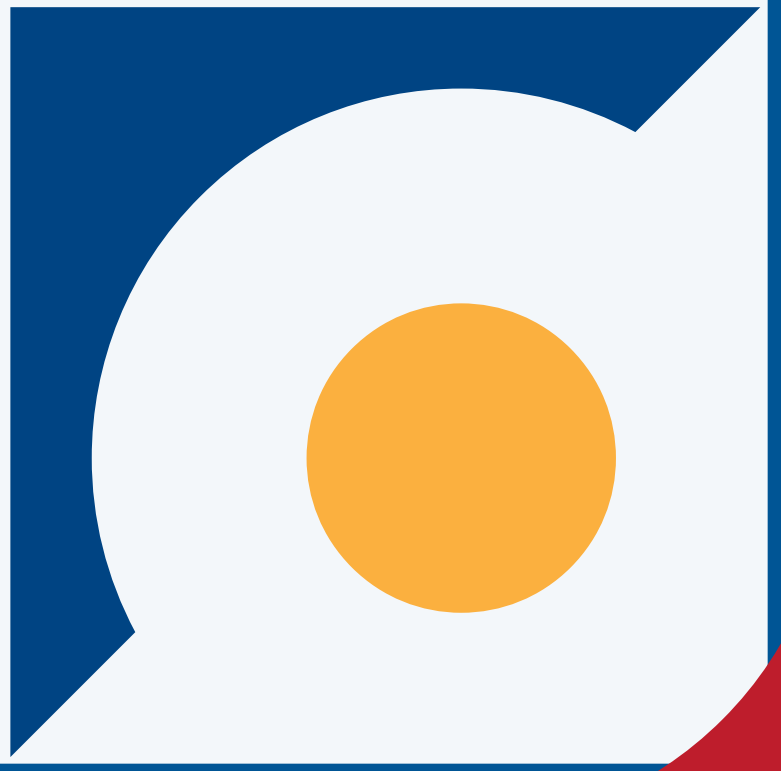




Bridging the Divide:
Broadband and Businesses in
Appalachian Ohio

April 13, 2012



Appalachian Ohio represents a geographically large and culturally rich region of the state, stretching from the Ohio River in the south to Lake Erie in the north and covering over 16,000 square miles or 40% of the land area in Ohio. While this region is predominantly rural (over two-thirds of the counties in Appalachian Ohio are classified as such), it is also the home of Ohio's first town, its first university, and the first two state capitals. Over 2 million Ohioans, more than 17% of the state's population, reside in the region. By many economic indicators, Appalachian Ohio is struggling; it features a lower per capita income and higher poverty and unemployment rates than the state and the nation. Traditionally, the economy of the region has been dominated by mining and agriculture but, more recently, there has been a focus on attracting a wider variety of companies to the area and on small business development and job creation.^{1, 2, 3}

Broadband can be a key component to economic growth in Appalachian Ohio. A strong broadband infrastructure has been shown to have many economic advantages, including job creation and business development.^{4, 5} Additionally, if existing businesses take full advantage of broadband technology, they can see opportunities to grow both their own companies and local economies. Increasing broadband adoption in Appalachian Ohio could have a dramatic effect on the economic success of the region.

As part of its 2010 Business Technology Assessment, Connect Ohio studied the adoption and utilization of broadband by businesses in Appalachian Ohio. This research shows that while broadband can increase revenues, provide opportunities to find new customers, and increase the efficiency of day-to-day activities for rural Appalachian businesses in Ohio, many are not taking advantage of the considerable opportunities that broadband service can provide.

Economic Conditions in Appalachian Ohio

Economically, Appalachian Ohio has many hurdles to overcome. In measurements of unemployment, per capita market income, and poverty, the region is far behind the United States and Ohio, as well as Appalachian counties in other states (Table 1).⁶

Among the findings from this survey:

- Nearly **40% of businesses** in Appalachian Ohio do not use broadband. This translates into 21,000 businesses, or approximately one quarter of all businesses without broadband in Ohio.
- Nearly **20,000** of these businesses without broadband in Appalachian Ohio have fewer than 20 employees.
- The median annual revenues of businesses with broadband in Appalachian Ohio are **\$200,000 more** than those without broadband in the region.
- Only **21% of businesses** in Appalachian Ohio with the Internet earn revenue from online sales, compared to 29% of businesses with the Internet across the entire state.
- Appalachian Ohio businesses are **more likely to cite availability** as a hurdle to broadband adoption than businesses throughout the state.

1 http://www.arc.gov/reports/region_report.asp?FIPS=39999&REPORT_ID=41

2 http://www.firstohio.com/Economic/ED_history.aspx

3 Three-Year Average Unemployment Rate, 2008-2010: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics; Per Capita Market Income: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System; 2006-2010 Average Poverty Rate: U.S. Census Bureau, American Community Survey 5-Year Estimates; source: http://www.arc.gov/reports/custom_report.asp?REPORT_ID=42

4 Stenberg, P., Morehart, M, Vogel, S. Cromartie, J., Breneman, V., and Brown D. (2009). *Broadband Internet's Value for Rural America*. (Economic Research Report No. (ERR-78)). Washington, DC.: Economic Research Service, U.S. Department of Agriculture.

5 Gillet, S.E. and Sirbu, M.A. (2006). *Measuring the Economic Impact of Broadband Deployment*. (National Technical Assistance, Training, Research, and Evaluation Project #99-07-13829). Washington, D.C.: Economic Development Administration, U.S. Department of Commerce; Mack, E.A. and Grubestic, T.H. (2008). Broadband provision and firm location in Ohio: An exploratory spatial analysis. *Tijdschrift voor economische en sociale geografie*, 100, 298-315.

6 Three-Year Average Unemployment Rate, 2008-2010: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics; Per Capita Market Income: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System; 2006-2010 Average Poverty Rate: U.S. Census Bureau, American Community Survey 5-Year Estimates; source: http://www.arc.gov/reports/custom_report.asp?REPORT_ID=42

Table 1.
Economic Indicators in Appalachian Ohio

	United States	Entire Appalachian Region	Ohio	Appalachian Ohio
Unemployment Rate	8.20%	8.40%	8.90%	10.10%
Per Capita Market Income	\$32,691	\$24,553	\$27,914	\$21,298
Poverty Rate	13.80%	15.60%	14.20%	16.40%

The per capita income in Appalachian Ohio is approximately \$11,000 less than that of the United States. The unemployment rate in the region is over 10% and the poverty rate is over 16%. All of these indicators highlight the economic challenges that exist in Appalachian Ohio.

The Appalachian Regional Commission (ARC) has categorized every county in Appalachian Ohio for the upcoming fiscal year (FY 2013) as either Transitional, At-Risk, or Distressed, based on how the county compares to other counties in the United States in these three criteria.⁷ Of the 32 Appalachian Ohio counties, 18 are classified as either At-Risk or Distressed and rank among the lowest quartile of all counties in the United States.

The Economic Impact of Broadband

Broadband access has been shown to provide many economic benefits to regional economies. Communities with broadband access can experience more growth in employment than those without access.⁸ Broadband can have a positive impact on the number of information technology and knowledge intensive businesses in a region.⁹ In rural areas, it has been shown to assist in local business development and the transition to an information-based global economy.¹⁰ Past research by Connect Ohio has shown that a seven percentage point increase in broadband use could lead to an economic boost to the state of \$5.2 billion, including 96,000 jobs saved or created.¹¹ For the region to fully experience these benefits, increased broadband access and capacity is needed, and Appalachian Ohio businesses must fully utilize the broadband access that they have.

Technology and Broadband Adoption

Appalachian Ohio lags behind the state average in all areas of technology adoption studied by Connect Ohio (Table 2). Businesses in Appalachian Ohio are less likely to use computers and the Internet. Only 61% of businesses in Appalachian Ohio use broadband technology, compared to the statewide average of 67%.

Table 2.
Business Technology Adoption

	Ohio Average	Appalachian Ohio
Computer Use	88%	85%
Internet Use	74%	70%
Broadband Adoption	67%	61%
Website Use	53%	42%

⁷ These classifications are based on the ARC's 2013 Fiscal Year. The best 10% of counties are classified as "Attainment", the best 10% to 25% as "Competitive", the best 25% to the worst 25% as "Transitional", the worst 10% to 25% of counties as "At-Risk", and the worst 10% as "Distressed." <http://www.arc.gov/research/SourceandMethodologyCountyEconomicStatusFY2007FY2013.asp>

⁸ Stenberg, P., Morehart, M., Vogel, S., Cromartie, J., Breneman, V., and Brown D. (2009). *Broadband Internet's Value for Rural America*. (Economic Research Report No. (ERR-78)). Washington, DC.: Economic Research Service, U.S. Department of Agriculture.

⁹ Gillet, S.E. and Sirbu, M.A. (2006). *Measuring the Economic Impact of Broadband Deployment*. (National Technical Assistance, Training, Research, and Evaluation Project #99-07-13829). Washington, D.C.: Economic Development Administration, U.S. Department of Commerce; Mack, E.A. and Grubestic, T.H. (2008). Broadband provision and firm location in Ohio: An exploratory spatial analysis. *Tijdschrift voor economische en sociale geografie*, 100, 298-315.

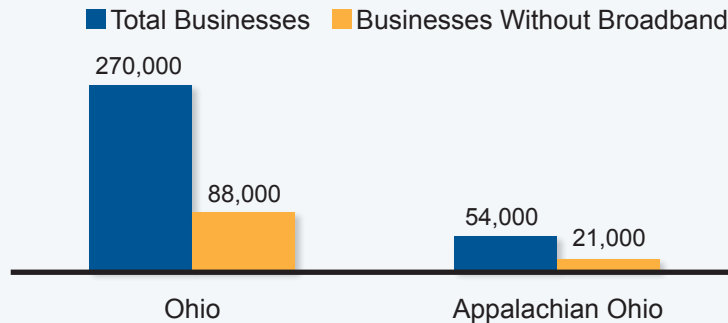
¹⁰ LaRose, R., Gregg, J.L., Strover, S., Straubhaar, J., and Inagaki, N. (2008). *Closing the Rural Broadband Gap*. (U.S. Department of Agriculture CREES Program, Grant Number 2004-35401-14985).

¹¹ http://www.connectednation.org/sites/default/files/the_economic_impact_of_stimulating_broadband_nationally_-_full_version.pdf

Businesses in Appalachian Ohio are also significantly less likely to have a website than the Ohio average. Only 42% of businesses in Appalachian Ohio have websites, which can help connect them to customers and expand revenues, compared to the statewide average of 53%.

Across the state of Ohio there are approximately 270,000 business establishments, and about one in five are in Appalachian counties (Figure 1). However, nearly one quarter of the 88,000 businesses in Ohio without broadband are located in Appalachia. This translates into approximately 21,000 businesses in Appalachian Ohio that are not using and benefiting from broadband.

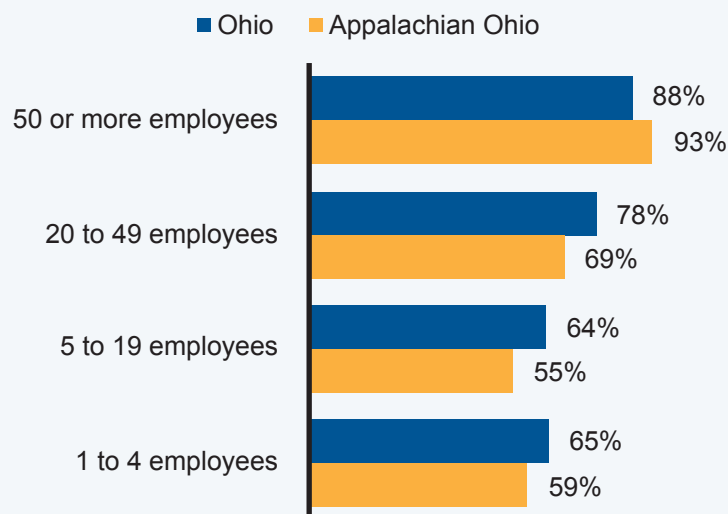
Figure 1.
Businesses in Ohio



Broadband Adoption by Business Size

In Appalachian Ohio, businesses with 1 to 4 employees and those with 5 to 19 employees are the least likely to have adopted broadband (Figure 2). Throughout the state, businesses of these sizes have a 65% and 64% broadband adoption rate, respectively; in contrast, only 59% of businesses with 1 to 4 employees and 55% of businesses with 5 to 19 employees in Appalachian Ohio use broadband. This means that nearly 20,000 businesses with fewer than 20 employees in Appalachian Ohio are conducting business without broadband and not experiencing many of the monetary and efficiency benefits this technology can provide. In contrast, 93% of businesses with 50 or more employees in Appalachian Ohio are using broadband, higher than the statewide average.

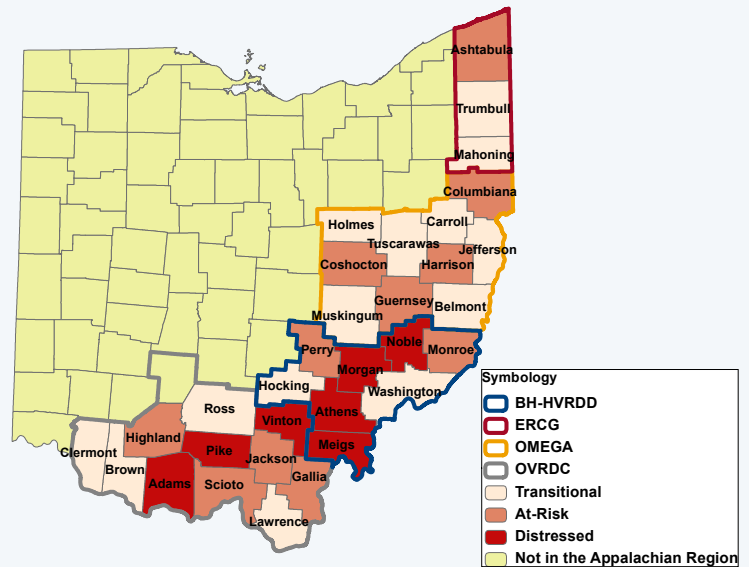
Figure 2.
Ohio Broadband Adoption by Business Size



Technology Adoption by Local Development District

There are four local development districts in Appalachian Ohio: the Ohio Valley Regional Development Commission (OVRDC), the Buckeye Hills-Hocking Valley Regional Development District (BH-HVRDD), the Ohio Mid-Eastern Governments Association (OMEGA), and the Eastgate Regional Council of Governments (ERCG) (Figure 3). The role of these local development districts is to identify and target the most important needs of local communities to further their economic and community development goals.¹² Economic conditions vary between these districts. ARC has classified all of the counties in both the ERCG and the OMEGA districts as either Transitional or At-Risk, while the BH-HVRDD and OVRDC feature a mix of Transitional, At-Risk, and Distressed counties.¹³

Figure 3.
Local Development Districts in Appalachian Ohio



Businesses in the ERCG are the least likely to have adopted broadband in Appalachian Ohio (Table 3). Only 46% of businesses in that region subscribe to broadband, compared to the Appalachian Ohio average of 61%. Only 54% of businesses in the ERCG use the Internet for business purposes, compared to 70% in all of Appalachian Ohio. Just 28% of businesses in the ERCG have a website, well below the statewide average of 53% and the average for Appalachian Ohio of 42%.

Table 3.
Business Technology Adoption by Local Development District

	Appalachian Ohio	OVRDC	BH-HVRDD	OMEGA	ERCG
Computer Use	85%	88%	*	78%	91%
Internet Use	70%	78%	*	65%	54%
Broadband Adoption	61%	67%	*	58%	46%
Website Use	42%	39%	*	43%	28%

* Sample size is too small to report accurate results

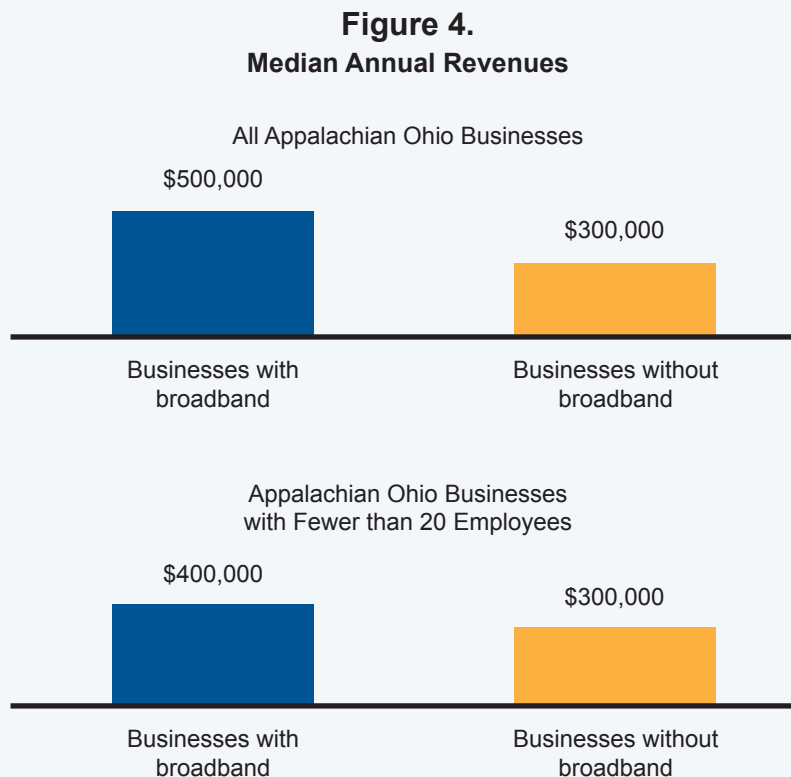
Businesses in the OMEGA district are also falling behind in terms of technology adoption. Only 58% of businesses in OMEGA use broadband and only 65% use the Internet to conduct business. Like the region as a whole, these districts could potentially benefit from better technology utilization by businesses.

¹² <http://www.arc.gov/ldds>

¹³ Based on ARC's 2013 Fiscal Year http://www.arc.gov/research/MapsofAppalachia.asp?MAP_ID=64

Broadband and Business Revenues

There is a stark contrast in business revenues in Appalachian Ohio between businesses that have broadband and those that do not. The median annual revenue of businesses with broadband is nearly \$200,000 higher than businesses without broadband (Figure 4). Businesses with fewer than 20 employees in Appalachian Ohio that have broadband also see more revenues than those who do not. These businesses have median annual revenues that are \$100,000 more than those that do not have broadband.



Businesses in Appalachian Ohio are also less likely to use the Internet as a tool to earn online revenues. Only 8,000, or 21% of businesses that use the Internet in Appalachian Ohio, earn revenues from online sales, compared to the statewide average of 29%. Among the smallest businesses, that percentage drops to only 18% of Appalachian Ohio businesses that use the Internet.

How Appalachian Businesses Use Broadband

In Appalachian Ohio, broadband and the Internet are being used to increase business efficiency (Table 4). The number one use of the Internet by Appalachian Ohio businesses is to purchase or place orders for products or services - 87% of businesses in the region use the Internet for this purpose, compared to 81% statewide. Other major online activities by Appalachian Ohio businesses include researching and booking travel, shipment tracking and control, and online banking. Businesses in the region are relying on the Internet to better connect them to the world outside Appalachia.

Table 4.
Online Applications Used by Ohio Businesses

	Ohio	Appalachian Ohio
Purchasing or placing orders for products or services	81%	87%
Marketing and advertising of products and services	64%	49%
Online banking	63%	60%
Researching or booking business travel arrangements	56%	63%
Shipment tracking and control	55%	58%
Billing or bill payment	53%	47%
Selling, or accepting orders for products or services	49%	43%
Providing customer support for products or services	42%	42%
Online training	37%	36%
Accounting and internal auditing	34%	31%
Employee benefits information	33%	30%
Administration with healthcare insurance companies	32%	34%
Bidding on contracts	31%	20%
Accepting real time payments via credit or debit card	28%	29%
Inventory tracking and control	19%	21%
Videoconferencing	18%	15%
Blogging	12%	8%
Manufacturing process control	4%	4%

However, Appalachian Ohio businesses also use the Internet less than the state average for many activities that could potentially impact business profits and economic development in the region. Only one in five (or 20% of) Appalachian Ohio businesses that use the Internet go online to bid on contracts, compared to the Ohio average of 31%, a statistically significant difference. In addition, only 43% of Internet-connected Appalachian Ohio businesses sell or accept orders for products or services online, and only 49% go online to market or advertise their products or services, compared to the significantly higher Ohio average of 64%.

Appalachian Ohio businesses are also less likely to use newer technologies that could help connect to the marketplace outside of Appalachia and potentially benefit both their profits and efficiency. Only 15% of Internet-connected businesses in Appalachian Ohio use videoconferencing, compared to the state average of 18%; and only 8% of these Appalachian Ohio businesses are blogging, while 12% of Internet-connected businesses in all of Ohio go online for this purpose.

Barriers to Adopting Broadband

Reflecting statewide trends, the number one reason that businesses in Appalachian Ohio do not adopt broadband is that they believe they do not need it (Table 5). However, Appalachian businesses are less likely to cite this as a barrier than all businesses in Ohio. Only 60% of Appalachian Ohio businesses that do not subscribe to broadband cite this barrier, compared to the state average of 68%. Businesses in Appalachia may be facing more concrete hurdles to broadband adoption. The lack of a computer is the second largest barrier to broadband adoption in Appalachian Ohio, similar to the state average. However, businesses in Appalachian Ohio are more likely to cite availability as a hurdle to broadband adoption. Efforts to increase both broadband availability and computer ownership in the region may be important to improving business broadband utilization.

Table 5.
Barriers to Broadband Adoption

	Ohio Average	Appalachian Ohio
We don't need broadband	68%	60%
We don't have a computer	16%	17%
Service poses a security risk	7%	4%
Service is too complicated	3%	2%
Broadband service is not available in our area	5%	8%
Service is too expensive	11%	9%
Don't know/Refused	12%	11%

While Appalachian Ohio businesses are less likely to cite cost as a barrier to broadband adoption than the entire state, 9% of businesses in the region that do not subscribe to broadband still find that the cost of service is prohibitive to their use of this technology. The median monthly cost that businesses in Appalachian Ohio pay for broadband is only \$42.05. While that amount is lower than the state average of \$67.36, it is also accompanied by a lower average download speed (3.4 Mbps, compared to 6.9 Mbps statewide), indicating that there may be a trade-off between cost and quality of service in the region.

Efforts to Help Appalachian Ohio

Although Appalachian Ohio businesses face numerous hurdles, several initiatives are working to help Appalachian Ohio businesses improve their adoption, access, and usage of broadband.

The Connect Appalachia Broadband Initiative (CABI) Task Force was established by the Governor's Office in conjunction with Connect Ohio and Chesapeake Energy. This Task Force is administered by Connect Ohio and is made up of public, private, and non-profit leaders in Ohio.¹⁴ The mission of the CABI Task Force is to pull Appalachian Ohio to within state and national standards in broadband adoption by 2014 by identifying and coordinating resources required for facilitating affordable broadband access and driving adoption through digital literacy training. The Task Force will improve access by broadening the Connect Ohio Last-Mile program to a regional level and will increase adoption through its Every Citizen Online program.

¹⁴ To learn more about Connect Ohio and the Connect Appalachia Broadband Initiative please visit www.connectoh.org or e-mail us at info@connectoh.org.

The Last-Mile Enablement Project was developed by Connect Ohio's technical outreach team as a way to help get more communities connected. Through this project, Connect Ohio engineers collaborate with county officials, private enterprise, and residents to develop sustainable broadband expansion. One resident of Appalachian Ohio who has benefited from this program is Jerry Smith, the owner of Anvils and Ink Studios in Belmont County. After broadband coverage expanded in the county, Smith upgraded to broadband from a slow dial-up connection, took his art studio business online, and increased his annual revenue from approximately \$80,000 each year to over \$3.7 million each year.

Connect Ohio's Every Citizen Online (ECO) program is aimed at increasing broadband adoption and digital literacy. This program provides residents of Ohio 6 hours of free basic training sessions on computers, the Internet, and the benefits of using the Internet. Seventy percent of participants who were surveyed after completing this program said that they intended to either buy a computer or subscribe to home broadband service. Training is offered at more than 250 locations throughout the state, including libraries, community colleges, community action councils, Goodwill locations, YMCAs, workforce development centers, and other community anchor institutions. More than 20,000 Ohioans have taken advantage of the ECO program since it began in January 2011. After completing this program, participants are eligible to receive exclusive savings on monthly broadband service subscriptions from providers supporting the ECO program, as well as fully licensed and warranted desktop and laptop computers at significantly discounted prices. Among survey respondents who expressed an opinion, 87% said they thought it was likely that they would subscribe to broadband service in the future.

Conclusion

Appalachian Ohio is a region that could benefit greatly from the full utilization of broadband by businesses. Broadband has the potential to impact employment, business development, and the efficiency of businesses in the region. However, approximately 21,000 businesses in Appalachian Ohio are not using broadband in their day to day activities, a large portion of which have fewer than 20 employees. These businesses could benefit greatly from the expanded customer base and online sales opportunities that broadband technology can provide. In fact, businesses of this size with broadband in Appalachian Ohio earn \$100,000 more in median annual revenue than businesses without broadband.

Appalachian Ohio businesses that do use the Internet are using this technology to better connect to customers and potential partners outside of Appalachia. However, they are less likely to go online for many revenue-building activities such as bidding on contracts and selling products, and are less likely to use other technologies such as videoconferencing and blogging. Digital literacy programs focused on how businesses can better use the Internet as a tool in increasing profits and business growth may be useful in the region.

Businesses in Appalachian Ohio cite a lack of a need for broadband as the number one hurdle to adopting broadband technology, but they are less likely to cite this as a barrier than the state as a whole. Computer ownership, broadband availability, and cost are all large barriers to business broadband adoption in the region. Efforts that focus on providing businesses with both the hardware and the opportunity to connect to broadband may be key to increasing the use of broadband by businesses in Appalachian Ohio. Full utilization of broadband by businesses could help Appalachian Ohio to strengthen its economy and to be more competitive in the global marketplace.



Methodology and Definitions

Connect Ohio conducted a random digit dial telephone survey of 802 business establishments statewide between June 22 and July 21, 2010. Data were collected by Thoroughbred Research Group, located in Louisville, KY. The purpose of this survey was to set benchmarks for technology adoption and barriers to adoption; determine best practices by identifying which applications Ohio businesses use most often; and measure the average price and speed of broadband service among business establishments across Ohio. On average, these surveys took approximately nine minutes to complete.

Sample quotas were established by company size (5 brackets) and industry sector (8 sectors). Within these 40 cells, a randomly-drawn sample of businesses listed with Dun & Bradstreet were contacted for the survey. Altogether, this sample included 186 businesses with 50+ employees, 203 businesses with 20-49 employees, 209 businesses with 5-19 employees, and 204 businesses with 1-4 employees. In cases where the respondent's information regarding the number of employees at the establishment differed from the information provided by Dun & Bradstreet, the respondent's answer was used in determining business size quotas. Connect Ohio intentionally over-sampled large businesses to ensure a sample that was large enough to analyze and compare to smaller businesses.

In addition to the size and sector quotas, the data was subsequently weighted to ensure that the sample was representative of all employer business establishments statewide, with targets determined according to the 2007 United States Census Bureau's County Business Pattern report, the most recent data that was available at the time the survey was conducted. Weighting of the survey data and research consultation were provided by Lucidity Research LLC, located in Westminster, MD.

The Ohio Appalachian region includes the following counties in Ohio: Adams, Ashtabula, Athens, Belmont, Brown, Carroll, Clermont, Columbiana, Coshocton, Gallia, Guernsey, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Lawrence, Mahoning, Meigs, Monroe, Morgan, Muskingum, Noble, Perry, Pike, Ross, Scioto, Trumbull, Tuscarawas, Vinton, and Washington.¹⁵

The local development districts include the following counties in Ohio:

- Buckeye Hills–Hocking Valley Regional Development District: Athens, Hocking, Meigs, Monroe, Morgan, Noble, Perry, Washington
- Eastgate Regional Council of Governments: Ashtabula, Mahoning, Trumbull
- Ohio Mid-Eastern Governments Association: Belmont, Carroll, Columbiana, Coshocton, Guernsey, Harrison, Holmes, Jefferson, Muskingum, Tuscarawas
- Ohio Valley Regional Development Commission: Adams, Brown, Clermont, Gallia, Highland, Jackson, Lawrence, Pike, Ross, Scioto, Vinton, Fayette¹⁶

This sample provides a margin of error of $\pm 4.72\%$ at the 95% confidence level for the total sample of 802 businesses. This sample error accounts for sample weighting, using the effective sample size.

The Ohio Business Technology Assessment was conducted as part of the State Broadband Initiative (SBI) grant program, funded by the National Telecommunications and Information Administration (NTIA). The SBI grant program was created by the Broadband Data Improvement Act (BDIA), unanimously passed by Congress in 2008 and funded by the American Recovery and Reinvestment Act (ARRA) in 2009. To learn more about Connect Ohio and its programs please visit www.connectoh.org or e-mail us at info@connectoh.org.

¹⁵ <http://www.arc.gov/counties>

¹⁶ The ARC does not count Fayette County as part of the Appalachian Region of Ohio, but it is included in the Ohio Valley Regional Development Commission district, <http://www.arc.gov/about/LocalDevelopmentDistrictsinOhio.asp>

Appendix A:

Select Sample Sizes

	n	n	n	n	n	n
	Ohio	Appalachian Ohio	OVRDC	BH-HVRDD	OMEGA	ERCG
All businesses	802	161	59	20	54	32
Businesses that use the Internet	643	128	49	18	41	24
Businesses that use broadband	588	116	43	17	37	22
How many people are employed by your operation at this location?						
Less than 5	204	47				
5 to 19	209	34				
20 to 49	203	40				
50 or more	261	40				