as polymers for lightweight protective gear and flame-retardant fabrics for defense, sealants (noise) and adhesives (weight savings) for the automotive industry, and bio-plastics and other sustainable materials for high-value, high-performance bio-based engineering polymers.
3. **Electronics (flexible electronics)**: Products such as flexible chips must be durable and reliable to replace silicon, roll-to-roll manufacturing consistency and improved performance, organic Light

[10] Dennis Barber/Salman Farooq & Battelle Technology Partnership “2011 Update: Ohio’s Polymer Strategic Opportunity Roadmap” March 2011
[11] Dennis Barber/Salman Farooq & Battelle Technology Partnership “2011 Update: Ohio’s Polymer Strategic Opportunity Roadmap” March 2011
[12] Ohio Department of Development. “Ohio’s Polymer and Advanced Materials Industry”
[13] Dennis Barber “The Ohio Polymer Industry” Presentation given August 10, 2011

Emitting Diodes (OLEDs) are polymer film layers and could be a major factor in flat panel displays (longer life required).

4. **Biomedical**: Products such as renewable, recyclable materials for disposable medical products, medical adhesives for implants, equipment that will use "benign" chemicals, coatings and sealants and renewable materials, biofilms that will be used for timed-release antibiotics and bacterial resistance, building materials, and packaging.
5. **Building Materials**: Products such as cast polymers that provide increased durability and design flexibility, composites (shingles, siding) for improved durability, shape, color, flame resistant polymers, residential attributes - easy to customize, cost, durability.
6. **Packaging**: This $400 billion sustainable market is growing in importance. The flexible packaging and single-serve packaging areas are growing, protective packaging has seen major growth because of retail sales on the Internet and there are significant opportunities in custom resins with aesthetic and/or design advantages.

Ohio Polymer Strategy Council (OPSC)

The Ohio Polymer Strategy Council (OPSC) is an organization that assists in the planning and advocacy of polymers in Ohio. Members of these organizations include public and private entities as well as universities. It is important to note that of the five universities that are members, two (the University of Akron and Kent State University) are located within the Akron region.

OPSC utilizes four major pillars to grow the size of the cluster. These include:

1. **New technology commercialization**
   - Upgrade the polymer technology infrastructure to pursue significant opportunity areas.
   - Establish efficient mechanisms to increase the commercial success rates for emerging technologies.
   - Increase the speed of new technology commercialization.
2. **Value chain**
   - Strengthen the value chain in Ohio by improving the competitiveness of small-to-medium-sized manufacturers.
   - Increase the number of collaborative projects by identifying productive partnerships across the value chain, reducing the time to market for both new technologies and incremental advances in existing technologies.
3. **Talent**
   - Strengthen the existing infrastructure to assure the established manufacturing talent is capable of leveraging new technology.
4. **Access to capital**
   - Increase access to state, federal, and corporate funding.

Advanced Manufacturing

- It is estimated that direct employment of the manufacturing sector in 2010 is 71,124.[14]
- It is important to note that advanced manufacturing is an umbrella industry that feeds the polymer, plastic, and chemical industry either directly or through supply-chain mechanisms.
- Advanced manufacturing represents "new" manufacturing through innovation and R&D.
- Local assets supporting the advanced manufacturing cluster include:
    - University of Akron
    - Kent State University
    - Manufacturing Advocacy & Growth Network (MAGNET)
    - Wire-Net

Advanced Energy[15]

- According to the Brookings Institution report, "Sizing the Green Economy," 72.9% of Akron's share of green-collar[16] jobs offer good pay for a modest education; this is considerably larger than the 42.9% of the U.S. blue-collar jobs that offer good pay for a modest education.
- In 2010, there were 5,445 jobs in the Akron MSA green economy, which ranks 78th among the 100 largest metro areas; it is estimated that these jobs pay an annual wage of $38,120, which is higher than the average annual wage for all jobs in the Akron MSA ($35,428).
- Clean economy employers in the Akron region include:
    - American Environmental Group (Waste Management and Treatment)
    - Clearwater Systems Inc. (Air and Water Purification Technologies)
    - Georgia-Pacific LLC (Sustainable Forestry Products)
    - Rotek Inc. (Wind)
    - Technical Consumer Products (Lighting)

Biomedical[17]

- There has been significant growth in the medical industry in the Akron area. Numerous companies, research institutions, medical device manufacturers, biomedical advanced materials producers, testing laboratories, and diagnostic imaging centers are located within the region.
- Within the biomedical field, the Akron region's focus is on:
    - Orthopedics
    - Advanced burn and wound care
    - Tissue engineering
    - Imaging and diagnostics
    - Dentistry
    - Skin hygiene, anti-microbial formulations, and delivery devices
    - Biomedical testing
- The Austen BioInnovation Institute in Akron, a collaboration of Akron Children's Hospital, Akron General Health System, Northeast Ohio Medical University (NEOMED), Summa Health System and the University of Akron, was established to further innovation and excellence in the biomedical cluster.

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[14] Moody's Economy.com

[15] Brookings Institution "Sizing the Green Economy: The Clean Economy in the Akron, OH Metropolitan Area" 2010

[16] "Green collar" occupations include jobs in the following occupational categories: production, transportation, installation, construction, office administration and support, protective services, and social services.

[17] Mayor's Office of Economic Development, City of Akron. "The Akron Biomedical Corridor"

- In March of 2011, the mayor of Akron, Don Plusquellic, announced that he was going to form the Akron Development Corporation Seed Fund to attract early stage and biomedical companies to the Akron Global Business Accelerator and/or to the Akron Biomedical Corridor. Mayor Plusquellic hopes to raise $15 million for the fund. [18]

STRENGTHS

The Northeast Ohio Four County Regional Planning and Development Organization (NEFCO)[19] prepared an economic development strategy in 2009[20] that pointed out the strengths of the Akron region. The strengths of the Akron region are unique, allowing the region to find a niche market for its products and services in the future. Condensing the list created a few core strengths:

1. **Quality of Life**
    - The region's proximity to other major markets
    - Numerous recreational amenities
    - Low cost of living
2. **Economic Assets**
    - City of Akron fares well in job standings
    - Akron Global Business Accelerator
    - EB-5 Regional Center: The Wayne Economic Development Council and Wooster Growth Corporation have applied to be an EB-5 Regional Center that could take advantage of receiving investment dollars from foreign investors in exchange for an immigration Green Card for the investor and/or their family. The EB-5 Regional Center program is a federal program.
    - There are a number of public/private polymer science partnerships in the region.
    - Foreign Trade Zone 181 adjacent to a strong regional airport provides many opportunities for growth of the international economy and trade that would benefit businesses in the region.
3. **Strong Companies are Headquartered in the Region**
    - Bridgestone Firestone has made a commitment to keep its headquarters in Akron.
    - Numerous companies are headquartered in Northeast Ohio. The region ranks fourth in company headquarters.

UNIVERSITY OF AKRON

One of the major strengths within the region is the role the **University of Akron**[21] has played in helping shape the industrial and innovation agenda for the city of Akron and the region. Many of these initiatives will be highlighted in the third chapter of this report, but it is essential to acknowledge the importance and strength of this institution in the polymer and biomedical industry clusters and the role the university plays in attracting talent, increasing innovation, and fostering collaboration between the public, private, and academic setting.

[18] Glen, Brandon "Akron plans biomedical seed fund to attract startups to city" MedCity News. March 23, 2011
[19] As defined as Portage, Stark, Summit, and Wayne Counties.
[20] Northeast Ohio Four County Regional Planning and Development Organization (NEFCO)" Comprehensive Economic Development Strategy Annual Performance Report" 2009
[21] Proenza, Luis "Universities and their Regions: The Akron Model" June 2009

The University of Akron understands its role in leading the Akron region to a better economic environment and has established five elements that underpin a new university strategy and educational philosophy:[22]

1. Public purpose is tied to enhancing the health of regional economies
2. Workforce development, community development and economic development are fully integrated into common strategies at the national, state, and regional levels
3. Regions are based on economic spheres of interconnected communities, without political boundaries, and having critical mass
4. All regions have a competitive strategy and collaborations that enable them to act
5. Acknowledge that strengthening communities is not the sole province of government

WEAKNESSES

The economic development strategy prepared by NEFCO in 2009[23] also revealed the economic development problems of the region, some of which are common characteristics shared with other rust belt cities. Condensing the list created a few core weaknesses:

1. **Economic Realities**
    - High cost of production inputs means higher manufacturing costs
    - Job losses in the industrial core
    - Area foreclosures
    - Local government cutbacks
    - Current utility rates make it challenging to attract businesses

2. **Economic Development Issues**
    - Reliance on private sector for economic development
    - Aging infrastructure is a drawback in making concessions for businesses to stay
    - National perception of Northeast Ohio as a less-than-ideal place to live and work partly because of its manufacturing past, cool climate, and occasional studies that paint an unfavorable portrait of the region.

3. **Political Fragmentation**
    - Large numbers of political units can lead to a lack of coordination among entities with similar goals.

[22] University of Akron "Charting the Course v. 2020: Serving the State through the University System of Ohio" July 14, 2009 P. 1
[23] Northeast Ohio Four County Regional Planning and Development Organization (NEFCO)" Comprehensive Economic Development Strategy Annual Performance Report" 2009

Education Gap

Many studies have pointed to the education gap that exists in the Northeast Ohio region, defined as low levels of educational achievement at the level of bachelor's and advanced degrees. This low educational attainment spans across all fields, but is especially prevalent in the science and technology fields. In 2006, the Ohio General Assembly passed legislation to create the Northeast Ohio Universities Collaboration and Innovation Study Commission to address gaps and issues within this arena.[24]

In the summer of 2011, the Northeast Ohio Council on Higher Education (NOCHE),[25] in cooperation with CEO for Cities, found that it can increase college attainment if it focuses on (1) improving college readiness, (2) increasing retention to degree completion, and (3) increasing degree attainment among adults with some college but no degree. The program has been monitoring high school and college completion rates as well as other metrics and determined that the on-time high school graduation rate should increase from 82% (2009) in the NOCHE region to 97% (2014) and the college completion rate should increase from 39.05% (2009) to 50% (2014).

Increasing the quality of human capital in the Akron region is an important component of economic development as a strong correlation exists between increasing educational attainment and increasing per capita income and wages in a region.

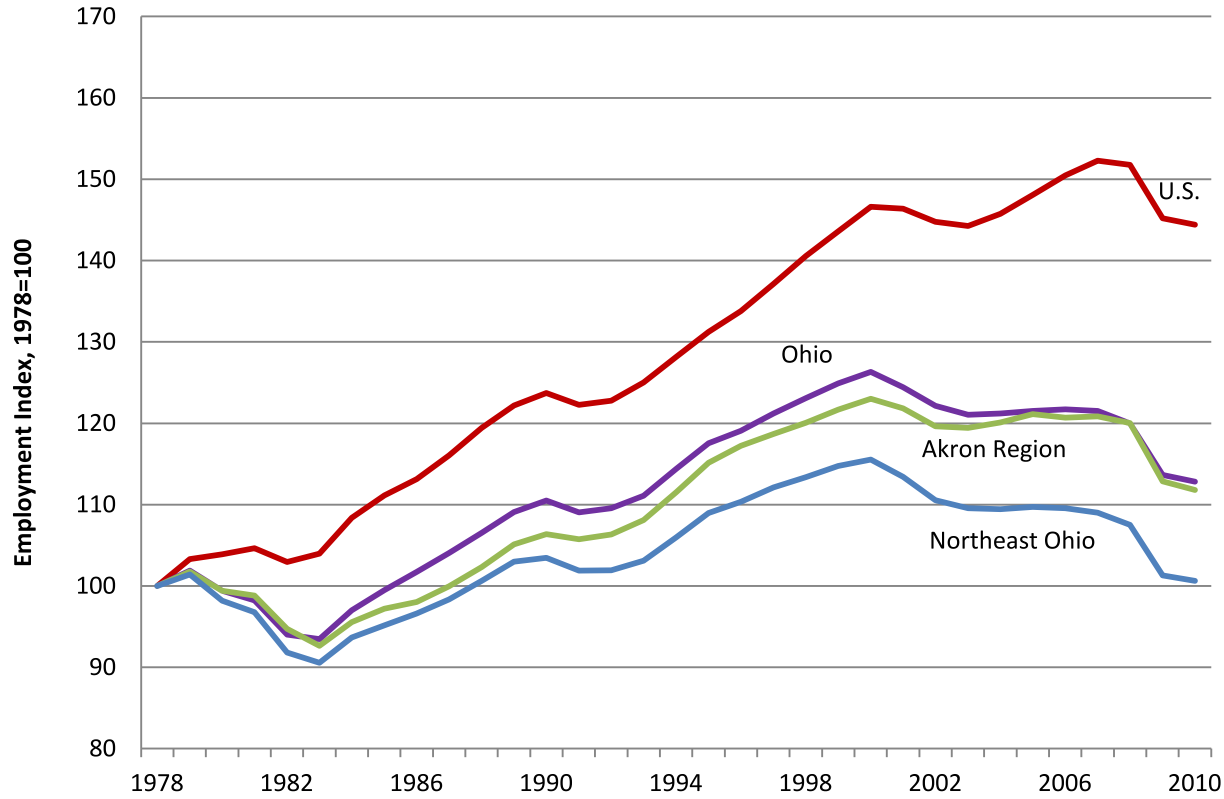
[24] Northeast Ohio Universities Collaboration & Innovation Study Commission. "Report of the Northeast Ohio Universities Collaboration and Innovation Study Commission." December 2007

[25] The service area for NOCHE is a 21-county definition that includes the Akron region, but also includes the Cleveland, Canton, and Youngstown metropolitan areas.

INDUSTRY ANALYSIS

EMPLOYMENT TRENDS

Figure 1. Total Employment for the Akron Region, Northeast Ohio Region, State of Ohio, and United States, 1978-2010



Note: Data includes private households
Source: Moody's Economy.com

- Throughout the employment time span in Figure 1, total employment growth in the Akron region mirrored employment growth in the state of Ohio; however, both have dramatically lagged behind the United States. Excluding the most recent recession, the employment growth rate in the Akron region from 1978 to 2006 was 20.7%, similar to the growth rate in Ohio (21.7%), but in stark contrast to the United States (50.5%) (Figure 1).
- Employment in the Akron region peaked in 2001 (568,000 employees) and has been declining since.
- The 2010 employment index (111.8) in the Akron region is approximately equal to the level of employment in 1994 (111.5).
- Employment growth in Northeast Ohio lagged behind the Akron region and grew only 0.63% over the last 40 years (1978 to 2010).

Table 6. Employment Change by Major Industry Sector, 2000-2010

	Akron Region (4 County)		Northeast Ohio	Ohio	U.S.
Industry Sector	2010 Employment	Percentage Change, 2000-2010			
Public Administration	77,658	-0.5%	-2.1%	-0.5%	7.1%
Health Care and Social Assistance	77,010	23.5%	19.8%	21.8%	28.0%
Manufacturing	71,124	-38.8%	-41.2%	-39.3%	-33.8%
Retail Trade	58,589	-15.5%	-18.3%	-18.0%	-5.6%
Accommodation and Food Services	41,790	0.6%	-3.4%	0.5%	10.5%
Administrative and Support and Waste Management and Remediation Services	27,246	-16.3%	-15.4%	-13.7%	-4.7%
Wholesale Trade	24,790	-4.6%	-11.5%	-12.6%	-5.4%
Other Services (except Public Administration)	22,668	-9.7%	-9.8%	-5.5%	3.2%
Professional, Scientific, and Technical Services	20,034	6.9%	-7.3%	0.0%	9.5%
Construction	18,566	-30.0%	-30.1%	-32.0%	-17.8%
Finance and Insurance	17,280	-7.6%	-13.9%	-6.4%	-2.0%
Management of Companies and Enterprises	16,253	153.6%	34.6%	24.1%	5.8%
Transportation and Warehousing	12,899	4.3%	-13.0%	-7.3%	-6.0%
Educational Services	9,567	44.4%	44.1%	39.3%	31.9%
Information	6,160	-23.6%	-31.1%	-27.8%	-24.7%
Arts, Entertainment, and Recreation	6,108	-36.1%	-22.1%	-13.9%	5.9%
Agriculture, Forestry, Fishing and Hunting	6,083	-4.1%	-11.5%	-16.4%	-13.6%
Real Estate and Rental and Leasing	4,883	-23.3%	-17.6%	-21.9%	-4.3%
Utilities	1,914	24.8%	-14.7%	-15.9%	-7.4%
Mining, Quarrying, and Oil and Gas Extraction	808	-16.2%	-9.2%	-12.8%	31.1%
TOTAL	**521,430**	**-9.1%**	**-12.9%**	**-10.6%**	**-1.7%**

Source: Moody's Economy.com
Note: Data does not include private households

- Public Administration was the largest sector in the Akron region in 2010 in terms of employment. This sector accounted for 77,658 employees or 14.9% of total employment. The next largest sector, only slightly smaller than Public Administration, was Healthcare and Social Assistance, which employed 77,010 employees and accounted for 14.8% of total employment (Table 6).

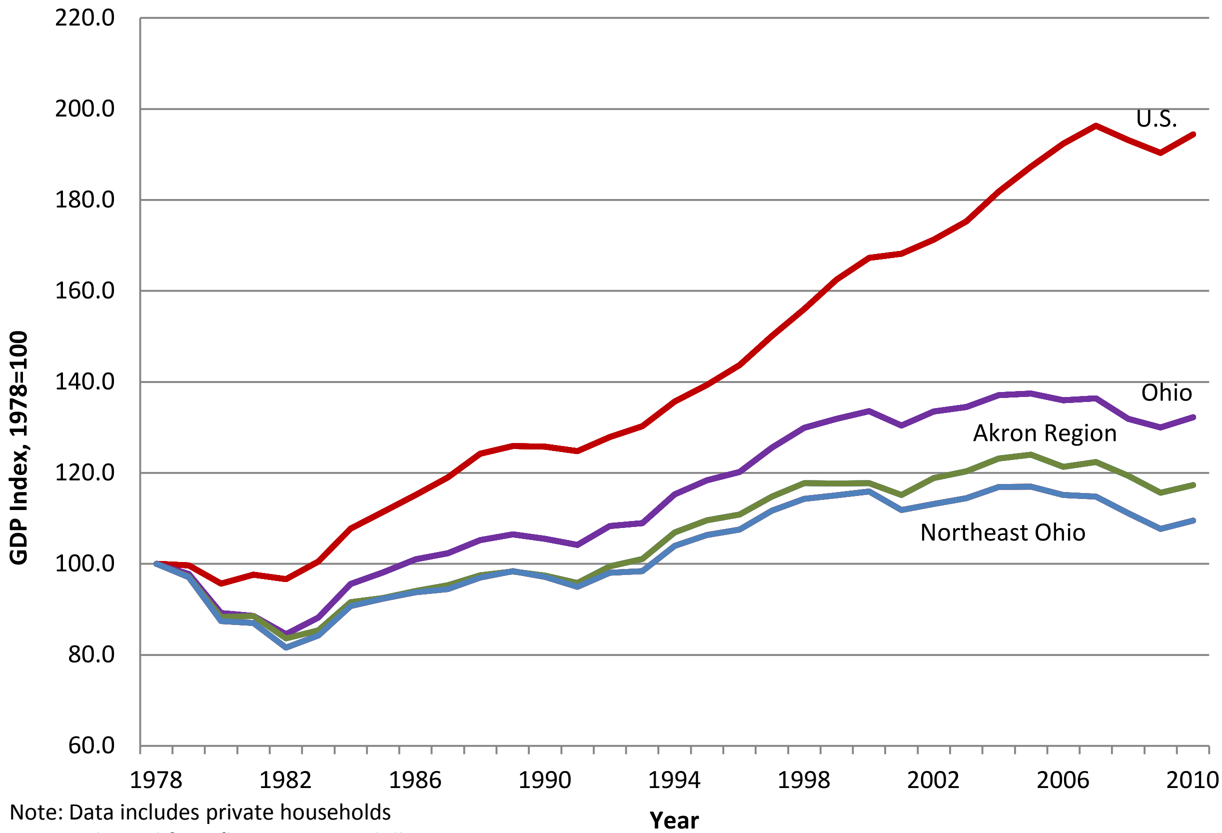
- Eight sectors in the Akron region suffered double-digit rates of decline from 2000 to 2010, compared to 12 sectors in Northeast Ohio, 11 sectors in the state of Ohio, and four in the United States.

- Employment grew in seven of the 20 major industry sectors in the Akron region from 2000 to 2010, compared to three in Northeast Ohio, four in the state of Ohio, and nine in the United States.

- In comparison to the Akron region and the United States, the Northeast Ohio region experienced the largest loss in total employment with a 12.9% decrease between 2000 and 2010. The sectors with the largest employment losses in Northeast Ohio were Manufacturing (-41.9%), Information (-31.1%), and Construction (-30.1%).

TRENDS IN GROSS PRODUCT

Figure 2. Gross Product for the Akron Region, Northeast Ohio Region, State of Ohio, and United States, 1978-2010



Note: Data includes private households
GDP is adjusted for inflation to 2010 dollars
Source: Moody's Economy.com

- The gap in the gross product growth rate between the Akron region and the United States has grown wider over the last 40 years. Between 1978 and 2010, the gross product growth rate in the Akron region was only 17.4%, compared to 94.5% in the United States. This widening gap shows the significant structural economic issues of the Akron region.
- It is staggering to note that the gross product in the Akron region did not return to 1978 levels until 1993, more than 15 years later.
- The largest over-the-year gross product decrease in the Akron region occurred during the recession of the early 1980s, from 1981 to 1982, when gross product declined by 4.5%.
- Until 2000, the Northeast Ohio region closely mimicked the Akron region's GDP growth; however, since 2000 the Akron region has experienced stronger GDP growth than the Northeast Ohio region, creating a gap between the two regions.

Table 7. Gross Product Change by Major Industry Sector, 2000-2010

	Akron Region (4 County)		Northeast Ohio	Ohio	U.S.
Industry Sector	2010 Gross Product ($Mil)	Percent Change, 2000-2010			
Manufacturing	$8,806.0	-27.4%	-28.2%	-24.8%	-4.2%
Public Administration	$4,613.3	6.8%	6.2%	9.8%	27.6%
Health Care and Social Assistance	$4,596.6	35.8%	31.0%	37.3%	48.3%
Retail Trade	$3,323.1	-8.7%	-16.5%	-14.9%	-0.7%
Real Estate and Rental and Leasing	$3,156.0	-3.2%	-4.7%	-5.1%	18.9%
Wholesale Trade	$3,127.3	6.1%	-0.7%	0.4%	3.3%
Finance and Insurance	$2,686.0	14.4%	3.0%	18.4%	27.9%
Professional, Scientific, and Technical Services	$2,068.2	25.8%	4.4%	16.9%	31.6%
Management of Companies and Enterprises	$2,028.9	278.7%	79.9%	48.5%	18.3%
Construction	$1,300.3	-37.5%	-41.3%	-41.3%	-14.6%
Administrative and Support and Waste Management and Remediation Services	$1,284.4	6.2%	8.5%	9.1%	15.0%
Transportation and Warehousing	$1,139.1	-13.7%	-6.0%	2.5%	6.5%
Other Services (except Public Administration)	$1,046.2	-8.2%	-18.4%	-14.1%	-1.5%
Accommodation and Food Services	$1,030.4	-0.8%	-4.3%	0.2%	11.6%
Information	$915.1	14.8%	8.5%	14.0%	26.7%
Utilities	$894.9	53.8%	24.7%	14.0%	25.2%
Educational Services	$372.3	-69.2%	24.7%	39.2%	49.6%
Agriculture, Forestry, Fishing and Hunting	$309.7	51.6%	53.7%	57.7%	27.3%
Mining, Quarrying, and Oil and Gas Extraction	$272.5	64.1%	37.8%	27.0%	104.1%
Arts, Entertainment, and Recreation	$174.1	-37.3%	-14.3%	-11.6%	5.1%
TOTAL	**$43,144.5**	**-2.5%**	**-5.5%**	**-1.0%**	**16.3%**

Source: Moody's Economy.com
Note: Data does not include private households

- Manufacturing was the largest contributor to gross product in the Akron region in 2010 ($8.8 billion), accounting for 20.4% of total gross product (Table 7). However, gross product from Manufacturing shrank by -27.4% over the last decade.

- The second largest contributor to the Akron region's gross product in 2010 was Public Administration ($4.6 billion). The Public Administration sector accounted for 10.7% of the Akron region's gross product and grew 6.8% between 2000 and 2010.

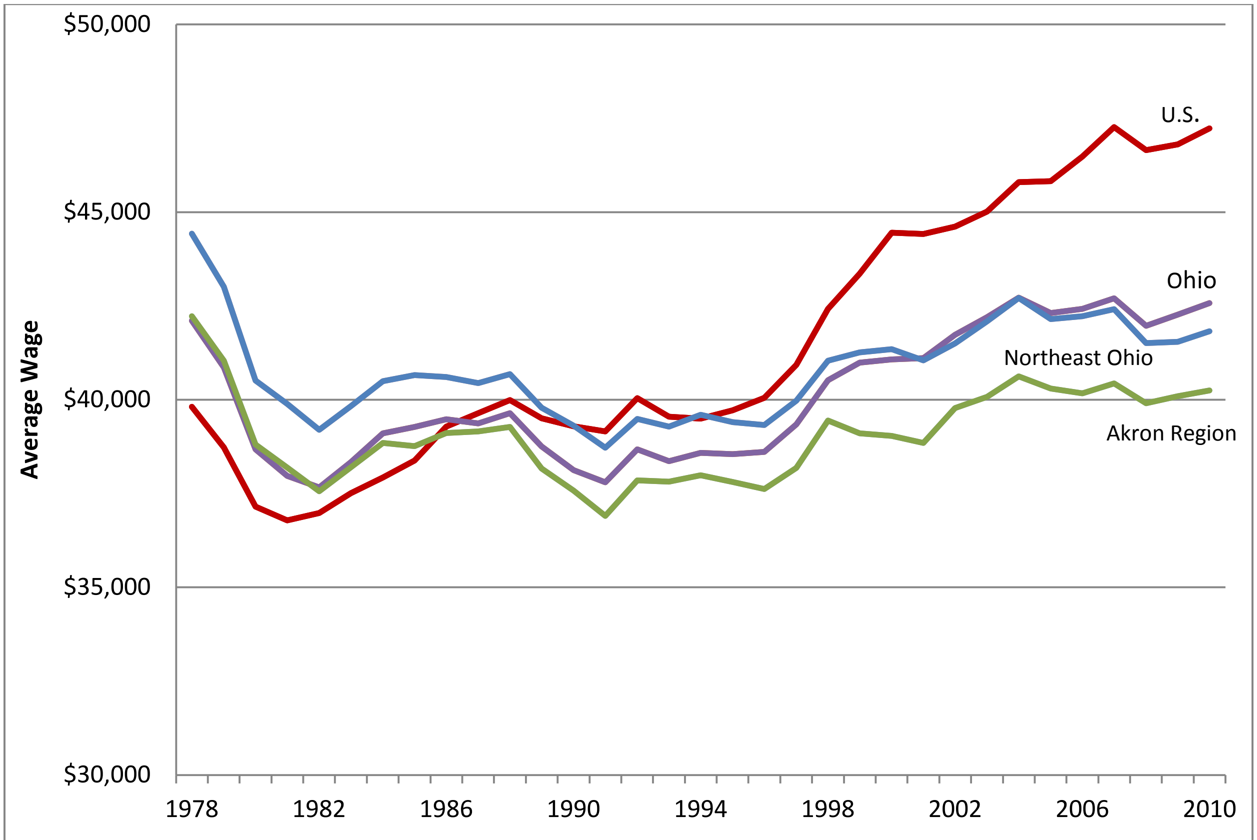
- Health Care and Social Assistance ($4.6 billion) was the third largest contributor to the Akron region's gross product in 2010. This sector grew by more than a third (37.8%) between 2000 and 2010.

- Gross product grew in 11 of the 20 major industry sectors in the Akron region from 2000 to 2010, compared to 11 in Northeast Ohio, 14 in the state of Ohio, and 16 in the United States.

- Northeast Ohio experienced more than double the loss in total gross product than the Akron region (-5.5% and -2.5, respectively). The sectors with the biggest losses were Construction (-41.3%), Manufacturing (-28.2%), and Other Services (-18.4%).

Trends in Average Wage

Figure 3. Average Wage for the Akron Region, Northeast Ohio Region, State of Ohio, and United States, 1978-2010



Note: Average Wage is adjusted for inflation to 2010 dollars
Source: Moody's Economy.com

- Average wage was similar in all three regions in 1987 and 1988 at approximately $39,000. After 1989, the United States' average wage grew faster than Ohio's, and Ohio's grew faster than the average wage in the Akron region (Figure 3).
- By 2010, the average wage in the United States was $47,230 and Ohio's average wage was $42,576. The Akron region had a lower average wage than both regions in 2010 ($40,249).
- In all four regions compared, average wage has had growth over the long term since 1992. Additionally, each region has begun to experience growth in average wage since the last recession.

Table 8. Average Wage Change by Major Industry Sector, 2000-2010

	Akron Region (4 County)		Northeast Ohio	Ohio	U.S.
Industry Sector	2010 Average Wage ($)	Percentage Change, 2000-2010			
Mining, Quarrying, and Oil and Gas Extraction	$114,124	47.3%	26.8%	21.8%	20.5%
Management of Companies and Enterprises	$86,405	49.5%	33.8%	19.7%	13.9%
Utilities	$78,591	8.0%	28.1%	18.7%	8.7%
Wholesale Trade	$57,614	1.6%	2.4%	4.9%	5.6%
Professional, Scientific, and Technical Services	$55,516	9.2%	4.6%	8.5%	7.2%
Manufacturing	$53,418	-3.6%	-0.9%	0.2%	7.9%
Finance and Insurance	$50,532	10.7%	5.6%	11.3%	10.3%
Information	$49,391	-0.1%	3.8%	2.5%	2.1%
Construction	$46,575	7.0%	0.6%	3.3%	6.9%
Transportation and Warehousing	$44,978	-21.8%	1.7%	4.6%	0.8%
Health Care and Social Assistance	$40,426	3.2%	3.1%	5.8%	10.1%
Public Administration	$40,200	6.3%	7.0%	-32.4%	12.0%
Real Estate and Rental and Leasing	$31,600	10.5%	-0.2%	6.4%	4.7%
Educational Services	$28,617	-0.5%	-13.6%	-0.1%	13.5%
Administrative and Support and Waste Management and Remediation Services	$28,260	12.1%	13.2%	12.1%	12.1%
Other Services (except Public Administration)	$27,894	13.2%	0.6%	1.0%	8.5%
Retail Trade	$26,348	-0.4%	-5.7%	-4.3%	-2.3%
Arts, Entertainment, and Recreation	$18,456	20.9%	27.0%	19.9%	9.0%
Accommodation and Food Services	$14,352	-1.8%	-2.1%	-1.1%	2.1%
Agriculture, Forestry, Fishing and Hunting	$7,342	26.6%	39.1%	51.0%	26.9%
TOTAL	**$40,227**	**3.1%**	**1.1%**	**-5.5%**	**6.4%**

Source: Moody's Economy.com
Note Data does not include private households

- The sectors with the highest average wages in the Akron region were Mining, Quarrying, and Oil and Gas Extraction ($114,124), Management of Companies and Enterprises ($86,405), and Utilities ($78,591) (Table 8). Average wage grew in all three sectors; Mining, Quarrying, and Oil and Gas Extraction and Utilities, however, were the two smallest sectors of the 20 listed in Table 8 with about 800 and 1,900 employees, respectively.

- Average wages grew in 14 of the 20 industry sectors in the Akron region between 2000 and 2010, compared to 15 industry sectors in Northeast Ohio, 16 in the state of Ohio, and 19 in the United States.

- Total average wages grew 3.1% in the Akron region and 1.1% in Northeast Ohio region, but they fell 5.5% in the state of Ohio. Over the same time period, average wages in the United States grew 6.4%.

HIGH PERFORMANCE INDUSTRIES

To identify which industries in the Akron region are outperforming other industries regionally and nationally, the Center for Economic Development analyzed data at a finer detail level of industry (4-digit). This analysis explores 283 industry sectors in greater depth.

"WINNING" INDUSTRIES – TIER I

To examine these high performance industries, we selected industries that meet all of the following criteria:

1. **Percent Employment Change (2000-2010) > 1%** – to show employment growth
2. **Average Wage (2010) > $50,283.75**[26] – to find industries that have livable wages
3. **Percent Change in Gross Product (2000-2010) > 0.1%** – to show positive growth in output
4. **Gross Product Location Quotient**[27] **(2010) > 1.2**[28] - to find industries that are more concentrated in the Akron region relative to the United States.
5. **2010 Employment > 500** – to find large employers

- Table 9 shows the ten industries that met the criteria for winning industries in the Akron region. All ten industries had employment greater than 500 employees in 2010, suggesting that they are employment drivers in the region.

- The ten winning Tier I industries had a gross product LQ greater than 1.2, indicating these industries are specialists in their field nationally, have livable wages, and experienced growth in both employment and output. These industries combined employed 45,328 people in 2010.

- One Tier I industry is in the Construction industry (Highway, Street, and Bridge Construction), three are in Manufacturing (Other Food Manufacturing; Soap, Cleaning Compound, and Toilet Preparation Manufacturing; and Boiler, Tank, and Shipping Container Manufacturing), three are in Wholesale Trade (Motor Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers; Grocery and Related Product Merchant Wholesalers; and Specialized Freight Trucking), one is in Professional, Scientific, and Technical Services (Accounting, Tax Preparation, Bookkeeping, and Payroll Services), one is in Management of Companies and Enterprises, and one is in Health Care and Social Assistance (Offices of Physicians).

- Of the Tier I industries, the largest employer in 2010 was Management of Companies and Enterprises with 16,253 employees and 35.9% of total Tier I employment.

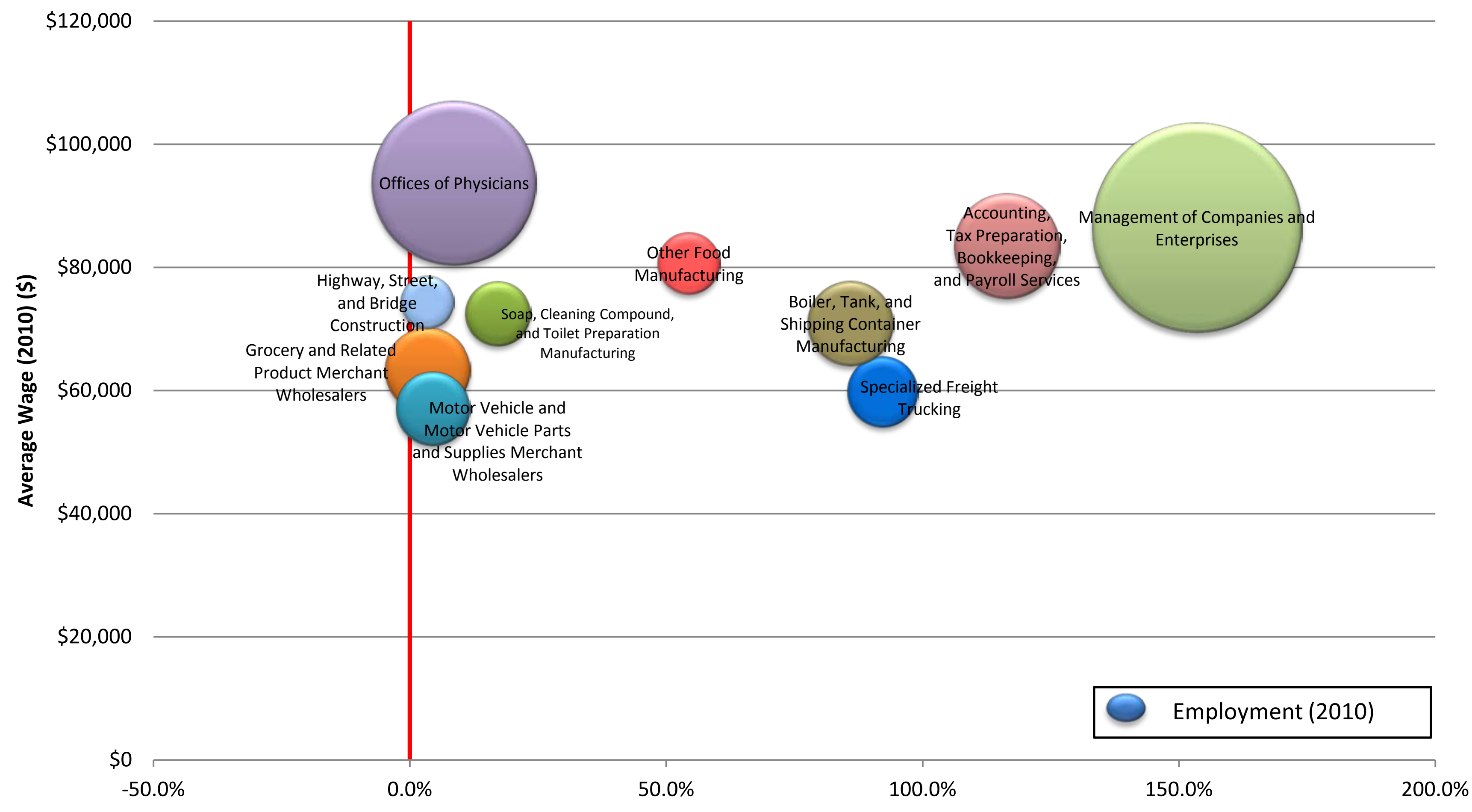
[26] This calculation was taken as 25% above the average wage in Table 8.
[27] Location Quotient measures the specialization of an industry in a region by comparing it to data in a larger region. For our analysis: $LQ = \frac{\frac{g_i}{g}}{\frac{G_i}{G}}$ where g_i = The Akron region Gross Product in industry i; g = Total in The Akron region Gross Product; G_i= US Gross Product in industry i; G = Total US Gross Product
[28] A location quotient > 1.2 indicates specialization in an industry.

Table 9. Industry Winners (Tier I) in the Akron region in terms of Employment, Gross Product, and Average Wage

		Employment					GDP					Average wage				
NAICS	NAICS Description	2000	2010	Difference (2000-2010)	% Change (2000-2010)	LQ 2010	2000 ($Mil)	2010 ($Mil)	Difference (2000-2010)	% Change (2000-2010)	LQ 2010	2000 ($)	2010 ($)	Difference (2000-2010)	% Change (2000-2010)	LQ 2010
2373	Highway, Street, and Bridge Construction	988	1,022	34	3.4%	0.91	$94.7	$112.7	$18.0	19.0%	1.25	$53,183	$74,328	$21,145	39.8%	1.47
3119	Other Food Manufacturing	894	1,381	487	54.5%	2.39	$152.3	$360.7	$208.4	136.8%	4.55	$59,438	$80,666	$21,228	35.7%	1.70
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	1,312	1,538	226	17.2%	3.86	$90.8	$401.3	$310.5	342.1%	6.59	$31,380	$72,437	$41,057	130.8%	1.42
3324	Boiler, Tank, and Shipping Container Manufacturing	1,428	2,656	1,228	86.0%	8.68	$168.5	$417.4	$249.0	147.8%	14.03	$62,803	$70,885	$8,082	12.9%	1.36
4231	Motor Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers	1,896	1,983	87	4.6%	1.64	$178.0	$247.2	$69.2	38.9%	2.54	$46,945	$57,009	$10,065	21.4%	1.45
4244	Grocery and Related Product Merchant Wholesalers	2,585	2,676	91	3.5%	0.99	$259.3	$372.3	$113.0	43.6%	1.51	$50,158	$63,318	$13,160	26.2%	1.42
4842	Specialized Freight Trucking	935	1,798	863	92.3%	1.36	$92.2	$219.7	$127.5	138.3%	2.15	$52,274	$59,798	$7,524	14.4%	1.49
5412	Accounting, Tax Preparation, Bookkeeping, and Payroll Services	1,871	4,051	2,180	116.5%	1.20	$128.4	$628.8	$500.4	389.6%	2.17	$39,750	$83,480	$43,730	110.0%	1.64
5511	Management of Companies and Enterprises	6,410	16,253	9,843	153.6%	2.18	$535.8	$2,028.9	$1,493.1	278.7%	2.67	$57,791	$86,405	$28,614	49.5%	1.06
6211	Offices of Physicians	9,167	9,960	793	8.7%	1.13	$1,041.1	$1,511.8	$470.7	45.2%	1.69	$74,437	$93,733	$19,296	25.9%	1.38

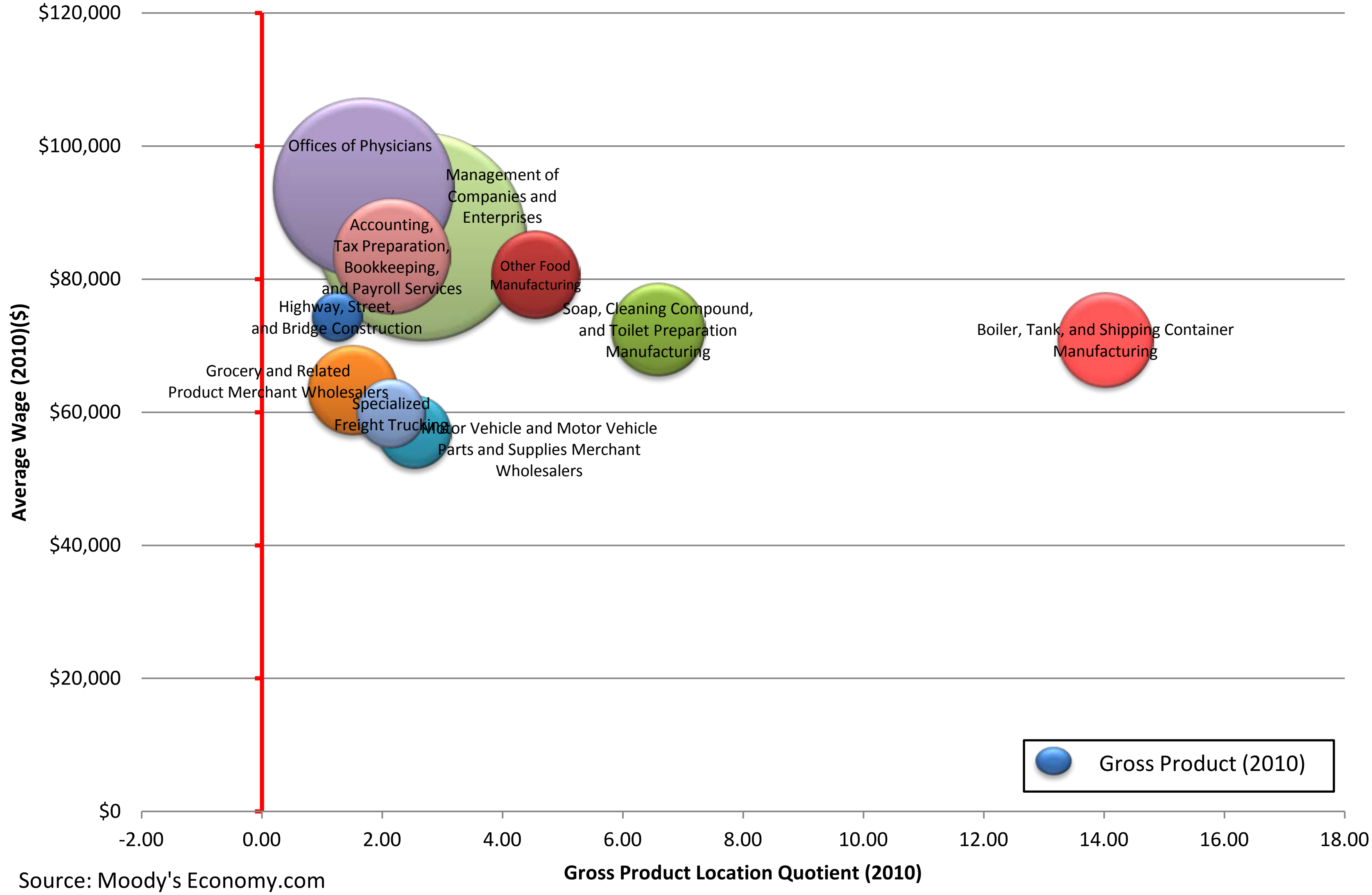
Source: Moody's Economy.com

Figure 4. Industry Winners (Tier I): Average Wage by Employment Change, and Employment Level



Source: Moody's Economy.com

Figure 5. Industry Winners (Tier I): Average Wage by Gross Product Location Quotient, and Gross Product



Source: Moody's Economy.com

AVERAGE WAGE BY EMPLOYMENT CHANGE, AND EMPLOYMENT LEVEL (TIER I)

- Five Tier I winning industries (Other Food Manufacturing; Boiler, Tank, and Shipping Container Manufacturing; Specialized Freight Trucking; Accounting, Tax Preparation, Bookkeeping, and Payroll Services; Management of Companies and Enterprises) had employment growth greater than 50% from 2000 to 2010 and an average wage greater than $59,000 in 2010 (Figure 4). Their 2010 employment ranged from 1,381 to 16,253.

- In Tier I, industries with the largest employment in 2010 included Management of Companies and Enterprises (16,253); Offices of Physicians (9,960); and Accounting, Tax Preparation, Bookkeeping, and Payroll Services (4,051).

AVERAGE WAGE BY LOCATION QUOTIENT, AND TOTAL GROSS PRODUCT (TIER I)

- One Tier I industry, Boiler, Tank, and Shipping Container Manufacturing, stands out when examining average wage, gross product location quotient, and total gross product. This industry has high wages, large employment numbers, and a gross product location quotient (LQ) of over 14, which indicates that this industry is an extreme specialist in its field within the nation (Figure 5).

- Three industries have a gross product LQ greater than 3, indicating these industries both are specialists in their field within the nation and have livable wages: Other Food Manufacturing; Soap, Cleaning Compound, and Toilet Preparation Manufacturing; and Boiler, Tank, and Shipping Container Manufacturing. These three industries are of similar size; the Other Food Manufacturing industry's 2010 output was $360.7 million, while Soap, Cleaning Compound, and Toilet Preparation Manufacturing's output was $401.3 million and Boiler, Tank, and Shipping Container Manufacturing's 2010 output was $417.4 million.

"WINNING" INDUSTRIES – TIER II

The main reason for the small number of Tier I winning industries was employment change. Only 96 of the 283 industries (34%) selected for this more detailed industry analysis had positive employment growth from 2000 to 2010.

Since there were only ten Tier I winning industries in the Akron region, we looked next to find industries that are surviving the economic storm, which we call Tier II winning industries. For Tier II winning industries, we selected industries that met four of the five criteria (all previous criteria except employment growth):

1. **Average Wage (2010) > $50,283.75** – to find industries that have livable wages
2. **Percent Change in Gross Product (2000-2010) > 0.1%** – to show positive growth in output
3. **Gross Product Location Quotient (2010) > 1.2** - to find industries that are more concentrated in the Akron region relative to the United States.
4. **2010 Employment > 500** – to find large employment industries

- Table 10 lists the eight industries that are Tier II winning industries in the Akron region. Of those eight, five are in the Manufacturing sector (Fruit and Vegetable Preserving and Specialty Food Manufacturing; Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing; Steel Product Manufacturing from Purchased Steel; Other Fabricated Metal Product Manufacturing; and Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing), two are in the Wholesale Trade sector (Furniture and Home Furnishing Merchant Wholesalers; and Petroleum and Petroleum Products Merchant Wholesalers), and one is in Finance and Insurance (Agencies, Brokerages, and Other Insurance Related Activities).

- The two highest wage Tier II industries are Petroleum and Petroleum Products Merchant Wholesalers ($141,486) and Furniture and Home Furnishing Merchant Wholesalers ($138,833). Both industries experienced a slight employment gain from 2000 to 2010, but not enough to meet the criteria of growing employment for Tier I winning industries.

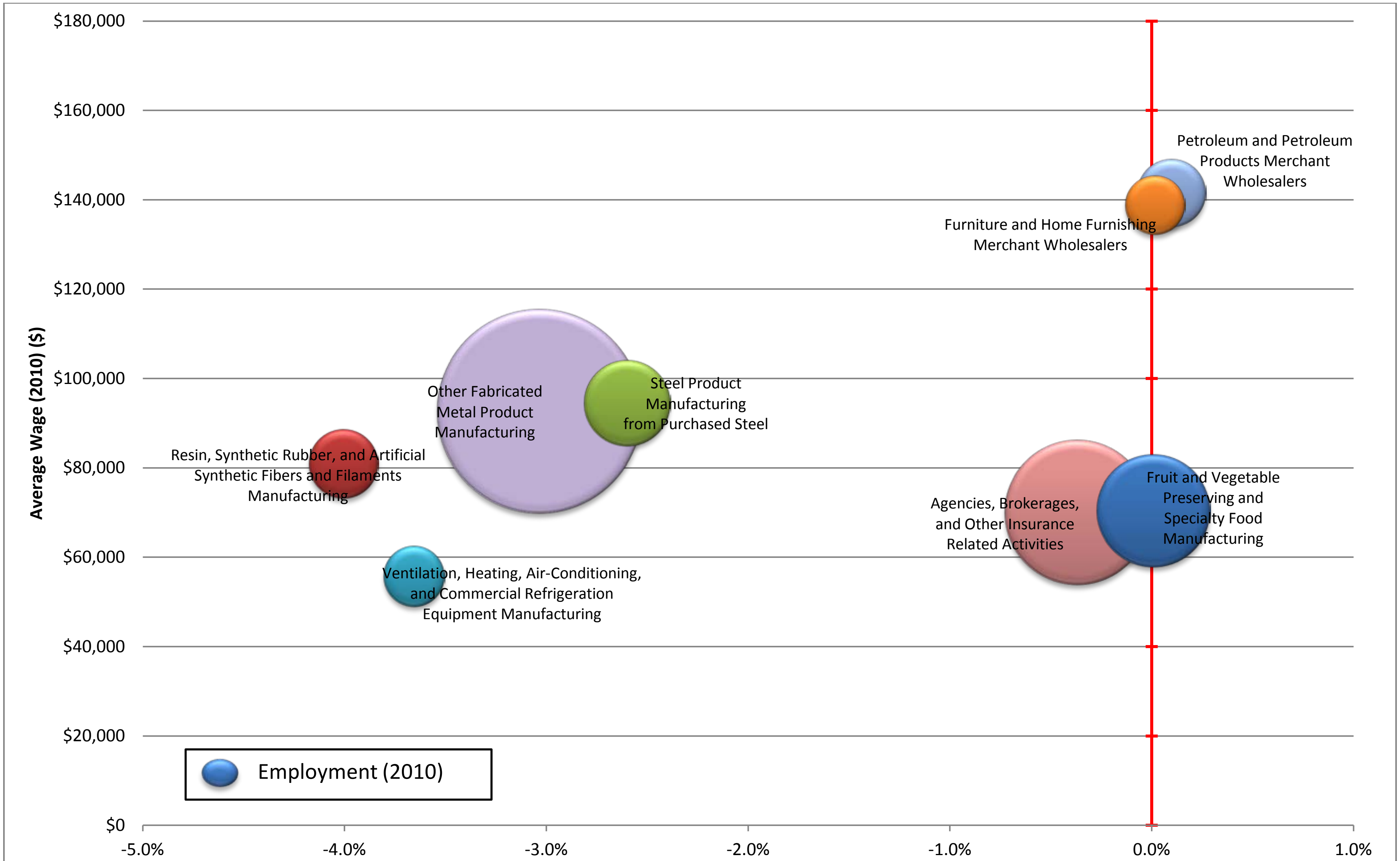
- While all Tier II industries had an increase in gross product from 2000 to 2010, almost all had significant employment loss over this period. This indicates that even though employers were shedding workers their output increased, which demonstrates productivity increases in these sectors.

Table 10. Industry Winners (Tier II) in the Akron Region for Employment, Gross Product, and Average Wage

		Employment					GDP					Average wage				
NAICS	NAICS Description	2000	2010	Difference (2000-2010)	% Change (2000-2010)	LQ 2010	2000 ($Mil)	2010 ($Mil)	Difference (2000-2010)	% Change (2000-2010)	LQ 2010	2000 ($)	2010 ($)	Difference (2000-2010)	% Change (2000-2010)	LQ 2010
3114	Fruit and Vegetable Preserving and Specialty Food Manufacturing	1,966	1,968	2	0.0%	3.31	$244.4	$448.6	$204.2	8.4%	6.73	$43,367	$70,361	$26,994	6.2%	1.66
3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing	1,224	734	-490	-4.0%	2.47	$185.1	$208.4	$23.3	1.3%	3.18	$68,560	$80,876	$12,316	1.8%	1.15
3312	Steel Product Manufacturing from Purchased Steel	1,539	1,139	-400	-2.6%	6.73	$168.9	$175.7	$6.7	0.4%	8.85	$66,846	$94,494	$27,648	4.1%	1.63
3329	Other Fabricated Metal Product Manufacturing	9,295	6,476	-2,819	-3.0%	7.28	$1,017.6	$1,321.8	$304.2	3.0%	15.60	$58,293	$92,651	$34,358	5.9%	1.85
3334	Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing	887	563	-324	-3.7%	1.36	$52.5	$52.6	$0.2	0.0%	1.41	$41,208	$55,692	$14,484	3.5%	1.17
4232	Furniture and Home Furnishing Merchant Wholesalers	536	537	1	0.0%	1.33	$43.3	$164.0	$120.7	27.9%	4.75	$40,414	$138,833	$98,420	24.4%	3.33
4247	Petroleum and Petroleum Products Merchant Wholesalers	701	708	7	0.1%	1.81	$80.7	$217.1	$136.4	16.9%	5.22	$57,529	$141,486	$83,957	14.6%	2.76
5242	Agencies, Brokerages, and Other Insurance Related Activities	3,377	3,253	-124	-0.4%	0.96	$447.6	$643.8	$196.1	4.4%	1.26	$44,875	$70,065	$25,190	5.6%	1.15

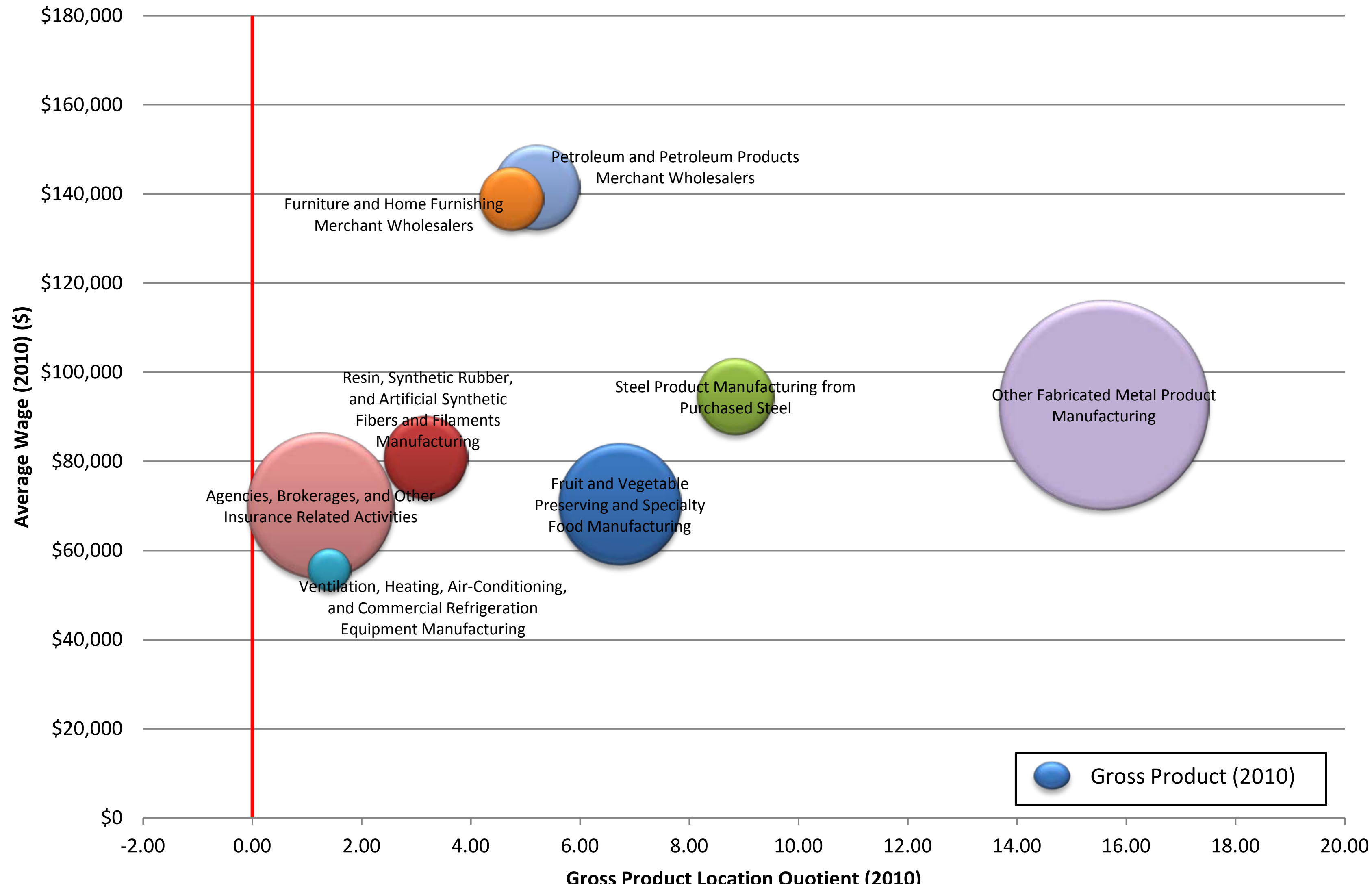
Source: Moody's Economy.com

Figure 6. Industry Winners (Tier II): Average Wage by Employment Change, and Employment Level



Source: Moody's Economy.com

Figure 7. Industry Winners (Tier II): Average Wage by Gross Product Location Quotient, and Gross Product



Source: Moody's Economy.com

Average Wage by Employment Change, and Employment Level (Tier II)

- Five Tier II winning industries (Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing; Steel Product Manufacturing from Purchased Steel; Other Fabricated Metal Product Manufacturing; Furniture and Home Furnishing Merchant Wholesalers; and Petroleum and Petroleum Products Merchant Wholesalers) had an average wage greater than $80,000 in 2010 (Figure 6).

- In Tier II, industries with the largest employment in 2010 were Other Fabricated Metal Product Manufacturing (6,476); Agencies, Brokerages, and Other Insurance Related Activities (3,253); and Fruit and Vegetable Preserving and Specialty Food Manufacturing (1,968).

Average Wage by Location Quotient (LQ), and Total Gross Product (Tier II)

- One Tier II industry that stands out when examining average wage, gross product location quotient, and total gross product is Other Fabricated Metal Product Manufacturing. This industry has high wages, large employment numbers, and a gross product LQ of over 15, indicating that this industry is an extreme specialist in its field within the nation (Figure 7).

- Four industries—Fruit and Vegetable Preserving and Specialty Food Manufacturing; Steel Product Manufacturing from Purchased Steel; Other Fabricated Metal Product Manufacturing; and Petroleum and Petroleum Products Merchant Wholesalers—have gross product LQs greater than 5, indicating these industries are specialists in their field within the nation and have livable wages. However, these four industries are of different sizes. The Other Fabricated Metal Product Manufacturing industry's output in 2010 was $1.3 billion, the Fruit and Vegetable Preserving and Specialty Food Manufacturing industry's output in 2010 was $448.6 million, and the Petroleum and Petroleum Products Merchant Wholesalers and Steel Product Manufacturing from Purchased Steel industries were much smaller at $217.1 million and $175.7 million, respectively.

Employment Location Quotient

Table 11. Industry Sectors in which Employment Location Quotient was Greater than 3

		Employment				
NAICS	**NAICS Description**	**2000**	**2010**	**Difference (2000-2010)**	**% Change (2000-2010)**	**LQ 2010**
3114	Fruit and Vegetable Preserving and Specialty Food Manufacturing	1,966	1,968	2	0.1%	3.31
3149	Other Textile Product Mills	826	763	-63	-7.6%	3.57
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	1,312	1,538	226	17.2%	3.86
3261	Plastics Product Manufacturing	9,377	6,077	-3,300	-35.2%	3.13
3262	Rubber Product Manufacturing	8,635	2,158	-6,477	-75.0%	4.35
3312	Steel Product Manufacturing from Purchased Steel	1,539	1,139	-400	-26.0%	6.73
3315	Foundries	4,262	1,868	-2,394	-56.2%	4.17
3322	Cutlery and Handtool Manufacturing	1,978	897	-1,081	-54.7%	4.66
3324	Boiler, Tank, and Shipping Container Manufacturing	1,428	2,656	1,228	86.0%	8.68
3329	Other Fabricated Metal Product Manufacturing	9,295	6,476	-2,819	-30.3%	7.28
3335	Metalworking Machinery Manufacturing	3,686	1,959	-1,727	-46.9%	3.31

Source: Moody's Economy.com

- Excluding all other criteria, the eight industries above represent the industries with an employment LQ greater than 3 (Table 11).
- All of the industries in Table 11 are within the Manufacturing industry (NAICS 31-33).
- The highest LQ (8.68) belongs to Boiler, Tank, and Shipping Container Manufacturing, indicating it is an extreme specialist within its field in comparison to the nation.
- Of the industries in Table 11, Rubber Product Manufacturing lost the most employment from 2000 to 2010. This industry lost almost 6,500 employees over the reference period (75.0% of its workforce).
- Boiler, Tank, and Shipping Container Manufacturing appears on the Tier I winning industry list (Table 9) and Fruit and Vegetable Preserving and Specialty Food Manufacturing and Steel Product Manufacturing from Purchased Steel appear on the Tier II winning industry list (Table 10).

Gross Product Location Quotient

Table 12. Industry Sectors in which Gross Product Location Quotient was Greater than 5

		Gross Product				
NAICS	NAICS Description	2000 ($Mil)	2010 ($Mil)	Difference (2000-2010)	% Change (2000-2010)	LQ 2010
3114	Fruit and Vegetable Preserving and Specialty Food Manufacturing	$244.4	$448.6	$204.2	83.5%	6.73
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	$90.8	$401.3	$310.5	342.1%	6.59
3312	Steel Product Manufacturing from Purchased Steel	$168.9	$175.7	$6.7	4.0%	8.85
3322	Cutlery and Handtool Manufacturing	$209.1	$62.4	-$146.7	-70.2%	5.15
3324	Boiler, Tank, and Shipping Container Manufacturing	$168.5	$417.4	$249.0	147.8%	14.03
3329	Other Fabricated Metal Product Manufacturing	$1,017.6	$1,321.8	$304.2	29.9%	15.60
4247	Petroleum and Petroleum Products Merchant Wholesalers	$80.7	$217.1	$136.4	169.1%	5.22
4542	Vending Machine Operators	$42.0	$67.2	$25.2	60.0%	8.94

Source: Moody's Economy.com

- Excluding all other criteria, the eight industries above represent the industries with a gross product LQ greater than 5. In this instance, the LQ restriction was changed to an LQ greater than 5 because a large number of industries had an LQ greater than 3 (Table 12).
- Other Fabricated Metal Product Manufacturing had an extremely high gross product location quotient of 15.60, demonstrating that this sector is an extreme specialist in the Akron regional economy when compared to the United States. In addition, the gross product of this industry is very large ($1.3 billion) and has grown by 29.9% between 2000 and 2010.
- Almost all of the industries listed in Table 12 experienced an increase in gross product from 2000 to 2010.
- Soap, Cleaning Compound, and Toilet Preparation Manufacturing appeared on the Tier I winning industry lists (Table 9). Fruit and Vegetable Preserving, Steel Product Manufacturing from Purchased Steel, Other Fabricated Metal Product Manufacturing, and Petroleum and Petroleum Products Merchant Wholesalers appeared on the Tier II winning industry lists (Table 10).

UNEMPLOYMENT

Table 13. Unemployment Rates for the Akron Region, State of Ohio, and United States, 2010

	Total Labor Force Participation	Unemployed	Unemployment Rate
Akron 4-County Region [A]	629,275	64,550	10.3%
State of Ohio [A]	5,897,559	594,540	10.1%
United States [B]	153,889,000	14,825,000	9.6%

Source: [A] U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics
[B] U.S. Bureau of Labor Statistics, Current Population Survey

- The Akron region (10.3%) had a higher unemployment rate than the state of Ohio (10.1%) and the United States (9.6%) in 2010 (Table 13).

INDUSTRY OCCUPATIONS

Table 14. Occupational Shares and Wages, 2010

	Akron MSA [A]			Ohio		United States	
Occupations	Employment (2010)	Emp. Share	Median Wage	Emp. Share	Median Wage	Emp. Share	Median Wage
Office and Administrative Support	52,440	17.1%	$29,070	16.5%	$29,740	16.9%	$30,710
Sales and Related	35,510	11.6%	$22,790	10.5%	$23,100	10.6%	$24,370
Food Preparation and Serving Related	28,110	9.2%	$17,900	9.3%	$18,030	8.7%	$18,770
Production	25,870	8.4%	$31,750	8.8%	$31,920	6.5%	$30,330
Transportation and Material Moving	21,110	6.9%	$26,570	7.4%	$26,730	6.7%	$28,400
Healthcare Practitioners and Technical	19,610	6.4%	$57,060	6.6%	$54,490	5.8%	$58,490
Education, Training, and Library	18,780	6.1%	$46,880	6.2%	$45,930	6.7%	$45,690
Business and Financial Operations	13,950	4.5%	$54,070	4.4%	$56,690	4.8%	$60,670
Healthcare Support	12,470	4.1%	$21,600	4.1%	$23,030	3.1%	$24,760
Management	12,360	4.0%	$90,530	3.7%	$88,150	4.7%	$91,440
Installation, Maintenance, and Repair	11,400	3.7%	$39,140	3.8%	$39,150	3.9%	$40,120
Building and Grounds Cleaning and Maintenance	9,070	3.0%	$21,870	3.1%	$21,480	3.3%	$22,490
Personal Care and Service	8,310	2.7%	$20,500	2.2%	$20,340	2.7%	$20,640
Construction and Extraction	8,240	2.7%	$42,070	3.1%	$41,480	4.0%	$39,080
Computer and Mathematical	6,910	2.2%	$63,110	2.4%	$67,960	2.6%	$73,720
Protective Service	5,850	1.9%	$37,650	2.3%	$37,180	2.5%	$36,660
Architecture and Engineering	5,480	1.8%	$62,890	1.6%	$65,040	1.8%	$70,610
Community and Social Services	4,790	1.6%	$37,160	1.5%	$39,130	1.5%	$39,280
Arts, Design, Entertainment, Sports, and Media	3,320	1.1%	$36,380	1.1%	$37,010	1.4%	$42,870
Legal	1,770	0.6%	$60,070	0.6%	$61,410	0.8%	$74,580
Life, Physical, and Social Science	1,680	0.5%	$53,380	0.6%	$55,890	0.8%	$58,530
Farming, Fishing, and Forestry	110	0.0%	$22,100	0.1%	$24,080	0.3%	$19,630
All Occupations	**307,140**	**100.0%**	**$31,760**	**100.0%**	**$32,150**	**100.0%**	**$33,840**

Note: [A] The Akron MSA data only includes Portage and Summit Counties.
Source: U.S. Bureau of Labor Statistics

- Two occupational categories in the Akron region, Sales and Related and Production, had higher occupational shares (those with a difference greater than one percentage point) than the United States. Neither of these two occupational categories exceeded the median wage in the Akron region ($31,760) for all occupations (Table 14).

- Only one occupational category in the Akron region had lower occupational shares (those with a difference greater than one percentage point) than the United States: Construction and Extraction. This occupational category did exceed the median wage in the Akron region ($31,760) for all occupations.

- It is interesting to note few occupational shares were higher or lower than one percentage point than the United States. This indicates that the Akron region has an occupational structure similar to that of the United States.

TOP EMPLOYERS

Table 15. Top 25 Employers in the Akron Region, 2011

Rank	Company	City	Employment
1	Summa Health System	Akron	8,000
2	Group Management Services Inc.	Richfield	6,541
3	FirstEnergy Corp.	Akron	5,367
4	Kent State University	Kent	5,030
5	Akron General Health System	Akron	4,151
6	Summit County	Akron	3,788
7	Timken Co.	Canton	3,700
8	Akron Children's Hospital	Akron	3,179
9	Goodyear Tire & Rubber Co.	Akron	3,000
10	University of Akron	Akron	2,573
11	Sterling Jewelers Inc.	Akron	2,323
12	The Babcock & Wilcox Co	Barberton	2,227
13	City of Akron	Akron	1,931
14	InfoCision Management Corp	Akron	1,875
15	Mercy Medical Center	Canton	1,850
16	Diebold Inc.	North Canton	1,826
17	Bridgestone Americas Inc.	Akron	1,715
18	Fred W. Albrecht Grovery Co.	Akron	1,435
19	Republic Engineered Products Inc.	Canton	1,310
20	The J.M. Smucker Co	Orrville	1,200
21	Robinson Memorial Hospital	Ravenna	1,106
22	Pepsi Beverages Co.	Twinsburg	1,055
23	Portage County	Ravenna	1,052
24	Myers Industries Inc.	Akron	863
25	Luk USA LLC	Wooster	800

Source: Crain's Cleveland, Book of Lists 2011

- Table 15 displays the Top 25 Employers in the Akron Region in 2011. These employers had a total employment of 67,897.

- Five of the 25 employers listed in Table 15 are in the health care field (Summa Health System (#1), Akron General Health System (#5), Akron Children's Hospital (#8), Mercy Medical Center (#15), and Robinson Memorial Hospital (#21)). These five employers accounted for 27% of employment in Table 15 (18,286).

- Two of the companies are universities: Kent State University (#4) and University of Akron (#10).

Fast Growth Firms

Table 16. Fastest Growing Private Firms in the Akron Region, by National Rank (Out of 5,000) and Revenue Growth (2009-2011)

Rank	Name	City	County	Revenue ($ Mil)	Revenue Growth (2009-2011)	Founded	Employees
3670	Etactics	Stow	Summit	$11.2	43%	1999	32
4652	Razorleaf	Stow	Summit	$2.9	13%	2000	25
4137	MobilityWorks	Akron	Summit	$78.2	28%	1997	235
3647	Cambridge Home Health Care	Akron	Summit	$38.4	44%	1994	1,740
4423	Midwest Industrial Supply	Canton	Stark	$17.1	20%	1975	52
2146	Summit Data Communications	Akron	Summit	$15.2	116%	2006	28
3462	Catacel	Garrettsville	Portage	$2.6	51%	2001	15
3267	Ohio Realty Advisors	Richfield	Summit	$3.0	58%	2001	38
3435	SeniorTV	Akron	Summit	$12.1	52%	1992	25
4529	The Davey Tree Expert Company	Kent	Portage	$591.7	17%	1880	7,000

Note: Employees are self-reported. Totals may reflect employees outside of the Akron region
Source: www.inc.com

- Of the 5,000 fastest growing firms in the United States in 2011, 186 are located in Ohio; of those 186, 10 are located within the Akron region (Table 16).
- All of the companies listed in Table 16 experienced at least double-digit revenue growth from 2009 to 2011. One company experienced triple-digit growth.
- In total, seven firms had revenues over $10 million in 2011.
- The Davey Tree Expert Company (#4529) had the largest total revenue ($591.7 million).

Economic Inclusion (Minority- and Women-Owned Businesses)

Minority Inclusion

Table 17. Economic Inclusion as a Percentage of Business Owners and a Percentage of the Population, 2007

	WHITE/CAUCASIAN			BLACK/AFRICAN AMERICAN			ASIAN			HISPANIC		
Area	% of Business Owners	% of Population	Share of Shares	% of Business Owners	% of Population	Share of Shares	% of Business Owners	% of Population	Share of Shares	% of Business Owners	% of Population	Share of Shares
Akron 4-County	93.8%	86.3%	1.09	4.5%	9.4%	0.48	1.7%	1.5%	1.13	0.6%	1.6%	0.36
Ohio	91.6%	83.0%	1.10	6.0%	12.2%	0.49	2.1%	1.7%	1.22	1.1%	3.1%	0.36
United States	85.9%	74.2%	1.16	7.3%	12.6%	0.58	5.9%	4.8%	1.24	8.6%	16.4%	0.52

Source: U.S. Census Bureau, Survey of Business Owners; U.S. Census Bureau, American Community Survey

Table 17 presents minority business ownership in the Akron region, the state of Ohio, and the United States:

- Percentage of business owners by minority group[29]
- Percentage of the minority group to the total population[30]
- Share of shares - compares the percentage of business owners to the percentage of the minority group in the total population. If this percentage equals 1, the share of business owners in a minority group is equal to the proportion of that group in the total population.
- Share of shares for Black/African American business ownership in the Akron region (0.48) was lower than in the state of Ohio (0.49) and the United States (0.58) (Table 17).
- In comparison to other minority groups, Asians had the largest share of shares in business ownership: 1.13 in the Akron region, 1.22 in the state of Ohio, and 1.24 in the United States.
- In comparison to other minority groups, Hispanics had the smallest share of shares in business ownership: 0.36 in the Akron region, 0.36 in the state of Ohio, and 0.52 in the United States.

[29] U.S. Census Bureau, Survey of Business Owners (2007)
[30] U.S. Census Bureau, American Community Survey (2007)

Women-Owned Businesses

Table 18. Percentage of Women-Owned Businesses, 2007

Area	Women-Owned Firms	Total Firms	Percentage of Women-Owned Firms
Akron (4-County Region)	24,894	94,357	26.4%
Ohio	249,180	869,343	28.7%
United States	7,792,115	26,294,860	29.6%

Source: U.S. Census Bureau, Survey of Business Owners 2007

- Women-owned firms accounted for more than one quarter of firms (26.4%) in the Akron region (Table 18).
- The percentage of women-owned firms in the Akron Region (26.4%) was slightly lower than in the state of Ohio (28.7%) and the United States (29.6%).

Economic Development Organizations

Akron Region

Table 19. Akron Region Economic Development Organizations, 2010

County	Local Economic Development Corporation	Contact	Phone	Website
Portage	Portage Development Board	Brad Ehrhart	(330) 297-3470	http://www.portagedevbd.org
Stark	Canton Regional Chamber of Commerce	Dennis P. Saunier	(330) 456.7253	http://www.cantonchamber.org/
Stark	Stark Development Board	Steve Paquette	(330) 453-5900	http://www.starkcoohio.com
Summit	Akron Mayor's Office of Economic Development	Robert Y. Bowman	(330) 375-2133	http://www.ci.akron.oh.us/ed/index.htm
Summit	Akron Polymer Training Center	Tayba Tahir	(330) 972-8661	http://www2.uakron.edu/aptc/index.php
Summit	Downtown Akron Partnership	Suzie Graham	(330) 374-7676	http://www.downtownakron.com
Summit	Greater Akron Chamber	Gregg P. Cramer	(330) 376-5550	http://www.greaterakronchamber.org
Summit	Northeast Ohio Four County Regional Planning & Development Organization	Dr. Peter D. Ferguson	(330) 252-0337	http://www.uptuscwatershed.org/NEFCO.htm
Summit	Summit Business Partnership	Patrick Bravo	(330) 643-8745	http://www.co.summit.oh.us/executive/summitbuspartpgm.htm
Summit	Summit County Port Authority	Libby Ensor	(330) 762-4776	http://www.summitportauthority.org
Summit	University Park Alliance		(330) 777-2070	http://www.upakron.com/
Wayne	Wayne County Economic Development Council	Rod Crider	(330) 264-2411	http://www.waynecountyedc.com/

Source: Entrepreneur Resource Guide; Individual Websites

- Table 19 lists **local** economic development organizations in each of the four counties in the Akron region with contact information.

Regional Level

Table 20. Northeast Ohio Region Economic Development Organizations, 2010

Local Economic Development Corporation	Contact	Phone	Website
NorTech	Emily N. Dierig	(216) 363-6883	http://www.nortech.org
Northeast Ohio Trade & Economic Consortium	Marilyn Morgan	(330) 672-4080	http://www.neotec.org
Team NEO	Nina Holliday	(216) 363-5414	http://www.clevelandplusbusiness.com
Manufacturing Advocacy and Growth Network	Gregory M. Krizman	(216) 391-7002	http://www.magnetwork.org
Greater Cleveland Partnership	Robert Recker	(216) 621-3300	http://www.gcpartnership.com/
Fund for our Economic Future	Chris Thompson	(216) 456-9800	http://www.futurefundneo.org
Eastern Ohio Development Alliance	Tracy V. Drake		http://www.eoda.org/
BioEnterprise	Baiju R. Shah	(216)658-3999	http://www.bioenterprise.com

Source: Entrepreneur Resource Guide; Individual Websites

- Table 20 lists **regional** economic development organizations in the Northeast Ohio region with contact information.

CHAPTER 3: ENTREPRENEURSHIP AND INNOVATION

This analysis in this chapter, conducted by the Center for Economic Development, examines variables that measure entrepreneurship and innovation. Entrepreneurship analysis takes into account employment dynamics, risk capital firms, venture capital investments, small business development centers, tax incentives, and loan programs. Innovation trends are marked by science, engineering, and technology degrees; Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) grants; university research and development; and patents.

Note: In the Akron region there were no public offerings[31]; therefore, this component was not included in the analysis.

[31] Public offerings are the sale of shares of a company on a public market (i.e. NASDAQ). Initial public offerings (IPO) are the first time sale of stock for a private company going public, and a secondary offering is the offering of new stock from an existing public company.

REVIEW OF OTHER STUDIES: SUMMARY OF FINDINGS

Existing research studies about the Akron region indicate the region is moving towards building and facilitating an entrepreneurial environment. The Akron region and the state of Ohio offer many programs that incentivize innovation and entrepreneurship, including the Ohio Third Frontier program. This can be seen in the Akron region's high score on the innovation index (92.0) as compared to the state of Ohio overall (89.8), the involvement of the University of Akron in capacity building, and in other initiatives designed to foster innovation and entrepreneurship.

INNOVATION INDEX

The U.S. Economic Development Administration has funded research into empirically measuring innovation in United States metro regions.[32] The study created an Innovation Index by combining measures of human capital, economic dynamics, productivity and employment, and economic well-being. In this research, the Akron region scored lower than the United States, but higher than the state of Ohio.

- The Akron region = 92.0
- State of Ohio = 89.8
- United States = 100.0
- Boston-Cambridge-Quincy, MA (MSA) = 122.5 (National leader in Innovation)

FORTUNE 500 RANKINGS

The Fortune 500 list for 2010[33] ranks the 500 largest companies in the United States. Firms are ranked based on total revenue for their respective fiscal years.[34] To be included in the list, companies must be incorporated, operate in the United States, and file financial statements with a government agency. Three companies in the Akron area were on the Fortune 500 List:

- Rank 139th: Goodyear Tire & Rubber (2010 Revenue $18,832 million)
- Rank 183rd: First Energy (2010 Revenue $13,339 million)
- Rank 482nd: J.M. Smucker (2010 Revenue $4,605.3 million)

ENTREPRENEURIAL INITIATIVES

OHIO THIRD FRONTIER (OTF)

Created in 2010 by the Ohio General Assembly, the OTF[35] has been tasked with creating new technology-based products, companies, industries, and jobs. The goals of the OTF are to:[36]

1. Produce a high level of economic return for the state in quality jobs, company growth, and wealth creation.
2. Create sustainable engines of economic development activity in key areas of technology and industry strengths.

[32] http://www.statsamerica.org/innovation/innovation_index/region-select.html
[33] http://money.cnn.com/magazines/fortune/fortune500/2010/full_list/
[34] http://money.cnn.com/magazines/fortune/fortune500/2010/faq/
[35] http://thirdfrontier.com/
[36] State of Ohio Growing the Entrepreneurial Ecosystem at the Early Stage Summit VII, November 2, 2011

3. Reduce the risk of pursuing entrepreneurial, innovation, and development activities in Ohio.
4. Sustain best practices and relationships that lead to efficient commercialization.
5. Increase the visibility and reputation of Ohio as an innovation and entrepreneurial destination to attract investment capital, companies, and talent.

The OTF also seeks to provide support in entrepreneurship and product development by assisting throughout the entire entrepreneurial ecosystem:[37]

- **Entrepreneurial Support-** Improve the capacity of Ohio's entrepreneurial ecosystem to deliver services and attract capital necessary to create and grow scalable technology-based enterprises. OTF assists the ecosystem through:
  - Services
    - Entrepreneurial Signature Program (six regional organizations)
    - Edison Technology Incubators (12 in Ohio), e.g., Akron Global Business Accelerator
  - Investment Capital
    - One Fund (Accelerators)
    - Micro Funds
    - Pre-seed
    - Seed Funds (Gap)
    - Growth Fund (SBA Impact Fund)
    - Targeted Investment Program (SSBCI)
  - Tax Credits/Guarantees
    - Technology Investment Tax Credit
    - Ohio Capital Fund/Ohio Venture Capital Authority

- **Value Chain Development-** Increase the technical capabilities and business competencies of Ohio value chains within existing and emerging key driver industries, and pursue targeted attraction to fill gaps. OTF assists the ecosystem through:
  - JobsOhio Network – Pursue retention and expansion of businesses with high potential for job growth and wealth.
  - Commercial Acceleration Loan Program – Invests in projects moving products/services into meaningful market entry.
    - New Venture Loans – ($500,000 - $1 million per loan) loans are made to professional venture/smart money-backed companies with 25% of the loan forgivable for successful completion and another 25% forgivable with sales of $1 million and significant market entry.
    - Venture/Non-venture Loans – ($500,000 - $2 million per loan) loans are targeted to small, post-revenue companies with existing product/service(s) on market with near-to-market project(s) with high sales potential. These loans are 25% forgivable with sales of $1 million and another 25% is forgivable with sales greater than $2 million and significant market entry at each milestone.
    - Non-venture Loans – ($500,000 - $3 million per loan) loans are targeted at small to established companies with existing product/service(s) on market and these companies are near-to-market project(s) with strong financial support. Loans will

[37] State of Ohio Growing the Entrepreneurial Ecosystem at the Early Stage Summit VII, November 2, 2011

support up to 25% of the project with 5% annual interest, due monthly, and principal deferred during project period.

- **Open Innovation-** Cultivate a highly collaborative environment that encourages Ohio's community of technology seekers and solvers to exchange new knowledge in pursuit of targeted market-driven commercial opportunities**.**
  - Technology Validation & Start-up Fund - Increases the number of new or young Ohio companies that license technology at Ohio universities and are positioned with these funds to commercialize said technology.
  - Open Innovation Incentive – Connects middle-market companies in need of research capacity with for-profit or non-profit research institutions with the ability to help solve R&D issues.
  - Innovation Platform Program – Links the research capabilities/capacities of an already established technology platform and all its resources at an Ohio university, college, or non-profit research institution to the specific late-stage research and product development needs of Ohio companies.
  - Industrial R&D Center Incentive – Intended to attract awards from corporate R&D centers and large federal center with direct industrial relevance.

The Ohio Venture Capital Authority

The Ohio Venture Capital Authority (OVCA) has the authority to allocate $100 million in aggregate tax credits and invests to enterprises both in the seed and early stages of business development and in established business enterprises.[38] Tax credits are authorized by a written contract with the investor. Tax credit certificates are issued by the OVCA and the credit can be claimed for the taxable year specified in the certificate.[39]

In addition, the OVCA controls the Ohio Capital Fund, a fund of funds, which was established by the state of Ohio to help increase private investment in Ohio companies in the seed or early stages of business development.[40] Currently, the Ohio Capital Fund invests in 15 Ohio-based funds and four national funds.[41]

Entrepreneurial Support

There is significant support in the Akron region for entrepreneurs, especially those who are involved in technology-intensive industries. Through incubators and research centers, entrepreneurs can collaborate with public and private entities in order to facilitate the growth of companies and ideas in the Akron region.

Akron Incubators

1. **Akron Global Business Accelerator**[42]
   - A business incubator that has 200,000 square feet of modern, multi-use space at below market rates, including equipment and conference rooms and eight wet labs.

[38] Ice Miller "Venture Capital Tax Credits By State" 2005
[39] Ice Miller "Venture Capital Tax Credits By State" 2005
[40] http://www.theohiocapitalfund.com
[41] http://www.ohiocapitalfund.com/currentinvestments.asp#peppertree
[42] http://www.akronaccelerator.com

- The accelerator collaborates with many organizations throughout the world, especially in Germany and Finland, to help successfully launch its client enterprises.

2. **Akron Innovation Campus**[43]
    - Located on the University of Akron campus, this site, which has over 71,000 square feet of space, connects companies with the university by linking tenants for business growth and wealth creation.
3. **Safe Harbor**[44]
    - Safe Harbor is a minority small-business incubator and development center in collaboration with the East Akron Neighborhood Development Corporation.
    - The center coordinates a variety of services that support entrepreneurs and existing small business ventures.
4. **Kent Regional Business Alliance Incubator (KRBA)**[45]
    - Tenants have access to space at reduced costs.
    - Services offered include mentoring, business counseling, mailboxes, parking, and basic market research.
5. **Partnership for the Minority Business Accelerator (PMBA)**[46]
    - A collaborative program developed by the Akron Urban League, Akron SCORE, the GAR Foundation, and Kent State University.
    - The business accelerator program provides support to African-American and Hispanic business owners in Medina, Portage, and Summit counties.

Austen BioInnovation Institute

The Austen BioInnovation Institute (Akron, Ohio)[47]

- A $200 million, 10-year program with five partners: The University of Akron; Akron General Medical Center; Akron Children's Hospital; Summa Health System; and Northeast Ohio Medical University.
- The Institute was catalyzed by a grant from the Knight Foundation and matching funds from state, private, and partner investments in support of the city of Akron's Biomedical Corridor.
- The Austen Institute is an I-6 Challenge designee, which is a regional initiative to support technology commercialization and entrepreneurship. The program was created with cooperation from the Economic Development Administration (EDA), the National Science Foundation (NSF), and the National Institute of Health (NIH). The University of Akron Research Foundation and the Austen BioInnovation Institute received money for the Innovative Solutions for Invention Xceleration project.[48]
- On December 21, 2011, it was announced the Lubrizol Corporation was partnering with the Austen BioInnovation Institute to "share resources in hopes of speeding the development and commercialization of new technologies."[49]
- Centers within the Austen BioInnovation Institute include the:

[43] http://www.uakron.edu/research/aic.dot
[44] http://www.eakronndc.org/new_page_1.htm
[45] http://www.krba.biz/incubator.php
[46] http://www.pmba1.org/
[47] http://www.abiakron.org/
[48] http://www.abiakron.org/i6-home
[49] Magaw, Timothy. "Lubrizol Corp., Akron's Austen BioInnovation Institute enter partnership" Crain's Cleveland. December 21, 2011.

- Center for Biomaterials and Medicine –
  - Focuses on biopolymers, orthopedics, and wound-healing.
  - Leverages the world-class polymer science and engineering cluster in Akron to accelerate biomedical innovation.
- Medical Device Development Center –
  - Designs, tests, synthesizes, and manufactures new materials and health care applications of biomaterials.
  - Provides entrepreneurs and scientists with access to resources for commercialization of their ideas and products.
- Center for Simulation and Integrated Healthcare Education –
  - Simulation-based education and training center.
- Center for Clinical and Community Health Improvement –
  - Clinical and community-based research
  - Scientists and clinicians reach patients in community settings, which breaks the boundaries of traditional research.

REGIONAL SUPPORT

1. **JumpStart Inc.**
   - JumpStart Inc. was started in 2004, with the mission to "deliver vital, focused resources to entrepreneurs and the community, accelerate the growth of early-stage businesses and ideas into venture-ready companies, and to ultimately transform Northeast Ohio into a nationally significant center of entrepreneurship and innovation."[50]
   - Today, JumpStart Inc. is a nationally recognized model for entrepreneurship capacity building. In 2010, JumpStart Inc. reported that $237 million had been invested by venture capitalists and angel investors in 79 unique companies, more than double the amount invested in 2009.
2. **NorTech**
   - Founded in 1999, NorTech[51] aims to support building a technology cluster in the Northeast Ohio region. Today, NorTech works closely with regional partners to advance and build the alternative energy and flexible electronics clusters.
   - As a component of NorTech's cluster building in Northeast Ohio, the organization has launched two phases of its organization: NorTech Energy Enterprise[52] (which champions the advanced energy cluster) and NorTech Flex Matters[53] (which leads growth opportunities in the flexible electronic industry).
3. **BioEnterprise**
   - A non-profit organization focused on fueling the emerging biotechnology sector in the Northeast Ohio region[54] with partners including the Cleveland Clinic, University Hospitals, Case Western Reserve University, Summa Health System, BioInnovation Institute in Akron, NASA Glenn Research Center, Cleveland State University, and NorTech.

[50] http://www.jumpstartinc.org/aboutus/ourhistory.aspx
[51] http://www.nortech.org/
[52] http://www.nortechenergy.org/
[53] http://www.nortech.org/flexmatters/
[54] http://www.bioenterprise.com/dynamic/Overview

- BioEnterprise has created more than 110 companies, which have created, recruited, and grown with more than $1 billion in new funding. In addition, over 450 technology transfer deals have been completed with industry partners.

4. **Lorain Innovation Fund**
   - The Innovation Fund,[55] founded by the Lorain County Community College Foundation in 2007, is a regional fund focused on supporting technology-based entrepreneurial endeavors and emerging technology-based businesses from the Ohio Third Frontier program.

Risk Capital in the Northeast Ohio Region

Over the last 5 years, the Northeast Ohio region has been aggressively pursuing risk capital for start-up companies. Over 105 equity investors from across the United States invested in Northeast Ohio companies from 2006 to 2010.[56] After a slow year in 2009 due to the recession, 2010 saw investments in 96 companies in the Northeast Ohio region, totaling $237 million. These investments show unprecedented growth as more companies received investments in 2010 than in the previous 5 years.[57]

Despite these efforts, there are significant hurdles the Northeast Ohio region must overcome. In a Brookings report on venture capital in the Great Lakes region, the authors pointed out several issues involving risk capital in this market. The general observations for the Great Lakes region are:[58]

- A shortage of "investable deals" even if enough capital were available in the Great Lakes region.
- The lack of a "critical mass of deals" within the Great Lakes region and the wide geographic dispersion of cities over a large area intensifies the high costs of early stage venture investing.
- A lack of young companies, which increases the probability that companies will need to relocate in search of capital as they grow.

Role of Educational Institutions

University of Akron (UA)

One of the major strengths within the Akron region is the leadership of the **University of Akron**[59] in shaping the innovation agenda for the city of Akron and the region.

The University of Akron Research Foundation (UARF)

In 2001, the University of Akron saw an opportunity to enhance the growth of the Akron region by moving away from the traditional university model of engaging only in teaching, research, and service. It created the University of Akron Research Foundation (UARF), a 501(c)(3) non-profit independent of the university and the state of Ohio that has a charter that benefits the University of Akron.[60] The UARF provides indemnity to research sponsors, holds and disposes of equity in private companies, responds to

[55] http://www.innovationfundneohio.com
[56] Cleveland Plus Venture Capital Report, 2010
[57] Cleveland Plus Venture Capital Report, 2010
[58] Samuel, Frank, E. "Turning up the Heat: How Venture Capital Can Help Fuel the Economic Transformation of the Great Lakes Region" January 2010
[59] Proenza, Luis "Universities and their Regions: The Akron Model" June 2009
[60] Wayne Watkins "University of Akron Strategies for Small Technology Transfer Offices" July 23, 2008

faculty and industry on a commercial timeframe and with flexible decision-making authority, and has independence because the majority of its board is not university personnel.[61]

The technology focus of the UARF, not listed in order of importance, is: (1) medical, (2) computers, (3) sensors and devices; (4) biotechnology and biomimicry, (5) environmental, (6) polymer science and engineering, (7) advanced materials, (8) nanotechnology, (9) security, and (10) energy.[62]

Major Roles of the UARF:[63]

1. Technology commercialization[64]
    - Innovation Fund in partnership with Lorain County Community College
    - ARCHAngel Investment Network
2. Technology transfer success
    - Licensing to big business
    - Licensing to start-up companies
3. Other university start-ups
4. Technology-based economic development
    - Industry outreach through senior fellows
    - Innovation education
    - Practical internship programs

UA Research Centers[65]

Science and Engineering

- **Applied Polymer Research Center (APRC)**[66]
    - Contract services facility operated by the University of Akron's College of Polymer Science and Polymer Engineering.
    - Services provided by the Center include chemical analysis, thermal analysis, physical testing, rubber compounding and testing, microscopy services to the polymer industry, and patent assistance.
- **Collaborative Center in Polymer Photonics[67]**
    - Develops polymer-based materials and fabrication methods for photonic applications.
- **Institute for Polymer Engineering[68]**
    - Serves as a source of technical assistance for clients.
    - Services include optimum processing conditions, evaluating new technologies and materials, selecting the best equipment for production, solving processing problems, training on processing and testing equipment, understanding theoretical and practical issues, and providing pilot plant samples.
- **Maurice Morton Institute of Polymer Science[69]**

[61] Wayne Watkins "University of Akron Strategies for Small Technology Transfer Offices" July 23, 2008
[62] University of Akron Research Foundation Brochure 2010
[63] University of Akron Research Foundation Brochure 2010
[64] Barry Rosenbaum "Leadership in University Startups The University of Akron Model" 2011 UEDA Annual Conference
[65] University of Akron Resource Guide
[66] http://www2.uakron.edu/cpspe/applied/index.php
[67] http://www3.uakron.edu/ccpp/
[68] http://www.poly-eng.uakron.edu/ipe.php
[69] http://www2.uakron.edu/cpspe/MMIPS/institute.html

  - Conducts basic and applied research, focusing on the creation of new polymers and the study of their physical properties.
- **Institute for Biomedical Engineering Research (IBER)**[70]
  - Created in 1979 as a collaboration of Akron City Hospital (now part of Summa Health System), Akron General Medical Center, and UA's College of Engineering.
  - The goal is to advance partnerships with medical and research health care providers and the university community.
  - IBER is composed of over 150 faculty, academics, medical professionals, staff, and administrators working in over 17 biomedical research laboratories in Northeast Ohio.
- **Microscale Physiochemical Engineering Center (MPEC)**[71]
  - Conducts research and transfers technologies in physiochemical processes.
  - Its major goals are:
    1. Enhancing research funding by developing innovative strategies that are responsive to a changing funding environment.
    2. Reinforcing and establishing ties with the public and private sectors by developing outreach programs in research and education.
    3. Synthesizing and integrating College of Engineering activities in research and education.

Workforce Development Training

- **Akron Global Polymer Academy**[72]
  - Assists the College of Polymer Science and Polymer Engineering by supporting initiatives in P-16 education and other education ventures about science, technology, engineering, and mathematics (STEM) education.
  - Helps create a workforce development pipeline for the polymer industry.
- **Akron Polymer Training Center (APTC)**[73]
  - The Center is the training division of the College of Polymer Science and Polymer Engineering.
  - The Center's workforce development and training facility has courses in plastics, rubber, corrosion, innovative solutions, medical technology, and color technology.

Entrepreneurship Support Centers

- **Intellectual Property Law Center**[74]
  - Facilitates and manages the IP program at the University of Akron Law School.
- **William and Rita Fitzgerald Institute for Entrepreneurial Studies**[75]
  - Instructs students and the community on entrepreneurship, and provides relevant research, knowledge, and tools for effective entrepreneurial participation.
  - Helps facilitate new and emerging business development.
- **Small Entrepreneur and Economic Development (SEED) Legal Clinic**[76]

[70] http://www.ecgf.uakron.edu/grad_biomed.html
[71] http://www.ecgf.uakron.edu/~mpec/index.html
[72] http://www.agpa.uakron.edu/
[73] http://www2.uakron.edu/aptc/
[74] http://www.uakron.edu/law/ip/index.dot
[75] http://www.uakron.edu/cba/cba-home/dept-cent-inst/fitzgerald/
[76] http://www.uakron.edu/law/clinical/seed/

  - Provides low-cost legal and business assistance to small and emerging businesses supervised by licensed attorneys; 2nd and 3rd year law students assist clients.
  - Services include non-litigation, transactional legal, and business advice, which may include business planning, employment, contract/lease, tax, and entity formation information

Kent State University (KSU)

Kent State University, located in Portage County, is a prominent player in the entrepreneurship and innovation arena, especially with its role as the birthplace of liquid crystal technology.

- **Liquid Crystal Institute (LCI)**[77]
  - The activities at the LCI are focused on streamlining the research from basic science to the development of practical applications of liquid crystals.
  - Research facilities are available for use by students and researchers, including academic and industrial partners.
  - Facilities at the Institute Include:
    - Liquid Crystal Device Prototype Facility
    - Characterization Facility
    - Organic Synthesis Facility
    - Machine Shop
    - Electronics Shop
- **Center for Entrepreneurship and Business Innovation**[78]
  - The Center is associated with the college of business administration at KSU and facilitates entrepreneurial education and innovation.
  - Focuses on instruction, innovation, and support for emerging businesses in Northeast Ohio.
  - The Center houses the John Brinzo Entrepreneurial Laboratory, an incubator space for students to develop their business plans and engage in entrepreneurial activity.

Ohio Agricultural Research and Development Center (OARDC)

The Ohio State University, Ohio Agricultural Research and Development Center (OARDC) located in Wooster, Ohio (Wayne County), is the research arm of The Ohio State University's College of Food, Agricultural, and Environmental Sciences. The OARDC conducts research on food, agriculture, family, and the environment.

AgBioscience Centers of Innovation[79] develop and support interdisciplinary research teams that look to (a) commercialize discoveries, (b) create start-up companies, (c) expand existing companies, and (d) create public-private partnerships. In addition, the Centers strive to:

- Research programs that cross disciplines
- Actively identify discoveries that have commercial potential
- Link fundamental and translational research
- Leverage and combine resources (funding, facilities, people)
- Overcome barriers to commercializing agbioscience discoveries

[77] http://www.lcinet.kent.edu/
[78] http://www.kent.edu/cebi/getinvolved.cfm
[79] http://www.oardc.ohio-state.edu/agbiosci/secondary.asp?id=202

The Multiple AgBioscience Centers are[80] [81]:

1. **Center for Diagnostic Assays** – Performs diagnostic tests on infectious pathogens that are essential for the health of food-producing animals and plants, and for the safety and security of our food supply.
2. **Center for Food Safety and Agrosecurity** – Researches advances in food safety and its commercial applications including processing techniques that eliminate dangerous, tamper-proof packages, and rapid tests to diagnose food-borne pathogens to promote safety and security.
3. **Center for Advanced Functional Food Research and Entrepreneurship** - Addresses serious societal issues by developing functional foods to combat cholesterol and cancer.
4. **Center for Urban Environment and Economic Development -** Focuses on the development and commercialization of new organic and biological products to meet the fertility, pest control, and pollution mitigation needs of urbanized areas.
5. **Center for Innovation Based Enterprise -** Provides the necessary expertise to address barriers to product commercialization by providing cutting-edge research into entrepreneurship, contract design, finance, marketing, and risk management for innovation-based and start-up AgBioscience enterprises.
6. **The Ohio BioProducts Innovation Center (OBIC)** - Focuses on the development of specialty chemicals, polymers, and industrial products from renewable plant sources.
7. **Plant and Animal Agrosecurity Research Facility**[82] –
    - The Plant and Animal Agrosecurity Research (PAAR) facility is a highly secure biocontainment building, which is one of two facilities in the United States designated for BSL-3 Ag level for plants and animals.
    - The facility will allow Ohio to develop new diagnostic tools, treatments, vaccines, and genetically-resistant animals and plants to reduce economic losses from diseases and pests.

NORTHEAST OHIO MEDICAL UNIVERSITY

Formerly known as Northeastern Ohio Universities Colleges of Medicine and Pharmacy (NEOUCOM),[83] the Northeast Ohio Medical University, located in Portage County, was established in 1973. The university trains doctors, pharmacists, researchers, and other health professionals in an inter-professional environment and increases the human capital in the Akron region.

[80] Ohio Agricultural Research and Development Center "The AgBioscience Centers of Innovation Brochure"
[81] http://www.oardc.ohio-state.edu/agbiosci/secondary.asp?id=215
[82] http://oardc.osu.edu/paar/t02_pageview/Home.htm
[83] Magaw, Timothy "NEOUCOM wins official OK to change name to Northeast Ohio Medical University" Crain's Cleveland April 29, 2011

Entrepreneurship Trends

Employment Dynamics

Table 21. Local Employment Dynamics, Q1 2010

Demographic Category	Area	Total Employment	Net Job Flows	Job Creation	New Hires	Separations	Turnover	Average Monthly Earnings	Average New Hire Earnings
All Races	Portage County	47,477	-207	1,503	4,430	5,714	6.60%	$3,021	$1,487
	Stark County	145,014	-1,086	5,419	13,078	17,493	7.40%	$2,874	$1,426
	Summit County	251,088	-815	9,559	23,100	30,036	7.70%	$3,566	$1,818
	Wayne County	40,344	249	1,504	3,141	3,747	6.00%	$2,789	$1,470
	Akron Region (4-County)	***483,923***	***-1,859***	***17,985***	***43,749***	***56,990***	-	-	-
	State of Ohio	4,663,149	13,380	204,317	438,716	551,284	7.20%	$3,426	$1,813
African American	Portage County	2,497	-92	110	756	894	10.10%	$2,277	$1,070
	Stark County	9,109	-53	598	1,373	1,673	10.30%	$2,035	$1,126
	Summit County	26,119	-520	1,283	3,632	4,815	10.50%	$2,305	$1,427
	Wayne County	1,181	-28	61	140	189	9.80%	$2,231	$1,243
	Akron Region (4-County)	***38,906***	***-693***	***2,052***	***5,901***	***7,571***	-	-	-
	State of Ohio	473,360	-5,090	26,155	64,620	82,570	9.60%	$2,429	$1,456
Hispanic	Portage County	716	-3	57	99	120	9.20%	$2,753	$1,374
	Stark County	2,297	N/A	205	367	420	10.00%	$2,390	$1,383
	Summit County	4,159	12	368	701	804	10.30%	$2,784	$1,447
	Wayne County	833	4	48	101	114	9.10%	$2,225	$1,845
	Akron Region (4-County)	***8,005***	***13***	***678***	***1,268***	***1,458***	-	-	-
	State of Ohio	117,242	611	9,585	17,442	20,146	9.40%	$2,705	$1,620

Note: The LED is comprised of many sources such as censuses, surveys, and other administrative record.
Definitions: Net job flows = job creations - job destructions;
Separations = separations are individuals who separate during the current quarter who were full quarter employees in the previous quarter;
Turnover = employment churning;
For more information on LED definitions see http://lehd.did.census.gov/led/library/techpapers/QWI_definitions.pdf
Source: U.S. Census Bureau, Local Employment Dynamics (LED)

- Employment dynamics of a region measure the flow and movement of jobs that are not captured by the net gain/loss of overall employment and unemployment data.

- Including all races in the Akron region, the net job flow in the first quarter of 2010 was negative (-1,895), indicating that the number of jobs created in the Akron region fell below the number of jobs destroyed (Table 21).

- The breakdown by racial and ethnic categories demonstrates that African-American workers within the Akron region account for 8% of the overall workforce and posted a negative net job flow in the first quarter of 2010 (-693). For the same time period, Hispanic workers, which account for 2% of overall employment, experienced a nominal net job flow increase (13).

- The turnover rates for African Americans and Hispanics are higher than turnover rates for all races in Ohio and in each of the four counties in the Akron region.

Risk Capital Firms

Table 22. Risk Capital Firms in the Akron Region

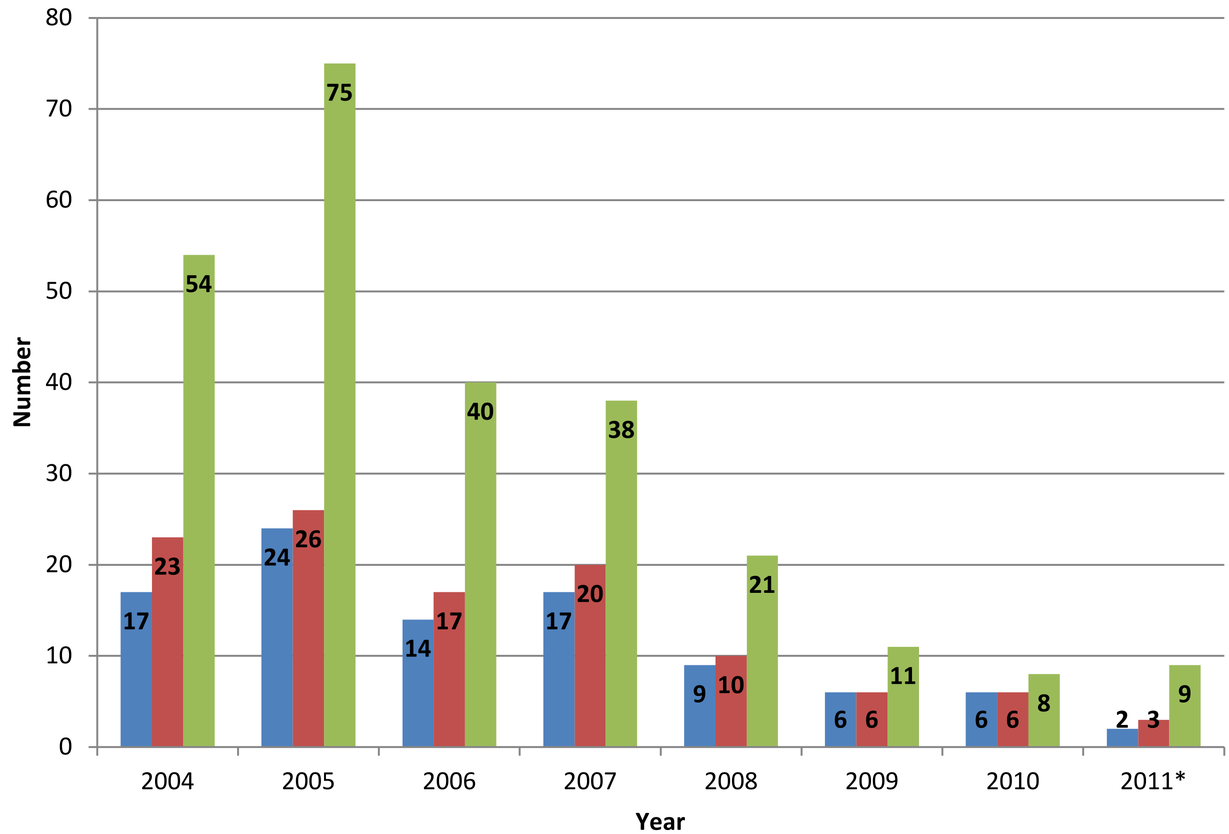
Organization	City	Phone Number	Website	Contact
ArchAngels	Akron	(330) 972-7840	http://www.akronarchangels.com	Gordon Schorr
Summa Health Ventures	Akron	(330) 375-3196	http://www.summahealth.org	
Signet Enterprises LLC	Akron	(330) 762-9102	www.signet-enterprises.com	Kenneth Krismanth
Akron BioInvestments Funds, LLC	Akron	(330) 258-0120	http://www.ci.akron.oh.us/	
The Reserve Group	Akron	(330) 665-2900	http://www.reservegroup.com/	
Student Venture Fund at The University of Akron	Akron	(330) 972-6532	http://www.uakron.edu/research/svf/companies.dot	Neil Brennan

Source: BioOhio and Individual Organizations Websites

• There are five risk capital firms located in the Akron region, all located in the city of Akron (Table 22).

RISK CAPITAL INVESTMENT

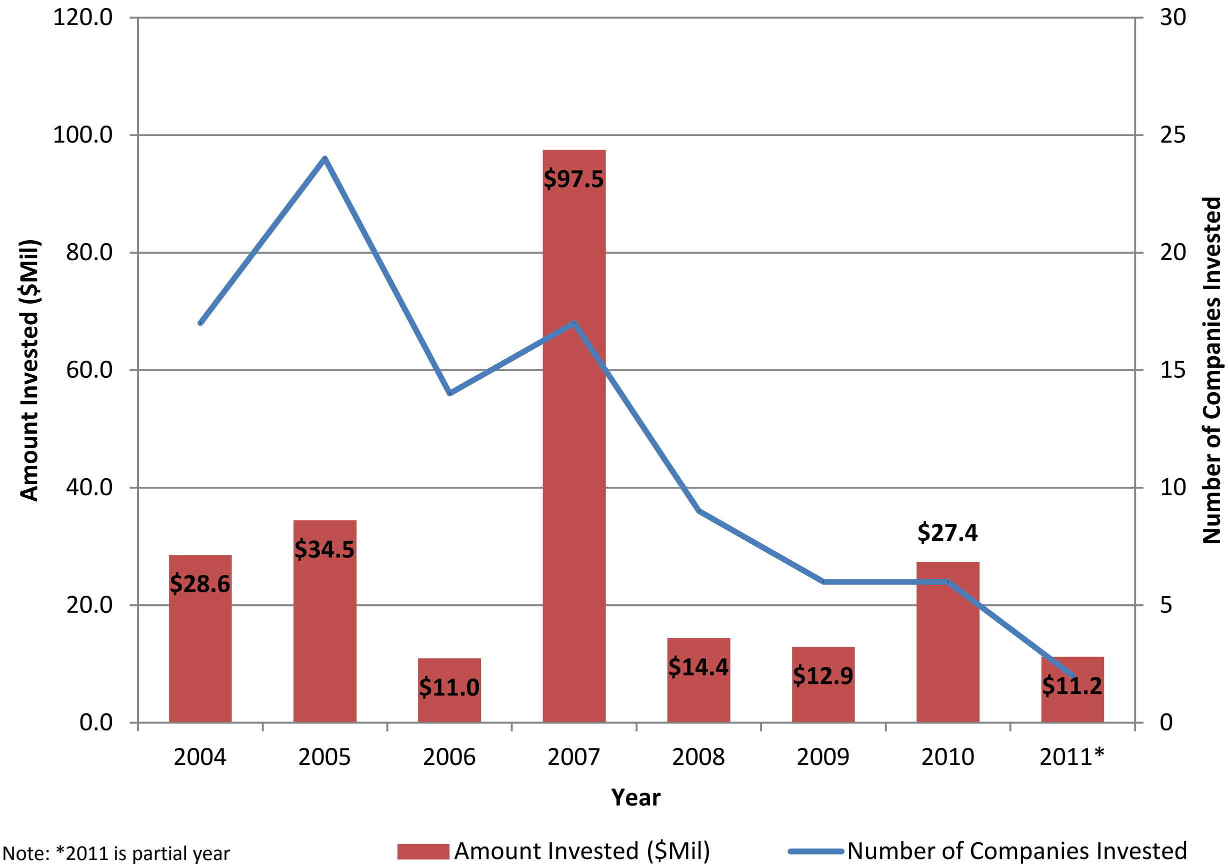
Figure 8. Risk Capital Investments by Number of Companies Invested, Number of Deals, and Number of Investments in the Akron Region (4-County), 2004 -2011



Note: *2011 is partial year
Source: JumpStart Inc.

- Risk capital investment in the Akron region has markedly declined since 2007, with the number of investments in 2010 (8) falling far below its 2007 value (38). This series peaked in 2005 with 75 investments in companies in the Akron region (Figure 8).
- The number of companies in the Akron region that have received risk capital has also declined over the last 7 years from 17 in 2004 to just 6 in 2010.

Figure 9. Risk Capital Investments by Amount Invested ($Mil) and Number of Companies Invested in the Akron Region (4-County), 2004 - 2011



Note: *2011 is partial year
Source: JumpStart Inc.

- The dollar amount of risk capital investments in the Akron region peaked in 2007 ($97.5 million) and saw a precipitous decline in 2008 and 2009. The year 2010 saw a mild resurgence of investments with an increase to $27.4 million invested in the region (Figure 9).
- Even as the amount of money invested in companies in the Akron region has fluctuated, there has been a decrease overall in the number of companies that have received investment from an all-time high in 2005 of 26 to 6 in 2010.

Small Business Development Centers

Table 23. Small Business Development Centers in the Akron Region

Organization Name	City	County	Phone	Contact
Small Business Development Center at the Summit Medina Business Alliance	Akron	Summit	(330) 375-2111	Mary Ann Jasionowski
Ohio SBDC at Kent State University	North Canton	Stark	(330) 244-3290	Victor Pavona
Cascade Capital Corporation	Akron	Summit	(330) 379-3160	Robert Filipiak
Akron SCORE	Akron	Summit	(330) 379-3163	Diana Bennett
Northeast Ohio Trade & Economic Consortium	Kent	Portage	(330) 672 -4087	Kimberly M. Holizna
Canton Regional SCORE	North Canton	Stark	(330) 244-3280	Mike Johnson
Stark Development Board Finance Corporation	Canton	Stark	(330) 453-5900	Justin Hoffee

Source: Small Business Administration and Individual Organization Websites

- Seven small business development centers were identified within the four counties of the Akron region (Table 23).

Tax Incentives

Table 24. Tax Incentives in the State of Ohio

Program Name	Description	Sponsoring Agency	Contact	Phone
Research & Development Sales Tax Exemption	A sales tax exemption for machinery and equipment used in research and development	State of Ohio	Governor's Office of Economic Development	(330) 643-3392
Technology Investment Tax Credit	Ohio investors may reduce their state taxes by 25 percent on the amount they invest in qualified, technology-based Ohio companies	State of Ohio	Rich Amsden, Technology and Innovation Division	(614) 466-3887

Source: Greater Akron Chamber Economic Development Assistance Brochure and the City of Akron Website

- There are two tax incentives available in the state of Ohio (Table 24). For eligibility requirements, see Appendix B.1. Tax Incentives in the State of Ohio.

Loan Programs

Table 25. Loan Programs Available in the Akron Region and State of Ohio

Program Name	Description	Sponsoring Agency	Contact	Phone
504 Loan Program (SBA)	504 loans are used for construction, renovation, expansion, land acquisition, machinery and equipment for businesses meeting SBA guidelines.	U.S. Small Business Administration	Cascade Capital Corporation	(330) 379-3160
State of Ohio 166 Regional Loan Program	Provides financing for small industrial businesses. . Participates in the financing of the acquisition of fixed assets, including land, buildings, machinery and equipment, for healthy, expanding, area small industrial businesses.	State of Ohio	Cascade Capital Corporation	(330) 379-3160
SBA Lowdoc Loan Program	Guarantees up to 90% of a small business loan up to $100,000. Aimed at entrepreneurs starting a new business and existing businesses whose average annual sales for the preceding 3 years do not exceed $5 million and employ 100 or less, including affiliates.	U.S. Small Business Administration	SBA Cleveland District Office	(216) 522-4180
Innovation Ohio Loan Program	Provides capital to existing Ohio companies developing next generation products and services. The IOF loan may finance up to 75% of allowable project costs ranging from $500k - $1.5M	State of Ohio	Ohio Department of Development Strategic Business Investment Division Loans & Servicing Office	(614) 466-542
Research and Development Investment Loan Program	Provides low interest loans partnered with a tax credit	State of Ohio	Ohio Department of Development Strategic Business Investment Division Loans & Servicing Office	(614) 466-542
Wayne County Revolving Loan Fund	Working capital for the start-up of new businesses or existing businesses.	Wayne County	Wayne County Economic Development Council	(330) 264-2411

Source: Greater Akron Chamber Economic Development Assistance Brochure; the City of Akron Website; the Ohio Department of Development

- There are six loan programs available to the Akron region (Table 25). Two programs are provided by the U.S. Small Business Administration, three programs are available through the state of Ohio, and one program is provided by Wayne County.
- For program eligibility, terms, and rates, see Appendix B.2. Loan Programs Available in the Akron Region and State of Ohio.

Innovation Trends

Science, Engineering, and Technology Degrees

Table 26. Science, Engineering, and Technology Degrees Awarded at Institutions in the Akron Region, 2009

Institution	Total Degree Awarded	Engineering	Physical Sciences	Math and Computer Sciences	Life Sciences	Social Sciences	Science and Engineering Technologies	Business and Management
College of Wooster	435	0	19	13	45	136	2	0
Hiram College	237	0	6	8	46	43	0	51
Kent State University	6,371	180	52	198	865	172	265	1,092
Malone College	599	0	1	13	140	5	16	208
Mount Union College	346	0	3	31	43	23	0	72
Northeastern Ohio Universities College of Medicine	120	0	0	0	120	0	0	0
Ohio State University Agricultural Technical Institute	147	0	0	0	34	0	10	88
Stark State College of Technology	972	20	0	91	87	0	360	199
University of Akron, All Campuses	4,175	279	45	131	512	208	318	717
Walsh University	578	0	2	5	166	17	15	200
Total Degrees Awarded	**13,980**	**479**	**128**	**490**	**2,058**	**604**	**986**	**2,627**

Source: U.S. Department of Education, National Center for Education Statistics

- The total number of degrees awarded in Table 26 (13,980) represents 12% of all degrees awarded in the state of Ohio (121,264) in 2009.
- Of the institutions listed in Table 26, Kent State University and the University of Akron (6,371 degrees and 4,175 degrees, respectively) represent over three-quarters of degrees awarded (75%).
- Overall, the highest number of degrees awarded by specialization were in *Business and Management* (2,627), followed by *Life Sciences* (2,058). These two fields accounted for 34% of the total degrees awarded at these institutions in 2009.
- It is interesting to note that Walsh University issued 29% of its degrees in the category *Life Sciences.*

UNIVERSITY R&D EXPENDITURES

Table 27. University R&D Expenditures in the Akron Region, 2005 - 2009

Institution	2005 ($ Mil)	2006 ($ Mil)	2007 ($ Mil)	2008 ($ Mil)	2009 ($ Mil)
College of Wooster	$0.61	$1.01	$0.97	$0.60	$0.88
Hiram College	$0.00	$0.00	$0.00	$0.00	$0.00
Kent State University	$11.79	$11.61	$19.45	$22.97	$25.05
Malone College	$0.00	$0.00	$0.00	$0.00	$0.00
Mount Union College	$0.00	$0.00	$0.00	$0.00	$0.00
Northeastern Ohio Universities College of Medicine	$6.09	$5.55	$5.10	$9.04	$10.08
Ohio State University Agricultural Technical Institute	$0.00	$0.00	$0.00	$0.00	$0.00
Stark State College of Technology	$0.00	$0.00	$0.00	$0.00	$0.00
University of Akron, All Campuses	$28.70	$29.81	$27.79	$26.81	$34.51
Walsh University	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$47.19**	**$47.98**	**$53.31**	**$59.43**	**$70.51**

Note: Expenditures are adjusted for inflation to 2009 dollars
Source: National Science Foundation

- Total university R&D expenditures in the Akron region ($70.51 million) represented 3.7% of all university R&D expenditures in the state of Ohio ($1.90 billion) in 2009 (Table 27).
- Over the last 5 years, total university R&D expenditures in the Akron region have grown by 33%; the largest percentage increase during this time occurred at Kent State University, which increased its university R&D expenditures by 125%.

Table 28. University R&D Expenditures in the Akron Region by Science Type, 2009

Institution	Total Amount Awarded ($Mil)	Engineering ($Mil)	Physical Sciences ($Mil)	Math and Computer Sciences ($Mil)	Life Sciences ($Mil)	Social Sciences ($Mil)	Geosciences ($Mil)
College of Wooster	**$0.88**	$0.00	$0.59	$0.04	$0.16	$0.00	$0.04
Hiram College	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Kent State University	**$25.05**	$0.20	$12.42	$1.50	$3.59	$0.64	$0.58
Malone College	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Mount Union College	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Northeastern Ohio Universities College of Medicine	**$10.08**	$0.00	$0.00	$0.00	$9.30	$0.78	$0.00
Ohio State University Agricultural Technical Institute	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Stark State College of Technology	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
University of Akron, All Campuses	**$34.51**	$15.73	$12.44	$0.20	$2.20	$3.09	$0.55
Walsh University	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$70.51**	**$15.93**	**$25.45**	**$1.73**	**$15.25**	**$4.51**	**$1.17**

Source: National Science Foundation

- The largest share of university R&D expenditures in the Akron region occurred in Physical Sciences, which accounted for 36% of all university R&D expenditures for the region (Table 28).
- At the University of Akron, the largest share of university R&D expenditures (46%) was reported in Engineering.

SBIR/STTR Awards

Table 29. SBIR/STTR Number of Awards by Year and Award Total ($) in the Akron Region, 2005 – 2010

Year	Number of Awards	Award Total ($)
2005	11	$2,641,856
2006	14	$5,587,295
2007	7	$3,271,519
2008	7	$2,758,408
2009	14	$3,206,797
2010	14	$3,482,632
Total	**67**	**$20,948,507**

Note: SBIR/STTR Awards totaled from the following government agencies: DHS, DOC, DOD, DOE, DOI, DOT, ED, EPA, HHS, HUD, NASA, NIH, NIST, NRC, NSF, and USDA
Source: Small Business Administration Tech-Net; National Institute of Health

- Between 2005 and 2010, 67 SBIR/STTR awards were distributed in the Akron region to 17 different firms, totaling over $21 million (Table 29).
- Over these 6 years, the largest number of awards (14) occurred in 2006, 2009, and 2010. The year 2006 had the largest overall dollar amount allocated ($5.6 million).
- For a complete list of firms and awards, please see to Appendix B.3. SBIR/STTR Awards in the Akron Region, 2005 – 2010.

Table 30. SBIR/STTR Awards for Portage, Summit, and Wayne Counties by Number of Awards, Award Total and Percent of Region Total, 2005 – 2010

County	Number of Awards	Percentage of Total Awards	Award Total ($)	Percentage of Award Total ($)
Portage County	15	22.4%	$4,888,261	23.3%
Stark County	0	0.0%	$0	0.0%
Summit County	50	74.6%	$15,810,401	75.5%
Wayne County	2	3.0%	$249,845	1.2%

Note: SBIR/STTR Awards totaled from the following government agencies: DHS, DOC, DOD, DOE, DOI, DOT, ED, EPA, HHS, HUD, NASA, NIH, NIST, NRC, NSF, and USDA
Source: Small Business Administration Tech-Net; National Institute of Health

- Firms in Summit County received over 74.6% of all SBIR/STTR awards (50) in the Akron region, and over 75.5% of total award dollars ($15.8 million) (Table 30).
- Portage County received 22.4% of all awards (15) and 23.3% of the total award dollars ($4.9 million), and Wayne County received only two awards (3.0%) and just under $250,000 (1.2%) in funding.

Table 31. Top Ten SBIR/STTR Award Winners for the Akron Region by Number of Awards, 2005 – 2010

Rank	Firm Name	County	Number of Awards	Award Total ($)
1	Novelmed Therapeutics, Inc.	Summit	22	$8,021,891
2	Creative Action, LLC	Summit	9	$3,719,254
3	Kent Optronics, Inc.	Portage	6	$2,464,892
4	Homesense Enterprises, LLC	Summit	5	$1,572,092
5	Kent Displays, Inc.	Portage	5	$1,549,977
6	Akron Polymer Systems, Inc.	Summit	4	$1,019,310
7	Catacel	Portage	3	$773,394
8	Abs Materials	Wayne	2	$249,845
9	Akron Rubber Development Laboratory, Inc	Summit	2	$139,900
10	Sorbent Technologies Corp	Summit	2	$599,714
	Total	-	**60**	**$20,110,269**

Note: SBIR/STTR Awards totaled from the following government agencies: DHS, DOC, DOD, DOE, DOI, DOT, ED, EPA, HHS, HUD, NASA, NIH, NIST, NRC, NSF, and USDA
Source: Small Business Administration Tech-Net; National Institute of Health

- Table 31 displays the top ten firms aggregated by number of SBIR/STTR awards in the Akron region. Collectively, these firms garnered 60 awards, which accounted for 89% of all awards in the region.
- Six of the ten companies were located in Summit County, three were located in Portage County, and one was in Wayne County.
- Novelmed Therapeutics Inc. had the largest number awards (22). The second-highest award count was held by Creative Action, LLC (9).
- Companies that receive multiple awards over several years may indicate progress towards commercialization.

Table 32. Top Ten SBIR/STTR Award Winners for the Akron Region by Award Total ($), 2005 – 2010

Rank	Firm Name	County	Number of Awards	Award Total ($)
1	Novelmed Therapeutics, Inc.	Summit	22	$ 8,021,891
2	Creative Action, LLC	Summit	9	$ 3,719,254
3	Kent Optronics, Inc.	Portage	6	$ 2,464,892
4	Homesense Enterprises, LLC	Summit	5	$ 1,572,092
5	Kent Displays, Inc.	Portage	5	$ 1,549,977
6	Akron Polymer Systems, Inc.	Summit	4	$ 1,019,310
7	Catacel	Portage	3	$ 773,394
8	Sorbent Technologies Corp	Summit	1	$ 599,714
9	Abs Materials	Wayne	2	$ 249,845
10	Bnoat Oncology, Inc.	Summit	1	$200,000
	Total	**-**	**59**	**$ 20,170,369**

Note: SBIR/STTR Awards totaled from the following government agencies: DHS, DOC, DOD, DOE, DOI, DOT, ED, EPA, HHS, HUD, NASA, NIH, NIST, NRC, NSF, and USDA
Source: Small Business Administration Tech-Net; National Institute of Health

- Table 32 displays the top ten firms aggregated by total SBIR/STTR award dollars in the Akron Region. Together, these firms were awarded over $20 million in awards, representing 96% of all dollars allocated in the region. The firms were located in Summit County (6), Portage County (3), and Wayne County (1).
- Novelmed Therapeutics, Inc. had the largest award total dollar amount at $8.0 million, which was more than double that of any other firm. The next closest dollar award winner was Creative Action, LLC. with $3.7 million in awards.

PATENTS

Patents are an alternative measure of regional innovative activities and are often used as a proxy for innovation. Each patent includes the name of at least one individual inventor (many have multiple inventors). Ownership is assigned to an individual inventor or to a corporation, university, or another research institution (assignee).

Patents (both applications and those already granted) for the state of Ohio between January 2007 and October 12, 2011, were downloaded and analyzed. To be included in the data for the Akron region, the patent had to include at least one inventor or an assignee from the Akron region. Additional inventors or assignees can be from outside the Akron region (referred to as "Outside").

PATENT COUNTS

Table 33. Akron Region (4-Counties) Patent Frequency Counts, January 2007 - October 2011

Year	Number of Patents	Percentage of Total
2007	1,081	29.4%
2008	948	25.8%
2009	854	23.2%
2010	640	17.4%
2011*	156	4.2%
Total	**3,679**	**100.0%**

Note: *Partial year
Source: Delphion.com

- In the Akron region, 3,679 patents were granted and applied for between January 2007 and October 12, 2011 (Table 33).
- From 2007 to 2010, there was a significant decrease in the number of patents. In 2007, there were 1,081 patents in the Akron region, but that number fell to 156 (-86%) by 2010. This reflects trends during the recessionary years.

Table 34. Patents: Akron Region (4-Counties), January 2007 - October 2011

Designation	All Patents: Granted and Applications
Akron Region Inventor without Assignee	1,574
Akron Region Inventor and Akron Region Assignee	744
Akron Region Inventor and Outside Assignee	1,193
Outside Inventor and Akron Region Assignee	168
Total Patent Applications from Akron Region Inventors and/or Assignees	**3,679**

Source: Delphion.com

- Of the 3,679 patents, 744 were in the name of an Akron regional inventor with an Akron regional assignee (20%) (Table 34).
- Only 25% of the patents had an assignee from the Akron region, showing that businesses within the Akron region are **not** the major drivers of local patents.
- The largest aggregation of patents is from an Akron regional inventor without an assignee, which accounted for 43% of total patents (1,574).

PATENT COUNTS BY ASSIGNEE

Table 35. Patent Assignee Companies located in Akron Region (4-Counties), January 2007 - October 2011

Rank	Assignee Name	Number of Patents	Percentage of Total Patents
1	Goodyear Tire & Rubber Company	83	9.1%
2	Diebold Self Service Systems, A Division of Diebold, Inc.	73	8.0%
3	The University of Akron	73	8.0%
4	Saint Gobain Performance Plastics Corp.	63	6.9%
5	Diebold Inc.	44	4.8%
6	Timken Co.	39	4.3%
7	Kent State University	36	3.9%
8	Crucs Holdings LLC.	23	2.5%
9	Veyance Technologies, Inc.	23	2.5%
10	Apteryx, Inc.	17	1.9%
11	GED Integrated Solutions, Inc.	17	1.9%
12	GO-JO Industries, Inc.	15	1.6%
13	Automated Packaging Systems, Inc.	13	1.4%
14	Kent Displays Inc.	12	1.3%
15	Lockheed Martin Corp.	12	1.3%

Note: 912 Patents; Rank out of 198
Source: Delphion.com

- The top five companies or organizations listed in Table 35 (Goodyear Tire & Rubber Company, Diebold Self Service Systems, Saint Gobain Performance Plastics Corp, The University of Akron, and Diebold Inc.) accounted for 37% (336) of assignee company patents in the Akron region.

Patent Counts by Industry Classification

Table 36. Top 15 International Patent Classifications for Assignees Located in Akron Region (4-Counties) by Number of Patents, January 2007 - October 2011

Rank	International Patent Classifications	Number of Patents	Percentage of Total
1	Data processing systems or methods	47	5.2%
2	Electric digital data processing	42	4.6%
3	Layered products	39	4.3%
4	Vehicle tires	37	4.1%
5	Shaping or joining of plastics	30	3.3%
6	Coin-freed or like apparatus	30	3.3%
7	Recognition of data	29	3.2%
8	Macromolecular compounds	24	2.6%
9	Processes for applying liquids	23	2.5%
10	Diagnosis; surgery; identification	19	2.1%
11	Producing particular articles from plastics	19	2.1%
12	Other working of metal	17	1.9%
13	Preparation for medical, dental, or toilet purposes	16	1.8%
14	Containers for storage or transport of articles or materials	16	1.8%
15	Separation	14	1.5%

Note: 912 Patents; Rank out of 200
Source: Delphion.com

- Table 36 displays the top 15 patent counts by the International Patent Classification name (IPC) and shows that the top 10 patent classifications account for almost 44% (402) of patents in the Akron region in this category.
- These scientific fields identify the technology strengths in the Akron region.

Individual Inventors Patent Counts by Industry Classification

Table 37. Top 15 International Patent Classifications by Individual Inventors in the Akron Region (4-Counties) by Number of Patents, January 2007 - October 2011

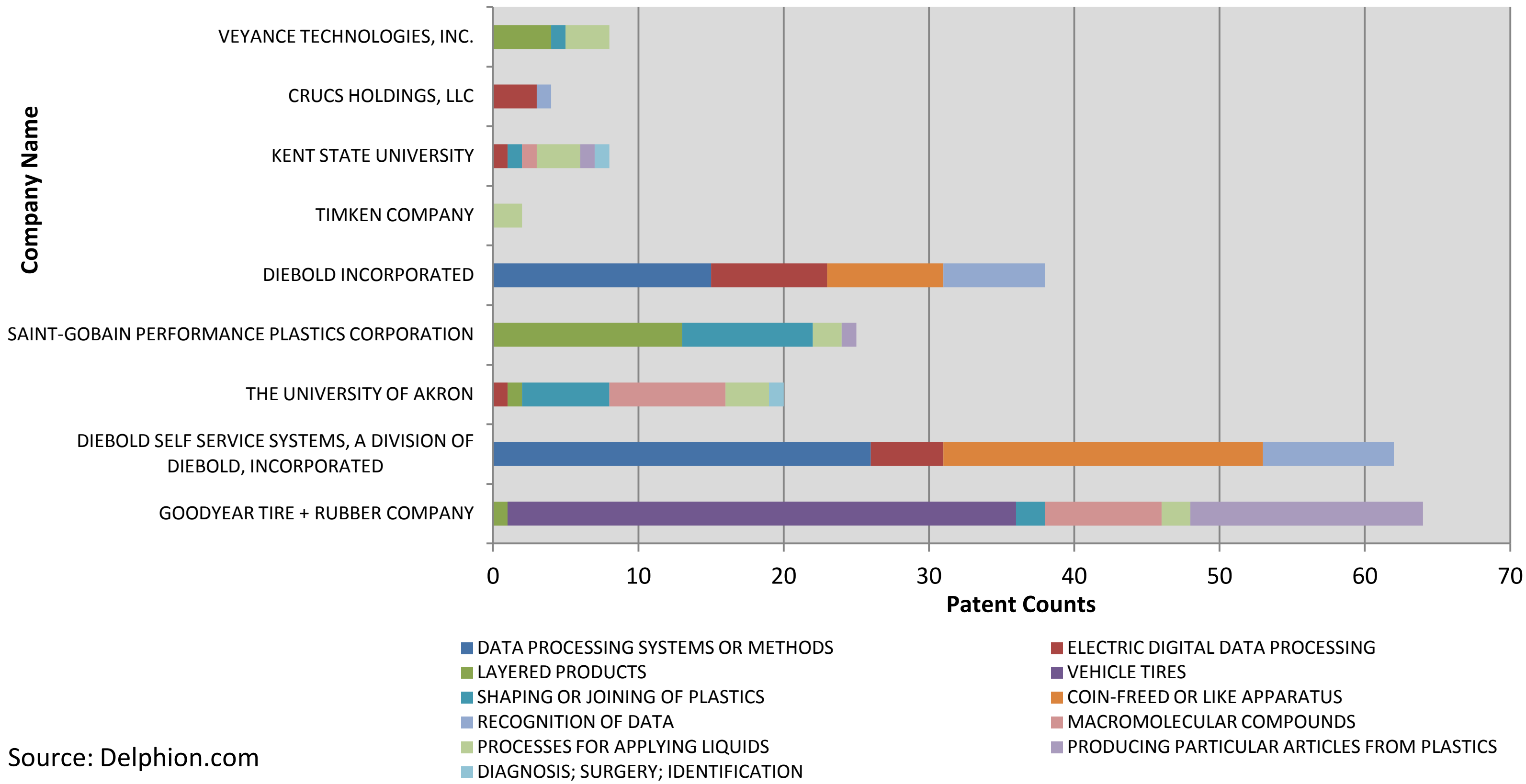
Rank	International Patent Classifications	Number of Patents	Percentage of Total
1	Vehicle tires	114	7.2%
2	Separation	48	3.0%
3	Electric digital data processing	46	2.9%
4	Shaping or joining of plastics	45	2.9%
5	Containers for storage or transport of articles or materials	45	2.9%
6	Preparation for medical, dental, or toilet purposes	41	2.6%
7	Layered products	39	2.5%
8	Macromolecular compounds	37	2.4%
9	Functional features of lighting devices	36	2.3%
10	Producing particular articles from plastics	34	2.2%
11	Domestic washing or cleaning	29	1.8%
12	Diagnosis; surgery; identification	27	1.7%
13	Other working of metal	26	1.7%
14	Compositions of macromolecular compounds	26	1.7%
15	Processes for applying liquids	23	1.5%

Note: 1,574 Patents; Rank out of 278
Source: Delphion.com

- Table 37 displays the top 15 patent counts by individual inventors by the International Patent Classification name (IPC). It shows that the top 15 patent classifications account for almost 39% (616) of individual inventor patents in the Akron region.
- These scientific fields identify the technology strengths in the Akron region.

Patent Assignee by Industry Classification

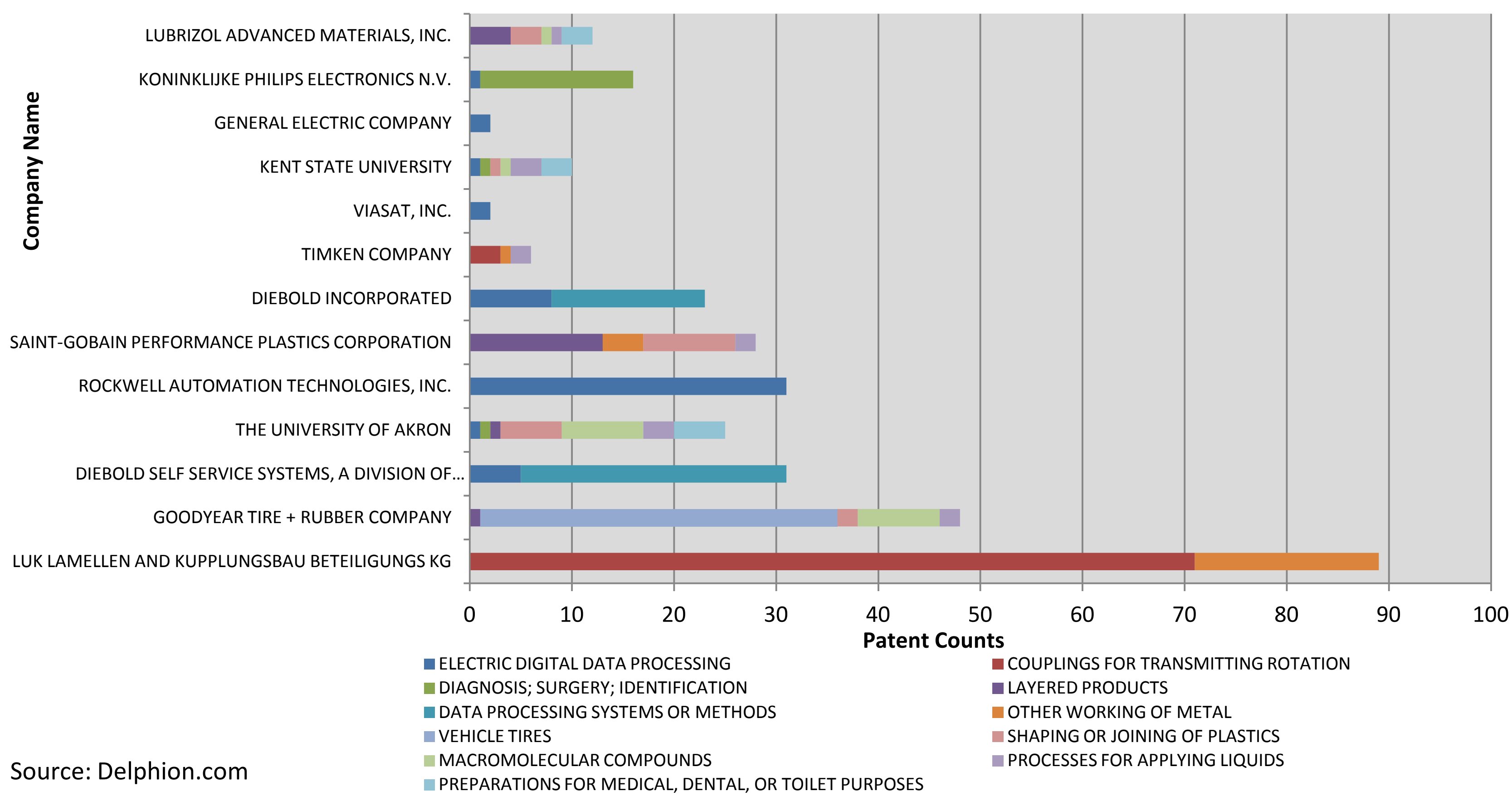
Figure 10. Akron Region Patents: Top 9 Assignees located in the Akron region by International Patent Classification Code, January 2007 – October 2011



Source: Delphion.com

- Figure 10 displays patent counts by assignee and International Patent Classification for assignees located in the Akron region. The largest number of patents held by an individual company within a single International Patent Classification was Goodyear Tire & Rubber Company. It held 35 patents in the category *Vehicle Tires.* Goodyear Tire & Rubber Company patents accounted for 67% of all patents in this category.

Figure 11. Akron Region Patents: Top 13 Assignees by International Patent Classification Code, January 2007 – August 2011



Source: Delphion.com

- Figure 11 displays patent counts by assignee and International Patent Classification for all assignees no matter their physical location. The largest number of patents held by an individual company within a single International Patent Classification was Luk Lamellen and Kupplungsbau Beteiligungs Kg, which held 71 patents in the category *Couplings for transmitting rotation.*

APPENDIX A: POLYMER INDUSTRY CLUSTER – TABLES A.1. – A.6.

A. 1. Listing of NAICS Codes and Descriptions for Polymer Industry Cluster

NAICS	NAICS Description
316211	Rubber & Plastic Footwear Manufacturing
324122	Asphalt Shingle and Coating Materials Manufacturing
324191	Petroleum Lubricating Oil and Grease Manufacturing
325131	Inorganic Dye and Pigment Manufacturing
325132	Synthetic Organic Dye and Pigment Manufacturing
325211	Plastics Materials and Resin Manufacturing
325212	Synthetic Rubber Manufacturing
325221	Cellulosic Organic Fiber Manufacturing
325222	Noncellulosic Organic Fiber Manufacturing
325510	Paint and Coating Manufacturing
325520	Adhesive Manufacturing
325991	Custom Compounding of Purchased Resins
326111	Plastics Bag Manufacturing
326112	Plastics Packaging Film and Sheet (incl. Lam.) Manufacturing
326113	Unlaminated Plastics Film and Sheet Manufacturing
326121	Unlaminated Plastics Profile Shape Manufacturing
326122	Plastics Pipe and Pipe Fitting manufacturing
326130	Laminated Plastics Plate, Sheet (ex. Pack.), and Shape Manufacturing
326140	Polystyrene Foam Product Manufacturing
326150	Urethane and Other Foam Product (ex. PS) Manufacturing
326160	Plastics Bottle Manufacturing
326191	Plastics Plumbing Fixture Manufacturing
326192	Resilient Floor Covering Manufacturing
326199	All Other Plastics Products Manufacturing
326211	Tire Manufacturing
326212	Tire Retreading
326220	Rubber and Plastics Hoses and Belting Manufacturing
326291	Rubber Product Manufacturing for Mechanical Use
326299	All Other Rubber Product Manufacturing
333220	Plastics and Rubber Industry Machinery Manufacturing
333511	Industrial Mold Manufacturing

Source: Ohio Polymer Strategy Council (OPSC)

A. 2. Polymer Industry Cluster based on 4-digit NAICS codes, Portage County, 2009

NAICS	NAICS code description	Total Establishment Counts	Paid employees*	First-quarter payroll ($1,000)	Annual payroll ($1,000)
3162	Footwear manufacturing	0	0	0	0
3241	Petroleum and coal products manufacturing	2	S	S	S
3251	Basic chemical manufacturing	1	S	S	S
3252	Resin, rubber, and artificial fibers mfg.	4	S	S	S
3255	Paint, coating, and adhesive manufacturing	3	S	S	S
3259	Other chemical product and preparation manufacturing	1	S	S	S
3261	Plastics product manufacturing	28	1,693	19,288	74,055
3262	Rubber product manufacturing	18	855	9,396	33,116
3332	Industrial machinery manufacturing	7	104	1,053	4,138
3335	Metalworking machinery manufacturing	21	321	3,081	12,213

Note: *for pay period including March 12; S denotes a suppression in the data;
4-digit NAICS codes for Polymer Industry Cluster derived from Appendix A.1. Listing of NAICS Codes and Descriptions for Polymer Industry Cluster
Source: U.S. Census Bureau: County Business Patterns

A. 3. Polymer Industry Cluster based on 4-digit NAICS codes, Summit County, 2009

NAICS	NAICS code description	Total Establishment Counts	Paid employees*	First-quarter payroll ($1,000)	Annual payroll ($1,000)
3162	Footwear manufacturing	0	0	0	0
3241	Petroleum and coal products manufacturing	3	S	S	S
3251	Basic chemical manufacturing	10	S	4,170	16,654
3252	Resin, rubber, and artificial fibers mfg.	14	522	7,195	33,449
3255	Paint, coating, and adhesive manufacturing	11	240	2,612	9,464
3259	Other chemical product and preparation manufacturing	18	569	6,291	26,082
3261	Plastics product manufacturing	61	3,097	28,547	115,106
3262	Rubber product manufacturing	31	1,024	11,467	46,098
3332	Industrial machinery manufacturing	38	1,066	12,113	47,182
3335	Metalworking machinery manufacturing	59	1,317	14,294	55,627

Note: *for pay period including March 12; S denotes a suppression in the data;
4-digit NAICS codes for Polymer Industry Cluster derived from Appendix A.1. Listing of NAICS Codes and Descriptions for Polymer Industry Cluster
Source: U.S. Census Bureau: County Business Patterns

A. 4. Polymer Industry Cluster based on 4-digit NAICS codes, Stark County, 2009

NAICS	NAICS code description	Total Establishment Counts	Paid employees*	First-quarter payroll ($1,000)	Annual payroll ($1,000)
3162	Footwear manufacturing	0	0	0	0
3241	Petroleum and coal products manufacturing	3	S	S	S
3251	Basic chemical manufacturing	5	S	S	S
3252	Resin, rubber, and artificial fibers mfg.	1	S	S	S
3255	Paint, coating, and adhesive manufacturing	5	72	653	2,544
3259	Other chemical product and preparation manufacturing	6	260	2,983	11,523
3261	Plastics product manufacturing	28	1,104	9,353	39,956
3262	Rubber product manufacturing	6	326	2,158	7,630
3332	Industrial machinery manufacturing	12	493	5,744	21,410
3335	Metalworking machinery manufacturing	22	695	7,700	42,493

Note: *for pay period including March 12; S denotes a suppression in the data;
4-digit NAICS codes for Polymer Industry Cluster derived from Appendix A.1. Listing of NAICS Codes and Descriptions for Polymer Industry Cluster
Source: U.S. Census Bureau: County Business Patterns

A. 5. Polymer Industry Cluster based on 4-digit NAICS codes, Wayne County, 2009

NAICS	NAICS code description	Total Establishment Counts	Paid employees*	First-quarter payroll ($1,000)	Annual payroll ($1,000)
3162	Footwear manufacturing	0	0	0	0
3241	Petroleum and coal products manufacturing	2	S	S	S
3251	Basic chemical manufacturing	1	S	S	S
3252	Resin, rubber, and artificial fibers mfg.	2	S	S	S
3255	Paint, coating, and adhesive manufacturing	5	S	S	S
3259	Other chemical product and preparation manufacturing	1	S	S	S
3261	Plastics product manufacturing	10	254	2,199	11,069
3262	Rubber product manufacturing	5	197	1,249	5,897
3332	Industrial machinery manufacturing	2	S	S	S
3335	Metalworking machinery manufacturing	4	S	S	S

Note: *for pay period including March 12; S denotes a suppression in the data;
4-digit NAICS codes for Polymer Industry Cluster derived from Appendix A.1. Listing of NAICS Codes and Descriptions for Polymer Industry Cluster
Source: U.S. Census Bureau: County Business Patterns

A. 6. Polymer Industry Cluster based on 4-digit NAICS codes, the Akron Region, 2000 & 2010

		Employment					GDP					Average wage				
NAICS	NAICS Description	2000	2010	Difference (2000-2010)	% Change (2000-2010)	LQ 2010	2000 ($Mil)	2010 ($Mil)	Difference (2000-2010)	% Change (2000-2010)	LQ 2010	2000 ($)	2010 ($)	Difference (2000-2010)	% Change (2000-2010)	LQ 2010
3162	Footwear manufacturing	30	18	-12	-40.0%	0.31	$1.0	$0.0	-$1.0	-97.0%	0.01	$26,296	$501	-$25,795	-98.1%	0.02
3241	Petroleum and coal products manufacturing	1,298	126	-1,172	-90.3%	0.31	$75.2	$125.5	$50.4	67.1%	0.33	$10,615	$74,794	$64,178	604.6%	0.86
3251	Basic chemical manufacturing	466	676	210	45.1%	1.32	$95.2	$94.2	-$0.9	-1.0%	0.71	$92,642	$39,356	-$53,286	-57.5%	0.52
3252	Resin, rubber, and artificial fibers mfg.	1,224	734	-490	-40.0%	2.47	$185.1	$208.4	$23.3	12.6%	3.18	$68,560	$80,876	$12,316	18.0%	1.15
3255	Paint, coating, and adhesive manufacturing	784	581	-203	-25.9%	2.63	$98.5	$42.2	-$56.3	-57.2%	1.23	$56,961	$20,392	-$36,569	-64.2%	0.39
3259	Other chemical product and preparation manufacturing	1,635	719	-916	-56.0%	2.23	$231.6	$118.2	-$113.4	-49.0%	2.20	$64,231	$46,370	-$17,861	-27.8%	0.89
3261	Plastics product manufacturing	9,377	6,077	-3,300	-35.2%	3.13	$799.0	$600.5	-$198.4	-24.8%	4.19	$50,004	$46,795	-$3,209	-6.4%	1.20
3262	Rubber product manufacturing	8,635	2,158	-6,477	-75.0%	4.35	$1,013.8	$137.4	-$876.5	-86.5%	3.54	$68,811	$30,145	-$38,666	-56.2%	0.74
3332	Industrial machinery manufacturing	1,641	1,023	-618	-37.7%	2.81	$168.6	$141.9	-$26.7	-15.8%	3.73	$71,606	$83,471	$11,865	16.6%	1.38
3335	Metalworking machinery manufacturing	3,686	1,959	-1,727	-46.9%	3.31	$291.7	$168.2	-$123.5	-42.3%	3.58	$55,138	$51,436	-$3,702	-6.7%	1.12

Note: 4-digit NAICS codes for Polymer Industry Cluster derived from Appendix A.1. Listing of NAICS Codes and Descriptions for Polymer Industry Cluster
Source: Moody's Economy.com

APPENDIX B: ENTREPRENEURSHIP TABLES – TABLES B.1. – B.3.

B. 1. Tax Incentives Available in the State of Ohio

Program Name	Description	Eligibility	Sponsoring Agency	Contact	Phone
Research & Development Sales Tax Exemption	A sales tax exemption for machinery and equipment used in research and development.	Applies only to equipment, and the equipment must be used in qualified research and development activities. Qualified research includes "pure" research (scientific or technological inquiry and experimentation in the physical sciences) and "directed" research (research conducted to design, create or formulate new or better products, equipment or manufacturing processes).	State of Ohio	Governor’s Office of Economic Development	(330) 643-3392
Technology Investment Tax Credit	Ohio investors may reduce their state taxes by 25 percent on the amount they invest in qualified, technology-based Ohio companies	Both the companies and their investor's must meet several requirements specified by Ohio law in order to be considered for the Technology Investment Tax Credit program.	State of Ohio	Rich Amsden, Technology and Innovation Division	(614) 466-3887

Source: Greater Akron Chamber, Ohio Department of Development, and the City of Akron

B. 2. Loan Programs Available in the Akron Region and State of Ohio

Program Name	Description	Eligibility	Rates and Terms	Sponsoring Agency	Contact	Phone
504 Loan Program (SBA)	504 loans are used for construction, renovation, expansion, land acquisition, machinery and equipment for businesses meeting SBA guidelines.	Small businesses. The project must demonstrate a significant impact on the community in which it is located, primarily through job creation or retention.	Terms are 10-20 years depending on project. Interest rates are based on current rates for five and ten-year U.S. Treasury issues, plus a spread.	SBA	Cascade Capital Corporation	(330) 379-3160
State of Ohio 166 Regional Loan Program	Provides financing for small industrial businesses. . Participates in the financing of the acquisition of fixed assets, including land, buildings, machinery and equipment, for healthy, expanding, area small industrial businesses.	The business must be located in Ashland, Holmes, Medina, Summit or Wayne Counties. The business must demonstrate that jobs will be created, private financing must be secured for 60% of the project cost and owner equity must provide a minimum of 10%. The 166 programs may lend funds to businesses engaged in commerce, manufacturing, research and development or distribution.	Rates are generally 2/3 of prime. The rate is fixed for the life of the loan. The term is based on the useful life of the assets being financed and the term of the bank loan in the project.	State of Ohio	Cascade Capital Corporation	(330) 379-3160
SBA Lowdoc Loan Program	Guarantees up to 90% of a small business loan up to $100,000. Aimed at entrepreneurs starting a new business and existing businesses whose average annual sales do not exceed $5 million and fewer than 100 employees.	All types of businesses are eligible except media and speculative.	Applicants negotiate terms with the lender. Interest rates are tied to the prime rate and may be fixed or variable; however, they cannot exceed SBA maximums.	SBA	SBA Cleveland District Office	(216) 522-4180
Innovation Ohio Loan Program	Provides capital to existing Ohio companies developing next generation products and services . The IOF loan may finance up to 75% of allowable project costs ranging from $500k - $1.5M	Available to existing companies in the following sectors: advanced materials; instruments, controls and electronics; power and propulsion; biosciences; and information technology	Loan term is determined by staff and ranges from 4-7 years. Rates will be fixed at or below private sector loans with comparable risk	State of Ohio	Ohio Department of Development	(614) 466-542
Research and Development Investment Loan Program	Provides low interest loans partnered with a tax credit	R&D activities for the commercialization of a new or improved product, process, technique, formula, or invention.	Term is based on the useful life of the allowable project costs. The rate is fixed at or below market rates. The required equity contribution may be higher for early stage.	State of Ohio	Ohio Department of	(614) 466-542
Wayne County Revolving Loan Fund	Working capital for the start-up of new businesses or existing businesses.	The focus of the RLF is to promote business start-up and expansion in Wayne County by creating and/or retaining employment opportunities for low to moderate-income persons.	The Wayne County RLF is the "Gap Lender," loaning the difference between total funds needed and other loans and equity available. Loans are generally extended with below-market rates and with flexible terms.	Wayne County	Wayne County Economic Development Council	(330) 264-2411

Source: Greater Akron Chamber, Ohio Department of Development, and the City of Akron

B. 3. SBIR/STTR Awards in the Akron Region, 2005 - 2010

Firm Name	City	County	Agency	Year	Award Amount ($)	Purpose
Abs Materials	Wooster	Wayne	NSF	2010	$149,850.00	SBIR Phase I:Produced Water Treatment Using Animated Organosilicas That Rapidly and Reversibly Swell
Abs Materials	Wooster	Wayne	DOE	2010	$99,995.00	Swellable Organosilica Materials to Clean Produced Water
Advanced Coatings International	Akron	Summit	NASA	2006	$69,429.00	Photochemical Cyclopolymerization of Polyimides in Ultraviolet Ridgidizing Composites for Use in Inflatable Structures
Akron Air Materials, LLC	Akron	Summit	DOD, Navy	2008	$69,825.00	Innovative Concepts for Non-Thermal Based Anti-Icing/De-Icing of Rotor Blade Leading Edges
Akron Polymer Systems, Inc.	Akron	Summit	DOD, AF	2007	$99,746.00	Develop High-Temperature, Low-Humidity Aromatic Hydrocarbon-based H2/O2 Membranes for Proton Exchange Membrane (PEM) Fuel Cells
Akron Polymer Systems, Inc.	Akron	Summit	DOD, AF	2008	$749,887.00	Develop High-Temperature, Low-Humidity Aromatic Hydrocarbon-based H2/O2 Membranes for Proton Exchange Membrane (PEM) Fuel Cells
Akron Polymer Systems, Inc.	Akron	Summit	DOD, OSD	2009	$99,702.00	Wide Temperature, High Energy Density Capacitors for Power System Conditioning
Akron Polymer Systems, Inc.	Akron	Summit	DOD, Army	2010	$69,975.00	Antimicrobial Coatings for Medical Shelters
Akron Rubber Development Laboratory, Inc	Akron	Summit	DOD, Army	2010	$69,919.00	Fatigue Life Modeling & Simulation of Elastomer-Polymer Materials
Akron Rubber Development Laboratory, Inc	Akron	Summit	DOD, Army	2008	$69,981.00	Malaria Diagnostic Methods to Replace Microscopy in Clinical Trials
Alphamicron, Inc.	Kent	Portage	DOD, AF	2006	$99,998.00	VALiD Visor: Variable Attenuation Liquid Crystal Device on Double-Curved Flexible Plastic Substrates
APS	Akron	Summit	NSF	2010	$149,996.00	SBIR Phase I:Thermally Stable, Flexible Substrates for Flat Panel Displays
Bnoat Oncology, Inc.	Akron	Summit	HHS	2010	$200,000.00	PURIFICATION, REFORMULATION AND PHARMACOKINETICS OF NITROSYLCO
Catacel	Garrettsville	Portage	NSF	2006	$473,502.00	SBIR Phase II: Compact, Lightweight Flexible Fuel Reformer for Solid Oxide Fuel Cells (SOFC)

Note: SBIR/STTR Awards totaled from the following government agencies: DHS, DOC, DOD, DOE, DOI, DOT, ED, EPA, HHS, HUD, NASA, NIH, NIST, NRC, NSF, and USDA
Source: Small Business Administration Tech-Net; National Institute of Health

B.3. SBIR/STTR Awards in the Akron Region, 2005 – 2010 (continued)

Firm Name	City	County	Agency	Year	Award Amount ($)	Purpose
Catacel	Garrettsville	Portage	NSF	2008	$149,990.00	STTR PHASE I: Simple Desulfurizing Component Enables Fuel Processing of Sulfur-laden Logistic Fuels for Fuel Cells
Creative Action, LLC	Akron	Summit	HHS	2005	$99,965.00	WEARABLE WIRELESS PDA PERIPHERAL FOR RESEARCH
Creative Action, LLC	Akron	Summit	NIH	2005	$99,965	Wearable Wireless PDA Peripheral For Research
Creative Action, LLC	Akron	Summit	HHS	2006	$999,768.00	Care Envronment English for Non-English Speaking Staff
Creative Action, LLC	Akron	Summit	NIH	2006	$539,763	Care Environment English for Non-English Speaking Staff
Creative Action, LLC	Akron	Summit	NIH	2006	$565,190	PIRL: Prison Information Resource Library
Creative Action, LLC	Akron	Summit	NIH	2007	$439,082	PIRL: Prison Information Resource Library
Creative Action, LLC	Akron	Summit	NIH	2007	$460,005	Care Environment English for Non-English Speaking Staff
Creative Action, LLC	Akron	Summit	HHS	2009	$257,758.00	Digital Assistant Supported Medication Adherence and Medical Monitoring Syst
Creative Action, LLC	Akron	Summit	NIH	2009	$257,758	Digital Assistant Supported Medication Adherence and Medical Monitoring System
E3M	Akron	Summit	NSF	2010	$149,000.00	SBIR Phase I: TBNTBN
Homesense Enterprises, LLC	Akron	Summit	HHS	2006	$99,980.00	Preventing Fires Associated With Gas Cooking Appliances Among Older Adults
Homesense Enterprises, LLC	Akron	Summit	NIH	2006	$99,980	Preventing Fires Associated With Gas Cooking Appliances Among Older Adults
Homesense Enterprises, LLC	Akron	Summit	HHS	2007	$686,066.00	Preventing Fires Associated With Gas Cooking Appliances Among Older Adults
Homesense Enterprises, LLC	Akron	Summit	NIH	2007	$430,610	Preventing Fires Associated With Gas Cooking Appliances Among Older Adults

Note: SBIR/STTR Awards totaled from the following government agencies: DHS, DOC, DOD, DOE, DOI, DOT, ED, EPA, HHS, HUD, NASA, NIH, NIST, NRC, NSF, and USDA
Source: Small Business Administration Tech-Net; National Institute of Health

B.3. SBIR/STTR Awards in the Akron Region, 2005 – 2010 (continued)

Firm Name	City	County	Agency	Year	Award Amount ($)	Purpose
Homesense Enterprises, LLC	Akron	Summit	NIH	2008	$255,456	Preventing Fires Associated With Gas Cooking Appliances Among Older Adults
Kent Displays, Inc.	Kent	Portage	NSF	2006	$100,000.00	STTR Phase II: Photochemically Switched Chiral Materials for Chiral Nematic Displays
Kent Displays, Inc.	Kent	Portage	NSF	2008	$500,000.00	STTR Phase II: Photochemically Switched Chiral Materials for Chiral Nematic Displays
Kent Displays, Inc.	Kent	Portage	DOD, Army	2005	$69,996.00	Self Powered Cholesteric Reflective Flexible Displays
Kent Displays, Inc.	Kent	Portage	DOD, Army	2005	$729,981.00	Self Powered Cholesteric Reflective Flexible Displays
Kent Displays, Inc.	Kent	Portage	NSF	2010	$150,000.00	STTR Phase I: Controlled Phase Separation for Graphic Smart Card Display
Kent Optronics, Inc.	Kent	Portage	DOD, MDA	2005	$749,990.00	Multi-Band IR Scene Projection Display for Scene Simulation in Hardware-In-the-Loop
Kent Optronics, Inc.	Kent	Portage	DOD, AF	2005	$99,991.00	Innovative Electro-Optically Responsive Filters Using High Figure-of-Merit Liquid Crystals Materials
Kent Optronics, Inc.	Kent	Portage	DOD, Army	2005	$69,998.00	Laser Agile Multibeam Payload
Kent Optronics, Inc.	Kent	Portage	DOD, AF	2006	$99,973.00	Adaptive Agile Multi-Spectral Laser Protection Devices
Kent Optronics, Inc.	Kent	Portage	DOD, AF	2006	$699,945.00	Innovative Electro-Optically Responsive Filters Using High Figure-of-Merit Liquid Crystals Materials
Kent Optronics, Inc.	Kent	Portage	DOD, AF	2007	$744,995.00	Adaptive Agile Multi-Spectral Laser Protection Devices
NGJ LLC	Akron	Summit	NSF	2009	$99,990.00	SBIR Phase I: Improved Manufacturing Method for Carbon Nanofiber Production
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2005	$208,148.00	Rationally-Designed Synthetic Antithrombin Activators
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2005	$206,911.00	Novel Anti-Inflammatories for Cardiopulmonary Bypass
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2005	$206,911.00	Novel Anti-Inflammatories for Cardiopulmonary Bypass
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2006	$825,534.00	Anti-Properdin MoAb as a novel therapeutics for arthritis
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2006	$414,519	Anti-Properdin MoAb as a novel therapeutics for arthritis
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2007	$411,015	Anti-Properdin MoAb as a novel therapeutics for arthritis
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2008	$963,269	Novel Anti-Inflammatories for Cardiopulmonary Bypass

Note: SBIR/STTR Awards totaled from the following government agencies: DHS, DOC, DOD, DOE, DOI, DOT, ED, EPA, HHS, HUD, NASA, NIH, NIST, NRC, NSF, and USDA
Source: Small Business Administration Tech-Net; National Institute of Health

B.3. SBIR/STTR Awards in the Akron Region, 2005 – 2010 (continued)

Firm Name	City	County	Agency	Year	Award Amount ($)	Purpose
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2009	$249,927.00	Small Molecule TNF-alpha Inhibitor for the Treatment of Arthritis
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2009	$233,538.00	Novel Treatments to Abolish Inflammatory Mediators in Hemodialysis
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2009	$212,118.00	Complement Inhibitors for Macular Degeneration
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2009	$273,190.00	Anti-Inflammatory Cardiovascular Device
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2009	$212,118	Complement Inhibitors for Macular Degeneration
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2009	$233,538	Novel Treatments to Abolish Inflammatory Mediators in Hemodialysis
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2009	$249,927	Small Molecule TNF-alpha Inhibitor for the Treatment of Arthritis
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2009	$273,190	Anti-Inflammatory Cardiovascular Device
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2009	$31,982	Complement Inhibitors for Macular Degeneration
Novelmed Therapeutics, Inc.	Twinsburg	Summit	NIH	2009	$522,061	Novel Anti-Inflammatories for Cardiopulmonary Bypass
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2010	$791,681.00	Disease Modifying Biologics for Rheumatoid Arthritis
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2010	$300,000.00	Neutralizing Antibodies for Complement Inhibition
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2010	$266,001.00	Device for Surgical Adhesion Prevention
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2010	$420,195.00	Controlling Inflammation Due to Cardiac Devices
Novelmed Therapeutics, Inc.	Twinsburg	Summit	HHS	2010	$516,118.00	Inhibition of Cardiac Device Induced Cellular Dysfunction in Pigs
Sorbent Technologies Corp	Twinsburg	Summit	NSF	2005	$100,000.00	SBIR Phase II: Improved Methods to Manufacture Brominated-Carbon Adsorbents for Power-Plant Mercury-Emission Control
Sorbent Technologies Corp	Twinsburg	Summit	NSF	2006	$499,714.00	SBIR Phase II: Improved Methods to Manufacture Brominated-Carbon Adsorbents for Power-Plant Mercury-Emission Control

Note: SBIR/STTR Awards totaled from the following government agencies: DHS, DOC, DOD, DOE, DOI, DOT, ED, EPA, HHS, HUD, NASA, NIH, NIST, NRC, NSF, and USDA
Source: Small Business Administration Tech-Net; National Institute of Health