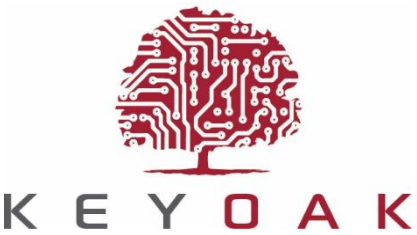


An Assessment of Domestic Sourcing in Madison County: Marshall, NC

April 2016

Contents

Executive Summary

The region including and surrounding Asheville, North Carolina, has at least seventeen years of history in appealing to technology entrepreneurs and technology-based businesses. With inspiring landscapes, a creative and artistic population, and thousands of new residents moving to the region annually, the region's technology economy appears poised for rapid growth.

This study, which involved 8 months of dedicated primary and secondary research, aimed to determine whether Madison County, and in particular, Marshall, North Carolina, stand to benefit from growth in the region's technology sector. It determines the viability of the region as a technology entrepreneurship destination, and as a potential destination for technology businesses looking to expand.

The researchers make this assessment by assessing Madison County on four key factors that are widely used in technology sourcing site selection processes. They also compare the region to 23 other U.S. destinations that have successfully attracted and grown technology businesses. They paint a comprehensive picture of the county's potential for technology business development by assessing the strengths and the relative gaps in the county's workforce, economy, and educational infrastructure. They also posit recommendations to the county on how to accelerate technology sector growth.

Readers of this report will obtain an objective view of how attractive Madison County is to technology businesses, how the county can accelerate efforts to grow the technology sector of its economy, and critical gaps and issues it will have to face in order to promote technology business growth.

It is clear that Madison County has significant attributes that compare very favorably to other rural U.S. technology destinations, but also has to focus economic development and investment efforts on a few important factors in order to maximize its potential. These assets and critical factors are outlined and discussed in depth in this report, and should be used to develop an actionable economic development plan that emphasizes information technology to bring Madison County's economy forward.

Report Highlights

- From a technology business perspective, the region's key asset is its ability to attract those from outside the region for its cultural and natural amenities.
- The broader region has at least a 17-year history of specifically trying to court technology-focused venture capital and fostering technology entrepreneurship.
- Within 3 hours of Marshall, 1,448 students graduate with computer science, software, or business-IT degrees annually. This represents $104,785,519 in total economic potential.
- Marshall could most optimistically project retaining $11,768,861 of this talent annually. Any single business based on the region's talent would likely make between $1.17 and $2.92m in annual revenue, and would max out at the $5-10m range before having to import talent to the region.
- 38% of area business and educational leaders and members of the software development community surveyed believe that the top software development talent in the region is coming from UNC-Asheville. 10% believe that AB-Tech is producing this talent. 48% believe that the area's talent is being produced outside of the region.
- 30% of computer science majors in three of the area's schools intend on staying in the region to start their careers while 20% intend to leave. 50% are not yet sure. 35% would be willing to accept lower wages to stay while 65% would need more than they could make in other markets to stay in the region. 41% of these students were from outside the Asheville area.
- The region's cost of living is no lower than the U.S. average, but is 2.4% lower than Asheville, and housing is 9.8% lower in Mars Hill than in Asheville on average. This relatively higher cost-of-living is a challenge to cost-based sourcing businesses, who have located in regions 6-20% lower than U.S. averages. Therefore, the region will likely have to compete on technology entrepreneurship and not cost.
- The cost-of-living, combined with rising housing costs in adjacent counties, and a residential housing supply challenge in the county are a major vulnerability in large-scale technology business recruitment efforts.
- The region ranks 17th out of 23 successful U.S. rural technology sourcing locations in university students within 50 miles, which is in the 30th percentile. Businesses that have located in areas smaller than the region have as many as 400 employees, or as few as 30.
- Madison County schools are perceived poorly both inside and outside the region, perhaps due to the lowest graduation rate among 7 regional counties in 2009 and 2010. However,

data shows that the system's performance has strongly improved to state average over the 2011-2015 period. In fact, Madison County high school students performed among the highest in the state in High School Biology in 2015.

- Diverse dining experiences (restaurants) are most important to retaining area computer science students, followed by live music and nature/recreational activities.

Introduction

Industry Background

Over the past two decades, advantages in technology and business processes, when combined with intense pressure to control costs, have driven many U.S. businesses to radically increase the outsourcing of functions that can be done less expensively elsewhere. These include business process functions such as human resources, data processing, call centers, and even higher end technology-related work such as application development, application maintenance and technical support.

As telecommunication costs dropped and the Internet expanded in the late 1990's, certain low-cost locations overseas became viable locations for outsourcing operations. However, within the past eight to ten years (fueled by 2007-2008 recession), these offshore locations have become saturated. As these countries advance, the cost competitiveness of overseas outsourced locations is not as compelling as it once was. Indeed, when all factors are taken into account, U.S. domestic sourcing (siting an outsourced business in the United States) has become more competitive, particularly within lower cost locations in mid-size metropolitan areas and rural communities. This is driven by a number of factors such as the desire to be closer to a customer base, government work that requires domestic sites, quality issues, time zones, and even improved cost structures, including tax incentives.

The software development industry in particular, is struggling to find qualified software developers and personnel to meet fast-growing market demands. This trend has existed for the past decade, and has accelerated since 2009. In response to this demand, several American software development firms have turned towards rural areas, partnering with regional universities and community colleges to cultivate software developers. This phenomenon in the software industry is known as the "domestic sourcing" movement, and has transformed rural economies in Georgia, Nebraska, South Dakota, Missouri, and Arkansas (Behrendt and Burkhart, 2015; Lacity, 2010). Yet, despite having substantial advantages over those areas, Western North Carolina has not been a part of the domestic sourcing movement.

The site selection process for a domestic outsourcing center takes many factors into account. However, resources are not infinite for site selection decision makers, who often must rely on consultants, selection magazines, known clusters, or even their own perceptions of ideal locations.

Given the large number of possible locations, a site selection decision maker's job is to narrow a list down to a few viable locations.

In order to better quantify this process, we surveyed site selection decision makers in the global services industry to quantify those factors that are most often used during the site selection process. From their experience the most critical factors are the cost of doing business (including labor, real estate, infrastructure, taxes, etc.) and availability of workforce (skills, pipeline, etc.). Additional factors include the business and political environment of the region, and the quality of life.

Current State of the Region: Madison County, NC

As of 2015, the state of North Carolina's prevailing political administration has adopted a discernibly pro-business stance, and has even aimed to make technology the lynchpin of its economic development strategy (News and Observer, 2015). Yet the four-county region (Buncombe, Madison, Haywood, Yancey) has not yet seen a technology firm of any significant scale come to the area. Madison County, despite its proximity to one of the creative meccas of the east coast, Asheville, and its favorable wage statistics, has only 13 people employed in NAICS code 51, information, as of 2015 (BLS).

The Asheville region of North Carolina is home to three universities with software development curricula and small colleges. In 2010, students from the region's two-year technology college, Asheville-Buncombe Technical College, finished second to students from Stanford University and just edged out MIT in a software application development competition (ComputerWeekly, 2010). The region also boasts a burgeoning "creative class" with a vibrant, unique culture and art scene, which is very well aligned to the culture of information technology firms (Strom, 2015; Licorish, 2014; Kassicieh, 2010). This is particularly true of Madison and Yancey Counties as both boast employment in the NAICS71 Arts, Entertainment and Recreation sector that is 223% and 181% higher than the national average (BLS, 2015).

The USDA's Economic Research Service scores counties by the attractiveness of their geographies, and has suggested that natural amenities have an influence on retaining and recruiting people to a region. This "Natural Amenities Scale" scores the 4-county Buncombe/Madison/Haywood/Yancey region all as 0-1 on a scale from 3 to -3, which is among the highest in the Southeast (USDA, 1999, 2005).

Asheville, located in Buncombe County, ranks highly in at least six of Dr. Suleiman Kassicieh's 11 factors for technology-based economic development climate, and has momentum in several others (2011; Strom, 2015; Frankel, 2014; Neal, 2013; AdvantageWest, 2010). The four-county region surrounding Asheville has an above average proportion of the population with a bachelor's degree or higher (relative to the US average of 28.5%), owed largely to the presence of the three universities in the region with computer science or software specific curriculum (ARC, 2014, 2015). The area is a top tourism destination (Strom, 2015), has been named to numerous national "top 10" or "best of lists" since 2014, and since 1980, has boasted the third largest film/movie economy in the nation

(Strom 2015, Laurie, 2008). It is cited as one of the most creative communities in the nation (Kassicieh, 2011; Florida 2009; Strom, 2015).

Objective of Report

This report builds on the foundation of these metrics to conduct a preliminary feasibility study for Madison County as a potential domestic sourcing location, with a particular focus on the town of Marshall. The goal of this report is twofold.

First, the report aims to provide decision-makers in Madison County with an understanding of how domestic sourcing could fit into its local economy, what their community has to offer to outsourcing companies, and how their community compares with domestic sourcing locations. The report itself identifies those types of sourcing businesses that are most likely to be viable options in Madison County and outlines those factors that are potentially attractive to businesses and those that are not. It also provides recommendations for how Madison County could improve its attractiveness to the business community.

The second goal of the report is to provide outsourcing companies and enterprise site selection managers with an independent preliminary assessment of Madison County as a potential selection site for service delivery centers. The data contained within this report will be valuable to site selection decision makers, as considerable time and resources must be spent when evaluating potential sites. Ultimately, it allows for the inclusion of a site that might have been too expensive for the initial selection process.

KeyOak Advisors in partnership with Ahilia collected data to provide an accurate understanding of Madison County. The research approach consisted of six main components:

1. A survey of computer science, software development and business-IT students. This survey assessed graduates' perceptions of the region and their intent to stay or leave the region to start their careers.
2. A qualitative survey of regional business and educational leaders and members of the region's software development community. This survey assessed perceptions of the region's educational infrastructure, quality, migration patterns of software developers, and limits, risks, and opinions about the viability of the region for a software business.
3. A regional economic, demographic, and educational comparison of Madison County and the broader region to other known successful software sourcing communities in the United States.
4. A critical analysis of the Madison County economy, with a focus on Marshall, NC.
5. An onsite evaluation that included personal interviews with a cross section of individuals from local economic development organizations, chambers of commerce, government statistical agencies, educational institutions, and businesses (including two call centers already located in this region).

6. Follow-up discussions and interviews with stakeholders including the North Carolina Department of Commerce, the USDA, Appalachian Regional Commission, local business owners, and business leaders in Raleigh-Durham, NC, southwest Virginia, and eastern Kentucky.

From this comprehensive quantitative and qualitative data, the researchers made a determination of the viability of the region as a destination for technology businesses. They also posit recommendations aimed at enhancing the region's competitiveness and growing its tech sector.

The Low Cost Domestic (LCD) Sourcing Model

The low cost domestic (LCD) sourcing model was developed to be used by U.S. state governments, government agencies, and private companies that are interested in evaluating and developing LCD sites. In order to evaluate the potential of setting up an LCD location, we have developed a framework to guide organizations through location selection.

Figure 1: LCD Selection Framework

Of the above criteria, cost of doing business and workforce rank as the most important criteria, followed by business and political environment and quality of life. When future revenue potential is a criterion for a company selecting a location, it usually ranks very high. For example, one company we interviewed only considered states where they had a good chance of securing government deals. Another company was lured by a large government contract to set up an LCD sourcing site in their state.

The model has been used successfully since 2007. Over time, the model has evolved to reflect the increased importance of the following criteria:

- Availability of real estate
- Ongoing assistance from local economic development and government agencies
- Technology and vendor ecosystem

Cost of Doing Business

Lower cost of doing business is the most important criteria when selecting a locale. In fact, it must exist for companies to even consider a location. In terms of cost of doing business, labor costs followed by real estate and other infrastructure costs are the most important sub-criteria on the list. However, economic incentives can impact labor and infrastructure costs significantly and were listed by virtually all companies as a primary reason why one locale was chosen over another.

Workforce

The second most important criteria are the characteristics of the workforce. Prior to embarking on a location search, most companies know the major skill sets they are going to require. Therefore, there needs to be a base of resources in the location that have the specific skill sets the company is seeking. Within the workforce criteria, existing high schools, junior colleges, colleges and training programs in near proximity to the LCD location are important because they guarantee a future stream of qualified workers. Therefore, the existence of these institutions and programs, coupled with their willingness to work closely with employers to tailor curricula to the changing needs of employers, also rated very high with companies. In addition, companies also place importance on good soft skills because these skills reflect good work ethic and loyalty.

Business & Political Environment

Following cost of doing business and workforce, business and political environment ranks third in importance. The most important sub-criteria in this section is the existence of a unified coalition of government, business, and educators working together to attract and retain business. This is commonly referred to as “community capital”. Although it is sometimes challenging to quantify, community capital was listed as highly important when choosing between two locations. Do good relationships exist between government and educators? Does the government make it easy to secure permits, etc.? Are agencies responsive to employer needs as they arise? Do the agencies provide ongoing support to businesses once operations have started? All of these can be crucial factors in site selection due-diligence.

Quality of Life

Although quality of life is a factor for selection, it falls last because most companies do not plan on attracting labor from outside the area. It is presumed that the existing population will stay in the area as long as good jobs exist. However, quality of life is a factor to attract college students to stay in the area post-graduation, so companies do take this into consideration. The quality of services such as hospitals and K-12 schools also must be assessed in quality of life, as do economic perceptions of the area, natural and cultural resources, family connections to the region, and the area's shopping amenities.

Future Revenue Potential

Existing business within a state, and potential for new business in the state, were criteria listed by some companies as a starting point for developing a list of states that may be suitable candidates for LCD sourcing locations. Proximity to existing clients for logistical reasons or offering existing clients a low cost alternative for services such as a disaster recovery center was cited as a reason for considering a location. In addition, state governments that incorporate government contracts as part of the economic incentive package have a very good shot of attracting companies to their state, especially if the locale requires heavy investment on the part of the employer.

Madison County – Assessment Based on LCD Model Comparative Aspect of the LCD Sourcing Model

Madison County LCD Assessment	Madison County, NC	Comment
Cost of Doing Business (40%)		
Labor Rates		IT rates better than many of locations onshore providers are in, BPO rates slightly higher.
Real Estate Costs		Cost on par with rural areas (Tier 3 locations); availability low. Cost highly sensitive to demand.
Infrastructure Costs		Bandwidth costs slightly higher than average.as, water, sewer, are higher than U.S. average.
State and Local Taxes		Total sales tax low at 6.75%, property tax also low at 5.2%, corporate income tax lowered to 5% starting from 1/1/2015.
Economic Incentives		Limited local incentives; State has several programs, but these lag behind other regions that have emphasized technology-based development. The area is potentially eligible for special Federal grant programs via USDA, ARC, US Department of Labor and US EDA.
Airport Access		Close proximity to domestic and international airports.
State Debt		Low per capita state debt at $853, AAA rated by Moody's.
Workforce (35%)		
Nearby Colleges & Universities		Within 3 hours, computer science and IT workforce availability is good, however the region lacks a technology-focused research institution. It is less likely to produce fast-growing technology innovation.
Stability of Future Workforce		The region will continue to see competition from Atlanta, Raleigh-Durham, Greenville S.C, and the West Coast for its top (and perhaps even moderately skilled tech talent).
Skill Sets of Knowledge Workforce		Without a major research university, the region isn't fostering high-aptitude workers focused on cutting-edge technical research and development.
Net Migration Potential		The region will continue to grow, and Madison County will benefit from this growth at the entry-levels. However, job availability and housing costs will limit this growth, and the lack of major tech employers will leave it vulnerable to high-performing or mid-level employees leaving the region.
Population/Scale		Educational population in the bottom 30% of 23 geographies benchmarked against. MSA is moderately sized.
Current Resource Availability		When the assessment range moves out to within three hours, the current resource availability ranks higher.
Labor Supply Competition		The region competes against Atlanta, Raleigh-Durham, Charlotte, Greenville, S.C., and increasingly, Greensboro for talent. The region tends to draw senior and near-retirement professionals who can work remotely, while it loses freshly graduated talent to the above metro areas.

Business & Political Environment (15%)		
Business/Political/College Consortium		No formal consortium but good evidence of institutions working together The absence of AdvantageWest hampers efforts to some extent, but the Land-of-Sky and ARC affiliations aid regional collaboration.
Political Support		Evidence of positive attitude towards technology and business services among local government. Elected officials appear to be receptive, but have not yet reached the advocacy stage and need further education.
State regulations limiting use of foreign labor		The state requires in-state contracting, and discourages or prohibits the use of foreign workers for certain classes of contracts.
Technology & Vendor Ecosystems		Very few technology or larger scale business services companies in region. The region has attempted to attract technology-oriented venture capital aggressively for at least 17 years. Despite these efforts, the technology economy in the region is still in a nascent phase.
Quality of Life (10%)		
Cost of Living		Cost of living is on par with the U.S. average. Savings on housing in the region are outweighed by higher healthcare, utility, grocery and commuting costs.
Housing		While Madison County housing is 9.8% less expensive than Asheville, the area's lack of residential capacity leaves it vulnerable to rapid housing price increases.
Commute		53.6% of residents commute out of county. The average commute is 28.6 minutes. This compares to a U.S. Average of 25.5 minutes.
Crime Rates (% of total crime in area)		Both property and violent crime rates are at least 10% lower than the U.S. index averages of 41.4 and 43.5. Most residents report that their communities are places where they don't have to keep the doors locked.
Hospitals		Healthcare coverage is high in the region. Asheville-area hospitals are a regional draw and are highly regarded.
K-12 Schools		Madison County public schools are in-line with state averages with areas of superior performance state-wide. They suffer from a perception issue, likely brought about by low graduation rates in 2009 and 2010 which lagged peer counties in the region.
Climate & Geography (degrees)		Asheville's climate is temperate, with some extremes in winter. Residents can expect only 1-2 days of commuting challenges based on winter or extreme summer weather.
Arts & Recreation		The area's arts, entertainment and outdoor recreation make it a national draw.

 Good  Good/Middle  Middle  Middle/Not Competitive  Not Competitive

Comparative Aspect of the LCD Sourcing Model

A critical part of the LCD sourcing model is to properly understand the comparative nature of the factors that are measured. Companies, when going through a site selection process, collect the metrics outlined in this report and compare them against other regions to best determine whether the measurement is attractive or not.

For the purpose of this initial report, we compared Madison County to regions that have already established themselves as viable locations for domestic sourcing.

Cost of Doing Business

Overall, the cost of doing business in Madison County is very similar to rural communities across the United States which gives significant cost savings for companies who want to establish delivery centers in the United States. Labor rates for software and IT are on average $32-$35 an hour. Rates for administration positions and contact centers are slightly higher than one would see in rural communities which we attribute to higher level of education in Madison County than most rural areas across the United States.

Cost of commercial space remains low, comparable to rural areas across the United States despite the lack of availability of Class A and B office space. We would anticipate that should companies (besides retail) start to move into the county, price of commercial real estate could go up rather quickly because of the lack of supply and lack of developers in the area that are ready to build.

Sales tax in Madison County remains low at 6.75%, Property taxes are also low at just over half a percent. The only negative from a tax perspective for the county is a 4% state corporate income tax rate, however, phased state tax cuts will reduce this burden to 3% by 2017.

Costs for Internet and T1 connectivity in Madison County are comparable to the other locations. The county also has a fiber optic network that is reasonably priced. This network, which runs along the I-26 corridor through Mars Hill and includes Marshall, is currently limited in terms of coverage but is progressively being built out. Electricity costs in Madison County are higher than the other assessed locations (average rates at these locations range between 8 cents and 11 cents). Overall utilities costs in Madison County are 7% higher than the U.S. average for all communities.

Madison County has better airport accessibility than most rural communities across the United States because of its proximity to Asheville. AVL is just 9 miles from the border of Madison County which has multiple major domestic carriers servicing the region. The nearest international airport GSP (Greenville, SC) is just over an hour drive from Madison County.

Workforce

Boasting three universities with computer science programs, a vibrant art and culinary scene, and attractive natural and cultural amenities, the Asheville region area seems like a natural fit for technology entrepreneurship. Even though an existing pipeline of software engineering talent already exists, and the region is highly attractive from multiple perspectives, software development businesses have not yet taken hold.

Solidifying this point, the region has held several recent events to bolster its technology profile amongst venture capitalists and Silicon Valley firms attempting to catalyze the entrepreneurial climate (MountainXpress, 2014;2015). Most recently, an active Silicon Valley venture capitalist, Henry Doss (who lives in the region) hosted the AVL Innovation reception on March 23, 2016.

The region has clearly made concerted appeals to the venture capital community over at least 12 years. The earliest evidence of these efforts to attract capital goes back to 2004. A feature in the journal Economic Development America entitled, "Angels, Entrepreneurs, Technology and Heritage: A Diverse Approach to Economic Development in Western North Carolina" touted the creation of the Blue Ridge Entrepreneurial Council (BREC) and the Blue Ridge Angel Investor Network (BRAIN). AdvantageWest, a regional economic development corporation which was largely defunded in 2013, played a significant role in promoting the region's assets and workforce capabilities.

This combination of factors suggests that talented software developers and those with information technology expertise are not making contributions to the area's entrepreneurial climate post-graduation. If the former statement is true, it strongly suggests that these individuals are leaving the area.

So, are the region's computer science and IT students intending on staying in the region to start their careers or are they planning on leaving? The workforce component of this study aimed to assess what role the career decisions of computer science majors is playing in the stagnancy of the region's technology economy. It is intended to inform regional economic developers, state and Federal policy makers, and business leaders on whether or not they can count on computer science majors, a significant source of potential economic capital, to spark technology entrepreneurship in Madison County and the surrounding rural areas.

Information technology workforce in the Asheville, North Carolina region is driven by three major sources: The University of North Carolina-Asheville, Asheville-Buncombe Technical College, and Western Carolina University. Mars Hill University also serves as a moderate driver. Since 2014, a coding academy in Asheville, Tech Talent South, has also started graduating market-ready personnel. Educational institutions within 1 hour of Marshall graduate at least 168 individuals with computer science, information technology or software development backgrounds, annually. Outside of AB-Tech, the community college infrastructure offers 6 schools within one-hour of Marshall.

As the assessment range expands outward to a two-hour radius, the number of potential entry-level personnel increases by 94%. Furman University (SC), Eastern Tennessee State University, the

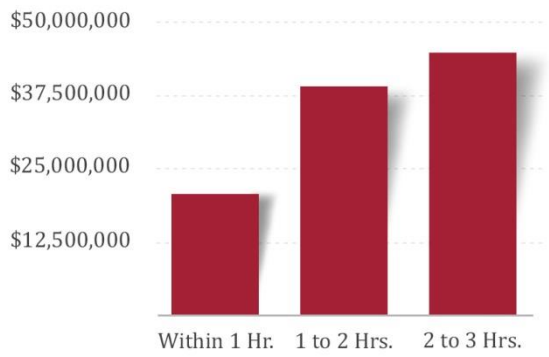
University of Tennessee, Knoxville, and the Iron Yard Academy (SC), produce 549 potentially qualified information technology graduates annually.

If the assessment range is expanded to within 3 hours, UNC Charlotte, Appalachian State University, Clemson University, and the University of Virginia's College at Wise add an additional 600 potentially qualified students. Community colleges in South Carolina, Virginia, Georgia and Tennessee could expand this number significantly, but were not factored into the analysis.

1,448 potentially qualified information technology personnel graduate within 3 hours of Marshall, North Carolina annually. **This equates to a maximum annual net economic product of $104,785,519.**

The optimal net economic potential for the county is based on the likely retention of software developer graduates within 3 hours is $11.67m annually. Roughly 10-25% of these graduates are likely to be a cultural and aptitude fit for any given technology business.

Figure 3: Total annual economic potential of technology graduates by distance from Marchall, NC



The four-county Asheville MSA, which had 424,858 as of the 2010 census, is likely to add 25,000 more residents over the next five years is likely to add 25,000 more residents over the next five years (Citizen Times, 2015). This growth will continue to bolster the region's profile, and should attract students from outside of the region to enrolling at UNCA and Mars Hill University. KeyOak Advisors estimates that the annual computer science workforce in the region will likely increase 5-10% over the next five years, which is in line with regional growth patterns.

Stability of Future Workforce

The quantitative study of regional businesses, educational leaders, and members of the software community suggest that the area's software community is likely growing. The county can likely expect a continued influx of moderate income individuals and workers who expect to commute to Asheville. Rush hour commutes to residential areas in Marshall and Mars Hill are in the 20-30 minute range. Madison County experienced inbound migration that outpaced outbound migration for five consecutive years 2005-2010.

Technology workforces tend to skew younger, and Madison County appeals to a younger demographic, as the majority of the county's recent growth has come from the 18-25 "millennial" generation. While this is a positive trend, these demographics are notoriously mobile. Because technology graduates' skillsets are in high demand, the graduated workforce in the region is less stable than comparable regions.

Remote employees, or those who work for companies that enable them to work from anywhere, continue to fuel growth in the region's technology community. The majority of mid-level and senior IT professionals in the region appear to be coming from virtual work arrangements with companies outside of the region. Data from a leading U.S. technology staffing firm suggests that there are 1,000 individuals with Java software development skills in the region, as of October 2015. This number should continue to grow over the next few years.

Skillsets of Knowledge Workforce

Within 1 hour of Marshall, UNCA, AB Tech, and Mars Hill graduate computer science majors. These individuals are most likely to be recruited by technology firms, and many of these graduates will go on to become software developers. UNCA is a more selective institution, and its computer science graduates are highly regarded. 38% of business, educational and software community leaders in the area believe that UNCA is producing the region's top talent. AB Tech is also highly regarded, with 10% of survey respondents believing it is graduating the region's top software development talent. No survey respondents believed that Mars Hill was producing top talent. While this may be a perception issue, a separate survey of computer science students from area universities suggested that the aptitude level of UNCA computer science students was significantly higher than Mars Hill students.

While the area is producing potential software development talent, the absence of a major research university with technology disciplines suggests that cutting-edge innovation is less likely to emerge from the region. However, with the proximity of Clemson University, the University of Tennessee at Knoxville, and the region's association with the University System of North Carolina, the county has the potential to address this weakness through future strategic partnership.

Net Migration Potential

The region has clearly established itself as a tourism and retirement destination, and both Madison and neighboring Buncombe County have seen population growth, whereas peer counties have seen accelerated out-flight and population loss. Madison County and Marshall should continue to see inbound migration, and greater demand for residential property in the area.

Current Resource Availability

According to private-sector market specialists, the region has around 1,100 individuals who are actively participating in the region's IT labor market. These individuals are predominately mid-level and senior level resources. The region produces between 150 and 200 graduates annually, of which approximately 50-80 are most likely to stay in the region. Rural sourcing providers interviewed in this study suggested that entry-level graduates are likely not market ready, unless they have gone through a firm-specific curriculum while in their computer science or IT major.

BLS data from March 2016 indicates that 1,690 individuals were employed in all IT occupations in the Asheville MSA. This figure includes:

Computer and Mathematical Occupations, Computer Systems Analysts, Computer Programmers, Software Developers, Applications, Web Developers, Database Administrators, Network and Computer Systems Administrators, Computer User Support Specialists, Computer Network Support Specialists, and Computer Occupations, all other.

Competition for Workforce

The region primarily competes against Atlanta, Raleigh-Durham, Charlotte, Greensboro, and Greenville, S.C. Competition with other markets for technology talent. The region's tech industry is especially vulnerable to this competition for two main reasons. First, the region's relatively small scale of technical employment options limits workers' options. Without a major anchor tech employer, those with IT skills have the choice to work for startup-type firms, start their own firm, or work for the IT department of an existing area business, which is likely to be in the healthcare, manufacturing, recreation, or tourism/recreation.

The second is that wage rates for IT skills in this region lag when compared of those major markets. Individuals can make a premium wage by locating to another market and securing employment with a larger employer.

Because of these factors, Madison County is extremely sensitive to competition for technology graduates.

However, competition for mid and senior level resources is likely to be low. Those involved with virtual work arrangements have likely self-selected the region, and have intentionally moved to experience its high quality of life. These employees are more numerous than new graduates, and are likely much more anchored to the region and therefore likely to stay in spite of high competition from other markets for their skills.

Business & Political Environment

Business/Political/College Consortium

Madison County has not always been perceived to be business friendly. But over the past few years, the county has made efforts to change its economic landscape. This shift in attitude towards new business was prompted by a major contraction of farming in the area, and realization that the other major industry-retail was very unstable without other businesses to support it.

We were happy to see that many of the senior community members and government officials were excited to bring new businesses into the area. All felt confident of the ability to attract people to the area but not confident in their ability to attract those companies, especially technology related businesses.

While the region exhibited several regional councils, such as the Land of Sky, and the High Country to the county's northeast, there were no formal consortiums focused on aligning business, government

and education. This was a role that the now defunded AdvantageWest played for the county, and the region by extension. We did observe that business, government, and education do in fact work together on a variety of economic initiatives; including rallying together to bring in new companies when the opportunity arose. We were particularly impressed with the technology college, AB Tech that had multiple examples of their ability to develop niche, specialized technical programs for new and existing companies when needed.

We also saw evidence of multiple counties/regions working together on initiatives. These joint initiatives have been spurred by requirements of federal grants that encourage larger area/region impact programs than specific city/county programs. While this collaboration is a very positive sign, other rural sourcing areas demonstrate more of a concerted focus that often leads directly back to the state Governor's office. Regional economic development is dispersed in the Western counties, and economic development duties at the state level are shared between the Department of Commerce and the Economic Development Partnership of NC. Therefore, obtaining the right level of support for technology development and recruitment efforts in Madison County will be more difficult and will likely take more time than in other areas where rural sourcing has flourished. Additionally, there is virtually no existing technology ecosystem in Madison County. We met only one "high-tech" company during our visit, and the existence of technology organizations is limited to two coding meet-up type groups in Asheville; Meet the Geeks and the Asheville Coders' League. Madison County and the surrounding area do not have a significant technology and vendor ecosystem, which will create a challenge because of the level of collaboration needed for technology business to grow.

Quality of Life

Quality of Life Assessment, Madison County

Overall, the region offers an above average quality of life. Madison County, specifically excels in arts and cultural recreation, natural resources, and safety and security. Its healthcare, when viewed as part of the broader region ranks as above average. Climate and geography, and retail amenities are ranked above average as well. Commute times are slightly above the U.S. average but well below 1-hour maximum range.

Technology students' family ties to the region are below average, suggesting that the rate of retention of these graduates may be lower than in other regions. 41% of computer science students in Mars Hill and UNCA's programs in Fall 2015, were from outside the Asheville area. Only 26% were born within 2 hours of Asheville, and 37% had lived within 2 hours of Asheville for over 5 years. Only 22% of this population acknowledged having family within 2 hours of Asheville. These findings strongly suggest that family capital will not be a significant factor in retaining the majority of highly qualified computer science graduates.

The county has five significant quality-of-life concerns in growing its technology sector.

Technology graduates perceive the region to have low economic opportunity for their skillset. This perception can actually fuel out-flight, even if it is out-of-line with economic reality. 30% of the area's computer science majors intend on staying in the region to start their careers while 20% intend to leave. 50% are not yet sure. 35% like the region and would be willing to accept lower wages to stay, while 65% would need more than they could make in other markets to stay in the region. However, Madison County is amongst the better performing counties in its commerce area in average employment and recent employment. From a quality of life perspective, Madison County has a moderate to significant higher percentage of its residents employed than five of the counties in its commerce region. Madison County does not exhibit the poverty characteristics of the highest poverty counties in the Appalachian region, and poverty issues are moderately unlikely to detract from the quality of life in the county for a prospective technology professional. Perception, however, can trump data.

Figure 4: Do you intend on staying or leaving to start a career?

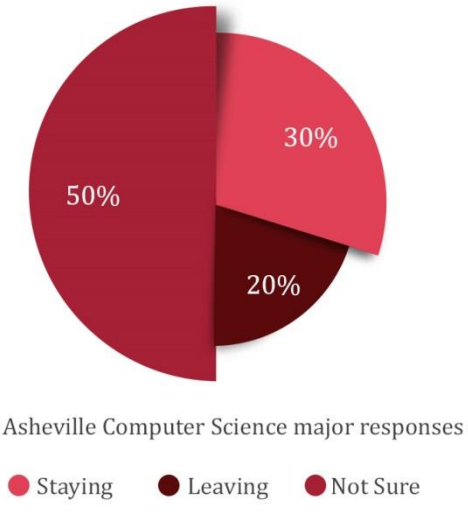
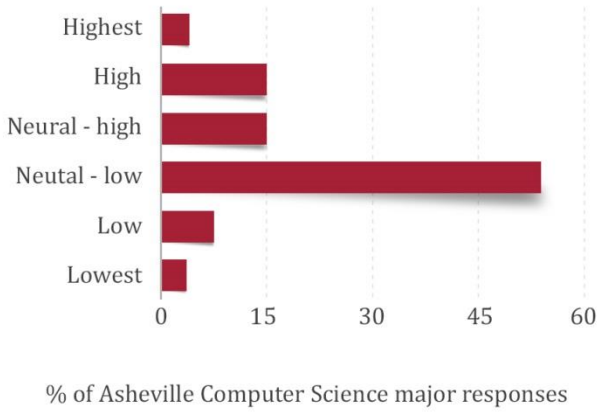


Figure 5 : Affinity to the Asheville Region



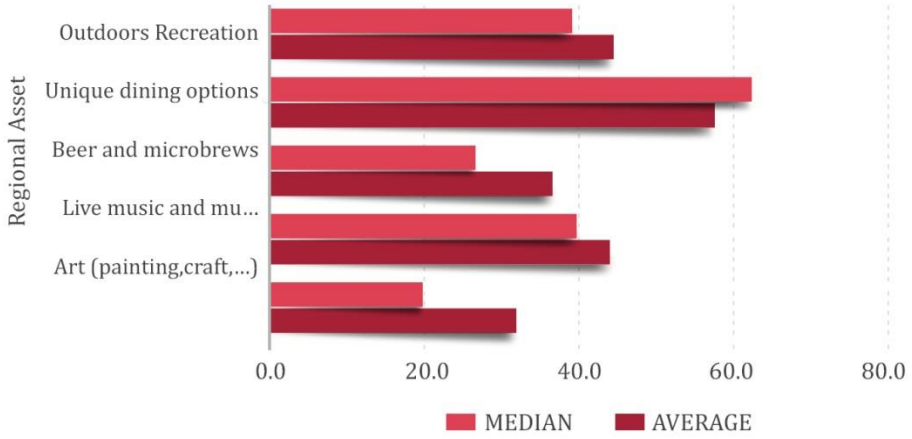
Madison County does not offer a cost of living lower than other known rural sourcing destinations. In particular, higher utility costs, grocery and entertainment expenses in the region reduce purchasing power. Cost-sensitive businesses, and those businesses based on wage

arbitrage would likely have challenges in operating a low-cost oriented sourcing model in Madison County, relative to areas in the U.S. Midwest, Deep South, or Great Plains regions. This affects quality of life in two ways. First, relatively high cost-of-living assumptions negatively influence entry-level graduates' perceptions about starting a career in the region. Second, the higher-cost of living makes graduates less likely to accept lower wages to stay in the region. In lower-cost rural sourcing destinations, employees are willing to earn less to stay in a region they like, largely because they retain roughly the same purchasing power that they would have in a major market.

Marshall and Madison County rank very highly on natural amenities, but the potential technology employees Marshall is looking to attract do not value these as highly as other social, cultural and community assets. Survey results suggested that potential technology students value unique restaurants and diverse dining opportunities much more so than all other potential regional assets, including outdoor recreation. The median score of 63 and average score of 58.2 for diverse dining were higher than the scores for live music (40/44.5), outdoor recreation (39.5/45), beer and microbrews (27/37), and art (20/32.2). The median score was 59.5% higher than the next closest category, live music. Marshall offers options for both dining and live music, augmented by a wealth of options in nearby Asheville.

As seen in our survey results, of the five amenities surveyed, outdoor recreation tended to be about as important as live music to potential software graduates, but less important than unique dining options. Therefore, the county should emphasize additional cultural and community assets in its messaging and marketing to potential technology employees. It should not expect that the region's natural recreational opportunities "sell themselves" to these employees.

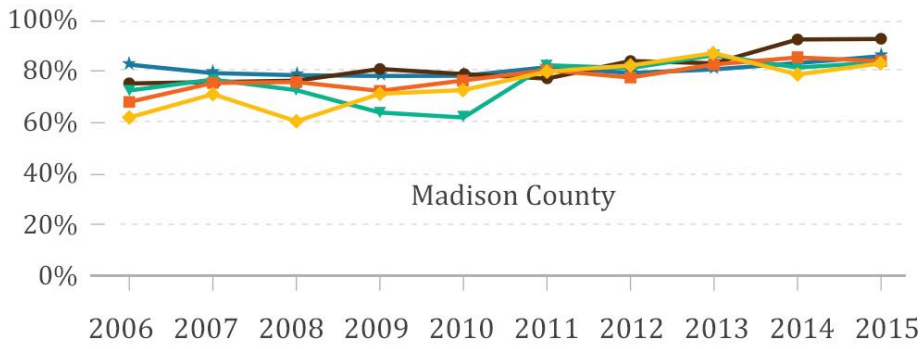
Figure 6 : Affinity for Regional Assets-Asheville area Computer Science students (2015 survey, UNCA; MHU; AB Tech)



The low performance of the county's school system in 2009 and 2010 has negatively affected the perception of the county's quality of education both inside and outside the region. Madison County's High School graduation rate, which lagged all 7 peer counties in 2009 and 2010, and was in the low 60% range, has improved to 83% in 2015, in line with the average of all counties. Recent data shows that the district's performance has increased, and is largely in-line with state averages. Madison County's Biology EOC scores in 2015 were among the highest in the state.

Potential technology employees and businesses considering Madison County should not have concerns about the caliber of the county's educational system, and commitment to higher standards. They should, however, be aware of legacy perceptions that appear to have less grounding in fact, given the system's recent improving performance.

Figure 7 : Graduation Rates



Without adequate current supply of entry-level housing coupled with increased demand likely coming from those priced out of the Asheville and Buncombe County markets, the

county is likely to see a rapid increase in entry-level housing prices. The county will not be likely to respond in the short-term to housing demand without a concerted focus on improving entry-level housing inventory.

Recommendations

Madison County should view technology-based economic development through three distinct lenses; 1) fostering technology-based entrepreneurship 2) promoting the growth of the technology function at existing businesses, and 3) making the climate more attractive for technology business recruitment. Each lens will require a different approach and may have different policy avenues as the county continues to look for support in growing the tech sector from state and Federal programs.

Our recommendations focus on linking specific technology disciplines with industry assets and clusters that currently exist in the Madison/Buncombe region. Linking these technology disciplines with growing industry clusters will position Madison to benefit from Asheville's economic growth. It will also solidify the region over time as a destination for those looking to enhance their skills in these disciplines, with the goal of providing them a career in a thriving regional industry.

Essentially, Madison County will need to take a creative approach when putting together programs to promote the region as a viable service technology outsourcing destination. As a small town community, Madison County has the opportunity to be more customer-focused and aggressive when targeting service companies, as well as the ability to reduce bureaucracy-or processes that hinder economic progress.

Below we have summarized the key recommendations for Madison County, as well as given detailed recommendations by specific area.

Key Recommendations

Below are our key recommendations on how Madison County can accelerate the growth of its technology industry while improving its attractiveness as a domestic sourcing location. If implemented, these are the activities that would have the highest impact.

1. **Aggressively recruit existing technology businesses located in the county's "backyard" to Marshall or Mars Hill.** There are several opportunities that could jumpstart building a technology ecosystem in Madison. Economic development should aggressively target these companies and put customized incentives in place to attract them (See Target Companies Section below).
2. **Focus on expanding residential housing and commercial building supply.** As Madison County will have difficulty in attracting a company that will be large enough (500+) to build

their own offices, it must solve availability of real estate and affordable housing for entry level workers in order to attract services companies (See Real Estate Availability section below).

3. **Develop a technology focus area/s for the region**. Other regions have chosen to focus their educational institutions on a very specific aspect of technology. This enables more effective cross-institution collaboration and deeper expertise from graduates. The region should consider information security, content management and design, laboratory information management systems, healthcare management systems, or digital animation services. (See Target Companies Section below)
4. **Build technical innovation capacity**. Because the region does not have a Tier 1 research facility, it must take steps to build innovation capacity. Starting a technology incubator that would initially provide free space to technology companies would be a great way to attract entrepreneurial companies as well as technology talent to the area. The technology incubator could serve as an innovation hub and be expanded to offer additional services over time, in partnership with other research institutions. [AJ1]
5. **Dedicate time to understanding the full range of economic development incentives available to the county**. Include state and federal incentives and build your own incentives where possible. Although it may take time to develop its own formal local incentives, Madison Economic Development can package state and Federal incentives and help companies with getting assistance which can make a big difference in the final selection process.

Target Companies

We recommend that Madison County target higher-value add niches in Technology and BPO services and not cost-oriented businesses. In other words, Madison County should compete on technology capability and education, and not cost. This strategy:

- Leverages higher level of education in the County relative to other rural locations
- Accounts for the lack of suitable office space and ready-to-build land in the county for generalized technology of low-end BPO services
- Allows Madison to get some quick wins to jumpstart the technology ecosystem. This is necessary to developing a thriving technology services region

Madison should look for the following attributes when targeting companies:

- Technology start-ups and small companies that are in Asheville that are looking to expand to a lower cost location close in proximity

- Skill sets that require higher level of education, but are not readily available (customized training required).
- High level of interaction required with U.S. office or U.S.-based customers (time zone and language strengths)
- Service or product can be delivered online, virtually, or over the phone

Specific Target Companies

Near-term (6-12 months)

- Just across the border in Buncombe County, Epsilon Inc. is expanding and exploring partnership with major industry consultants. This could bring further attention to Madison County from companies that drive technical market demand.
    - Madison County can continue dialog with them about meeting their physical equipment storage needs and office needs in the county
    - They need 4,000 square feet of office, and the capacity to store $100,000 in computer equipment
- MountainPoint is a business starting in Western North Carolina. Their mission is to develop an Appalachian workforce, inspired by BitSource, a firm out of eastern Kentucky.
- BitSource is a Kentucky-based firm interested in partnering with the county to train and source technical leads and architects from the region to support their Pikeville, KY-based development teams.

Intermediate-term (12-36 months)

- The county will likely have to build a technically-specific program to "build into" an existing business versus recruiting a business to the area. These options are recommended:
    - Laboratory Information Management Systems is a viable future program offering, both as an entrepreneurial track and as a business recruitment measure. It aligns well to healthcare and alcohol brewing, both clusters of industry in the region.
    - Rural Sourcing Inc. is a major player in this market. Developing the capability could attract further investment
- Web user experience and content management (Drupal development); aligns well to the artistic culture of the county
    - **Nextient, Apex Systems, ettain [AJ2]group and DISYS have built aspects of their business around this capability**
- Healthcare-oriented IT

    - **Phynd.com is a business platform that has supported rural sourcing growth at UST Global.**
- Digital animation services are a viable entrepreneurial career track, and align well to the existing film/motion-picture industry assets in the area. It's an intersection of film/art and software coding.
    - CherryBot Media is an example of a business created in this market
- Information security and architecture is a market in high demand and will continue to experience rapid growth
    - Epsilon, Inc. focuses on public sector information security
- Manufacturing-oriented IT and services
    - Align well to Madison, Yancey, and Buncombe County employers

Incentive Package Enhancement

Madison County needs to be familiar with all federal and state programs that can be leveraged by services companies, and articulate these incentives to companies during their process. As it takes some time to implement new incentives on county or local level, understanding and marketing these incentives can help jump start the initiative.

In addition, Madison should develop its own local incentives where possible such as expedited permitting, training grants, renovation assistance, etc. that will help companies choose Madison during the final selection process. Some programs Madison can consider to add to the existing package include:

Direct business incentives

- Corporate headquarters tax credit
- Investment credits
- Corporate income tax subsidies
- Sales and use tax exemption
- Land or building subsidies
- Local financing through sales tax

Workforce-oriented incentives

- Training/retraining grants or tax credits
- Employment/job tax credits

Real Estate Availability

Availability of real estate is key for service businesses planning to set up operations. Madison County has very little commercial space for lease, and virtually no land zoned for construction. To improve availability, local economic development should work with current land owners to minimally get land ready for construction and get agreements from owners/builders that they will build to suit if the lessee is interested.

Another idea is for the city or county to loan money, or to guarantee loans for speculative build to a qualified builder. This would encourage a builder to take on a speculative build project by lowering their risk.

As existing commercial space is limited, Madison should consider purchasing and renovating one of its spaces-such as a vacant church for sale into a technology incubator. Start by giving free or reduced fee rent to technology start-ups, and eventually start supplying other services needed by technology start-ups. This has the benefit of jump starting technology ecosystem in Madison with minimal investment and risk.

Another idea is for the city or county to loan money, or to guarantee loans for speculative build to a qualified builder. This would encourage a builder to take on speculative build projects by lowering their risk. This could take the form of a Tax Increment Financing project, particularly if it incorporated mixed-use concepts.

Quality of Life Enhancement

We have two recommendations to enhancing Marshall and Madison County's already high quality of life. The county must tackle the negative perceptions about the county's public school system head-on. However, the data obtained in this study does not support the numerous anecdotal comments made in interviews about a limited or underperforming school system.

The second challenge that the town of Marshall will likely encounter in its tech recruitment efforts is that the restaurant scene is dispersed between riverside locations in downtown Marshall and the business corridor along US-25 and NC 213. A technology business will most likely want to leverage a riverside location in downtown Marshall. These businesses value the creative aesthetic, and would be very unlikely to locate along US-25, especially if they are selling to other tech executives outside of the region. Madison County planning/zoning and economic development should consider incentives to draw more restaurant activity to downtown Marshall. Given the clear importance of dining diversity to the technology crowd displayed in this study, economic development leaders should strongly consider appeals to entrepreneurs in dining/hospitality. This recommendation can equally apply to Mars Hill.

Workforce Development

The Asheville region, and Madison County in particular, has a significant challenge in retaining high-aptitude graduates and new talent. High-aptitude individuals are integral to fostering a climate of entrepreneurship. Without this thought leadership, the region will have challenges in both the mentorship of moderate aptitude individuals, and in the attraction of other high-aptitude individuals from outside the region. It will also be unable to support or launch development-based businesses of any size with staying power.

Policy makers should consider measures to attract high-aptitude talent that has left the area. In addition, since telework appears to be bringing more seasoned but high performing talent into the region (according to this study's triangulation survey) regional leaders should consider incentives that further encourage Fortune 500 teleworkers to continue to migrate to the region. Lastly, economic developers should take active measures to monitor and improve technical students' opinions of the Asheville region. Clearly, there is both a predictive link between their opinion and their decision to stay in the area, and an opportunity to influence individuals "on the fence" about the region.

This study also demonstrates that Asheville area economic developers cannot assume that the region's cultural vibrancy and natural amenities are automatically resulting in high affinity for the region amongst computer science students. This is not the case amongst this survey's population, as a 65% majority indicated low to negative affinity for the region. These perceptions need to be changed to improve the likelihood that computer science students will consider staying in the area.

Madison County should investigate bringing a coding academy into the region to offer complementary training to the existing computer science offerings at Mars Hill, AB Tech and UNCA. A pilot program could help Madison County refine its retention strategy by gathering some initial data on 1) Number and type of students interested in the program 2) Job readiness of those graduating 3) companies' willingness to hire these students 4) retention rate of those completing the program in the area

Other suggestions that can help jumpstart workforce development are:

- Start a technology / coding meetup group in Madison County
  - Build relationships with Meet the Geeks and Asheville Coders' League
  - Attend Innovate Asheville events
  - Build trusted relationships with active members of the Asheville tech community, such as Marty Gilbert, co-founder of the Iron Yard Academy and Tech Talent South
- Partner with technology firms in the area to create a program that retains graduates from UNCA and Mars Hill

- Start to document technology workers who work from home so they can help fuel ecosystems initially
- Lure Asheville start-ups to Madison area through incentives, lower real estate, and housing costs
    - Appeal to technology start-ups at local venture capital meetups, and via building relationships with the region's software community
    - Foster dialog to better understand entrepreneurs' needs
- Investigate STEM programs / funding for the area
- Develop entrepreneurship curriculum, at the high school, community college, and college level
    - There are several examples of this yielding return on investment
        - Haywood Community college's program, late 1980's-today.
        - The Biz Foundry (Tennessee)
        - SOAR – Shaping Our Appalachian Region (Kentucky)
        - Clallam County, Washington -fostering entrepreneurship
- Create a technology incubator or innovation program in collaboration with AB Tech, UNC-Asheville, Mars Hill
    - Focus this on a specific technological discipline
        - Web user experience and content management (Drupal development); aligns well to the artistic culture of the county
        - Information security technology and architecture; is high in demand and aligns to an existing business in the vicinity of the county
        - Digital animation services; aligns well to the existing film/motion-picture industry assets in the area. It's an intersection of film/art and software coding
    - Perform outreach to major research universities in region to build ties and invite thought leadership in the specific discipline
        - The county has a relationship with Duke University through the Partnership for Appalachian Girls' Education that could be leveraged
        - University of Tennessee-Knoxville has several technology research programs as does Clemson University. Both have a history of outreach, though these are outside of state borders.

Recommended Next Steps

1. Link the region to other leading technology-related economic development efforts in the Appalachian region by meeting with officials and leaders in person
    I. EKCEP (Eastern Kentucky Concentrated Employment Program)
    II. SOAR – Shaping our Appalachian Region (KY)

III. Upper Cumberland Entrepreneurial Foundation (TN)

i. The BizFoundry

ii. 100 Girls of Code

2. Increase access to economic development funds

I. Investigate the new RBDG program and apply to help fund costs of infrastructure and next steps of technology development

II. Investigate other federal programs that may help fund new business / new technology efforts

III. Focus on building linkages to major technology and BPO markets (Charlotte, Raleigh-Durham)

3. Educate economic development on technology ecosystem

I. Madison County economic development should consider several conferences to raise awareness of the efforts of the county amongst technology businesses. It should consider:

i. Gartner – Sourcing and Strategic Vendor Relationship Conference (September 21-23)

ii. International Association of Outsourcing Professionals annual sourcing conference (February 19-22, 2017)

II. Continue to build relationships with the following by advancing the technology discussion

i. Appalachian Regional Commission

ii. NC Department of Commerce

iii. United States Department of Agriculture

a. Matt McKenna – Senior Policy Advisor

4. Launch workforce development efforts - consider starting a technology incubator to foster technology entrepreneurial companies, with goal of partnership with major research universities

I. Start small by offering just space; overtime expand services to companies

II. Market to Asheville technology associations and surrounding areas including Charlotte, Greensboro, and Raleigh area

5. Begin to market area as a "bohemian/millennial" destination. Aim to capture Asheville growth by publicizing the 9.8% lower comparative housing costs and incentivize dining/hospitality entrepreneurs.

I. Address public school perceptions head-on

II. Consider "branding" the county as a tech destination of the future

6. Prepare basic materials (brochure, presentation and website page) that is targeted towards services companies that highlights Madison County unique advantages

    I. Develop an e-brochure that outlines clearly federal, state, and local incentives-focusing on Madison County's ability to help access those funds for companies

    II. Consider funding a program to enhance web sites, web commerce and applications for arts-related and tourism-related businesses in the county.

        i. Madison Manufacturing will be building out its IT capabilities

            a. Madison County can inquire if IT security issues can be met by Epsilon

        ii. Advanced SuperAbrasives' web site and capabilities were developed by a Minnesota-based firm, Wellstronics.

            a. They may have additional needs that could be met by local entrepreneurs.

        iii. Arts oriented businesses in Marshall can benefit from greater marketing and user experiences for their existing web presences.

            a. The county can make a concerted effort to identify web/IT needs

            b. Can team up with arts-oriented businesses in Yancey County

            c. **ArtServe (Broward County) is an example:** https://www.artserve.org/programs/co-op-marketing-program/

            d. Leitrim County, Ireland's efforts to develop art industry could be a guidepost

References[AJ3]

U.S. Census Bureau

http://www.census.gov/

Various Demographic and Geographic information

Moody's

http://www.moodys.com/cust/default.asp

Public Debt Ratings and Information

The Tax Foundation

http://www.taxfoundation.org/

State, Local and Federal tax information

American Community Survey

http://www.census.gov/acs/

Comprehensive survey conducted by Census Bureau that shows what the U.S. population looks like and how it lives. Data includes housing statistics, cost of living information, commute times, etc.

QuickFacts

http://quickfacts.census.gov/qfd/index.html

Similar to above; U.S. Census Bureau overviews of data searchable by city, county, and state.

FBI Uniform Crime Reports

http://www.fbi.gov/ucr/ucr.htm

Crime Rates

K-12 Schools

http://www.greatschools.org/

ACCRA Index

http://www.coli.org/

Cost of Living Data

F.E.M.A.

http://www.fema.gov/

Natural Disaster and weather information

B.L.S.

http://www.bls.gov/

U.S. Bureau of Labor Statistics for all sources of labor information

About the Research Firms

KeyOak Advisors

Overview TBD

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