Centralina Economic Development Commission

Advanced Manufacturing
Target Industry Report

NO BOUNDARIES.
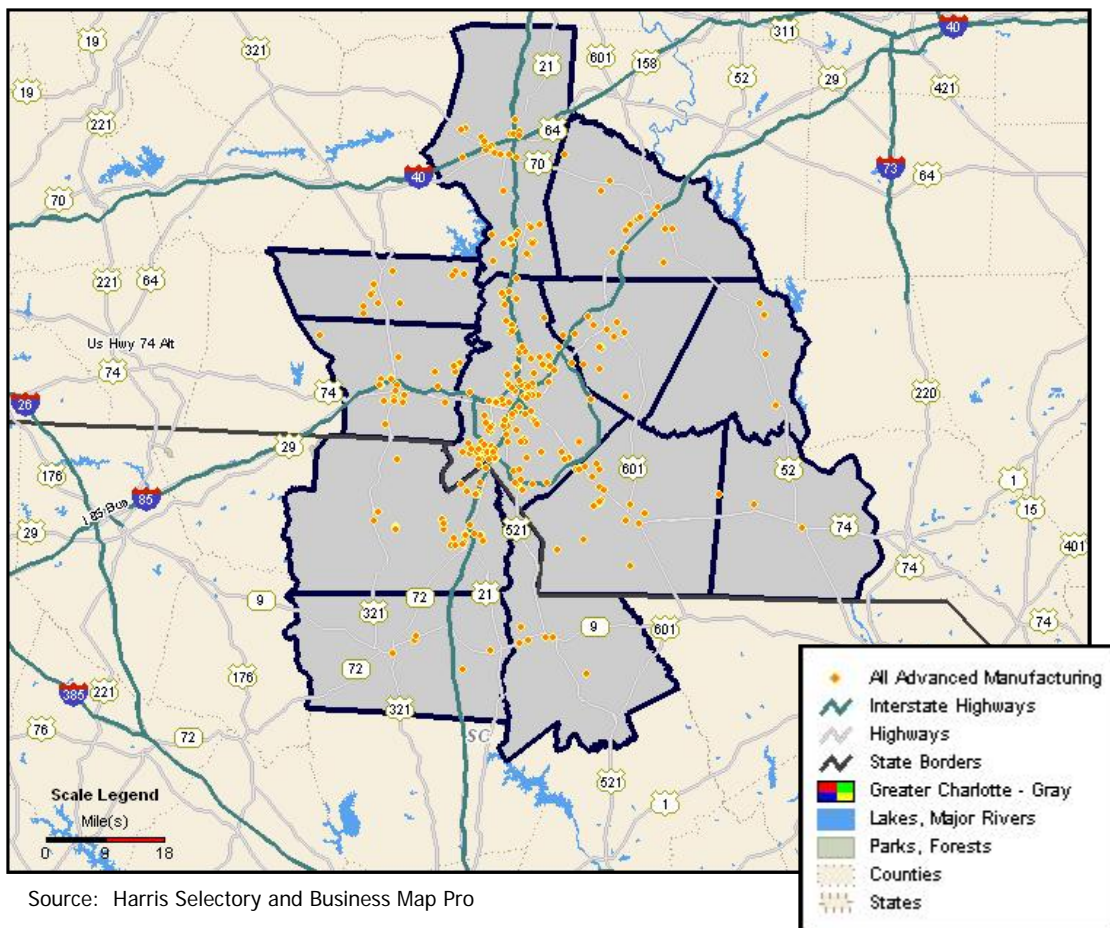
July 2007

Table of Contents

Target industry analysis involves identifying industries that are both desirable and appropriate for a region. CH2M HILL's Target Industry Analysis Model was customized to identify advanced manufacturing industries that warrant focused marketing both inside (retention & expansion) and outside (attraction) the region as high opportunity niches. For the purposes of this analysis, the Greater Charlotte Region is defined as the 12-county region consisting of nine counties in North Carolina (Anson, Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly and Union, and three in South Carolina (Chester, Lancaster and York). The map below shows the region with all the companies defined as advanced manufacturers and having 20 or more employees; there are approximately 389 companies in all. There are more than 1,200 companies that self-report as belonging to those primary NAICS defined as advanced manufacturing.

Figure 1: Greater Charlotte Region Map with Advanced Mfg. Cos. with 20 or More Employees

Source: Harris Selectory and Business Map Pro

Methodology Overview

To identify the optimal industry sectors for targeted marketing, CH2M HILL applies a two-step process: a **quantitative** and **qualitative** analysis backed by experience in site selection and economic development best practices. Quantitative analysis is always followed by qualitative assessment of the data and takes into account CH2M HILL's knowledge of the region's strengths and weaknesses and recent trends, as well as national industry trends that may be relevant. The qualitative step ensures that industry sectors chosen are not "statistical artifacts," in other words that they are not included or rejected simply because of anomalies in the data. Strengths and weaknesses applying to advanced manufacturing in the Greater Charlotte Region were gathered in the SWOT analysis found in the report entitled "Advanced Manufacturing in the Greater Charlotte Region."

CH2M HILL then groups or "clusters" the target industries (both manufacturing and support services) resulting from this approach. These target industry clusters are then recommended as suitable for the Greater Charlotte Region to focus their business retention and expansion and new prospect development efforts.

Recommended & Prioritized Advanced Manufacturing Clusters

High-Priority Clusters

These clusters have a strong representation of advanced manufacturing, received high rankings in the quantitative model, and make sense in terms of what we know about the industries' growth and competitive profiles and the region's strengths and weaknesses.

General Machinery, Equipment and Components Cluster

For more detailed information about this cluster please see the full report.

Figure 2: General Machinery, Equipment & Component Cos. in Region with 20 or more employees
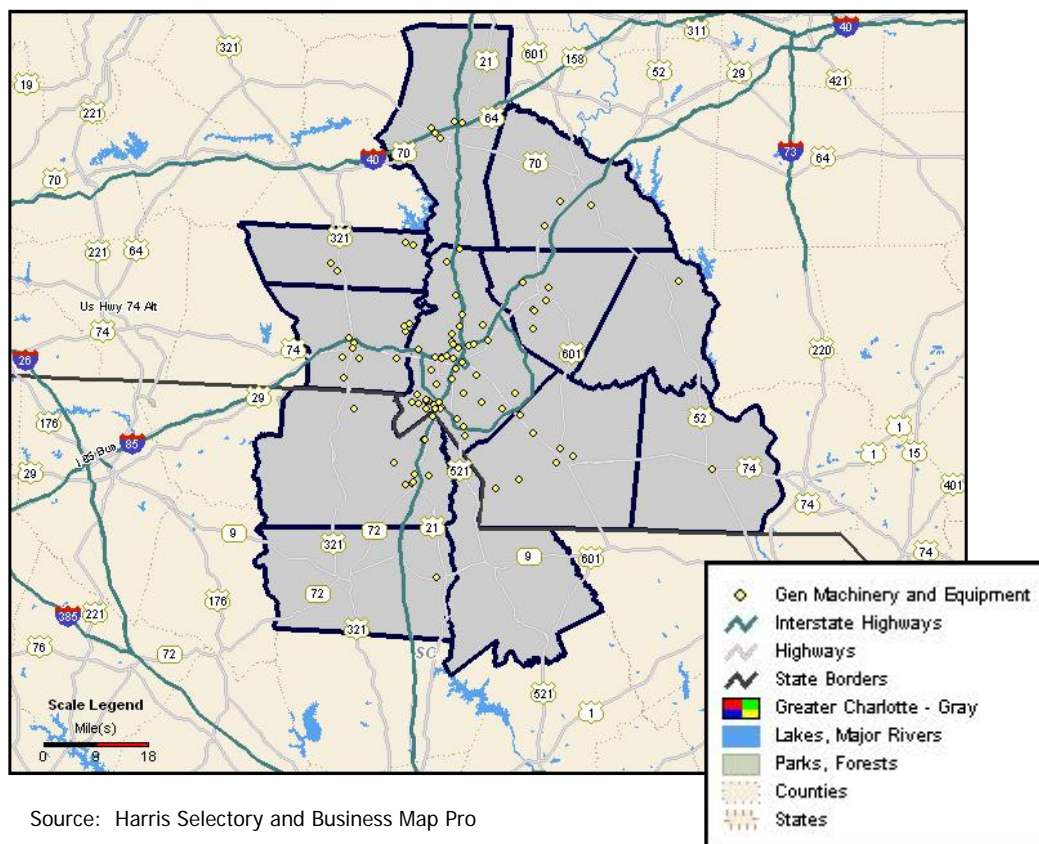
Source: Harris Selectory and Business Map Pro

Pharmaceutical and Medical Device Manufacturing Cluster

For more detailed information about this cluster please see the full report.

Figure 3:   Pharmaceutical and Medical Device Manufacturing Cos. in Region with 20 or more Employees
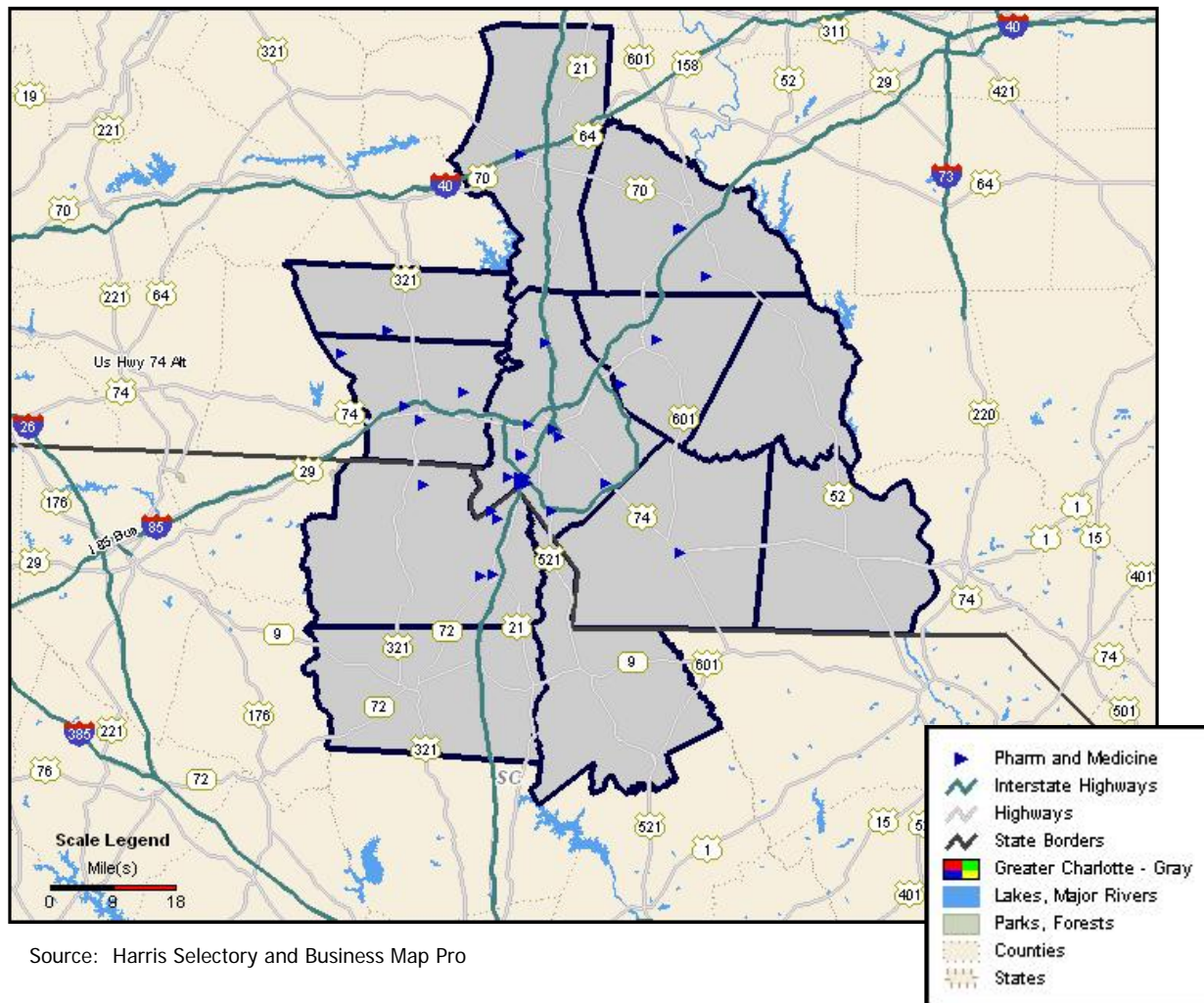
Source: Harris Selectory and Business Map Pro

Automotive/Transportation Cluster

For more detailed information about this cluster please see the full report.

Figure 4: Automotive/Transportation Cos. in Region with 20 or more employees

Source: Harris Selectory and Business Map Pro

CH2MHILL

Telecommunication and Electronic Components Manufacturing Cluster

For more detailed information about this cluster please see the full report.

Figure 5: Telecommunication and Electronic Components Mfg Cos. in Region with 20 or more employees

Source: Harris Selectory and Business Map Pro

Medium-Priority Cluster

Plastics and Rubber Manufacturing Cluster

For more detailed information about this cluster please see the full report.

Figure 6: Plastics and Rubber Manufacturing Cos. in Region with 20 or more employees
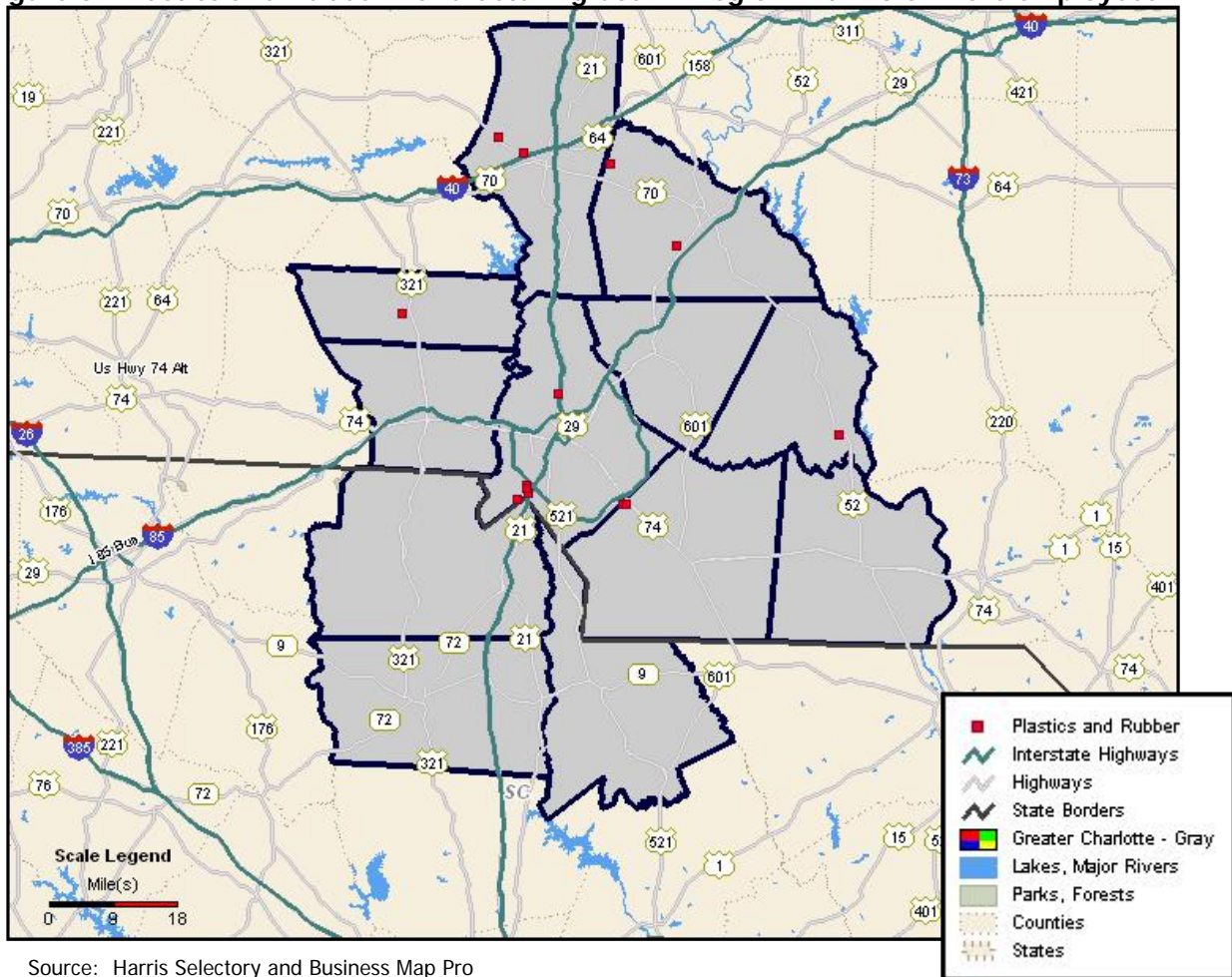
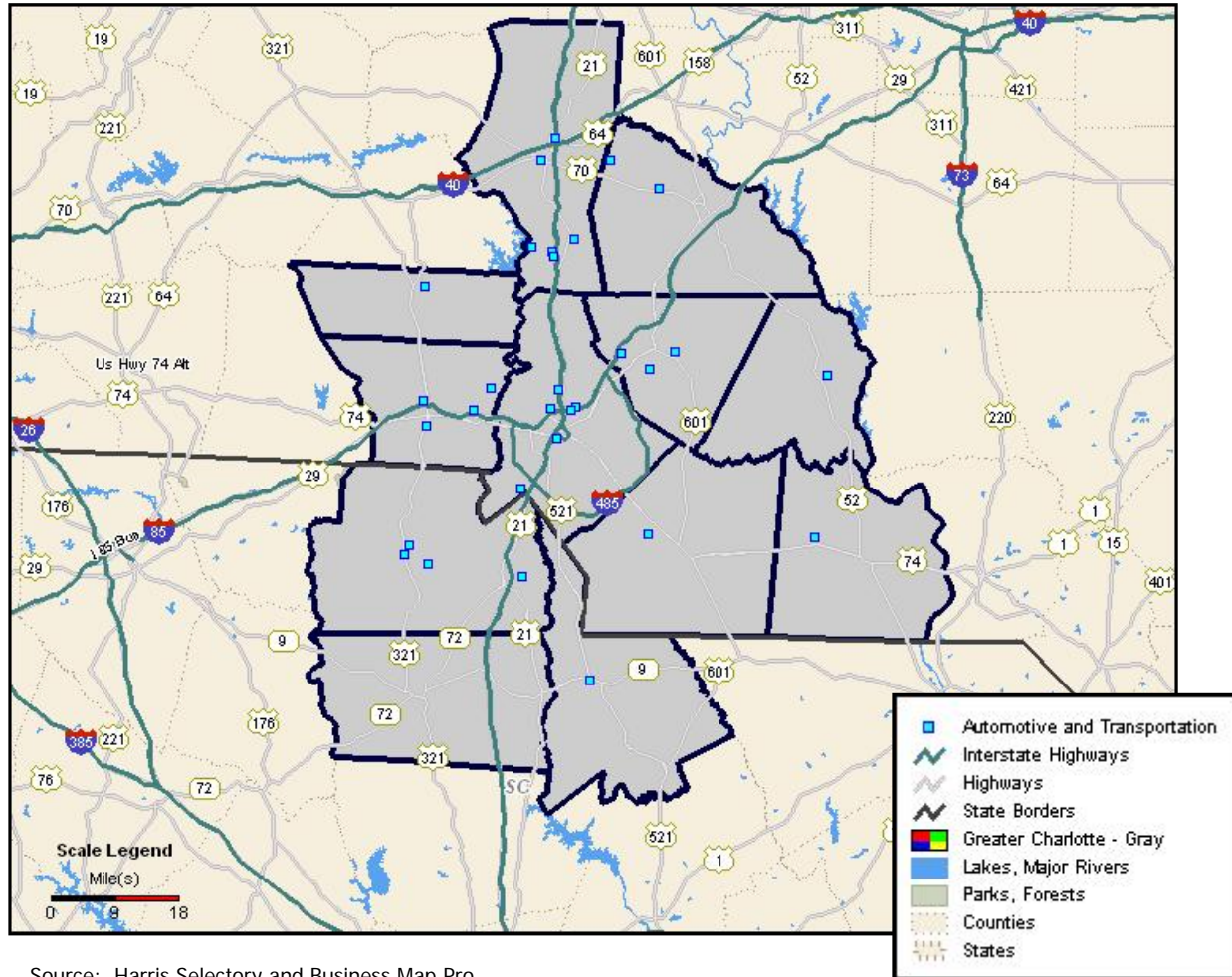Source: Harris Selectory and Business Map Pro

Low-Priority Cluster

Metals Forming and Fabrication Cluster

For more detailed information about this cluster please see the full report.

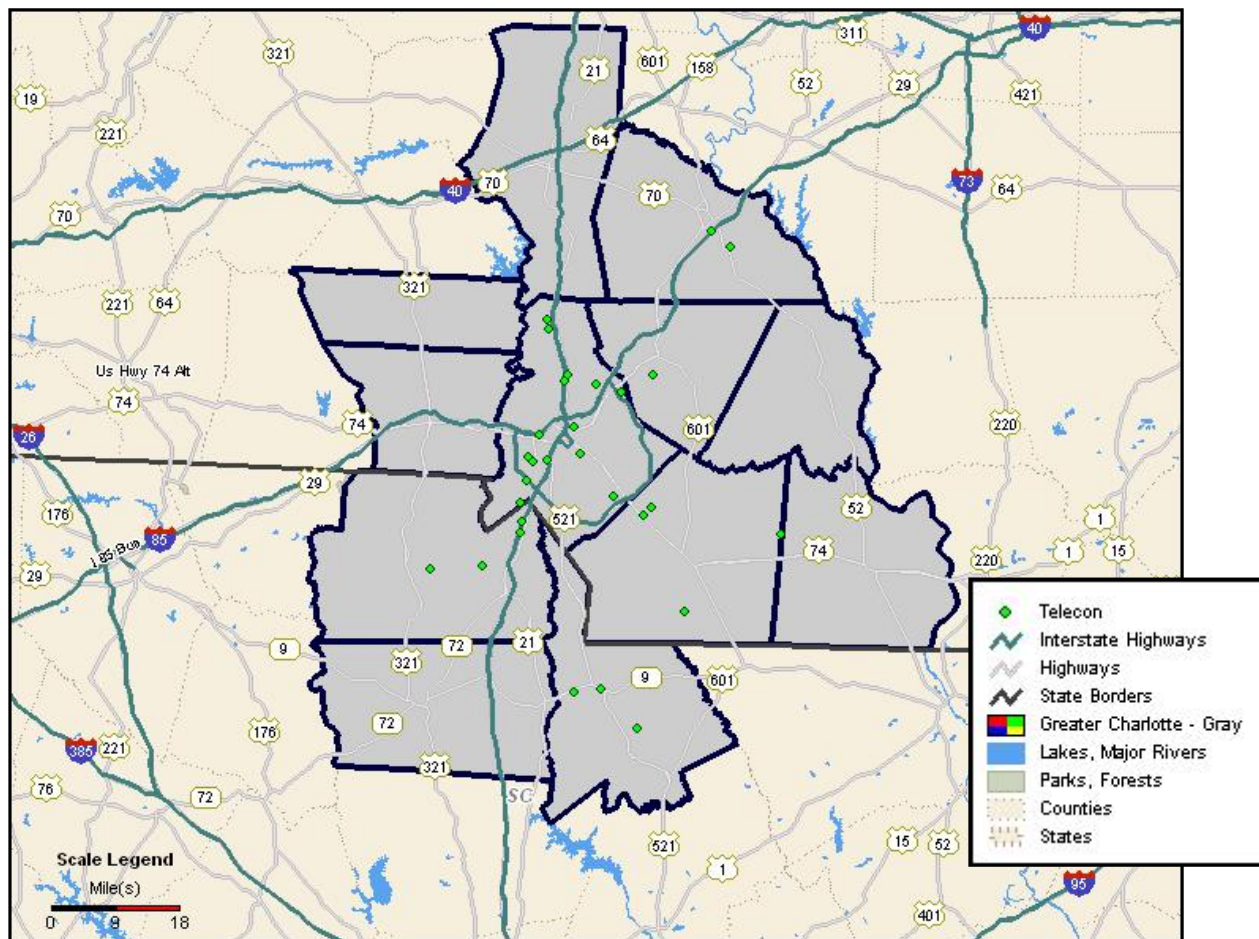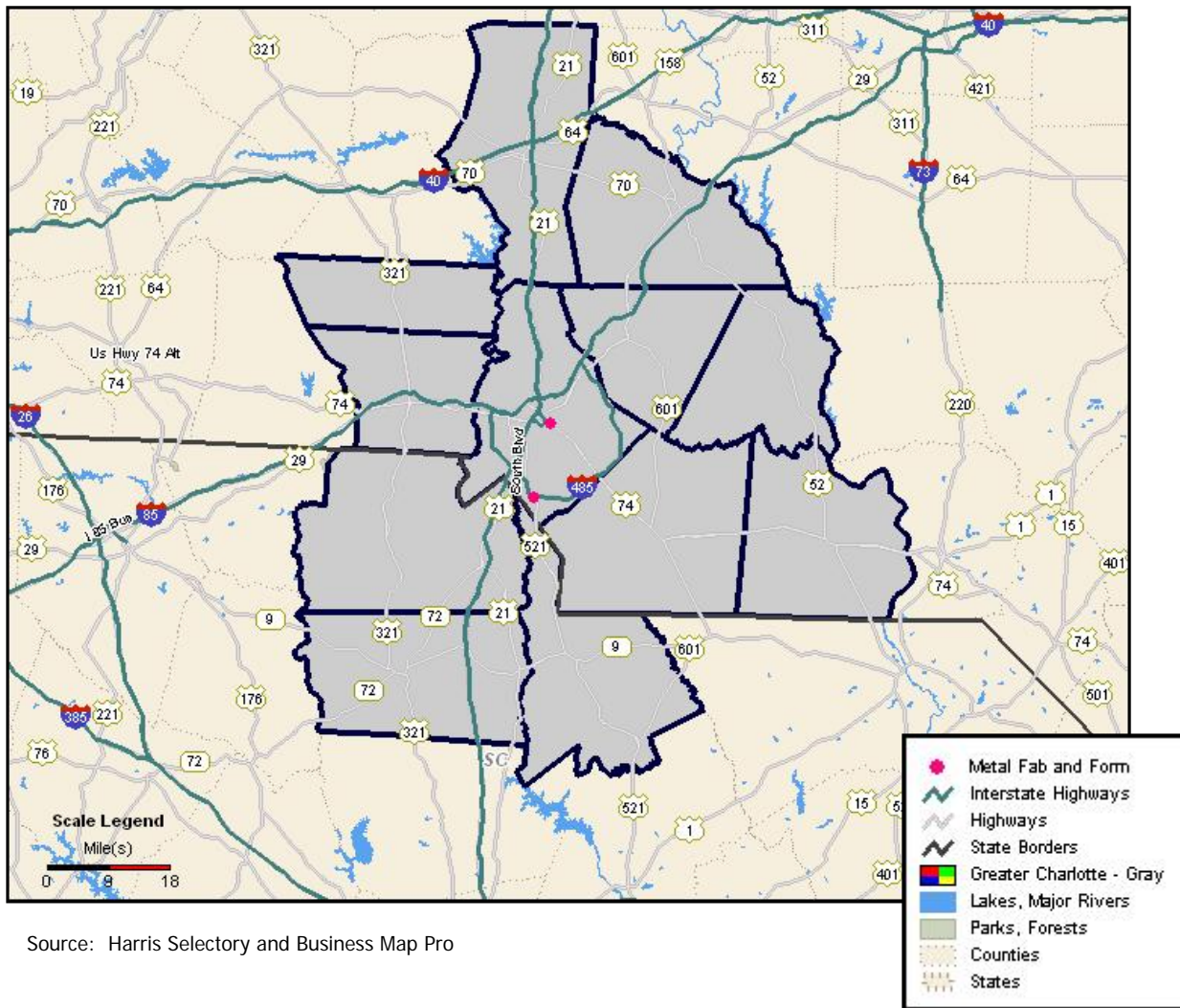**Figure 7: Metals Forming and Fabrication Co. in Region with 20 or more employees**

Source: Harris Selectory and Business Map Pro

CH2MHILL

Target Industry Analysis for Advanced Manufacturing in the Greater Charlotte Region

Introduction

Target industry analysis involves identifying industries that are both desirable and appropriate for a region. CH2M HILL's Target Industry Analysis Model was customized to identify advanced manufacturing industries that warrant focused marketing both inside (retention & expansion) and outside (attraction) the region as high opportunity niches. For the purposes of this analysis, the Greater Charlotte Region is defined as the 12-county region consisting of nine counties in North Carolina (Anson, Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly and Union, and three in South Carolina (Chester, Lancaster and York). Advanced Manufacturing industries present in the region with greater than 100 employees were defined and discussed in the report entitled "Advanced Manufacturing in the Greater Charlotte Region." Table 1 summarizes these 36 specific sectors by 5-Digit NAICS code. The map below shows the region with all the companies defined as advanced manufacturers and having 20 or more employees; there are approximately 389 companies in all. There are more than 1,200 companies that self-report as belonging to those primary NAICS defined as advanced manufacturing.

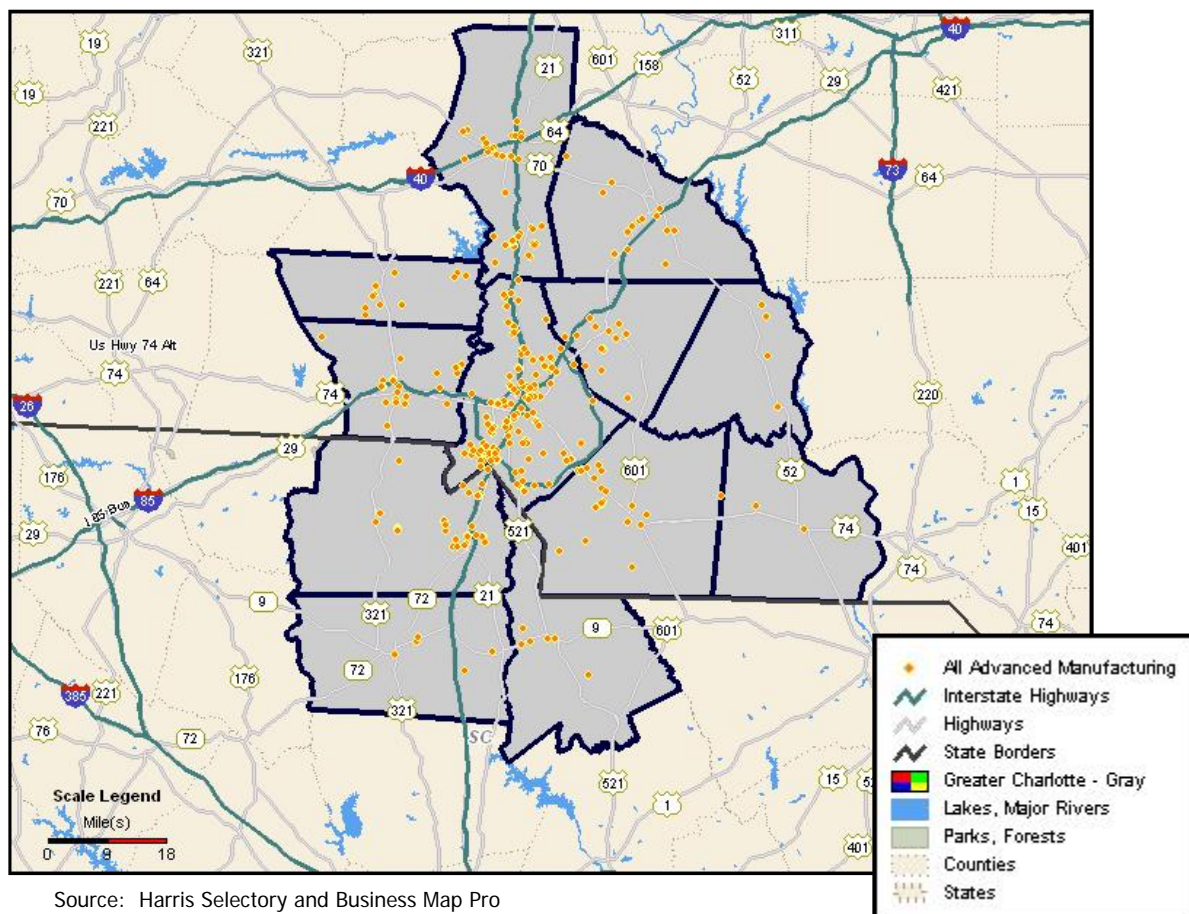**Figure 1: Greater Charlotte Region Map with Advanced Mfg. Cos. with 20 or More Employees**

Source: Harris Selectory and Business Map Pro

Table 1: Advanced Manufacturing Sectors Present in the Greater Charlotte Region

5-Digit NAICS and Sector Description			
32711	Pottery, Ceramics, and Plumbing Fixture	32621	Tires
33361	Engine, Turbine, and Power Transmission Equipment	32731	Cement
32522	Artificial and Synthetic Fibers and Filaments	33122	Rolling and Drawing of Purchased Steel
32611	Plastics Packaging Materials and Unlaminated Film and Sheet	33399	All Other General Purpose Machinery
32551	Paints and Coatings	33522	Major Appliance
33152	Nonferrous Metal Foundries	32532	Pesticides and Other Agricultural Chemicals
33661	Ship and Boat Building	33321	Sawmill and Woodworking Machinery
32721	Glass and Glass Products	33322	Plastics and Rubber Industry Machinery
33521	Small Electrical Appliances	33329	Other Industrial Machinery
33111	Iron and Steel Mills and Ferroalloy	33611	Automobiles and Light Duty Motor Vehicles
33392	Material Handling Equipment	33612	Heavy Duty Trucks
33531	Electrical Equipment	33632	Motor Vehicle Electrical and Electronic Equipment
33591	Batteries	33639	Other Motor Vehicle Parts
33635	Motor Vehicle Transmission and Power Train Parts	33141	Nonferrous Metal (except Aluminum) Smelting and Refining
32511	Petrochemicals	33151	Ferrous Metal Foundries
32513	Synthetic Dyes and Pigments	33313	Mining and Oil and Gas Field Machinery
32521	Resins and Synthetic Rubber	33631	Motor Vehicle Gasoline Engine and Parts
32613	Laminated Plastics Plate, Sheet (except Packaging), and Shapes	33633	Motor Vehicle Steering and Suspension Components (except Spring)
54171	Research and Development in the Physical, Engineering, and Life Sciences	54138	Testing Laboratories

Methodology Overview

To identify the optimal industry sectors for targeted marketing, CH2M HILL applies a two-step process: a **quantitative** and **qualitative** analysis backed by experience in site selection and economic development best practices. Quantitative analysis is always followed by qualitative assessment of the data and takes into account CH2M HILL's knowledge of the region's strengths and weaknesses and recent trends, as well as national industry trends that may be relevant. The qualitative step ensures that industry sectors chosen are not "statistical artifacts," in other words that they are not included or rejected simply because of anomalies in the data. Strengths and weaknesses applying to advanced manufacturing in the Greater Charlotte Region were gathered in the SWOT analysis found in the report entitled "Advanced Manufacturing in the Greater Charlotte Region." CH2M HILL then groups or "clusters" the target industries (both manufacturing and support services) resulting from this approach. These target industry clusters are then recommended as suitable for the Greater Charlotte Region to focus their business retention and expansion and new prospect development efforts.

CH2M HILL's Target Industry Model is highly customizable with over 23 different factors that can be used for 666 5-digit NAICS industries in the United States. The target industry model customized for the Greater Charlotte Region identified manufacturing and support industries that are both desirable and well suited to Greater Charlotte Region. For the manufacturing industries, the model identified target industries scoring the highest based on the following characteristics:

- Projected growth in employment over the next 5 years (2006 to 2011) in the US and in state of North Carolina
- Industries with a current presence in the Greater Charlotte Region or the state of North Carolina were given extra emphasis
- Projected increased industry profitability in the Greater Charlotte Region

- Higher productivity rates than the industry national average for the Greater Charlotte Region
- Higher wages than the average manufacturing wage in the Greater Charlotte Region
- Lower labor rates in the Greater Charlotte Region than the US, making the region attractive
- Projected growth in output in the US over the next 5 years (2006 to 2011)

For the supporting services industries, target industries were identified as those scoring the highest among the following characteristics:

- Projected growth in employment over the next 5 years (2006 to 2011) in the US and in state of North Carolina
- Industries with a current presence in the Greater Charlotte Region or the state of North Carolina are given extra emphasis
- Projected increased industry profitability in the Greater Charlotte Region
- Higher wages than the average manufacturing wage in the Greater Charlotte Region
- Lower labor rates in the Greater Charlotte Region than the US, making the region attractive
- Projected growth in output in the US over the next 5 years (2006 to 2011)

Further detailed information on the methodology used for targeting manufacturing and supporting service industries can be found in the Appendix.

Step 1: Results of Quantitative Analysis

Manufacturing Industries

Applying CH2M HILL's methodology to the data produced the raw results for the Greater Charlotte Region (Table 2). The table also lists the cluster to which each of these industries belongs. Advanced manufacturing industries fared quite well with over 65% of these industries ranking in the top 50 out of 184 manufacturing industries analyzed in the model. The target industries in the General Machinery, Equipment and Components cluster rank very strong, followed by industry sectors in the Automotive/Transportation, Telecommunication Equipment Manufacturing and Electronic Components cluster.

Table 2: Top 50 Manufacturing Industries Identified by Model

Rank	5-Digit NAICS Industry	Industry	Cluster	Advanced Mfg. Flag
1	33392	Material Handling Equipment Manufacturing	General Machinery, Equipment and Components	AM
2	32541	Pharmaceutical and Medicine Manufacturing	Pharmaceutical and Medical Device Manufacturing	AM
3	33391	Pump and Compressor Manufacturing	General Machinery, Equipment and Components	
4	32621	Tire Manufacturing	Plastics & Rubber Manufacturing	AM
5	33421	Telephone Apparatus Manufacturing	Telecommunication Equipment Manufacturing	AM
6	33399	All Other General Purpose Machinery Manufacturing	General Machinery, Equipment and Components	AM

Table 2: Top 50 Manufacturing Industries Identified by Model (cont.)

Rank	5-Digit NAICS Industry	Industry	Cluster	Advanced Mfg. Flag
7	33639	Other Motor Vehicle Parts Manufacturing	Automotive/ Transportation	AM
8	32732	Ready-Mix Concrete Manufacturing	Non-Metallic Minerals	
9	32613	Laminated Plastics Plate, Sheet, and Shape Manufacturing	Plastics & Rubber Manufacturing	AM
10	33231	Plate Work and Fabricated Structural Product Manufacturing	Metals forming and fabrication	
11	33329	Other Industrial Machinery Manufacturing	General Machinery, Equipment and Components	AM
12	33351	Metalworking Machinery Manufacturing	General Machinery, Equipment and Components	
13	32739	Other Concrete Product Manufacturing	Non-Metallic Minerals	
14	32611	Unsupported Plastics Film, Sheet, and Bag Manufacturing	Plastics & Rubber Manufacturing	AM
15	33312	Construction Machinery Manufacturing	General Machinery, Equipment and Components	
16	32622	Rubber and Plastics Hoses and Belting Manufacturing	Plastics & Rubber Manufacturing	
17	33221	Cutlery and Handtool Manufacturing	Metals forming and fabrication	
18	32614	Polystyrene Foam Product Manufacturing	Plastics & Rubber Manufacturing	
19	33361	Engine, Turbine, and Power Transmission Equipment Manufacturing	General Machinery, Equipment and Components	AM
20	33911	Medical Equipment and Supplies Manufacturing	Pharmaceutical and Medical Device Manufacturing	AM
21	32612	Plastics Pipe, Pipe Fitting, and Unsupported Profile Shape Manufacturing	Plastics & Rubber Manufacturing	
22	33634	Motor Vehicle Brake System Manufacturing	Automotive/Transportation	
23	33232	Ornamental and Architectural Metal Products Manufacturing	Metals forming and fabrication	
24	33461	Manufacturing and Reproducing Magnetic and Optical Media	General Machinery, Equipment and Components	AM
25	33151	Ferrous Metal Foundries	Metals forming and fabrication	AM
26	32561	Soap and Cleaning Compound Manufacturing	Chemicals Manufacturing	
27	32733	Concrete Pipe, Brick, and Block Manufacturing	Non-Metallic Minerals	
28	33612	Heavy Duty Truck Manufacturing	Automotive/ Transportation	AM
29	33211	Forging and Stamping	Metals forming and fabrication	
30	33631	Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	Automotive/ Transportation	AM
31	33429	Other Communications Equipment Manufacturing	Telecommunication Equipment Manufacturing	AM
32	33341	Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing	General Machinery, Equipment and Components	

Table 2: Top 50 Manufacturing Industries Identified by Model (cont.)

Rank	5-Digit NAICS Industry	Industry	Cluster	Advanced Mfg. Flag
33	32199	All Other Wood Product Manufacturing	Agricultural and Resource	
34	32712	Clay Building Material and Refractories Manufacturing	Non-Metallic Minerals	
35	33322	Plastics and Rubber Industry Machinery Manufacturing	General Machinery, Equipment and Components	AM
36	32192	Wood Container and Pallet Manufacturing	Agricultural and Resource	
37	33633	Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	Automotive/ Transportation	AM
38	33422	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	Telecommunication Equipment Manufacturing	AM
39	33635	Motor Vehicle Transmission and Power Train Parts Manufacturing	Automotive/ Transportation	AM
40	32615	Urethane and Other Foam Product (except Polystyrene) Manufacturing	Plastics & Rubber Manufacturing	
41	32616	Plastics Bottle Manufacturing	Plastics & Rubber Manufacturing	
42	33271	Machine Shops	Metals Forming and Fabrication	
43	33661	Ship and Boat Building	Automotive/ Transportation	AM
44	33591	Battery Manufacturing	Electronic Components	AM
45	33531	Electrical Equipment Manufacturing	Electronic Components	AM
46	33331	Commercial and Service Industry Machinery Manufacturing	General Machinery, Equipment and Components	
47	32619	Other Plastics Product Manufacturing	Plastics & Rubber Manufacturing	
48	32121	Veneer, Plywood, and Engineered Wood Product Manufacturing	Agricultural and Resource	
49	32562	Toilet Preparation Manufacturing	Chemicals Manufacturing	
50	31192	Coffee and Tea Manufacturing	Food and Beverage	

There are 23 industries that are both in the Top 50 table as most appropriate and desirable for the region, and are identified as advanced manufacturing industries present in the region. They fall into seven clusters, which are shown in Table 3 below, along with the number of industries per cluster and their average rank. The 23 industries are clearly concentrated in machinery and in automotive and transportation, with six in each cluster. The plastics and rubber manufacturing cluster, which includes tires, has the highest average rank. This is followed by the two-industry cluster of pharmaceutical and medical device manufacturing, and the machinery cluster. The metals forming and fabrication cluster has only one industry, ferrous metal foundries. Although this industry consists mainly of small companies, it is a necessary industry for the automotive and machinery clusters. The automotive cluster is significant in that it contains 6 industries, but its average ranking is quite low. The electronic components cluster has the lowest average ranking, mostly because of its relatively small presence in the region.

Table 3: Cluster Average Rank

Cluster	# of AM Industries In Top 50	Average Rank
Plastics & Rubber Manufacturing	3	9
Pharmaceutical and Medical Device Manufacturing	2	11
General Machinery, Equipment and Components	6	16
Telecommunication Equipment Manufacturing	3	25
Metals Forming and Fabrication	1	25
Automotive/Transportation	6	31
Electronic Components	2	45
Total	23	22

Another way of looking at the Advanced Manufacturing industries is under the three main categories used to group them in the environmental scan report ("Advanced Manufacturing in the Greater Charlotte Region"): Basic Materials, Intermediate Goods and Final Goods. In the initial analysis, 34 of the 50 Advanced Manufacturing Industries were identified to have a presence of 100 or more employees in the Greater Charlotte Region. Of these 34 advanced manufacturing industries, 23 are in the top 50 manufacturing sectors identified as good targets for the Greater Charlotte Region. Table 4 is expanded to include the ranking of each Advanced Manufacturing industry present in the Greater Charlotte Region, noted as a number in parentheses of each cell. The industries ranking in the top 50 are highlighted in yellow.

Table 4 – Advanced Manufacturing Sectors by Type and Rank

Basic Materials	Intermediate Goods	Final Goods
32522 – Artificial and Synthetic Fibers and Filaments (84)	33441 Semiconductors & Electronic Components (113)	32541 – Pharmaceuticals & Medicines (2)
33151 – Ferrous Metal Foundries (25)	33639 – Other Motor Vehicle Parts (7)	33612 – Heavy Duty Trucks (28)
32521 – Resins & Synthetic Rubber (73)	32621 – Tires (4)	33329 – Other Industrial Machinery (11)
32513 – Synthetic Pigments & Dyes (62)	32721 – Glass and Glass Products (53)	33911 – Medical Equipment and Supplies (20)
33111 – Iron and Steel Mills and Ferroalloys (144)	32611 – Unsupported Plastics, Sheet, and Bags (14)	33531 – Electrical Equipment (45)
32551 – Paints and Coatings (100)	33591 – Batteries (44)	33361 – Engines, Turbines, Power Transmission Eqpt. (19)
33152 – Nonferrous Metal Foundries (88)	33635 – Vehicle Transmission / Powertrain Parts (39)	33399 – All Other General Purpose Machinery (6)
33461 – Magnetic & Optical Media (24)	33592 – Communication and Energy Wire and Cable (56)	33392 – Material Handling Equipment (1)
	33451 – Instruments (Navigation, Control, etc.) (118)	33322 – Plastics and Rubber Industry Machinery (35)
	33632 – Vehicle Electrical and Electronic Equipment (64)	33411 – Computer and Peripheral Equipment (83)
	32711 – Pottery, Ceramics, and Plumbing Fixtures (53)	33321 – Sawmill and Woodworking Machinery (51)
	33631 – Vehicle Gasoline Engines and Engine Parts (30)	33431 – Audio and Video Equipment (147)
	33122 – Rolling and Drawing of Purchased Steel (133)	
	32613 – Laminated Plastics Plate, Sheet, and Shapes (9)	

A quarter of the industries classified in the basic materials category ranked in the top 50 manufacturing target industries. Half of the industries classified as intermediate goods and three quarters of the industries categorized as final goods ranked in the top 50 manufacturing target industries. The most promising advanced manufacturing industries for the region tend to be concentrated in intermediate and especially final goods. This is not surprising since the Region's strength is not in chemicals, metals and other basic materials. Because of its history, geography and strengths and weaknesses, the region needs to concentrate more on discrete rather than continuous process manufacturing and products closer to the final customers. These include capital equipment (machinery and vehicles), high-tech consumer goods and pharmaceutical/medical device manufacturing.

Non-Manufacturing/Service Industries

Service Industries were analyzed with a specific interest placed on identifying industries that would serve in supporting advanced manufacturing. Applying the CH2M HILL methodology for service industries, the raw results produced the top 50 service industries listed in Table 5. Neither of the overarching industries (R&D in Physical, Engineering, and Life Sciences and Testing Labs) made the list of the top 50 in the quantitative analysis. Research and Development in the Physical, Engineering, and Life Sciences industry ranked at a modest 213 out of 482 and Testing Labs ranking 426 out of 482. The quantitative analysis does not exclude them from being highly regarded target industries though.

Several service industries ranked quite high and are good targets as they apply to overarching technologies as well as provide continued support for Advanced Manufacturing sectors. A few of these industries include Other Scientific and Technical Consulting Services ranking number 2 and Environmental Consulting Services ranking 13. Management Consulting ranked 26 out of 482.

The raw results of an analysis of service industries provide clusters such as healthcare and entertainment which are not considered to be support industries to advanced manufacturing. This is where the qualitative review becomes necessary. A final list of recommended service industries is provided in the Qualitative Analysis and Final Recommendations Section of this report.

Table 5: Top 50 Non-Manufacturing Industries Identified by Model

Rank	5-Digit NAICS Industry	Industry	Cluster
1	62139	Offices of All Other Health Practitioners	Healthcare
2	54169	Other Scientific and Technical Consulting Services	Technical Services
3	51412	Libraries and Archives	Data and Information Services
4	51121	Software Publishers	Technical Services
5	54182	Public Relations Agencies	Business and Management Services
6	51419	Other Information Services	Data and Information Services
7	56121	Facilities Support Services	Business and Management Services
8	62141	Family Planning Centers	Healthcare
9	62121	Offices of Dentists	Healthcare
10	22133	Steam and Air-Conditioning Supply	Utilities
11	51421	Data Processing Services	Data and Information Services
12	48799	Scenic and Sightseeing Transportation, Other	Tourist
13	54162	Environmental Consulting Services	Technical Services
14	42231	Piece Goods, Notions, and Other Dry Goods Wholesalers	Logistics
15	62111	Offices of Physicians	Healthcare
16	62132	Offices of Optometrists	Healthcare
17	51411	News Syndicates	Other

Table 5: Top 50 Non-Manufacturing Industries Identified by Model (cont.)

Rank	5-Digit NAICS Industry	Industry	Cluster
18	54151	Computer Systems Design and Related Services	Technical Services
19	51222	Integrated Record Production/Distribution	Other
20	51219	Postproduction Services and Other Motion Picture and Video Industries	Other
21	42122	Home Furnishing Wholesalers	Logistics
22	62131	Offices of Chiropractors	Healthcare
23	71121	Spectator Sports	Entertainment/Tourist
24	51211	Motion Picture and Video Production	Entertainment
25	49311	General Warehousing and Storage	Logistics
26	54161	Management Consulting Services	Business and Management Services
27	48721	Scenic and Sightseeing Transportation, Water	Tourist
28	22131	Water Supply and Irrigation Systems	Other
29	62134	Offices of Physical, Occupational and Speech Therapists, and Audiologists	Healthcare
30	56133	Employee Leasing Services	Business and Management Services
31	54187	Advertising Material Distribution Services	Business and Management Services
32	42161	Electrical Apparatus and Equipment, Wiring Supplies, and Construction Material Wholesalers	Logistics
33	56299	All Other Waste Management Services	Technical Services
34	42292	Book, Periodical, and Newspaper Wholesalers	Logistics
35	42293	Flower, Nursery Stock, and Florists' Supplies Wholesalers	Logistics
36	54189	Other Services Related to Advertising	Business and Management Services
37	51321	Cable Networks	Entertainment Data and communications
38	51224	Sound Recording Studios	Entertainment
39	42186	Transportation Equipment and Supplies (except Motor Vehicle) Wholesalers	Logistics
40	51212	Motion Picture and Video Distribution	Logistics
41	48421	Used Household and Office Goods Moving	Business and Management Services
42	81131	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	Technical Services
43	42261	Plastics Materials and Basic Forms and Shapes Wholesalers	Logistics
44	54141	Interior Design Services	Other
45	51229	Other Sound Recording Industries	Entertainment
46	42172	Plumbing and Heating Equipment and Supplies (Hydronics) Wholesalers	Logistics
47	62149	Other Outpatient Care Centers	Healthcare
48	52391	Miscellaneous Intermediation	Financial
49	71141	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures	Entertainment
50	62199	All Other Ambulatory Health Care Services	Healthcare

Step 2: Results of Qualitative Analysis

Industry Clusters

In this phase, the industries identified by the quantitative model were grouped into clusters. The clusters are based on multiple criteria. The basic criteria of similar products, similar production processes, and similar raw materials have traditionally been used by standard industrial classification methodologies. In addition, common supply chains were added and the clusters were validated by knowledge from our industry experience: broad regional location patterns that hold in large communities, states and larger regions.

The presence of advanced manufacturing industries was evaluated in each cluster. When a cluster contained few advanced manufacturing industries, the following "sanity checks" were applied to the industries:

- Is the industry growing? Is there another common-sense reason why it was picked?
- Is this industry under severe pressure from low-cost imports, or will it face such pressure in the future?

Finally, industries were evaluated on their potential for creating abundant, well-paying jobs and having a strong economic impact in the region, preferably beyond their direct effect.

Manufacturing

Qualitative evaluation of the industries identified by the quantitative model revealed only a few industries that are statistical artifacts, or under severe competitive pressure. Almost every industry picked out by the model is there for a reason, even if it is not an advanced manufacturing industry. However, some are less promising than others.

For example, ready-mix concrete (#8 in rank) and structural steel (#10), and several other low-value construction materials, are necessary growth industries tied to construction in a growing region. However, even though they face little competition because of transportation costs, and though are growing, they are not good target industries because they do not create many or well-paying jobs, and have little positive economic impact beyond their direct effect. Industries that are on the list but are not good targets because of expected heavy competition from low-wage countries would include Rubber and Plastics Hoses and Belting, and Cutlery and Hand Tools,

The results of this exercise are given in Tables 7 - 12.

The Greater Charlotte Region's strengths in transportation infrastructure, quality of life, available sites, market and supply chain access, and labor cost, provide further justification for targeting the sectors identified above. Productivity of the existing workforce was rated a strength by existing manufacturers in the region with the caveat that a lot more workforce development is needed. If the Greater Charlotte Region is to become a world-class manufacturing environment through the broad implementation of overarching technologies (as identified in the environmental scan), there will be even more reason for targeted industries to locate or grow their existing businesses.

High-Priority Clusters

These clusters have a strong representation of advanced manufacturing, received high rankings in the quantitative model, and make sense in terms of what we know about the industries' growth and competitive profiles and the region's strengths and weaknesses.

General Machinery, Equipment and Components Cluster

The General Machinery, Equipment and Components Cluster is particularly fragmented because most companies specialize in producing a certain type of machinery. "Most companies have annual sales between $10 and $550 million and operate in a relatively small field, but may produce dozens of variations and models of the same basic product."[1] This cluster is going to be highly dependent upon the health of the US economy and the construction industry. Engineering expertise and efficient production operations determines the profitability of the companies in this cluster. Continuous innovation in product design is necessary to remain competitive.

Figure 2: General Machinery, Equipment & Component Cos. in Region with 20 or more employees
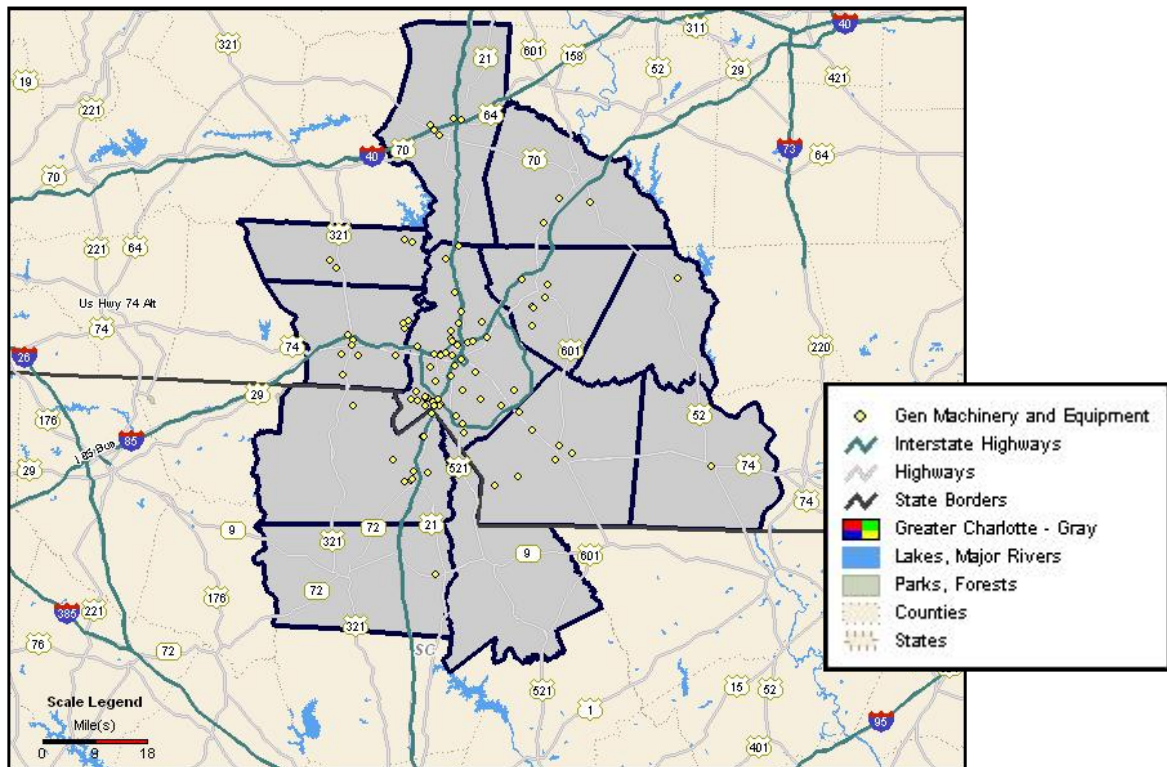
Source: Harris Selectory and Business Map Pro

Many of the industries in this cluster produce finished goods but many also produce components used in further production somewhere else and custom-designed products are commonly found here as well. This cluster is made up of discrete manufacturing industries that are producing and assembling components. Mechanical, hydraulic, and electrical control systems and other components are either made or bought. Skilled labor is often involved especially related to machining and welding. Product design usually involves 2D and 3D computer-aided design and modeling systems.

---

[1] First Research

Table 6: Industries in the General Machinery, Equipment and Components Cluster

Rank	5-Digit NAICS Industry	Industry	Advanced Manufacturing Flag
1	33392	Material Handling Equipment Manufacturing	AM
3	33391	Pump and Compressor Manufacturing	
6	33399	All Other General Purpose Machinery Manufacturing	AM
11	33329	Other Industrial Machinery Manufacturing	AM
12	33351	Metalworking Machinery Manufacturing	
19	33361	Engine, Turbine, and Power Transmission Equipment Manufacturing	AM
24	33461	Manufacturing and Reproducing Magnetic and Optical Media	AM
35	33322	Plastics and Rubber Industry Machinery Manufacturing	AM

CH2M HILL lists this cluster at the top because it has the best combination of high-priority target industries, advanced manufacturing industries, and a match to the strengths of the region. These are growing industries that provide good jobs and employ skilled workers, but are also sensitive to labor costs. These industries have been migrating from higher-cost, unionized states to the Southeast, but require strong industrial skills, precision and work ethic. The decline of textiles in the region has increased the availability of suitable labor, but our interviews with local employers reveal some challenges including poor basic skills, especially in problem-solving and technical ability.
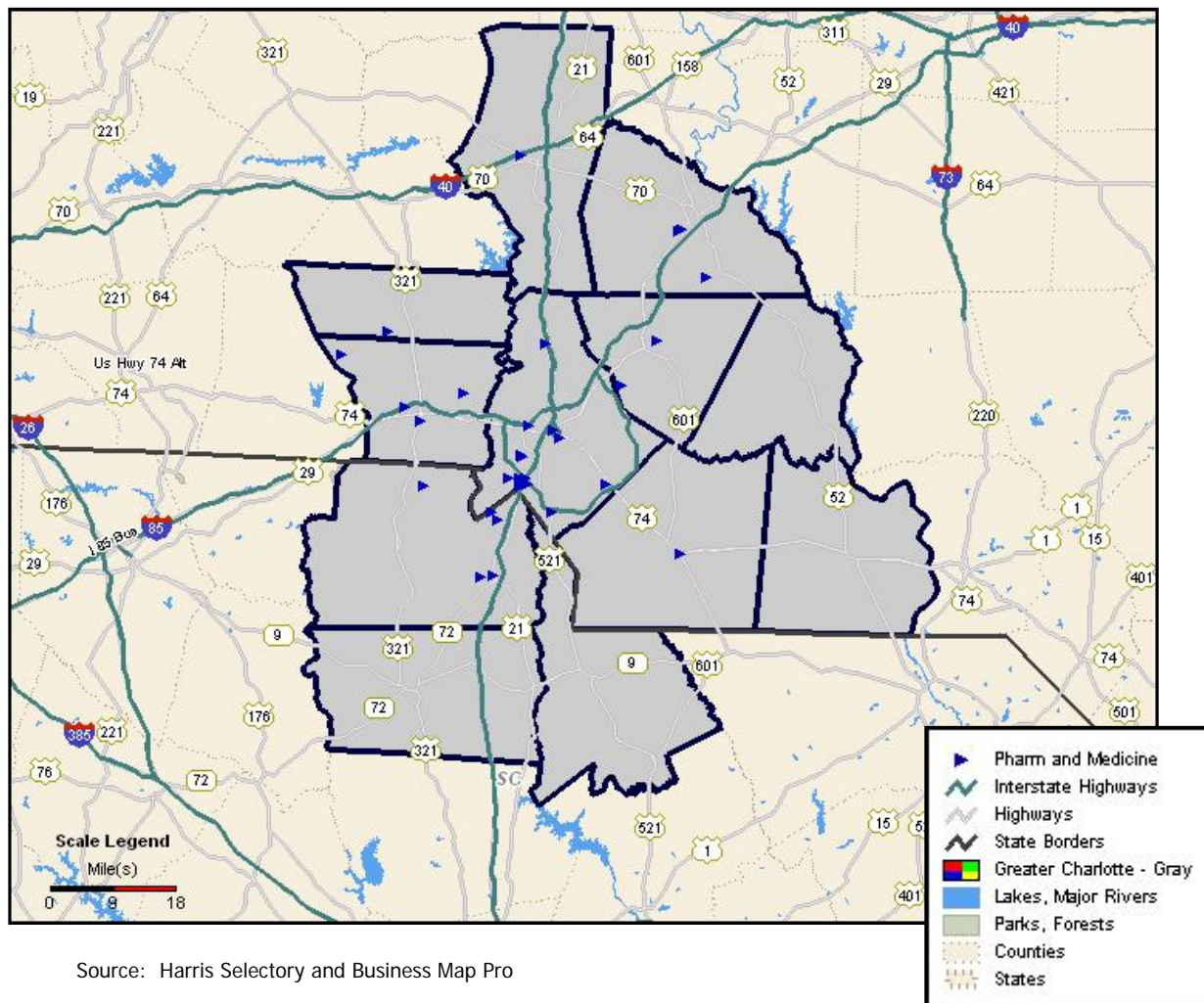
Pharmaceutical and Medical Device Manufacturing Cluster

The Pharmaceutical and Medical Device Manufacturing Cluster is really made up of Pharmaceutical Manufacturing and Medical Device Manufacturing.

Pharmaceutical Manufacturing is marked by rapid advances in scientific knowledge. Profitability is directly tied to the ability to discover, patent, and successfully become first to market for new drugs. The industry is dominated by large manufacturers with large research operations. Small companies can compete through research or manufacturing non-prescription products.

In Medical Device Manufacturing, demand is driven by population demographics and advanced in medical knowledge and technology. Development of superior products is the key to profitability. Large companies have an edge related to economies of scale in manufacturing and R&D however smaller companies can compete very well by specializing in a particular niche.

Figure 3:   Pharmaceutical and Medical Device Manufacturing Cos. in Region with 20 or more Employees

Source: Harris Selectory and Business Map Pro

There are major product segments in this industry: medical supplies, surgical instruments, therapeutic devices and diagnostic equipment. Technological innovation is the main feature of companies that produce these types of products. Technological obsolescence is the big risk in this industry, especially for smaller companies that have specialized. Research is a major activity of these manufacturers and patents are valuable with disputes frequent. There is also the trend of big companies swallowing up smaller ones that have promising new technologies.

Table 7: Pharmaceutical and Medical Device Manufacturing

5-Digit NAICS Industry	Industry	Rank	Advanced Manufacturing Flag
32541	Pharmaceutical and Medicine Manufacturing	2	AM
33911	Medical Equipment and Supplies Manufacturing	20	AM

The pharmaceutical and medical device cluster is the most desirable for many communities, and there are many programs launched and dollars spent to attract them. This is listed as a high-priority cluster, even though the fit with the region is not as close as with machinery. Regional strengths include good quality of life, labor costs and availability, and the relative proximity of the Research Triangle, where growth is starting to strain resources. On the negative side, there is the lack of strong medical research universities, competition from other nearby regions (most notably Piedmont Triad), and the same challenges of labor quality and training. For these reasons, medical devices and the straight manufacturing of pharmaceuticals are more likely to succeed than research and development parks and biotech facilities.

Focus needs to be implemented in developing centers of research and development inside the region. This takes time, so reaching out to areas where research and development is being done to assist in technology transfer for additional product development in existing businesses and/or new business start-ups could begin the process of innovation in the Greater Charlotte Region.

Automotive/Transportation Cluster

The Automotive/Transportation Cluster for the Greater Charlotte Region includes industries mostly involved with large components and other automotive parts but also includes Heavy Truck Manufacturing due to the presence of Freightliner. Motorsports is definitely part of this cluster although there is no specific industry sector with that name. Motorsports can be tied to many industry sectors from tourism and recreation to machining and research/development.

Demand for auto parts is driven by new car sales. Profitability of industries in this cluster is highly dependent on the volume of demand and how difficult it is to manufacture the product. Typically, smaller companies are referred to as "tier 2 or tier 3" suppliers which sell parts they have manufactured to larger suppliers, known as "tier 1" suppliers who then sell component assemblies or modules to car and truck assemblers.

Figure 4: Automotive/Transportation Cos. in Region with 20 or more employees
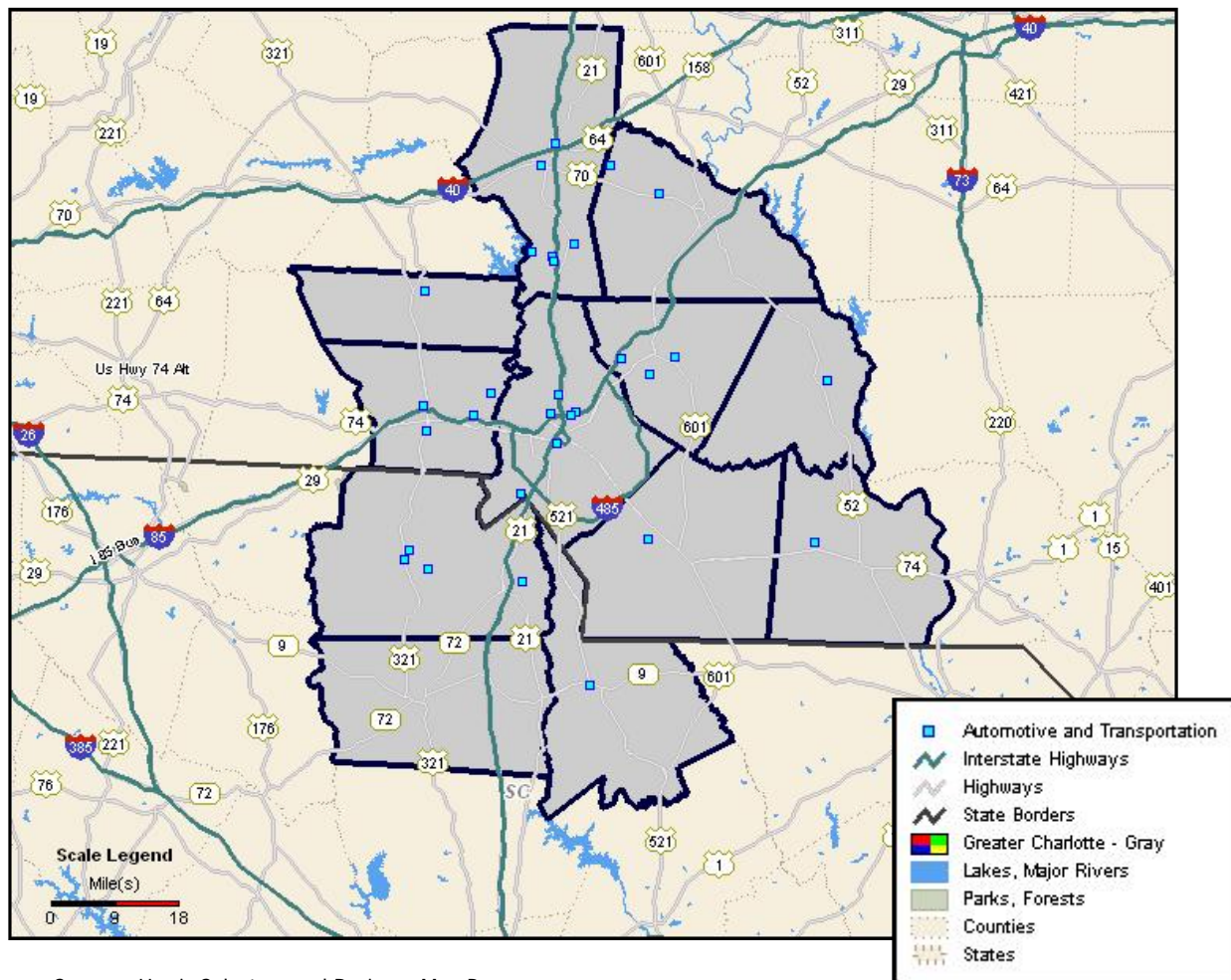
Source: Harris Selectory and Business Map Pro

Parts manufacturing plants are often located within 100 miles of assembly plants. Vehicle manufacturers focus very heavily on the research and development activities of their preferred suppliers. Engineering and quality assurance are extremely important to the manufacturing process and profitability of these industries.

Table 8: Automotive/Transportation

5-Digit NAICS Industry	Industry	Rank	Cluster	Advanced Manufacturing Flag
33639	Other Motor Vehicle Parts Manufacturing	7	Automotive Transportation	AM
33612	Heavy Duty Truck Manufacturing	28	Automotive/ Transportation	AM
3363	Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	30	Automotive/ Transportation	AM
33633	Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	37	Automotive/ Transportation	AM
33635	Motor Vehicle Transmission and Power Train Parts Manufacturing	39	Automotive/ Transportation	AM

The Automotive/Transportation Cluster comes next in priority. On the plus side, all industries included in this cluster are identified as advanced manufacturing. On the negative side, the rankings of most industries are relatively low. Still, this is a good target cluster for the region, and it takes advantage of several of its strengths, such as good transportation and logistics and labor costs and availability. Interestingly, automotive assembly is not on the list, which is just as well: landing such a plant is becoming a rare and difficult feat, involving ample incentives.

Telecommunication and Electronic Components Manufacturing Cluster

The Telecommunication and Electronic Components Manufacturing Cluster depends highly on demand from the computer industry and makers of telecommunication products like cell phones. The demand for these products varies sharply from year to year. Competition is enhanced around the development of specialized products or new applications. The industries in this cluster are highly automated.

The production of components is often focused on cost reduction. To a large extent, these products can become commoditized very quickly and easily duplicated by other manufacturers. Research and development related to new materials, applications, and production methods is integral to the success of companies in this cluster.

Figure 5: Telecommunication and Electronic Components Mfg Cos. in Region with 20 or more employees
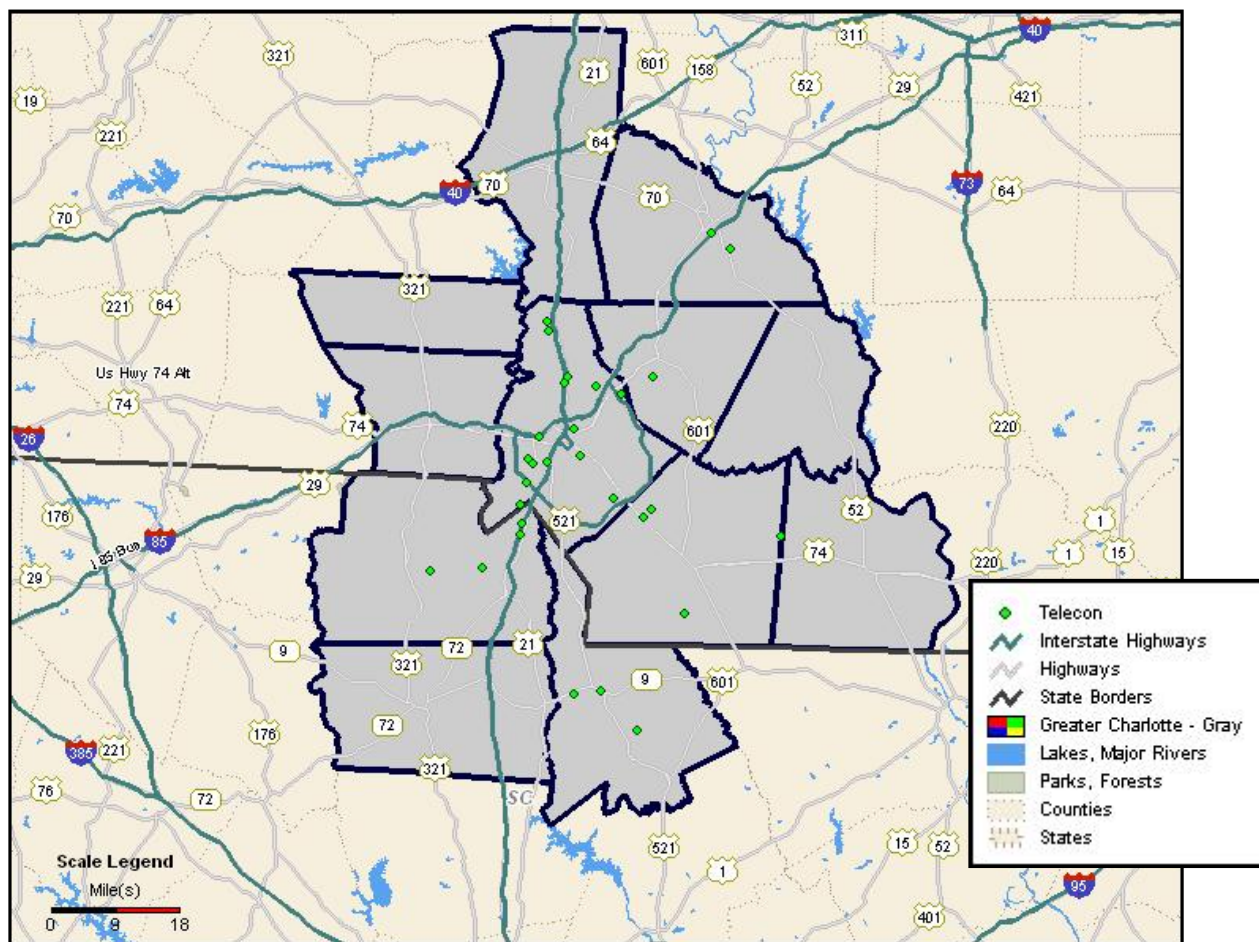
Source: Harris Selectory and Business Map Pro

Table 9: Telecommunication and Electronic Components Manufacturing

5-Digit NAICS Industry	Industry	Rank	Advanced Manufacturing Flag
33421	Telephone Apparatus Manufacturing	5	AM
33429	Other Communications Equipment Manufacturing	31	AM
33422	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	38	AM
33591	Battery Manufacturing	44	AM
33531	Electrical Equipment Manufacturing	45	AM
33592	Communication and Energy Wire and Cable Manufacturing	56	AM

This entire cluster consists of advanced manufacturing industries with Telephone Apparatus Manufacturing ranking fifth out of all manufacturing industries analyzed. It is worth noting that current employers in this sector stated in interviews that the existing textile industry workforce is particularly well-suited for this type of work. This could be an aspect upon which to build a new employment focus for displaced textile workers.

Medium-Priority Cluster

Plastics and Rubber Manufacturing Cluster

The Plastics and Rubber Manufacturing Cluster is a collection of industries and companies with hundreds of different niches determined by material type, manufacturing process and end-use. Profitability of these companies depends on product mix and production efficiency. This cluster is highly tied to the overall US economy as most of the industries' products go into other products.

Jobs in plastics manufacturing involve feeding and tending machinery that usually works in batches. Much of the work requires only modest skills, and wages are accordingly below average. Challenges in this cluster also include seasonal demand (construction related products), shortened product life-cycle, higher complexity products require more skilled labor force, and environmental concerns. Research and development is crucial to the success of industries in this sector. They are constantly looking to determine stronger and lighter materials.

Figure 6: Plastics and Rubber Manufacturing Cos. in Region with 20 or more employees
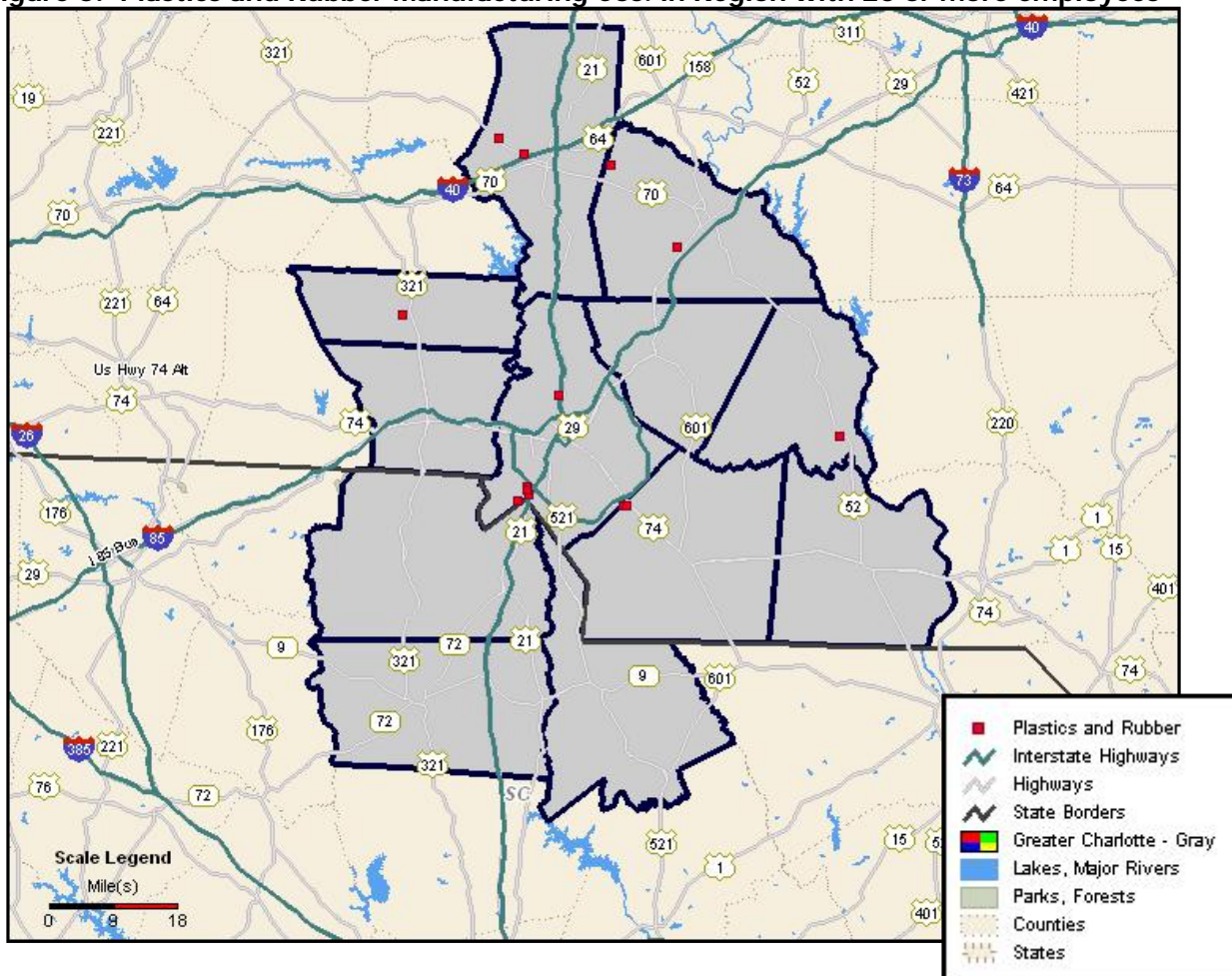
Source: Harris Selectory and Business Map Pro

Table 10: Plastics and Rubber Manufacturing Cluster

5-Digit NAICS Industry	Industry	Rank	Advanced Manufacturing Flag
32621	Tire Manufacturing	4	AM
32613	Laminated Plastics Plate, Sheet, and Shape Manufacturing	9	AM
32611	Unsupported Plastics Film, Sheet, and Bag Manufacturing	14	AM
32622	Rubber and Plastics Hoses and Belting Manufacturing	16	
32614	Polystyrene Foam Product Manufacturing	18	
32612	Plastics Pipe, Pipe Fitting, and Unsupported Profile Shape Manufacturing	21	
32615	Urethane and Other Foam Product (except Polystyrene) Manufacturing	40	
32616	Plastics Bottle Manufacturing	41	

This is the only cluster in this medium-priority category. It contains industries that ranked relatively high in the quantitative model. It represents an industry group that is similar to chemicals, but is not too close to basic chemical processing, something that the region is not strong in. This cluster is a good fit for the region's strengths, including labor availability, cost and skill sets, however, contains only three advanced manufacturing industries already present in the Greater Charlotte Region.

CH2MHILL

Low-Priority Cluster

Metals Forming and Fabrication Cluster

Demand depends on US manufacturing activity. The profitability of individual companies is linked to engineering expertise and operating efficiency. Larger shops have the ability to invest in advanced production machinery. Smaller shops can compete effectively by serving specialized customers, or by providing engineering services. Companies manufacture mainly simple metal parts used by industrial customers, such as those making autos, airplanes, machinery, appliances, and computers. Some companies make simple finished products like metal cans, tools, plumbing fixtures, and structural steel members.

Figure 7: Metals Forming and Fabrication Co. in Region with 20 or more employees
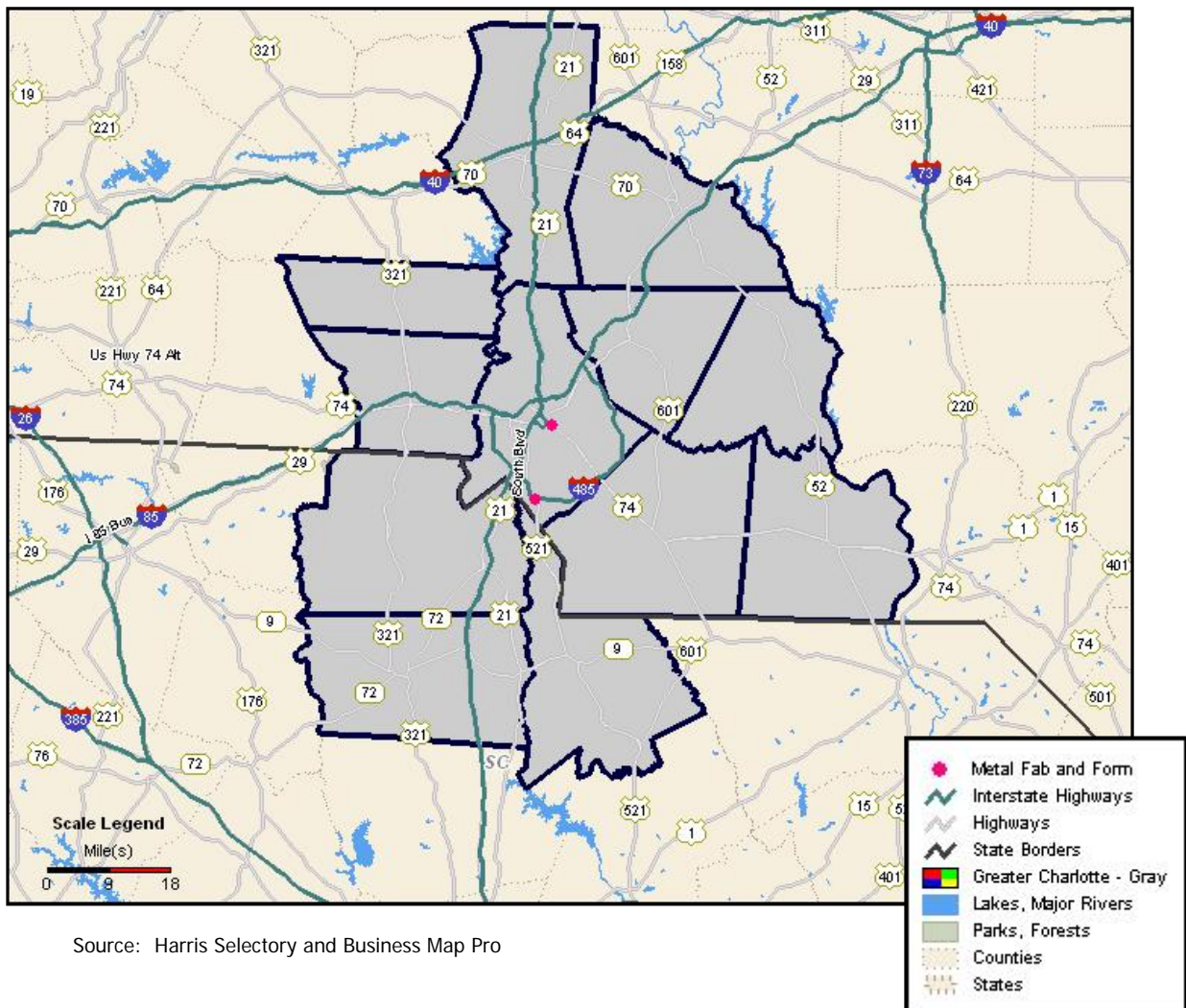
Source: Harris Selectory and Business Map Pro

Table 11: Metals Forming and Fabrication

5-Digit NAICS Industry	Industry	Rank	Advanced Manufacturing Flag
33231	Plate Work and Fabricated Structural Product Manufacturing	10	
33232	Ornamental and Architectural Metal Products Manufacturing	23	
33151	Ferrous Metal Foundries	25	AM
33271	Machine Shops	42	

The quantitative model identified these target industries where only one is an advanced manufacturing industry, and several were problematic. After reviewing them one by one, we removed several that are under severe competition from low-wage countries. The remaining industries are expected to do well in the foreseeable future, since they are under less competition because of customization and logistics advantages. These industries should be primarily targeted for internal marketing, specifically business retention and expansion activities.

Results of Qualitative Analysis

Services

Many service industries will support the advanced manufacturing clusters. Services in the Greater Charlotte Region are a strong part of the economic base. The industries ranking in the top 15% of the services industries were further reviewed and grouped into advanced manufacturing supporting clusters. Tables 12 – 15 identify recommended target sectors for advanced manufacturing support services.

Technical Services Cluster

Many of the technical services sectors scored well. These are industries that supply technical services or support to other industries and were identified as sectors that could technically support the advanced manufacturing industries. Other Scientific and Technical Consulting Services ranked the highest of all qualifying support industries and is ranked as the 2nd highest services industry. The Census Bureau defines this industry as an industry comprised of establishments primarily engaged in providing advice and assistance to businesses and other organizations on scientific and technical issues (except environmental). Environmental consulting services also ranked extremely high.

Table 12: Technical Services Cluster

5-Digit NAICS Industry	Industry	Rank
54169	Other Scientific and Technical Consulting Services	2
51121	Software Publishers	4
54162	Environmental Consulting Services	13
54151	Computer Systems Design and Related Services	18
56299	All Other Waste Management Services	33
81131	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	42
22133	Steam and Air-Conditioning Supply	10

Most of these industries use well-paid and qualified professionals, who could be attracted to the region by its good quality of life and cost of living. Some of the more technical professions would need to be nurtured through partnerships with regional universities and technical colleges.

Demand for consulting services is closely tied to the health of the US economy. The profitability of firms depends largely on the special expertise they provide to clients. Large firms can offer a variety of services to big customers. Small firms can easily coexist with large ones if they have expertise in a highly specialized area or industry.

"Most" consulting firms specialize in only one area of expertise, or in a particular industry. Information technology (IT) consulting accounts for 45 percent of industry revenues; general management for 25 percent; human resources (HR) for 10 percent; marketing for 7 percent; and process, logistics, and various types of technical and scientific consulting for the rest.

Many of the largest IT consulting firms today are offshoots of big accounting firms. About half of IT consulting revenue comes from the design and delivery of integrated "turnkey" computer systems for a client; the other half is from producing computer system design specifications, custom programming, computer system testing and maintenance, and sales of computer hardware and software.

General management consulting provides advice to senior and middle corporate managers about the operations or strategic direction of various functions in the client organization, including finance, marketing, HR, production, logistics, etc. Technical consultants provide expert assessments in environmental, legal, scientific, and other areas."[2]

Business and Management Services Cluster

Several of the overarching technologies for the advanced manufacturing industries focused on helping companies run more efficiently. The Business Management Services cluster provides outsourced services thus allowing the advanced manufacturing industries to focus on what they do best. This cluster is well-established in the region and already serves the very strong financial services industry.

Demand comes largely from corporations that sell consumer products, and telecommunications, entertainment, and financial services. The Greater Charlotte Region is ripe with entertainment and financial services as well as final products by advanced manufacturers. The profitability of individual companies depends on creative skills and good marketing. Large companies are advantaged in being able to serve the varied needs of large customers, but small companies can be competitive through special talent or lower pricing or through special services.

Table 13: Business and Management Services Cluster

5-digit NAICS Industry	Industry	Rank
54182	Public Relations Agencies	5
56121	Facilities Support Services	7
54161	Management Consulting Services	26
56133	Employee Leasing Services	30
54187	Advertising Material Distribution Services	31
54189	Other Services Related to Advertising	36

Data and Information Services

All industries, to some extent, rely on data and information services. This is a smaller cluster, but the industries within this cluster are very high ranking service industries and will support advanced manufacturing industries in data archiving and data processing. Again, these are well-established industries in the region, which has a strong base to build on.

Table 14: Data and Information Services

5-digit NAICS Industry	Industry	Rank
51412	Libraries and Archives	3
51419	Other Information Services	6
51421	Data Processing Services	11

---

[2] First Research

Logistics and Logistics Services

This last industry cluster was identified as being suitable for the region in general terms, because of strong growth and good fit with the region's location and infrastructure. However, their connection with Advanced Manufacturing is not specific.

Table 15: Logistics and Logistics Services

5-digit NAICS Industry	Industry	Rank
49311	General Warehousing and Storage	25
48422	Specialized Freight (except Used Goods) Trucking, Local	57
49211	Couriers	68
42161	Electrical Apparatus and Equipment, Wiring Supplies, and Construction Material Wholesalers	32
42186	Transportation Equipment and Supplies (except Motor Vehicle) Wholesalers	39
42261	Plastics Materials and Basic Forms and Shapes Wholesalers	43
42172	Plumbing and Heating Equipment and Supplies (Hydronics) Wholesalers	46

Final Note

As a final note, there is a significant amount of competitive information to be mined from the economic base analysis, and the benchmarking completed there, as it applies to where to start prospecting. The Greater Charlotte Region has significant advantages to show companies in several of the benchmarked regions. One of the significant challenges that the Greater Charlotte Regions is facing is the lack of any significant manufacturing company headquarters. Headquarters often direct and house research and development efforts for the entire enterprise. Not always the case, but often. With the significant presence of the FIRE (finance, investment, and real estate) industries and the locational strengths of the Greater Charlotte Region, headquarters need to be primary target.

CH2MHILL

Methodology

CH2M HILL applies a qualitative and quantitative approach backed by experienced consultants to designate target industries for a specific region of study. The result of such an approach is a realistic grouping of target industries suitable for a community to focus their economic development and marketing efforts.

The CH2M HILL proprietary target industry model is highly customizable with over 23 different factors that can be used for 666 5-digit NAICS industries in the United States. The model uses county-level data generated for 2006 and projected out to 2011 by a rigorous Input-Output model. There are 184 5-digit NAICS codes analyzed for the manufacturing sector (NAICS 31111 to 33999) and a total of 482 service industries.

The first step of the process is to customize a *quantitative* model for the region being reviewed for the specific purpose identified by the project. The model for the Greater Charlotte Region was built to identify target industries for the Region with an emphasis on those classified as Advanced Manufacturing. It was also utilized to identify service industries that would be good targets for supporting the Advanced Manufacturing industries.

Factors in the model are classified into several categories. Growth factors are meant to ensure growing industries are included and declining industries are discarded. Wage factors are meant to identify industries that pay better than average regional wages and to identify industries to which the region can offer a competitive advantage. Specifically to identify industries with average wages less than the national industry average wage making the region attractive to the industry from the perspective of cost of labor. Location Quotients are key factors in the model and describes how concentrated an industry is in the region of study. Productivity factors and profitability factors are also included.

Below is a list of the factors specifically used in the Greater Charlotte Region model followed by the justification for the use of each. These factors serve as the basis of the quantitative portion of the target industry model, prepared specifically for the Greater Charlotte Region to emphasize advanced manufacturing industry targets.

Factors Specific to Manufacturing Industries

FACTOR	FACTOR WEIGHT
Projected Employment Growth – North Carolina Region 2006 to 2011	Heavy
LQ Industry Concentration - Greater Charlotte Region vs. US 2006 data	Moderate
Projected change in profitability Greater Charlotte Region (2006 to 2011)	Moderate
Projected Output Growth US (2006 to 2011)	Moderate
Projected Employment Growth (US) 2006 to 2011	Moderate
Industry Productivity Index (Output per employee Greater Charlotte Region vs US) 2006 data	Moderate
National Industry Wage Index (only manufacturing uses sector specific average wage) 2006 data	Moderate
Regional Industry Wage Index (only manufacturing uses sector specific avg wage) 2006 data US industry specific wage/ regional avg wage	Moderate
LQ Industry Concentration – North Carolina vs US 2006 data	Minimal

Factors Specific to Non Manufacturing (Services) Industries

FACTOR	FACTOR WEIGHT
LQ Industry Concentration - Greater Charlotte Region vs. US 2006 data	Heavy
Projected change in profitability Greater Charlotte Region Region (2006 to 2011)	Heavy
National Industry Wage Index (only manufacturing uses sector specific average wage) 2006 data	Heavy
Projected Employment Growth – North Carolina Region 2006 to 2011	Moderate
Projected Employment Growth (US) 2006 to 2011	Moderate
Regional Industry Wage Index (only manufacturing uses sector specific avg wage) 2006 data US industry specific wage/ regional avg wage	Moderate
LQ Industry Concentration – North Carolina vs US 2006 data	Minimal
Projected Output Growth US (2006 to 2011)	Minimal

Factor Definitions and Justification

Location Quotient for the Greater Charlotte Region – Location Quotients are
simply a calculation to determine how concentrated an industry is in the region of study. For
manufacturing, it is important for the target industry analysis to take into account existing
industries in the Greater Charlotte Region, but not give so much credit for these industries that it
dampens emerging industries that could potentially do well in the region. For this reason, this
factor is a moderately weighted factor for manufacturing. For service industries, it is more
important to give credit for service industries already present in the region. It identifies the
services the region has a strong need for. Therefore in the services industry, location quotients
are weighted heavier.

Location Quotient for North Carolina–

Location Quotients calculated at the state level broaden the concept explained for their use in the
region. They are typically weighted less for the state than the region since a state economic
profile can vary significantly within various regions. It is important for the target industry
analysis to take into account existing industries in the state, since something about the state
quantitatively appears to be attractive to this industry. This is also a good way to identify
industries existing in the state and considered emerging industries in the region of study.

Projected Change In Industry Profitability for the Greater Charlotte Region –

Our Input-Output model calculates industry profitability in the region, and projects changes in
profitability, based on labor and other costs, productivity and output growth. Profitability is an
indicator of success and sustainability. Industries with strong projected growth in profitability are
good target industries. This factor is weighted equally with the location quotient in the
manufacturing industry analysis to give credit to existing industries predicted to do well in
profitability from 2006 to 2011 while dampening the industries resulting simply as a matter of
industry concentration but may not be predicted to fair as well in the region. It is weighted
heavier in service industries since location quotient is weighted heavy to identify those industries
that have a strong presence with staying power.

Project Output Growth US (2006 to 2011) –

Industries with projected growth in output in the US are likely candidates for emerging industries in the Greater Charlotte Region. Growth in output could also be an indicator of advanced manufacturing and will give more credit to those predicted to grow at a faster rate. Where these industries already exist in the region, this factor gives additional credit to the industry.

Projected Employment Growth US –

When this factor is reviewed at a national level, it predicts industries that are going to grow in employment nationally from 2006 to 2011. Although this is insightful, many of the industries will not be suitable for the Greater Charlotte Region resulting in wasted marketing dollars, thus a lower factor was used. It is important, however, to keep a continued element of national growth in a target industry model to capture new and emerging industries.

Projected Employment Growth North Carolina –

When employment growth is reviewed at the state level, it predicts industries that are going to grow in employment within the state from 2006 to 2011. We use state-level projections rather than projections specific to the region because state-level growth is a more appropriate measure of opportunities. Industries that are predicted to grow in the state are potentially good targets for the region and this factor is used to help the region get their fair share of industries that are already predicted to grow and/or locate within the state.

Industry Productivity Index (Output per Employee for the Greater Charlotte Region VS US) 2006 –

This factor brings out the industries currently having productivities higher than the national average. It builds leverage for attracting these industries since the Greater Charlotte Region will be able to state, based on quantitative predictions, these industries will be more productive if located in Greater Charlotte Region. This will also give additional credit to those industries that are not only doing well in North Carolina, but more specifically in the Greater Charlotte Region. Industries with high productivity have an advantage and would be good targets for recruitment, retention and expansion and are less likely to leave. Productivity factors were not included in the analysis of the service industry because they tend to distort the analysis. In many service industries labor productivity (output per worker) has more to do with the value and price of the product than with the physical productivity of the workers.

National Industry Wage Index –

The National Industry Wage Index is a ratio of the regional industry specific average wage compared to the national industry specific average wage of the industry. Lower indexes indicate industries that have average industry wages below the national industry average. This indicates the industry would be potentially interested in the region since labor rates are more attractive than the national average. This is a factor that builds competitive advantage into the target industry quantitative model.

Regional Industry Wage Index –

Projected manufacturing wages for 2006 were indexed against the average wage for the United States. The manufacturing sector uses sector specific average wages for indexing. The factor

gives credit to those industries paying higher than the regional average wages to help increase the average wage of the Greater Charlotte Region.

The *qualitative* input comes from the CHLG's team visit to the community. Talking with local leadership, existing industry, educational representatives, and others provide invaluable information that goes into reviewing the quantitative data. This insightful information obtained through the eyes and ears of seasoned site location consultants ensures the target industries chosen are realistic for Bartow County.

CH2MHILL

Companies in Clusters with 20 or more Employees[3]

General Equipment, Machinery and Components Companies

Company	County
1. A B Carter Inc	Gaston
2. Actuant Corp	Mecklenburg
3. Amca Machinery Inc	York
4. ASMO North Carolina Inc	Iredell
5. AUTEC Inc	Iredell
6. Automation Technology Inc	Cabarrus
7. Axia Inc	Iredell
8. Beacon Industrial Mfg	Mecklenburg
9. Belmont Textile Machinery Co	Gaston
10. Birch Brothers Southern Inc	Union
11. Bowman Hollis Manufacturing	Mecklenburg
12. Bradman-Lake Inc	Mecklenburg
13. Brown Equipment Manufacturing	Mecklenburg
14. Burnett Machine Co Inc	Gaston
15. Caledonian Alloys Inc	Union
16. Carolina Preprest Inc	Mecklenburg
17. Carolinas Custom Clad Inc	York
18. Carrier Commercial	Mecklenburg
19. Cates Mechanical Corp	Mecklenburg
20. Chicago Pneumatic Tool Co	York
21. Columbus McKinnon Corp	Anson
22. Composite Resources Inc	York
23. Control Techniques Americas	Mecklenburg
24. Cox Machine Co Inc	Union
25. Crown Equipment Corp	Mecklenburg
26. Cyklop Packaging Corp	Mecklenburg
27. Danaher Corp	Mecklenburg
28. Deleet Merchandising Corp	Mecklenburg
29. Dellinger Enterprises Ltd	Gaston

[3] Source: Harris Selectory

General Equipment, Machinery and Components Companies (cont.)

Company	County
30. Delta Mold Inc	Mecklenburg
31. Diversified Specialties Inc	Gaston
32. Excel Inc	Lincoln
33. Fab-Con Machinery Development	Cabarrus
34. Fanuc Robotics America Inc	Mecklenburg
35. Fischbein-Inglett Co	Iredell
36. Fischer Engine Development Inc	Lincoln
37. Flawtech Inc	Cabarrus
38. Freightliner LLC	Gaston
39. Fuji America Inc	Mecklenburg
40. Gardner Machinery Corp	Mecklenburg
41. Gaston Electronics LLC	Gaston
42. Gossett Machine Works Inc	Gaston
43. Gough Econ Inc	Mecklenburg
44. Gran International Inc	Union
45. Haldex Hydraulics Corp	Iredell
46. Hall-Dielectric Machinery Inc	York
47. Harper Corp Of America	Mecklenburg
48. Harper Machinery Corp	Mecklenburg
49. Hornback Meat Processing	Union
50. Icb LLC	Mecklenburg
51. Indian Head Industries Inc	Mecklenburg
52. Industrial Combustion Service	Mecklenburg
53. J & P Enterprises of The	Gaston
54. J C Steele & Sons Inc	Iredell
55. Jasper Penske Engines	Cabarrus
56. Jda Software Group Inc	Mecklenburg
57. John W Foster Sales Co Inc	Mecklenburg
58. Nord Gear Corp	Mecklenburg
59. Kvaerner Power Inc	Mecklenburg
60. L Griffin Ira & Son Inc	Mecklenburg
61. LCI Corp International	Mecklenburg
62. Liburdi Dimetrics Corp	Mecklenburg
63. Lincoln County Fabricators Inc	Lincoln
64. M & M Machinery Sales LLC	Gaston
65. Martin Sprocket & Gear Inc	Mecklenburg
66. McDonald Services Inc	Mecklenburg
67. Media Evolved LLC	Mecklenburg
68. Metro Metal & Design Inc	Mecklenburg
69. Monarch Manufacturing Corp	Union

General Equipment, Machinery and Components Companies (cont.)

Company	County
70. Mornic Corp	Rowan
71. Morrison Textile Machinery Co	Chester
72. Multi-Shifter Inc	Mecklenburg
73. Nabell USA Corp	Stanly
74. North Carolina Division of	Rowan
75. Oiles America Corp	Cabarrus
76. Otis Elevator Co	Mecklenburg
77. Park Manufacturing Co Inc	Gaston
78. Petty Machine Co Inc	Gaston
79. Porvair Filtration Group Inc	York
80. Precision Machine Products Inc	Gaston
81. Premtec Inc	Rowan
82. Progressive Crane Inc	Mecklenburg
83. Q C Manufacturing Inc	Mecklenburg
84. Quad Plus Inc	York
85. R E M Enterprises	Gaston
86. Red Oak Sales Co Inc	Lincoln
87. Reynolds Industries Inc	York
88. Roberts PolyPro Inc	Mecklenburg
89. Rosenmund Inc	Mecklenburg
90. Rothtec Engraving Corp	Mecklenburg
91. Schindler Elevator Corp	Mecklenburg
92. Sherrill Industries Inc	Gaston
93. Siemens Power Generation Inc	Mecklenburg
94. Smith Textile Apron Co Inc	Gaston
95. Southern Graphic Systems Inc	Mecklenburg
96. Spencer-Pettus Machine Co	Gaston
97. Spiez Tex LLC	Mecklenburg
98. Standard Engine Parts Inc	Mecklenburg
99. Sterling Fluid Systems	Mecklenburg
100. Sunco Powder Systems Inc	Mecklenburg
101. T & W Textile Machinery Inc	York
102. Tcg Technologies Inc	Mecklenburg
103. Terex Utilities South Inc	Mecklenburg
104. Transbotics Corp	Mecklenburg
105. Turnkey Technologies Inc	Cabarrus
106. UAV Corp	York
107. Ultrablend LLC	Mecklenburg
108. US Alloy Co	Mecklenburg
109. US Bottlers Machinery Co	Mecklenburg

General Equipment, Machinery and Components Companies (cont.)

Company	County
110. Wix Filtration Corp	Gaston
111. Yale Industrial Products Inc	Mecklenburg

Pharmaceutical and Medical Devices Companies

Company	County
1. Actavis Inc	Lincoln
2. Altiva Corp	Mecklenburg
3. American Bio Labs Inc	Gaston
4. Asheville Orthotic Prosthetic	Mecklenburg
5. Baja Products Ltd Inc	Rowan
6. Bristol-Myers Squibb Co	Mecklenburg
7. Cardinal Health 200 Inc	Mecklenburg
8. Cintas Corp	Mecklenburg
9. Daily Manufacturing Inc	Rowan
10. Dental Equipment LLC	Mecklenburg
11. Dental Equipment LLC	Mecklenburg
12. Depuy Orthopaedics Inc	Mecklenburg
13. Drake Precision Dental Lab	Mecklenburg
14. Faith Prosthetic-Orthotic Svcs	Cabarrus
15. Goodwin G Thomas	York
16. Hartmann-Conco Inc	York
17. Hmpn Inc	Gaston
18. Ingle Protective Systems Inc	Cabarrus
19. Jacuzzi Brands Inc	Gaston
20. Norcross Safety Products LLC	York
21. Kewaunee Scientific Corp	Iredell
22. Leiner Health Products Inc	York
23. Lincare Inc	Union
24. Orthofix Inc	Mecklenburg
25. Philip Medical Systems Inc	Mecklenburg
26. Philip Medical Systems Inc	Mecklenburg
27. Raitech Inc	Mecklenburg
28. Sanofi-Aventis US Inc	Mecklenburg
29. SciVolutions Inc	Gaston
30. Shaunn Dental Lab Inc	Cabarrus
31. Sherer Dental Laboratory Inc	York
32. Tri-State Hospital Supply Corp	Rowan

Telecommunication and Electronic Components Companies

Company	County
1. ABBd&t Power Co	Mecklenburg
2. Argus Fire Control Pf & S Inc	Mecklenburg
3. Atcom Inc	Durham
4. Avaya Inc	Mecklenburg
5. Baldor Electric Co Inc	York
6. Bosch Rexroth Corp	Mecklenburg
7. Carolina Products Inc	Mecklenburg
8. Carotron Inc	Lancaster
9. Electric Systems Integrators	York
10. Essex Group Inc	Mecklenburg
11. General Electric Co	Rowan
12. Gillette Co	Lancaster
13. Hella Lighting Corp	York
14. Huber Engineered Woods LLC	Mecklenburg
15. Joslyn Clark Controls LLC	Lancaster
16. Keyence Corp of America	Mecklenburg
17. Logicell Inc	Mecklenburg
18. Lucent Technologies Inc	Mecklenburg
19. Omega International Inc	Anson
20. Powertec Industrial Corp	York
21. PSI Control Solutions Inc	Mecklenburg
22. Rf Micro Devices Inc	Mecklenburg
23. Safe Fire Detection Inc	Union
24. Siei America Inc	Mecklenburg
25. Southern Electrical Equipment	Mecklenburg
26. Southern Electrical Equipment	Union
27. Square D Co	Rowan
28. T-Metrics Inc	Mecklenburg
29. Textrol Inc	Union
30. Total Controls Inc	Mecklenburg
31. Viper Communication Systems	Cabarrus

Plastics and Rubber Companies

Company	County
1. AEP Industries Inc	Union
2. Celgard LLC	Mecklenburg
3. Clark Tire & Auto Inc	Lincoln
4. Continental Automotive Inc	Mecklenburg
5. Continental Tire North America	Mecklenburg
6. Continental Tire North America	Mecklenburg
7. Cooper Tire & Rubber Co	Rowan
8. Flexsol Packaging Corp	Iredell
9. Michelin Aircraft Tire Corp	Stanly
10. Montsinger Technologies Inc	Union
11. Pinnacle Films Inc	Mecklenburg
12. Polypore Inc	Mecklenburg
13. Quality Packaging Services Inc	Iredell
14. Ragan Tire & Retread Co	Rowan
15. Werner Synthetics LLC	Mecklenburg

Metal Fabrication and Forming

Company	County
1. Paragon Metals Inc	Mecklenburg
2. Southern Cast Inc	Mecklenburg

Automotive and Transportation Companies

Company	County
1. Abundant Manufacturing Inc	Iredell
2. Altra Industrial Motion Inc	Mecklenburg
3. American Eagle Wheel Corp	York
4. Automated Refuse Equipment Inc	Mecklenburg
5. Cataler North America Corp	Lincoln
6. Champion Laboratories Inc	York
7. Coolant & Cleaning Techs	Anson
8. Dalmation Corp	Rowan
9. Dana Corp	Iredell
10. Detroit Speed & Engineering	Iredell
11. Eaton Corp	Cabarrus
12. Filtration Group Inc	York
13. Freightliner LLC	Gaston
14. Freightliner LLC	Gaston
15. Jasper Engine Exchange Inc	Iredell
16. Kee Auto Top Manufacturing Co	Mecklenburg
17. Killians Engine Core Supply	Gaston
18. Mch	Cabarrus
19. Meridian Automotive	Rowan
20. Mike Ege Racing Engines Inc	Iredell
21. Pro-Fabrication Inc	Cabarrus
22. S P X Corp	Stanly
23. S Triple Inc	Mecklenburg
24. Schrader-Bridgeport Intl	Union
25. Southeast Air Control Inc	Mecklenburg
26. Suspensions LLC	Iredell
27. Torque Traction Integration	Mecklenburg
28. Transaxle Manufacturer of Amer	York
29. Wix Filtration Corp	Gaston
30. ZF Commercial Suspension Systs	Lancaster