

| Charlottesville City Existing and Target Industry Analysis

Approach

This report for Charlottesville City provides an understanding of the industry groups currently present in the economy. Since at least 80 percent of economic growth within an independent city or county is typically generated by innovative existing industry, these groups must be understood and supported by economic developers.

In this study, existing industry groups have been analyzed in terms of growth, level of specialization in the local economy, degree of connectedness to the local economy and competitiveness. The region's strategic focus on balancing growth with maintaining the outstanding quality of life is also central to the analysis.

Charlottesville is the urban core for the Thomas Jefferson Partnership for Economic Development (TJPED) region. The city has national name recognition and many U.S. companies from outside the general region and international companies can identify the location. With only approximately 10 square miles within its boundaries and no future growth area, this city must be highly strategic in targeting economic opportunities. These factors were among those considered in the target industry analysis.

Target industry groups have been identified for the city and then screened to select sectors which have the strongest local rationale and best industry outlook. New and emerging industry, technology assets, workforce and locational strengths were considered in screening for select target sectors.

The select target sectors have been narrowed to a relatively precise focus in order to provide the most meaningful guidance to the users of this report. The list of target sectors is a list of optimal targets and should not be considered to exclude related sectors. These sectors are also generally well-suited to the city.

All localities in the TJPED Region can benefit from the successful attraction and expansion of businesses of the regional targets that are identified in the *Regional Target Analysis* of this report.

Existing Business Clusters and Major Industry Groups

The economy of Charlottesville City is comprised of seven major industry groups or clusters listed in Table 1. These seven groups represent 51 percent of all jobs in the city. Information on all other industries is presented in Appendix F.

Table 1
Charlottesville City
Major Business Clusters/Industry Groups
Ranked by Size

	2011 Jobs	Five- Year Change	Five- Year Change (%)	Speciali- zation (LQ)	Average Earnings	Jobs Multiplier	Firms
Business & Financial Services	5,297	129	2.5	0.96	\$66,890	15.65	439
Biomedical/Health Services	3,129	(314)	(9.1)	0.88	\$58,785	1.84	84
Arts, Entertainment, Recreation & Visitor Industries	2,115	264	14.3	1.17	\$27,719	2.05	84
Information Technology & Telecommunications	2,068	(23)	(1.1)	1.12	\$74,117	1.75	131
Education & Knowledge Creation	1,839	155	9.2	1.77	\$64,225	2.55	58
Defense & Security	1,627	142	9.6	0.85	\$87,458	2.24	88
Printing & Publishing	1,592	(137)	(7.9)	2.04	\$72,986	2.54	88
Benchmarks							
Charlottesville City	34,640*	(160)	(0.3)		\$49,964		
Virginia	4.7 M	23,688	0.5		\$56,533		
Nation	173 M	(895,331)	(0.5)		\$52,217		

* This is a 2010 annual average for jobs covered by unemployment insurance while other jobs numbers are 2011 projections

Source: Economic Modeling Specialist, Younger Associates

Three of the groups are very small, representing fewer than 300 employees each. While they met the screening criteria for this analysis, they are not a significant aspect of the economy within the confines of the city boundaries. For example, *Forest and Wood Products* is included in the major industry list, but it is small and declining within the city, and the *Apparel and Textiles* group has long been in decline nationally. *Agribusiness, Food Processing and Related Technology* has grown (by 15 jobs) locally and has a good national outlook, but the geographic confines of the city limit this industry group on the city.

Six of the seven industry groups added employment over the last five years and three of the six growing groups have average earnings greater than the average in the state and nation.

Business & Financial Services is the largest industry group in the Charlottesville, employing 5,297 in 439 firms. Over the last five years the group has added 129 jobs, up by 2.9 percent. At \$66,890, average annual earnings in this group are 34 percent above the overall city average of \$49,964, 18 percent above the state average of \$56,533 and 28 percent above the national average of \$52,217.

In Charlottesville dominant subgroups within this industry group include: *Portfolio Management, Payroll Services, Architectural Services, Computer Systems Design Services* and *Administrative Management & General Management Consulting Services*. Some examples of local firms in the group are SNL Financial, General Dynamics Consulting and Hantzmon Wiebel LLP.

The *Biomedical/Health Services* is the second largest industry group in the city, centered on the University of Virginia Health System, which includes a medical center, school of medicine and health sciences library. The group is comprised of 84 local establishments, of which nearly thirty are involved in research and development activities.

Over the last five years *Biomedical/Health Services* industry group employment has declined by 9.1 percent or 314 fewer jobs. This decline was caused primarily by some medical operations relocating outside the city. However these operations and jobs remain within the regional jurisdiction.

At \$58,785, average annual earnings in this group are 18 percent above the city average, 4 percent above the state average and 12.5 percent above the national average. There are sharp wages differences between the two major subgroups, the higher-skilled *Biosciences/Medical Devices* and the relatively lower-skilled *Health Services*.

Employing 2,115 workers, the *Arts, Entertainment, Recreation & Visitor Industries* industry group is the third largest group. With a five-year growth rate of 14.3 percent or 264 more jobs, it is the fastest growing group in both percentage and absolute terms.

The fourth largest industry group, *Information Technology & Telecommunications* employs 2,068, only slightly fewer persons than *Arts, Entertainment, Recreation & Visitor Industries* group. The group is comprised of 131 local firms. At \$74,117, average earnings are 48 percent above the city average, 31percent above the state and 42 percent above the national average. Some industries in the *Information Technology & Telecommunications* group can also be found in *Business & Financial Services*. Dominant subgroups within this group include: *Computer Systems Design Services, Custom Computer Programming Services, Electronic Component Manufacturing* and *Software Publishers*. Some examples of local firms in the group are ECL Inc., Skyline Information Systems, Silverchair Information Systems, Skeo Solutions and Virginia Electronic Components.

The *Education & Knowledge Creation* industry group employs 1,839 in 58 establishments. The group added 155 jobs over the last five years, up 9.2 percent. The group is comprised mostly of book, newspaper and periodical publishers, schools and training institutions, libraries and

various information services. Some examples of local establishments in the group are Money Market Directories, Jefferson-Madison Regional Library, LexisNexis and several facilities of the University of Virginia.

A comparison of the jobs multipliers in Table 1 present a measure of the expected impact of job gains or losses in each industry group as they ripple through the city. The multiplier offers an indication of the connectedness of each group within the Albemarle economy in terms of how many indirect jobs are created to support one job in an industry group. The *Business & Financial Services* group has a jobs multiplier of 15.65, which means that 14.65 jobs will be created across all industry groups locally to support the economic activity generated by one direct job. This indicates an exceptionally high level of connectedness with other local support industries. It greatly exceeds the jobs multipliers of all other industry groups, which range from 2.55 to 1.28.

Industry Growth and Specialization

Also shown in Table 1 is the location quotient (LQ), which indicates the level of specialization in each industry group. The LQ compares the concentration of employment in an industry group in the city to the concentration of employment in that same group in the U.S. workforce, where the U.S. concentrations is stated as 1.

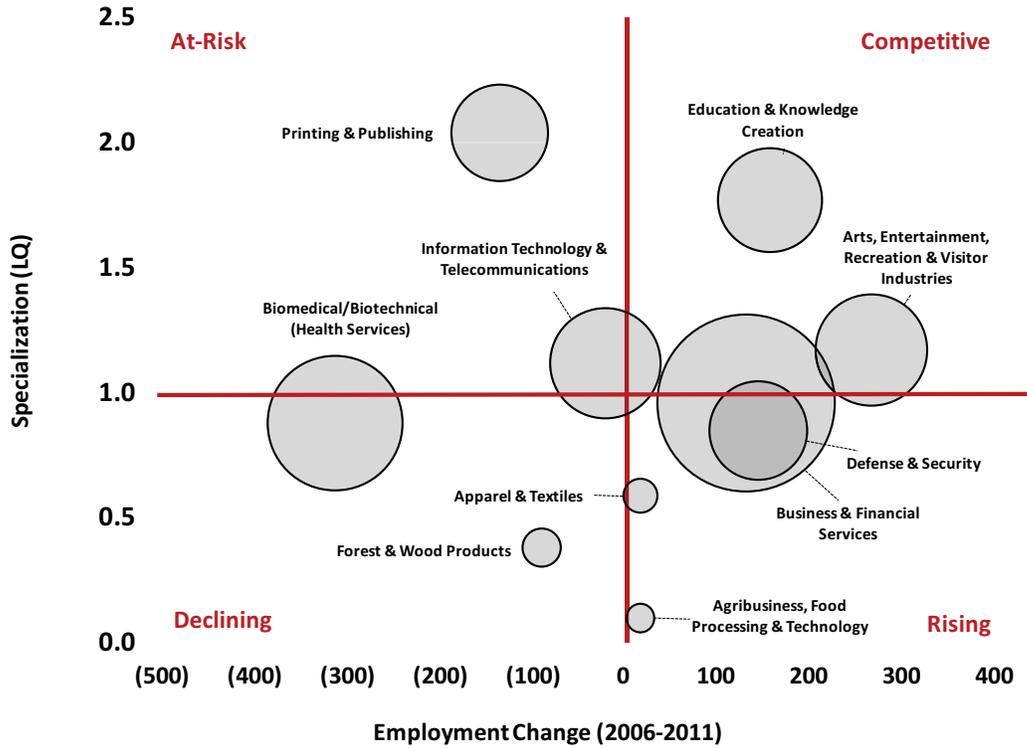
Among the seven major industry groups in Charlottesville City, four demonstrate levels of specialization above the nation by having a location quotient above 1.0 (Figure 1 and Table 1). *Printing & Publishing* has the highest degree of local specialization at 2.04, meaning that Charlottesville City is twice as specialized in this industry group as the nation as a whole.

The second highest area of specialization is *Education & Knowledge Creation* with a location quotient of 1.77. The LQ for this group is 5.51 for surrounding Albemarle County. These high concentrations of people working in this group is primarily driven by the University of Virginia, which is a shared asset between the city and county, and by other colleges and private schools in the area.

The other two groups with a level of specialization higher than the national rate—*Arts, Entertainment, Recreation & Visitor Industries* and *Information Technology & Telecommunications*—register LQ's of 1.17 and 1.12, respectively.

Figure 1 below compares the level of specialization and the local absolute growth of the major industry groups in the Charlottesville City.

Figure 1
Charlottesville City
Growth & Specialization
Major Business Clusters/Industry Groups



Size of bubble represents 2011 employment
 Source: Economic Modeling Specialist, Younger Associates

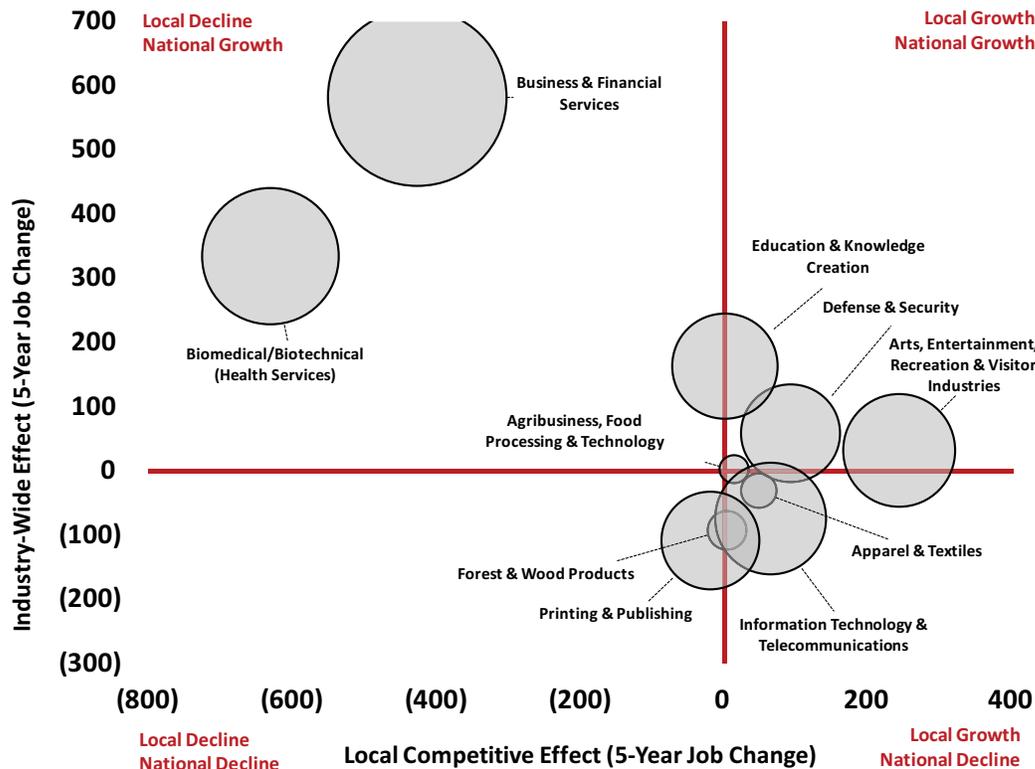
Relative Competitiveness

Measuring relative competitiveness among the seven major industry groups in Charlottesville helps uncover unique local competitive advantages and industry-specific growth. The analysis, as illustrated in Figure 2, disaggregates employment change into three effects: national, industry-wide and the remaining local competitive. The local competitive effect is the employment change that is not explained by national or industry-wide trends and may indicate unique local competitive advantage (or disadvantage). The analysis, also known as shift-share, does not answer the underlying causes for the growth or decline.

Of the seven industry groups, three experienced both strong industry-wide and local competitive effects. *Arts, Entertainment, Recreation & Visitor Industries* had the strongest local competitive effect, followed by the *Defense & Security* group, then the *Education and Knowledge Creation* group.

The city's two largest industry groups, *Business & Financial Services*, which grew 2.5%, and *Biomedical/Health Services*, which declined (due to relocations within the region), did not grow as fast as the national trend predicted, indicating the local economy did not perform as well in these sectors during the recession as the national economy. (These two sectors also experienced a lower localized trend in Albemarle County.)

Figure 2
Charlottesville City
Five-Year Competitiveness
Major Business Clusters/Industry Groups



Size of bubble represents 2011 employment
 Source: Economic Modeling Specialist, Younger Associates

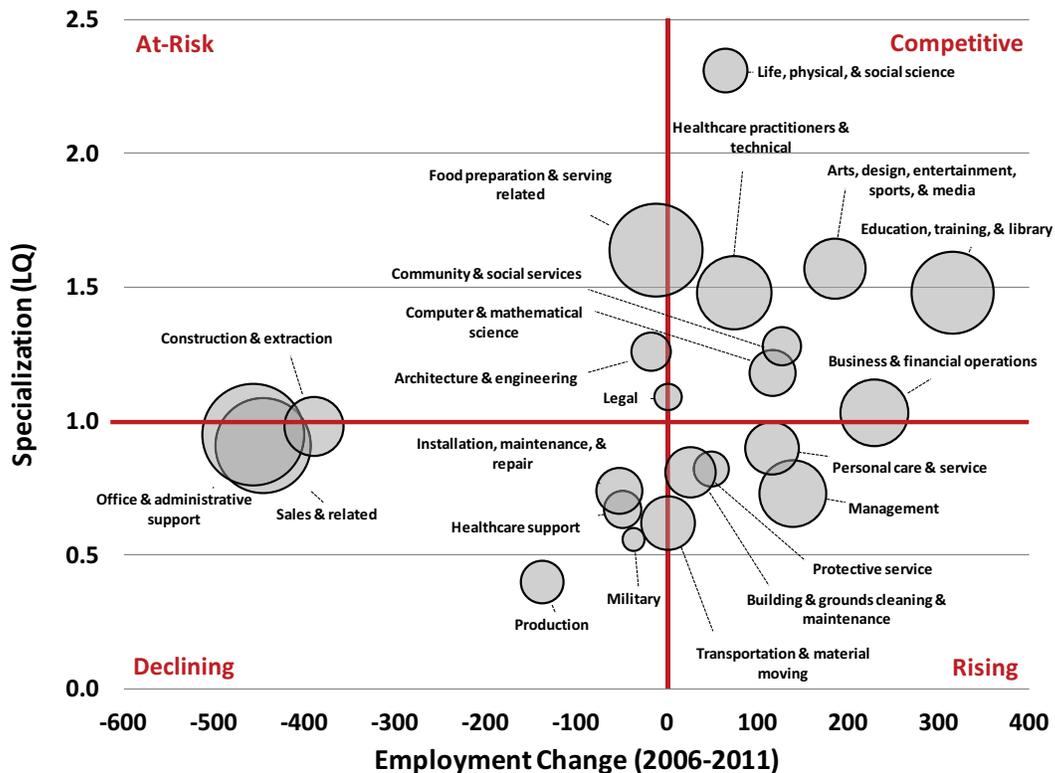
Occupational Growth and Specialization

Recognizing Charlottesville’s local occupational strengths and current job trends is just as critical as understanding its industrial position. An examination of local employment by major occupational groups reflects the city’s unique specialization in two areas: *Biomedical/Health Services* and *Arts, Entertainment, Recreation & Visitor Industries* (Figure 3 and Table 2).

The highest measure of occupational specialization is in *Life, Physical, & Social Science*, which in Charlottesville includes primarily *Biological and Medical Scientists*. The next two most specialized occupational groups are directly related to the *Arts, Entertainment, Recreation & Visitor Industries*. They are *Arts, Design, Entertainment, Sports, & Media* and *Food Preparation & Serving Related*, which is the lowest-paying occupational group.

The city has several well-paying occupational groups. Positions in the *Legal, Education, Training, & Library* and *Management* occupational groups have the highest average hourly wages in the city, exceeding the overall state average by 60 to 70 percent. Yet the overall city average hourly wage is \$20.61, while the state average is \$21.32.

Figure 3
Charlottesville City
Growth & Specialization
Major Occupational Groups



Size of bubble represents 2011 employment
 Source: Economic Modeling Specialist, Younger Associates

Table 2
Charlottesville City
Growth & Specialization
Major Occupational Groups
Ranked by Specialization

	2011 Jobs	Specialization LQ	Five- Year Change	Average Hourly Wage
Life, physical, & social science	1,097	2.31	64	\$27.80
Food preparation & serving related	5,001	1.64	(12)	\$10.35
Arts, design, entertainment, sports, & media	2,123	1.57	185	\$17.56
Education, training, & library	3,860	1.48	315	\$36.34
Healthcare practitioners & technical	3,118	1.48	74	\$27.52
Community & social services	865	1.28	127	\$17.55
Architecture & engineering	878	1.26	(18)	\$29.10
Computer & mathematical science	1,203	1.18	116	\$32.59
Legal	411	1.09	1	\$36.63
Business & financial operations	2,564	1.03	229	\$27.61
Construction & extraction	2,047	0.98	(390)	\$19.22
Office & administrative support	6,020	0.95	(457)	\$15.64
Sales & related	5,247	0.91	(446)	\$15.57
Personal care & service	1,606	0.90	116	\$11.85
Protective service	704	0.82	49	\$16.82
Building & grounds cleaning & maintenance	1,470	0.81	26	\$11.78
Installation, maintenance, & repair	1,178	0.74	(53)	\$19.59
Management	2,601	0.73	139	\$34.26
Healthcare support	791	0.67	(49)	\$13.66
Transportation & material moving	1,664	0.62	1	\$13.55
Military	299	0.56	(37)	\$30.41
Production	1,021	0.40	(138)	\$13.67
Benchmarks				
Charlottesville City				\$20.61
Virginia				\$21.32
Nation				\$19.94

Source: Economic Modeling Specialist, Younger Associates

Technology Assets

Technology Assets are organizations, companies and facilities in a region that create knowledge or employ knowledge workers in significant numbers, so that they are sources of employment growth in a region. Lists of candidate technology assets were identified by reviewing patents, Small Business Innovation Research (SBIR) grants, Small Business Technology Transfer (STTR) programs and large federal defense contract awards. Then, each asset was reviewed to classify it by location, industry sector and number of employees. The complete list of assets for the region is listed in chapter Appendix E and further discussed in the Technology Assets Inventory.

Charlottesville is known as the home of the University of Virginia, although technically, much of the campus is in Albemarle County. Combined, the city and county are home to a substantial portion of the technology assets in the Thomas Jefferson Partnership for Economic Development region. University of Virginia technology assets include research centers in the Medical School that support biosciences and School of Engineering and Applied Science centers that develop technologies for medical devices, information technology, aerospace and other national security applications, advanced materials including at nanoscale and a variety of energy technologies.

Charlottesville's technology assets include 11 relatively small bioscience and medical device companies, most related to research at the University of Virginia. An additional six companies in this industry were acquired or moved away in the past five years, perhaps partially explaining the local decline in employment in this industry group.

Interviews with knowledgeable industry observers point to the lack of venture capital in the region as a key challenge — companies in this sector require enormous investment to grow to a sustainable size and often require equity capital to reach this stage. For many small companies, the appropriate path to commercialization is to sell the company to a large pharmaceutical company or distributor that can manufacture and market the products. It can be difficult for a region, even one with as rich an intellectual position as the TJPED region, to maintain its start-up community in biotechnology. Possible solutions for addressing this challenge are discussed in the Optimal Target Markets section of this report.

Four technology asset companies in the city are in *Information Technology*, including Silverchair Information Systems, a large Internet publishing company. One of the *Information Technology* companies, Commonwealth Computer Research, was recently acquired, but stayed in place in Charlottesville.

General Dynamics, a *Defense & Security* company, is in the city as well. This location performs computer-related functions on classified information. In the TJPED region, *Information Technology* and *Defense & Security* have a great degree of overlap.

While the *Defense & Security* sector is somewhat vulnerable to changes in the federal budget, programs that support the intelligence community are less vulnerable. There does appear to be a trend toward federal agencies outsourcing critical data centers outside of Washington, DC. Federal agencies can generate other opportunities since the quality of workforce, quality of life, excellent broadband service and access to Washington, DC can help attract support companies to the TJPED region.

Other technology assets in the city are the Federal Executive Institute and three small electronics manufacturing companies.

A significant advantage that Charlottesville holds in attracting technology-related businesses is the establishment of a Technology Zone. The city created the first city-wide technology zone in the State of Virginia. A qualifying company that locates anywhere inside the ten square miles of the city can apply for a tax incentive that reduces business license taxes by 50 to 100 percent.

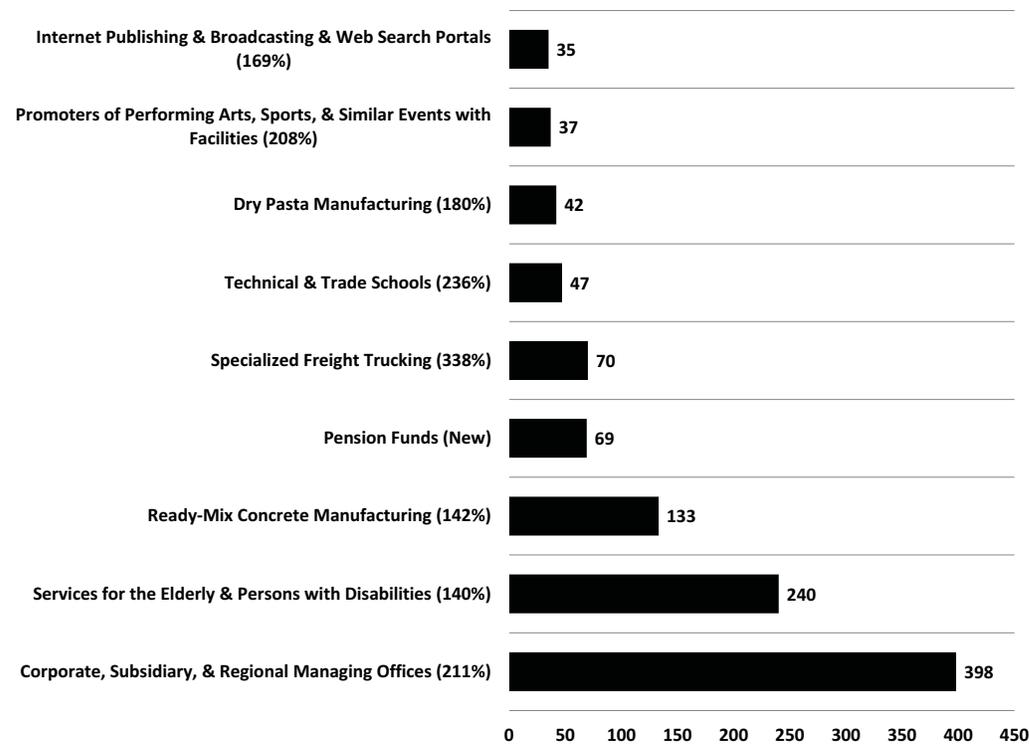
New or Emerging Industries

New or emerging industries are industry sectors that are new to the city within the last five years, or sectors that have recently experienced rapid employment growth. In some cases, the industry may be represented by a single new or expanding firm. New or emerging industries may provide an early indication of changing conditions or reveal new opportunities.

Eleven industries have experienced rapid growth since 2006, growing by at least 100 percent (Figure 4 and Table 3). Percentage growth rates can be deceptive when the base from which they are calculated is low. The largest absolute increase occurred in *Corporate, Subsidiary, & Regional Managing Offices* a part of the *Business & Financial Services* group, up 398 jobs or 211 percent. This was followed by *Services for the Elderly & Persons with Disabilities*, which is part of the *Health Services* sub-group.

One industry, *Pension Funds*, is new to the area.

Figure 4
Charlottesville City
New & Emerging Industries
2006-2011 Employment Change



Source: Economic Modeling Specialist, Younger Associates

Table3
Charlottesville City
New & Emerging Industries
2006-2011 Employment Change
Ranked by Change

	2006 Jobs	2006- 2011 Change	2011 Jobs	Average Earnings
Corporate, Subsidiary, & Regional Managing Offices (211%)	128	270	398	\$76,864
Services for the Elderly & Persons with Disabilities (140%)	100	140	240	\$15,924
Ready-Mix Concrete Manufacturing (142%)	55	78	133	\$44,006
Pension Funds (New)	0	69	69	\$118,400
Specialized Freight Trucking (338%)	16	54	70	\$43,864
Technical & Trade Schools (236%)	14	33	47	\$19,903
Dry Pasta Manufacturing (180%)	15	27	42	\$43,651
Promoters of Performing Arts, Sports, & Similar Events with Facilities (208%)	12	25	37	\$39,926
Internet Publishing & Broadcasting & Web Search Portals (169%)	13	22	35	\$61,585

Source: Economic Modeling Specialist, Younger Associates

Optimal Target Markets

Optimal targets should both provide solid business rationale for firms looking to relocate or expand in the city and provide Charlottesville City residents with a strong reason to support their presence.

Screening criteria for optimal targets include:

- High relative wages
- Support or strengthen existing industry groups/clusters
- Make use of the location's unique attributes
- Leverage local/national/global trends
- High relative jobs multiplier
- Utilize incumbent occupational skill-sets
- Match area's educational infrastructure and postsecondary completions
- Match the area's capacity and desire for growth and development
- Potential to employ underemployed and unemployed

Environmental suitability for the region was also a consideration in selecting target industry groups. None of the optimal targets would have a detrimental impact on the environment under typical circumstances for the industry group. Protection of natural resources, sustainability, and compatibility with the quality of life in the region were considerations. The size of the industry operating footprint, the impact on highway traffic, noise considerations, and esthetics were also taken into account for Albemarle County and the City of Charlottesville.

For each target area matching the screening criteria, the final selected targeted industries had to meet two additional conditions: positive projected employment growth over the next five years and industry-specific earnings greater than the overall local or state average.

Target Industry Group: Bioscience and Medical Devices

Charlottesville has shown strength as a location for *Bioscience and Medical Device* start-ups and commercialization opportunities emerging from research activities at the University of Virginia. With its highly regarded medical school and biomedical engineering department, the University is consistently producing new technologies in this area. As shown in Tables 4 and 5, these target industries have very high relative wages and offer the opportunity for substantial growth.

However, noting that in recent years many start-up bioscience companies moved out of the area to gain significant venture funding, or left after they were acquired, the city may wish to focus even more narrowly on the *Medical Devices* subsector. This subsector has a potential to create light manufacturing. These light manufacturing operations typically include relatively lower workforce skill requirements and tend to help anchor the companies where they are located. Facilities or suitable locations for these operations would be needed.

An alternative approach would be to build investor networks in the TJPED region, or to attract private equity firms to base key operations in the region. The feasibility of this strategy would have to be fully explored, but desirable quality of life, presence of high net worth organizations, proximity to major markets and broadband infrastructure could potentially support this strategy for keeping more *Bioscience* startups in the region as they grow.

While the Thomas Jefferson Partnership for Economic Development region is not currently recognized as one of the top regions in the country for biotechnology and bioscience, it is located between two extremely high performing regions, the Washington, DC/Maryland area and the Research Triangle, NC, area. It may be possible to lure partners, venture funds and other elements of a successful bioscience cluster to the TJPED from these adjacent regions.

The 2011 study, *A Declaration of Independence: A Family Self-Sufficiency Study in Charlottesville VA*, rightly noted two economic development strategies for connecting lower income residents to economic growth opportunities. Specifically these strategies are to focus on the regional economy and develop business and light manufacturing facilities in neighborhoods in need of revitalization. While the scope of this study is to analyze existing and target industries and not to recommend action strategies, it is noted that the two approaches briefly mentioned here for retaining the *Bioscience and Medical Devices* industry group are in keeping with those strategies.

The occupations required by these industries include a wide variety of life and physical scientists, as well as production positions. The life and physical scientists are well represented in the city, while production workers and science technicians may represent a training opportunity for those currently unemployed.

Other strategic rationales for supporting *Bioscience and Medical Devices* as a target include:

- High relative patent activity related to this industry group
- History of local SBIR/STTR grant activity related to this industry group
- Average annual earnings for the selected targets wages is \$111,910
- The selected targets are projected to grow an average of 12 percent over the next five years
- Potential Technology Zone tax incentives from the City of Charlottesville
- Annual University of Virginia completions (including doctorates) in specialized fields that support the industry such as:
 - Bioengineering or biomedical engineering (77)
 - Chemical engineering (55)
 - Other related engineering (51)
 - Biochemistry (7)
 - Chemistry (97)
 - Medicine, Neuroscience, Pharmacology (147)
 - Biological and sciences (222)
 - Biophysics, Cellular Biology, Medical Microbiology (27)
 - Pathology, Experimental Pathology (2)

Target Outlook

The select optimal *Bioscience and Medical Device* targets are expected to experience significant growth due to four major factors: 1) expanding market because of an aging population lead by the baby boomers, 2) potential gain of millions of new customers through Federally mandated healthcare coverage, 3) innovation and new product developments (for example, implantable devices, wireless medical technology, real-time medical data and reporting devices) and 4) continued quest for speedy, cost-effective and non-invasive medical diagnoses and treatments.

Table 4
Charlottesville City
Optimal Bioscience and Medical Device Targets

Industry Title	NAICS	National Average Earnings	Projected Five-Year Job Growth
Medical Equipment Manufacturing	3391	\$79,907	3%
In-Vitro Diagnostic Substance Manufacturing	325413	\$108,124	21%
Biological Product Manufacturing	325414	\$115,090	13%
Surgical and Medical Instrument Manufacturing	339112	\$100,844	7%
Research and Development in Biotechnology	541711	\$123,580	8%

Source: Economic Modeling Specialist, Younger Associates

Table 5
Charlottesville City
Optimal Bioscience and Medical Device Target Descriptions

NAICS Code	Title	Description
3391	Medical Equipment Manufacturing	This industry comprises establishments primarily engaged in manufacturing medical equipment and supplies. Examples of products made by these establishments are surgical and medical instruments, surgical appliances and supplies, dental equipment and supplies, orthodontic goods, ophthalmic goods, dentures, and orthodontic appliances.
325413	In-Vitro Diagnostic Substance Manufacturing	This U.S. industry comprises establishments primarily engaged in manufacturing in-vitro (i.e., not taken internally) diagnostic substances, such as chemical, biological, or radioactive substances. The substances are used for diagnostic tests that are performed in test tubes, petri dishes, machines, and other diagnostic test-type devices.
325414	Biological Product Manufacturing	This U.S. industry comprises establishments primarily engaged in manufacturing vaccines, toxoids, blood fractions, and culture media of plant or animal origin.
339112	Surgical and Medical Instrument Manufacturing	This U.S. industry comprises establishments primarily engaged in manufacturing medical, surgical, ophthalmic, and veterinary instruments and apparatus (except electrotherapeutic, electromedical and irradiation apparatus). Examples of products made by these establishments are syringes, hypodermic needles, anesthesia apparatus, blood transfusion equipment, catheters, surgical clamps, and medical thermometers.
541711	Research and Development in Biotechnology	This industry group comprises establishments engaged in conducting original investigation undertaken on a systematic basis to gain new knowledge (research) and/or the application of research findings or other scientific knowledge for the creation of new or significantly improved products or processes (experimental development). The industries within this industry group are defined on the basis of the domain of research; that is, on the scientific expertise of the establishment.

Source: U.S. Census Bureau

Target Industry Group: Information Technology and Defense & Security

Information Technology is a second target area for the region, with a focus on Internet publishing and bioinformatics. This approach would build upon the strong publishing companies already in the area, especially those like Silverchair and Medical Automation Systems that provide an intersection of Internet Publishing and the development and distributions of scholarly information, including bioscience information (See Tables 6 and 7).

Charlottesville has a high degree of specialization in traditional *Printing & Publishing* with a location quotient of 6.71. *Internet Publishing*, with an LQ of 1.09, is barely specialized in the Charlottesville economy. Pursuing and supporting *Internet Publishing* and related computer and digital electronic support activities can help transition Charlottesville's longstanding industry group of *Printing & Publishing* into a modernized growth sector. An example of this can already be found with Explore Learning, a company in Charlottesville that creates online educational learning tools.

Several industries in the *Defense & Security* group, which are also found in the *Information Technology & Telecommunications* group in Charlottesville, provide additional promising target opportunities. Building upon the University research centers and long-time large employers, the region can work to both expand and recruit in select sectors of this industry group.

While the direction of defense spending is always a question, the intelligence community seems more immune to wide swings in federal spending. In addition, there is a trend toward moving these assets out of the Washington, DC region, yet they cannot be sent overseas. In fact, the TJPED region's strategic location near, but just far enough away from, Washington, DC has proven to be very advantageous in recent location decisions.

General Dynamics, which is a defense and security contractor, has a back office operation in Charlottesville. This is a good example of how the niche where defense and security and information technology overlap is a viable target group for the Charlottesville.

Other business rationales for targeting these sectors include:

- High degree of local specialization in technical and scientific publishing
- High relative wages for the select industry group
- Builds on existing technology assets in the region including the federal agency locations, large employers and defense contractors
- Utilizes robust broadband fiber optic infrastructure and presence; major telecommunications providers will support industry requirements
- Overlaps with other existing business clusters in the county
- Regional patent activity related to this industry group
- Regional SBIR activity related to this industry group
- Potential Technology Zone tax incentive from the City of Charlottesville
- Reflected in regional growth in computer facilities management services
- Leverages regional specialization in computer and mathematical occupations
- Offers opportunity to existing workforce, which has interest in computer technologies training
- The presence of small technology companies such as Open Q (software for the life sciences) and Blue Ridge Interworks (fiber isp provider) are indicative of the attractiveness of the City's quality of life for entrepreneurs in this field

Target Outlook

The select optimal *Information Technology & Telecommunications* and *Defense & Security* targets are expected to continue a trend of strong growth due to several transformational developments: 1) record-high enrollment rates in higher education will likely lead to higher spending on textbooks and trade books, plus in the longer term better-educated people read more, 2) development of internet based “cloud” products will help drive internet publishing, 3) the convenience of e-books will become relatively greater and draw an even larger audience, 4) the complexity and specialization demanded from IT contractors serving the Defense industry will continue unabatedly and 5) developments that are spurring open access of information are also driving concerns and new technologies for added security.

Table 6
Charlottesville City
Optimal Information Technology & Telecommunications; Defense & Security Targets

Industry Title	NAICS	National Average Earnings	Projected Five-Year Job Growth
Newspaper, Periodical, Book and Directory Publishing	5111	\$84,708	N/A*
Internet Publishing	51913	\$54,919	16%
Custom Computer Programming Services	541511	\$97,515	14%
Computer Systems Design Services	541512	\$95,909	17%

*Projections are mixed, with Books up 5%, Periodicals flat, Directories down 12% and Newspapers down 13% while the intent of this target is to transition traditional publishing to Internet Publishing which is up.
 Source: Economic Modeling Specialist, Younger Associates

Table 7
Charlottesville City Optimal IT and Defense & Security Target Descriptions

NAICS Code	Title	Description
5111	Newspaper, Periodical, Book and Directory Publishing	<p>This industry group comprises establishments primarily engaged in publishing newspapers, magazines, other periodicals, books, directories and other works. These works are characterized by the intellectual creativity required in their development and are usually protected by copyright. Publishers distribute or arrange for the distribution of these works.</p> <p>Publishing establishments may create the works in-house, contract for, purchase, or compile works that were originally created by others. These works may be published in one or more formats, such as print and/or electronic form, including proprietary electronic networks. Establishments in this industry may print, reproduce, or offer direct access to the works themselves or may arrange with others to carry out such functions.</p>
51913	Internet Publishing	<p>This industry comprises establishments primarily engaged in 1) publishing and/or broadcasting content on the Internet exclusively or 2) operating Web sites that use a search engine to generate and maintain extensive databases of Internet addresses and content in an easily searchable format (and known as Web search portals). The publishing and broadcasting establishments in this industry do not provide traditional (non-Internet) versions of the content that they publish or broadcast. They provide textual, audio, and/or video content of general or specific interest on the Internet exclusively.</p>
541511	Custom Computer Programming Services	<p>This U.S. industry comprises establishments primarily engaged in writing, modifying, testing, and supporting software to meet the needs of a particular customer.</p>
541512	Computer Systems Design Services	<p>This U.S. industry comprises establishments primarily engaged in planning and designing computer systems that integrate computer hardware, software, and communication technologies. The hardware and software components of the system may be provided by this establishment or company as part of integrated services or may be provided by third parties or vendors. These establishments often install the system and train and support users of the system.</p>

Source: U.S. Census Bureau

Target Industry Group: Business & Financial Services

Charlottesville has experienced growth and demonstrated long-term competitive advantages that allowed the *Business & Financial Services* group to become the largest in the city. The industry group produces a very high jobs multiplier effect on the local economy. Local employers pay excellent wages in the *Business & Financial Services* group.

A select number of optimal targets offer opportunities for both expansion and attraction efforts (See Tables 8 and 9).

Important rationales for targeting this industry group include:

- Broad existing local base of 439 firms
- Targeting select optimal targets strengthens the business cluster, which already exhibits high level of connectedness with a high jobs multiplier
- Average annual wages nationally of \$71,426 among the targets, which is 43 percent above the current city overall average
- Broadband infrastructure will support the technology needs of this industry group
- Synergistic overlap with *Information Technology* group assets and targets – an example of this can be seen in local companies such as Helicopter which is a specialized search engine for the hotel industry
- Average five-year projected job growth of 16 percent among selected targets
- University of Virginia graduates with degrees (including doctorates) in specialized fields that support this target:
 - Accounting (107)
 - Business Administration and Management (390)
 - Business and Commerce (363)
 - Management Information Systems (78)
 - Computer and Information Sciences, General (58)
 - Mathematics (68)
 - Economics (263)

Target Outlook

The select optimal *Business & Financial Services* targets are expected to experience strong future growth due to four transformational developments: 1) rapid increases in the use of electronic payments, 2) new and emerging methods of retail electronic payment, including mobile technologies, 3) return to the US of some foreign outsourced services due to diminished efficiencies and customer dissatisfaction and 4) increased demand for businesses to manage healthcare and pension plans into compliance with new legislation. Together these forces can generate a generous number of opportunities for new start-ups, expansions and relocations.

Table 8
Charlottesville City
Select Optimal Business & Financial Services Targets

Industry Title	NAICS	National Average Earnings	Projected Five-Year Job Growth
Financial Transactions Processing, Reserve, and Clearinghouse Activities	522320	\$74,608	26%
Data Processing, Hosting, and Related Services	518210	\$80,651	13%
Third Party Administration of Insurance and Pension Funds	524292	\$59,018	10%

Source: Economic Modeling Specialist, Younger Associates

Table 9
Charlottesville City
Optimal Business & Financial Services Target Descriptions

NAICS Code	Title	Description
522320	Financial Transactions Processing, Reserve, and Clearinghouse Activities	This industry comprises establishments primarily engaged in providing one or more of the following: (1) financial transaction processing (except central bank); (2) reserve and liquidity services (except central bank); and/or (3) check or other financial instrument clearinghouse services (except central bank).
518210	Data Processing, Hosting, and Related Services	This industry comprises establishments primarily engaged in providing infrastructure for hosting or data processing services. These establishments may provide specialized hosting activities, such as web hosting, streaming services or application hosting; provide application service provisioning; or may provide general time-share mainframe facilities to clients. Data processing establishments provide complete processing and specialized reports from data supplied by clients or provide automated data processing and data entry services.
524292	Third Party Administration of Insurance and Pension Funds	This U.S. industry comprises establishments primarily engaged in providing third party administration services of insurance and pension funds, such as claims processing and other administrative services to insurance carriers, employee-benefit plans, and self-insurance funds.

Source: U.S. Census Bureau

Complementary Targets: Health Services and Arts, Design, Sports & Media

The complementary targets that have been identified are a set of industries that boost attraction to the area, add to quality of life factors for residents and potential newcomers and help support a vibrant, sustainable, urban community. These targets are prime opportunities for organic economic growth where growth comes from within the community through expansions and start-ups as opposed to recruitment of large entities to relocate into the city.

The *Health Services* targets emphasize the support of an aging population and relocating retirees, whereas the *Arts, Design, Sports & Media* targets can appeal particularly to young people looking for a diverse and active community.

Because of the types of services offered, the complementary targets provide employment opportunities for a lower skilled workforce, a group often overlooked in some of the higher wage targeted groups. This is especially true in the *Health Services* target industry group. The select target sectors are listed in Table 10 and described in Table 11.

Rationales for the *Health Services* target sectors include:

- A logical off-shoot of the *Biomedical and Medical Devices* industry
- Complementary to the University health care system
- An opportunity for the Not Employed group in the City who express an interest in medical related training, but do not possess highly technical skill sets
- Provides job opportunities for the lower income, lower skills segment of the workforce
- Support for aging population
- Support for relocating retirees

Rationales for the *Arts, Design and Sports & Media* include:

- Complementary to the attractive quality of life in the region
- Complementary to University student population
- Complementary to and supportive of the *Visitor Industry* group
- The presence of a large proportion of the “creative class” (young, educated, mobile, interested in arts, sports and media) within the local population supports the development of this industry group
- Charlottesville is a central core for attraction of artists to the region
- The College and University environment is attractive to talented workers needed for this industry group
- Some specialized sectors related to the group already exist in Charlottesville
- Large number of annual visitors to the region can provide some of the revenue and support base for firms in this group
- Development of this industry group can leverage the value of the visitors by extending stays and increasing local expenditures
- Can be a complementary element and continuing contributor to the regional quality of life

Two examples of companies in the industry group that are already in Charlottesville are Willow Tree Apps and Artquiver. The former creates apps for the ipad and iphone. The latter operates an online art auction.

Table 10
Charlottesville City
Optimal Complementary Targets

Industry Title	NAICS	National Average Earnings	Projected Five-Year Job Growth
Health Services			
Nursing Care Facilities	623110	\$35,793	11%
Residential Care Facilities	623990	\$34,041	10%
Continuing Care Retirement Communities	623311	\$31,127	17%
Arts, Sports, Media			
Graphic Design Services	541430	\$46,154	25%
Spectator Sports	711219	\$15,644	16%
Independent Artists, Writers, and Performers	711510	\$21,291	9%
Fitness and Recreational Sports Centers	713940	\$15,189	15%
Promoters of Performing Arts, Sports, and Similar Events	7113	\$35,695	11%

Source: Economic Modeling Specialist, Younger Associates

Table 11
Charlottesville City
Optimal Health Services Target Descriptions

NAICS Code	Title	Description
623110	Nursing Care Facilities	This industry comprises establishments primarily engaged in providing inpatient nursing and rehabilitative services. The care is generally provided for an extended period of time to individuals requiring nursing care. These establishments have a permanent core staff of registered or licensed practical nurses who, along with other staff, provide nursing and continuous personal care services.
623990	Residential Care Facilities	This industry comprises establishments primarily engaged in providing residential care. These establishments also provide supervision and personal care services.
623311	Continuing Care Retirement Communities	This U.S. industry comprises establishments primarily engaged in providing a range of residential and personal care services with on-site nursing care facilities for (1) the elderly and other persons who are unable to fully care for themselves and/or (2) the elderly and other persons who do not desire to live independently. Individuals live in a variety of residential settings with meals, housekeeping, social, leisure, and other services available to assist residents in daily living. Assisted-living facilities with on-site nursing care facilities are included in this industry.

Source: U.S. Census Bureau

Table 12
Charlottesville City
Optimal Arts, Design, Sports & Media Target Descriptions

NAICS Code	Title	Description
541430	Graphic Design Services	This industry comprises establishments primarily engaged in planning, designing, and managing the production of visual communication in order to convey specific messages or concepts, clarify complex information, or project visual identities. These services can include the design of printed materials, packaging, advertising, signage systems, and corporate identification (logos). This industry also includes commercial artists engaged exclusively in generating drawings and illustrations requiring technical accuracy or interpretative skills.
711219	Spectator Sports	This U.S. industry comprises (1) independent athletes, such as professional or semiprofessional golfers, boxers, and race car drivers, primarily engaged in participating in live sporting or racing events before a paying audience; (2) owners of racing participants, such as cars, dogs, and horses, primarily engaged in entering them in racing events or other spectator events; and (3) establishments, such as sports trainers, primarily engaged in providing specialized services required to support participants in sports events or competitions.
711510	Independent Artists, Writers, and Performers	This industry comprises independent (i.e., freelance) individuals primarily engaged in performing in artistic productions, in creating artistic and cultural works or productions, or in providing technical expertise necessary for these productions.
713940	Fitness and Recreational Sports Centers	This industry comprises establishments primarily engaged in operating fitness and recreational sports facilities featuring exercise and other active physical fitness conditioning or recreational sports activities, such as swimming, skating, or racquet sports.

Source: U.S. Census Bureau