strategic
networks group
the broadband economists

Arkansas
eSolutions Benchmarking Report

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Prepared for

Connect Arkansas
A Project of The Arkansas Capital Corporation Group

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Executive Summary

This eSolutions Benchmarking (eSB) Report is a documentation of data collected in Arkansas between November 2014 and February 2015. This summary provides an understanding of current broadband access, adoption and utilization patterns around the state.

Response Levels: A total of 1,532 organizations contributed to the broadband benchmarking effort. The organizations consisted of 1,236 commercial businesses, 95 government entities and 201 non-profit organizations.

Businesses and Organizations

Connectivity: While only 1.5% of respondents failed to meet the original FCC definition of broadband (768 kbps or more in at least one direction), speed test results during the assessment showed that a high percentage of respondents were significantly below the recently announced FCC standard for broadband[1]. Of those taking the speed test, 63.1% had upload speeds of less than the new standard of 3 mbps, while 80% failed to meet the new download standard of 25 mbps.

In recent years, **wireless networks and mobile devices** have increasingly become a factor in how people communicate, and how businesses and organizations bring efficiency to their operations. Over 83% of businesses use a smart phone and 76.8% use a web-enabled laptop computer. Looking to capitalize on these newer channels of communications, 47.6% of businesses have nonetheless recognized the importance of mobiles apps and have tailored their existing websites to mobile devices. Further, 26.9% percent of businesses are planning to optimize their websites for mobile browsers.

Internet Utilization Patterns: Almost 80% of businesses use the Internet to purchase goods and services online. In contrast, only 40.3% of businesses sell goods and services online and just over 36.8% deliver services and content online. Section 1.3 looks at the level of adoption of different types of Internet applications, as well as cloud solutions, use of mobile services, and which impacts of Internet use are most valued by their users.

Barriers: Security and privacy concerns are the two barriers to Internet utilization that rate the highest in importance, with 40% and 29% of businesses, respectively, rating them as very important barriers.

Financial and Employment Impacts of Internet Use: While over 1,682 new positions were created by responding businesses in the preceding 12 months, these businesses also experienced sizeable job reductions, resulting in a net job increase of 1,290 positions. The net job increase attributed to using the Internet was 461 positions or 29.4% of all new jobs. Section 1.5 outlines employment impacts, as well as reported impacts on revenues and costs in responding organizations.

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[1] http://www.washingtonpost.com/blogs/the-switch/wp/2015/01/29/the-fcc-has-set-a-new-faster-definition-for-broadband/

Benchmarks for Organizations:

Section 2 provides statewide benchmarking to compare how different regions and industry sectors utilize the Internet. Key conclusions are that size of business and geographic location are key factors in the level of Internet utilization. Larger and more metropolitan businesses utilize the Internet more than smaller and more rural businesses. In essence, there is a digital divide or **utilization gap,** between small and large businesses.

Introduction

This eSolutions Benchmarking (eSB) Report is a summary report that provides insights into current Internet access, adoption and utilization patterns across Arkansas.

On behalf of Connect Arkansas, SNG reached out to commercial and non-commercial organizations across the state to encourage participation in the online assessment. Businesses, non-profit organizations and some government entities were asked to complete a self-assessment in the form of an online survey that collected information on the availability of broadband (high-speed Internet access), how broadband is being used in the organization, along with questions that would help identify benefits, drivers and barriers to adoption and utilization.

While it is not possible to include every question and response from the assessment here, this eSB report provides insights into key findings that point to gaps and opportunities for increasing broadband utilization. In addition to the information presented in this report, all the data collected through this initiative is available through an online platform called the Digital Economy Analytics Platform (DEAP), which the staff of Connect Arkansas can access. The insights contained within this eSB report should be used as a guide for developing an overall broadband utilization strategy.

The report is organized into the following sections:

- **Introduction and Methodology Overview** – A brief description of the benchmarking initiative, an overview of the key methods used, and scope of research and analysis.

- **Key Findings** – Summary and highlights from data provided by Arkansas businesses.

- **Benchmarks for Analysis of Internet Utilization –** As a benchmarking process, SNG has created the Digital Economy Index (DEi) to compare Internet use between groups by various characteristics, such as industry, business size, and geographic location. Benchmarks create reference points against which the performance of any establishment or group can be compared.

- **Methodology Overview** – The core methodology is founded on primary research consisting of data collection through an online self-assessment of both commercial and non-commercial organizations. Information was collected directly from Internet users in the following categories: user profile, Internet utilization, Internet benefits and barriers to Internet use.

The organizational assessments were made available for online access through one of two means:
- Individual businesses and non-commercial organizations[2] were invited to participate via direct email invitations sent from a large, statewide contact list.

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[2] This report categorizes organizations into four areas: businesses, non-profit organizations, and government entities. The term "non-commercial organizations" includes both non-profit organizations and government entities.

- Businesses and non-commercial organizations were encouraged through a variety of communications channels to access a web link to the online assessment.

Email invitations were sent directly to 34,300 organizations across Arkansas, providing access to the online assessment. The initial email invitation was sent on November 20th, 2014 and reminder emails were sent roughly every seven days with the assessments process closing on February 18th, 2015.

A total of 1,532 organizations contributed to the broadband benchmarking effort. The organizations consisted of 1,236 commercial businesses, 95 government entities and 201 non-profit organizations. This eSolutions Benchmarking Report provides a very useful overview of Internet connectivity and utilization characteristics in Arkansas. Additional data from the assessment and benchmarking effort is provided through the Arkansas DEAP website, which is described in Appendix B.

The majority of respondents fully completed the assessments. However, partially completed assessments are included in the analysis on the basis that the responses provided are valid and useful even if the respondent chose not to complete the entire assessment. Therefore, every data chart in this report indicates the N= value that provides the number of data points included to generate each particular figure.

Further details on the methodology are provided in Appendix A with a brief Glossary of report terminology in Appendix B.

1   Organizational Assessment

Access to and effective use of the Internet has become an essential element in the survival and success of both commercial and non-commercial organizations in today's economy as well as society as a whole. This section identifies key findings related to how organizations and businesses use the Internet, what types of benefits they value most, and which barriers prevent more effective use. The report pays special attention to Internet use by businesses. The findings are broken down by key respondent characteristics such as industry sector, employment size and connectivity type.

1.1   Respondent Profile

The sample set outlined in this section includes data from organizations across the state. Figure 1 identifies the number and percentage of responses from each of eight regions within Arkansas. Figure 2 identifies the percentage of responses by level of urbanization[3]. These geographic categories show the degree to which different geographic areas and types of communities are captured in the assessment data. These geographic categories are also used later in the report to compare levels of Internet utilization across the state.

Figure 1 –Responses by Region

Region	# Responses	Pct. Of All Responses
Central	510	33.3%
Northwest	337	22.0%
East	145	9.5%
West Central	131	8.6%
White River	114	7.4%
Western	113	7.4%
Southwest	91	5.9%
Southeast	91	5.9%

Responses to the assessment and the completed data set are closely aligned to US Census Bureau data in terms of geographic distribution of businesses. The data (Figure 2) fell among Metropolitan was 59% (58% Census Bureau), Micropolitan 22% (19% Census Bureau), Small Town, 11% (15% Census Bureau), Isolated Small Town, 8% (8% Census Bureau).

Figure 2 - Responses by Level of Urbanization

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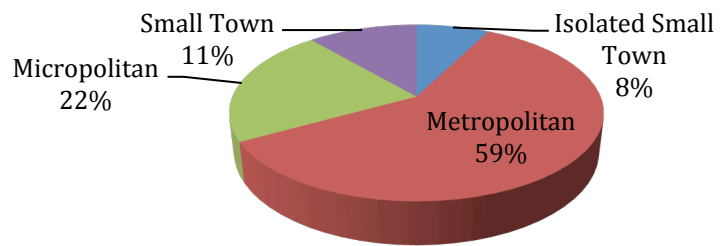
[3] A metropolitan area is defined by the Census Bureau as having a core urban area of over 50,000 with a population density greater than 1,000 people per square mile. A micropolitan area has a population of 10,000 to 49,999. A small town has a population of 2,500 to 9,999. The category of "isolated small town" includes the remainder.

Another key variable factor in understanding Internet use is the size of an organization. SNG research consistently shows that on average, the larger an organization is, the higher their utilization of Internet-enabled services. Our assessment sample, as shown in Figure 3, shows that the breakdown of responses by size of establishment is similar to the state profile as reported by the Census Bureau, with a slight under-representation of micro businesses (those with less than 10 employees). This in spite of an over-sampling of these businesses being invited to participate.

Figure 3 - Responses by Employment Size of Organization (Number of Employees)

N = 1,009
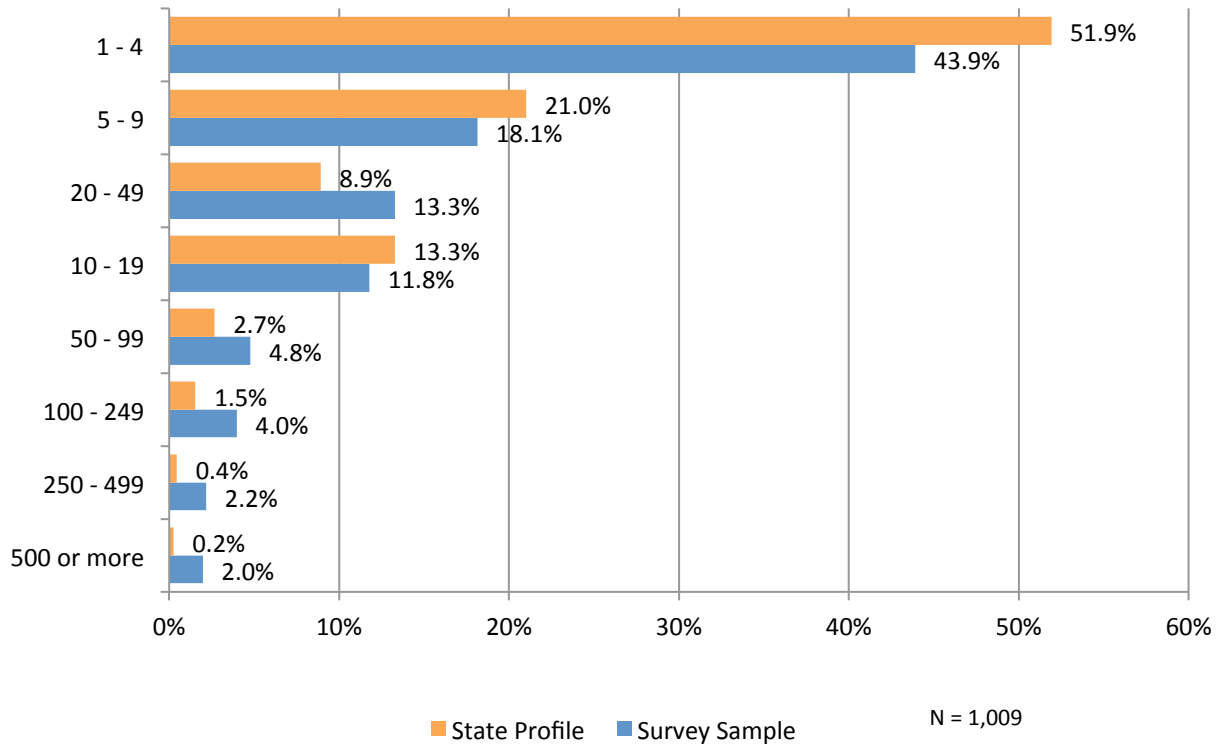
How businesses and organizations access and use the Internet also varies by industry sector. The sample includes assessments of organizations across all 20 industries classified by NAICS.[4]

Figure 4 provides a comparison of respondents to the industrial profile of Arkansas, including both businesses and non-profit organizations, but not government entities (which are not included in Census Bureau data).

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[4] North American Industry Classification System. Industry breakdowns are at the 2-digit NAICS code level. Some responses did not have an industry classification.

Figure 4 - Responses by Industry Sector

N = 1,525
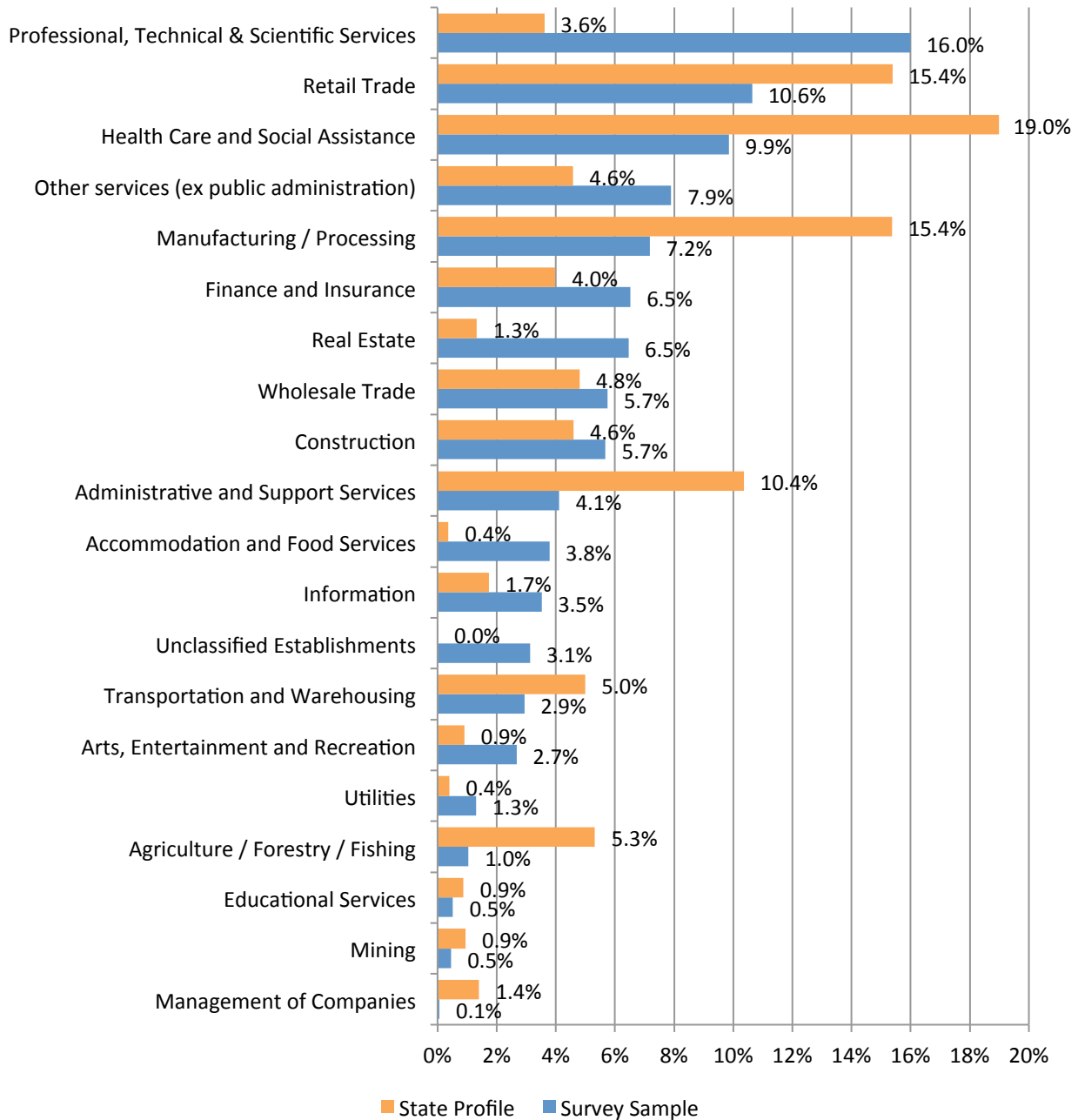
The sample resulting from the assessments is under-represented in retail trade, health care, manufacturing, agriculture, and administration services. Respondents were over-represented in professional and technical services, information, and real estate. The over- or under-representation of specific sectors is mitigated insofar as the report provides data on utilization within each of these industry sectors. State profile data does not include data on Public Administration.[5]

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[5] State data source: US Census Bureau County Business Patterns 2011 – Number of establishments shown for sample do not include Public Administration in the totals for comparative purposes.

1.2   Organizational Connectivity Characteristics

The speed and quality of Internet connections strongly impacts many organizational uses of the Internet, such as video conferencing and real-time collaboration.

As seen in Figure 5, cable, DSL, and fiber are the predominant technologies for connectivity. A small percentage of businesses and organizations use dial-up (0.7%) and satellite (2.1%) connections as their primary connection.[6]

Figure 5 – How Businesses and Nonprofit Organizations Connect to the Internet in Arkansas

N = 1,437   ■ % of Respondents
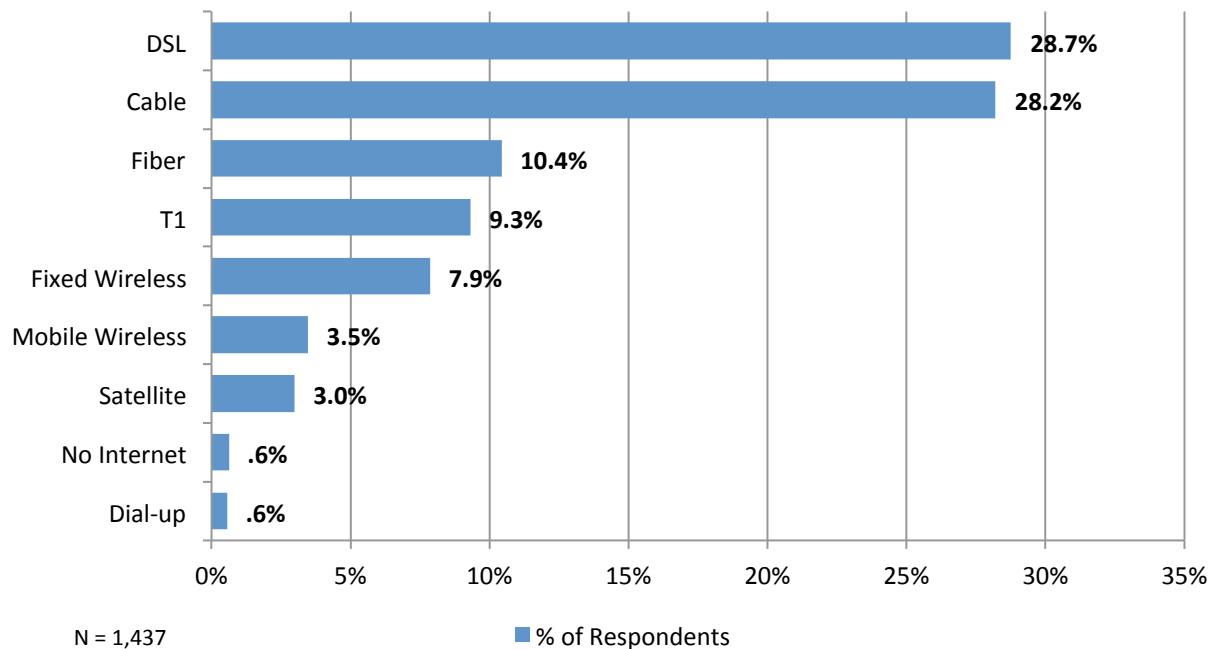
1.2.1   Internet Speeds

The use of broadband is very high across all types and locations of organizations. While almost 96% of businesses and non-profit organizations have connectivity other than dial-up or satellite, many still lack broadband level connections in at least one direction (upload and/or download).

The assessments included an opportunity for respondents to take a live speed test that assessed their actual upload and download speeds. The number of assessment responses, indicated by N in each chart, vary because completion of the speed test portion was optional. Figures 6 through 11 summarize the results of the speed test portion of the assessment.

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[6] Some of the tables in this section exclude data from government entities as there is a markedly different profile of connectivity characteristics among these in the form of a disproportionate presence of fiber (23.2%) and T1 (14.7%) Internet services.

While only 1.5% of respondents failed to meet the <u>original</u> FCC definition of broadband (768 kbps or more in at least one direction), speed test results (Figures 6 and 7) showed that a high percentage of respondents were significantly below the recently announced FCC standard for broadband[7]. Of those taking the speed test, 63.1% had upload speeds of less than the new standard of 3 mbps, while 80% failed to meet the download standard of 25 mbps.

Figure 6 – Speed-Test Results for Average Upload Speeds (businesses and nonprofit organizations)

Category	Pct. of Users
Less than 200 kbps	1.9%
200 kbps up to 768 kbps	22.6%
768 kbps up to 1.5 mbps	20.7%
1.5 mbps up to 3 mbps	17.9%
3 mbps up to 6 mbps	11.2%
6 mbps up to 10 mbps	7.9%
10 mbps up to 25 mbps	12.3%
25 mbps up to 50 mbps	1.9%
50 mbps up to 100 mbps	2.8%
100 mbps or more	.7%

N = 535
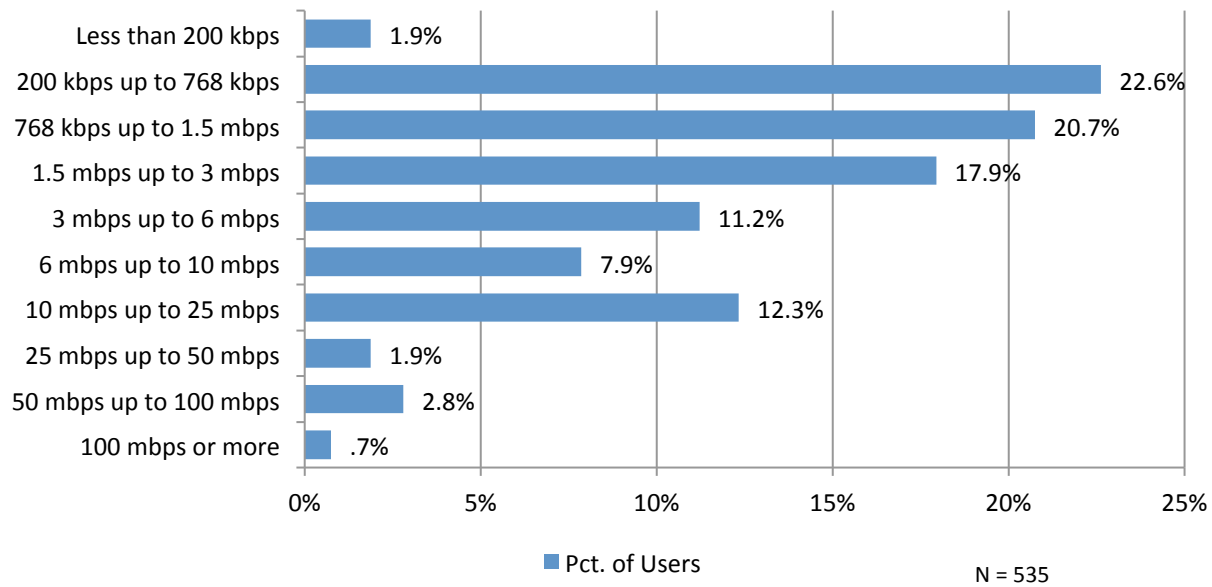
Figure 7 - Speed-Test Results for Average Download Speeds (businesses and nonprofit organizations)

Category	Pct. of Users
Less than 768 kbps	1.5%
768 kbps up to 1.5	6.1%
1.5 mbps up to 3	9.8%
3 mbps up to 6 mbps	17.6%
6 mbps up to 10 mbps	14.5%
10 mbps up to 25	29.5%
25 mbps up to 50	8.2%
50 mbps up to 100	11.1%
100 mbps up to 1	1.7%

N = 539

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[7] http://www.washingtonpost.com/blogs/the-switch/wp/2015/01/29/the-fcc-has-set-a-new-faster-definition-for-broadband/
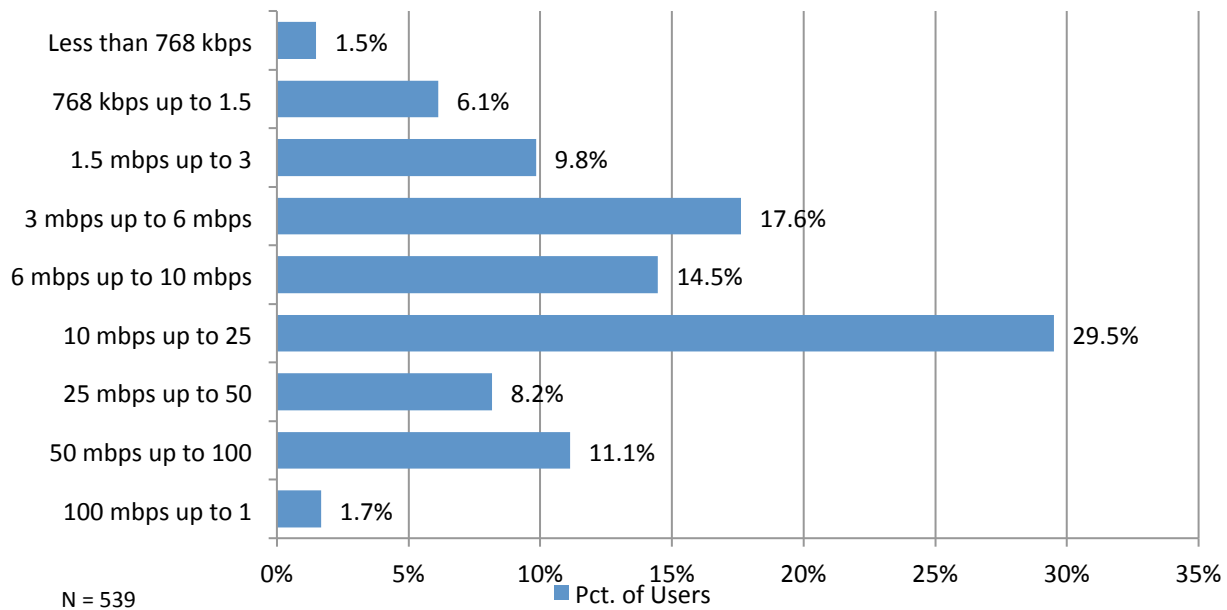
SNG's internal analysis shows a stronger correlation with Internet utilization and upload speeds than with download speeds. Thus, for businesses and other organizations to get the most out of broadband, upload speed is proving to be the critical direction. Figure 8 shows that businesses and non-profit organizations are far more likely to have slower upload speeds than government entities.

Figure 8 –Average Upload Speeds by Sector

Upload Speed Range		Businesses	Nonprofits	Gov't Entities
Lower speeds	Less than 200 kbps	1.4%	3.3%	5.3%
	200 kbps up to 768 kbps	22.0%	31.1%	15.8%
	768 kbps up to 1.5 mbps	22.2%	18.0%	7.9%
	Sub-total Under 1.5 mbps	45.6%	52.4%	29.0%

Upload Speed Range		Businesses	Nonprofits	Gov't Entities
Higher speeds	25 mbps up to 50 mbps	2.1%	0.0%	2.6%
	50 mbps up to 100 mbps	1.4%	9.8%	18.4%
	100 mbps or more	0.9%	0.0%	0.0%
	Sub-total Over 25 mbps	4.4%	9.8%	21.0%

As seen in Figure 9, the speed test results varied significantly between different technologies, with fiber leading by a wide margin. T1, cable, fixed wireless, and mobile wireless form the second fastest tier of service, while DSL and satellite recorded the slowest speeds. It is worth noting that based on SNG data collected since 2010; speeds are increasing rapidly for fiber, cable, and both fixed and mobile wireless.

Figure 9 – Speed-Test Results by Type of Connectivity (all sectors)

N = 535
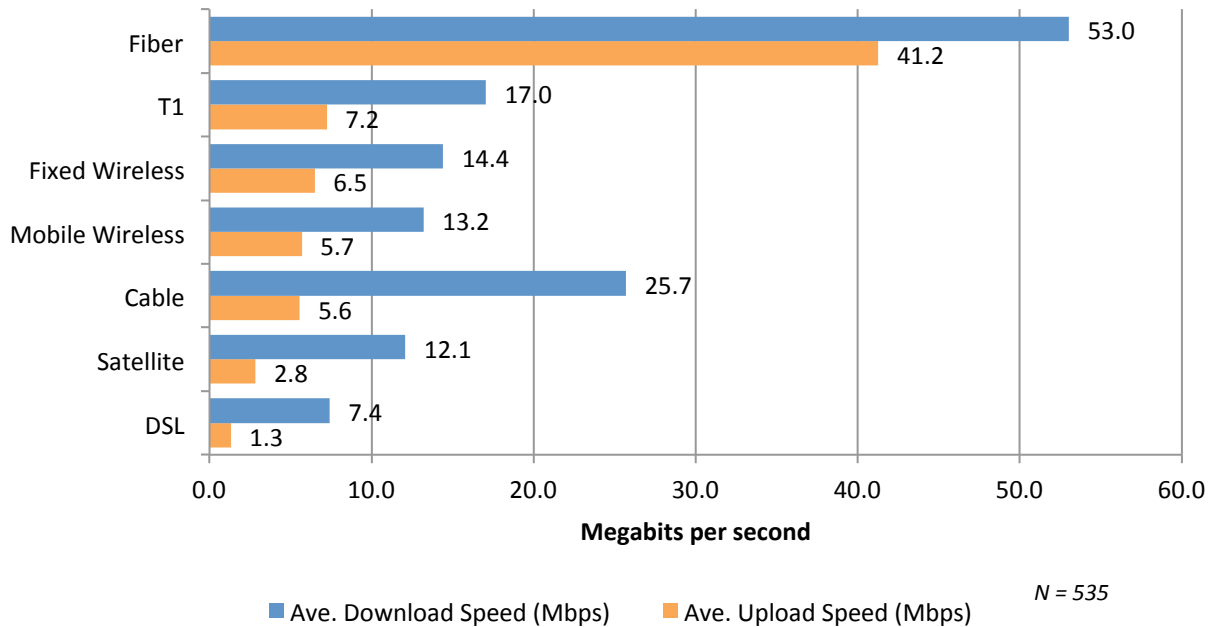
Figures 10 and 11 show that connectivity speeds for both downloads and uploads varies between metropolitan and non-metropolitan areas[8]. With a couple of exceptions, metropolitan areas have significantly faster connectivity than non-metro areas, even when controlling for types of technology. Other than T1 and satellite, metro areas have faster download speeds than non-metro areas. For uploads, metropolitan areas have consistently faster connectivity across all technologies.

Figure 10 –Download Speeds (mbps) by Connection and Level of Urbanization (all sectors)

N = 306 Metropolitan, 227 Non-Metro
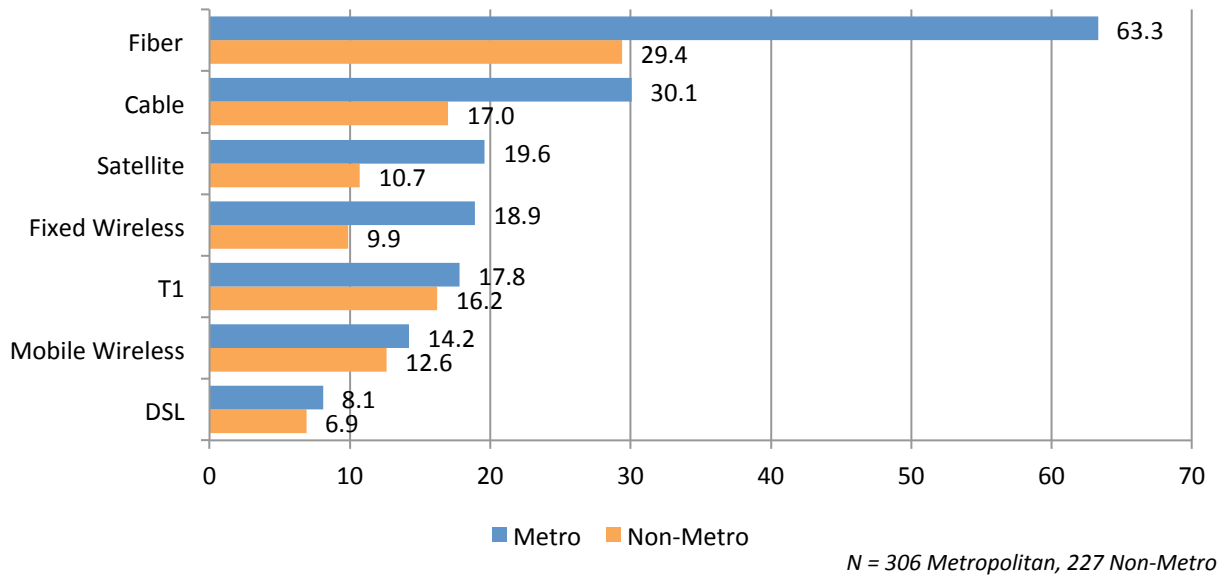
Figure 11 –Upload Speeds (mbps) by Connection and Level of Urbanization (all sectors)

N = 306 Metropolitan, 227 Non-Metro

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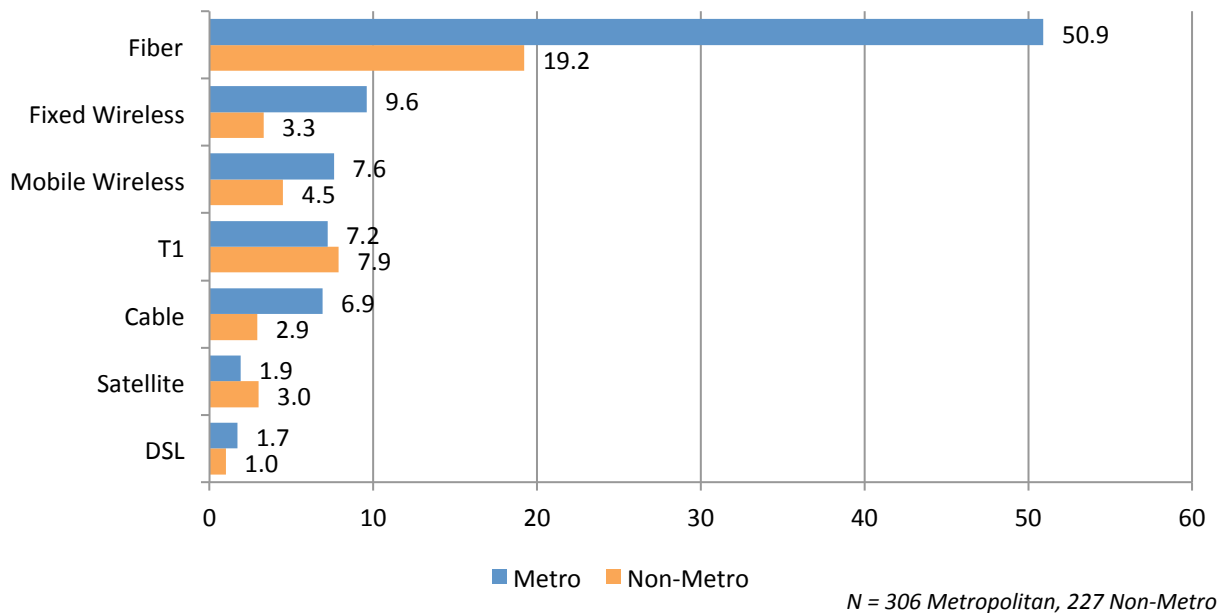
[8] A metropolitan area is defined by the Census Bureau as having a core urban area of over 50,000 with a population density greater than 1,000 people per square mile. A micropolitan area has a population of 10,000 to 49,999. A small town has a population of 2,500 to 9,999. The category of "isolated small town" includes the remainder.

1.2.2   Cost

Cost for Internet services vary greatly, ranging from a median of $60 for fixed wireless and DSL, to between $80 and $100 for satellite, mobile wireless, and cable. Dial-up costs are based on a small sample of four respondents and are most likely not representative (based on data from other SNG assessments and benchmarking efforts).

Figure 12 – Internet Costs by Type of Connection (all sectors)
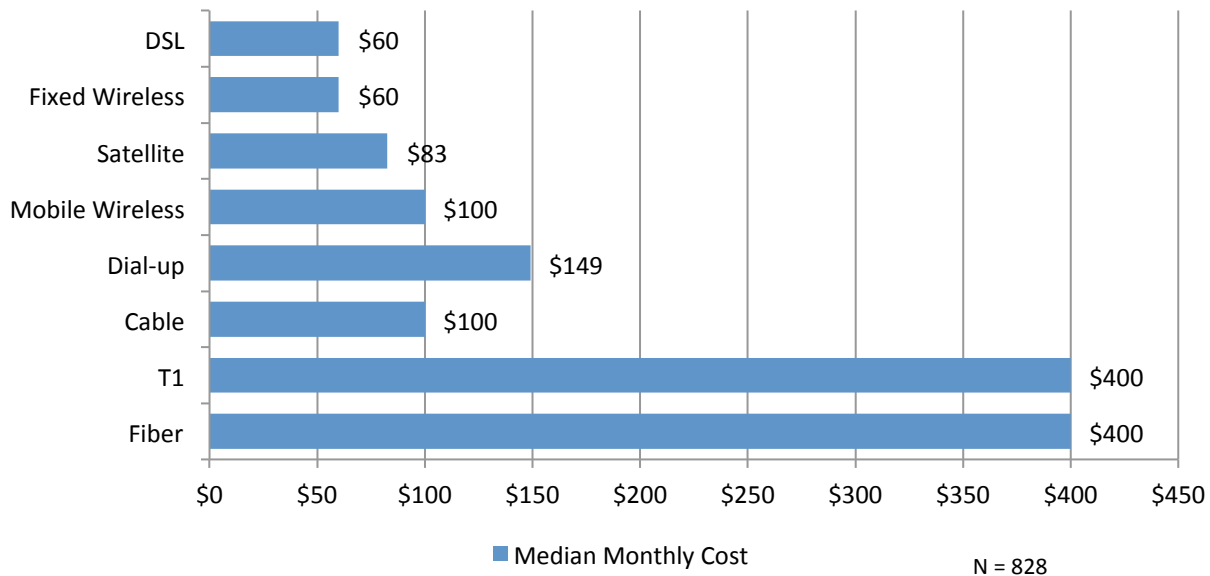
The monthly expenditures of Internet connectivity generally increase with organization size. Over 50% of small businesses with 1-9 employees spend less than $85 per month, while 50% of establishments with 20 or more employees spend $200 or more per month.

1.2.3   Satisfaction

Respondents were asked about their level of satisfaction with their existing Internet service. In terms of reliability, fiber was clearly the best rated of the available technologies, with only 8.8% of fiber users stating that they had occasional or frequent problems. Cable, T1 and fixed wireless formed the next tier with approximately 27% of users reporting occasional or frequent problems with reliability. Satellite and DSL were the worst rated with 42 to 44% of respondents reporting frequent or occasional problems.

While 21.3% of all respondents felt **the value of their Internet service** was poor or below expectations, this number increased for mobile wireless and satellite users (32% and 48.9% respectively). Fiber was the least likely to be rated as poor value or below expectations (5.7%).

1.3 Broadband Utilization and Benefits

1.3.1 Utilization Patterns

The extent to which **businesses** use esolutions (Internet-enabled applications[9]) provides an indication of their degree of engagement in the digital economy and their leveraging of broadband capacity. The following findings summarize the business uses of broadband categorized by organizational characteristics. Sections 1.3, 1.4 and 1.5 focus on commercial businesses only.

The assessment of businesses explores the uses of esolutions in two major categories: **eCommerce**, which includes activities related to the sales, marketing and delivery of products and services; and **eProcess**, which include internal operational uses, such as supplier coordination, training and teleworking. Figures 13 and 14 provide a summary of the results. Section 2.1 provides benchmark analysis of esolutions.

Figure 13 – eCommerce Uses of Broadband

Category	Currently use	Plan to use
Research by staff	84.8%	4.8%
Purchasing goods or services	79.9%	5.7%
Web site for organization	81.0%	8.4%
Customer service and support	66.4%	11.8%
Advertising and promotion	65.2%	13.8%
Selling goods or services	58.5%	7.3%
Multimedia & interactive web content	45.9%	15.0%
Deliver services and content	40.3%	14.3%

N = 1,087

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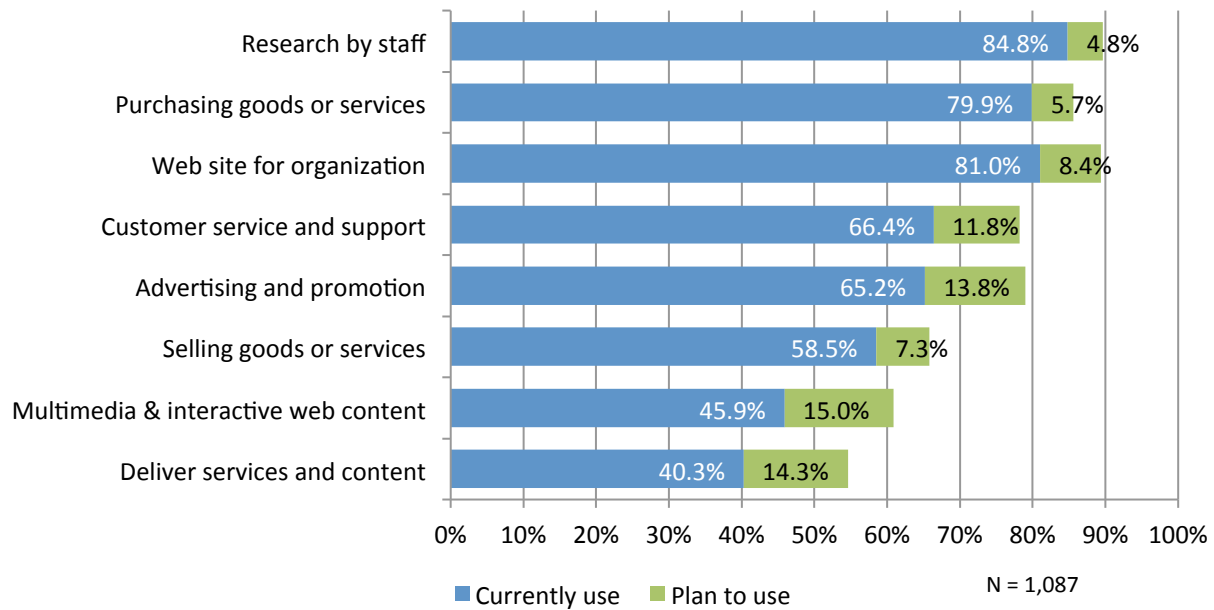
[9] The term "**esolutions**" refers to the integration of Internet technologies with the computer-based systems and applications within and among organizations for a variety of operational processes. eSolutions encompass not only product delivery and payment transactions (eCommerce) but also all processes that may be facilitated by computer-mediated communications over the Internet.

Figure 14 – eProcess Uses of Broadband
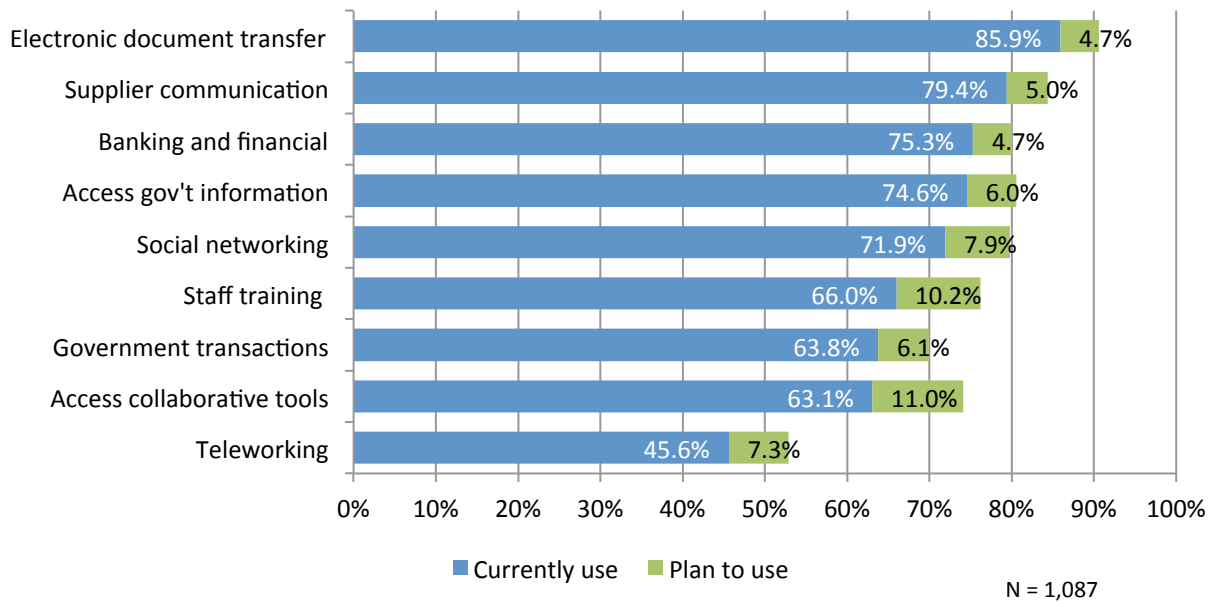
Utilization of Internet-enabled applications and operations is still evolving. Simpler processes that have long been available, such as email, are heavily accessed by all user types. Differentiation emerges in utilization patterns as more complex business and transactional processes come "online," and more current technologies spawn enhanced or new capabilities. **The two most significant factors in broadband utilization levels are size of organization and industrial classification to which an organization belongs**.[10]

Broadband offers processes and applications that can transform the way businesses conduct their operations. Nearly 4 in 5 (79%) businesses use broadband for coordination with suppliers, while 66% use broadband for employee training and another 66% for improving customer service. Likewise, 79.9% of businesses use the Internet to purchase goods and services online. In contrast, only 40.3% of businesses sell goods and services online and just over 36.8% deliver services and content online.

1.3.1.1 Utilization of Mobility Services

Businesses report a very high utilization of mobile devices for Internet access, which highlights the importance for mobility functions and services internal to their organization for use when away from the office or place of business. Mobility services allow remote workers to access business resources when working at off-site locations, such as at a client's location. These high utilization percentages are expected to increase as more mobile access is available, more devices are adopted, and more business applications are developed. Different industry sectors from non-metropolitan

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[10] This finding can be seen in the data from Arkansas and its consistent with assessments carried out by Strategic Networks Group in six other states.

Figure 15 – Business Utilization of Mobile Internet

Category	Currently use	Plan to use
Work communication	75.1%	9.0%
Research	73.5%	8.3%
Applications	46.9%	16.5%
Remote data entry	46.1%	17.1%
Training	42.0%	16.7%
VPN access	30.8%	9.4%

■ Currently use ■ Plan to use *N = 759*
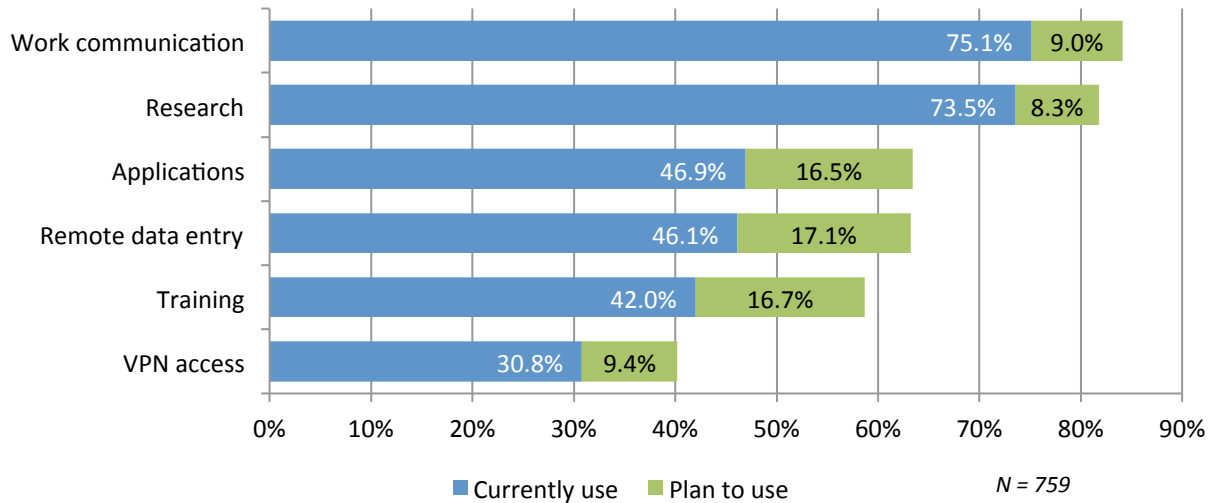
As seen in Figure 16, 83% of businesses use a smart phone and 76.8% use a web-enabled laptop computer. Tablets show the greatest planned growth, an expected finding as the other devices have long been around longer and are nearing market saturation. Many mobile analysts believe that the ceiling for tablets and laptop computers is around 93%, with smartphones potentially as high as 96% adoption.

Figure 16 – Use of Web-enabled Mobile Devices

Category	Currently use	Plan to use
Smartphones	83.0%	4.2%
Laptop computers	76.8%	4.9%
Tablets	60.3%	11.2%
Other web-enabled mobile phones	25.0%	5.5%
Other mobile devices	17.3%	9.1%

N = 849 ■ Currently use ■ Plan to use
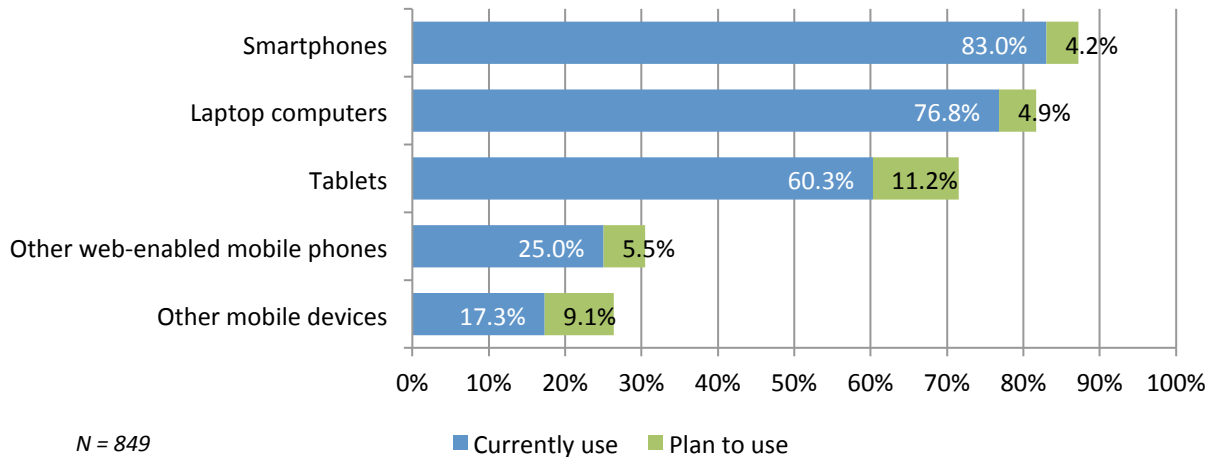
1.3.1.2 Cloud Services

With the recent rapid growth in cloud-based services, the Internet utilization assessment asked how many businesses were using cloud services and for what purposes. As seen in Figure 17 below, less than half (46.2%) of respondents indicated they were already using cloud-based services, with another 10.5% actively considering them as a possible solution for internal and external services and collaboration.

Figure 17 – Percentage of Businesses Using Cloud Based Services
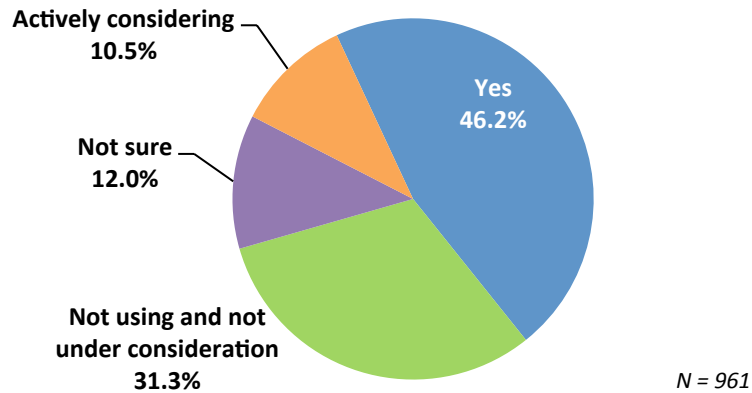
Basic applications (like email, word processing, sharing spreadsheets and office documents) and collaborative platforms[11] were the two most used cloud-based services at 63.8%. Motivations for utilizing cloud-based services are varied, with six possible motivating factors being identified as very important or somewhat important by over 75% of cloud services users. As Figure 18 shows, the most important drivers were mobile access to the Internet and affordability, with the ability to facilitate offsite disaster recovery at a close third.

Figure 18 – Motivating Drivers of Adoption of Cloud Services
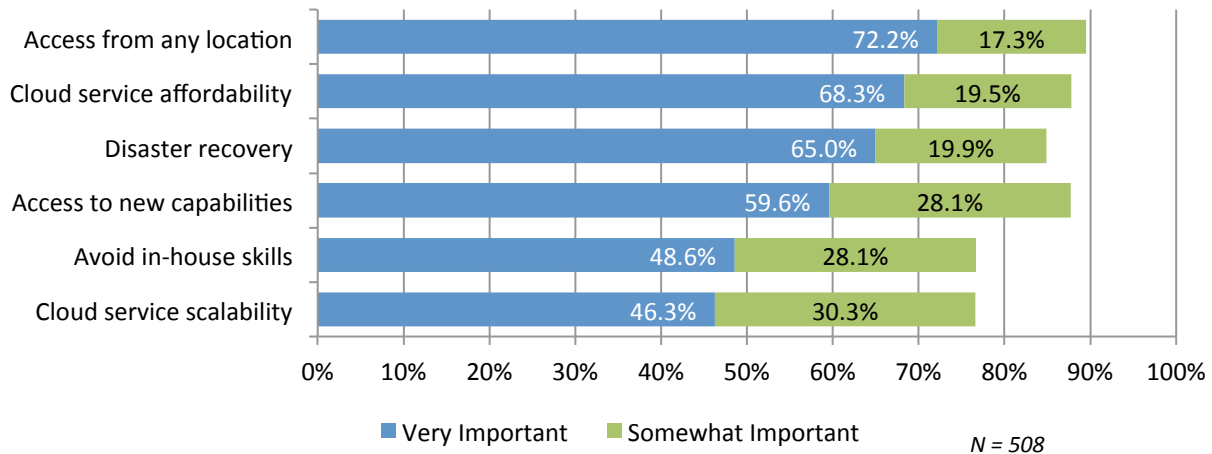
1.3.1.3   Mobile Applications and the Mobile Web

With the rapid growth in mobile applications (apps) and mobile-optimized websites, the business assessment probed how businesses were using mobile apps. Figure 19 looks at application-specific

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[11] Collaboration platforms integrate a range of software components that enable groups of individuals and organizations to work together on common tasks or projects. Typical components are messaging (email, scheduling, and calendars), file sharing with version control, and real-time communication (instant messaging and Internet conferencing).

utilization by category to offer an insightful look into how businesses in Arkansas today are using mobile applications.

Figure 19 - Mobile applications used by businesses

N = 339

■ Currently use   ■ Plan to use
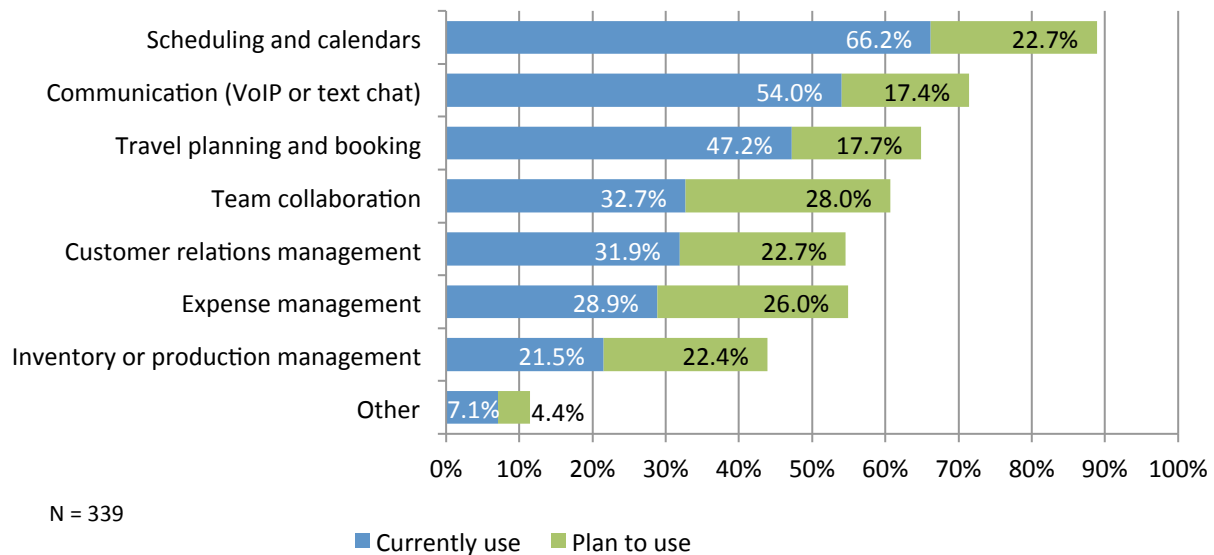
Even if a business did not have a stand-alone application for their business, 47.6% of these have nonetheless recognized the importance of mobile applications and have tailored their existing websites to mobile devices. Further, 26.9% percent of businesses are planning to optimize their websites for mobile browsers. Typically, a mobile-optimized website will contain most of the same content and information that a traditional browser-based website has, only organized and presented in a format suitable for smaller screens, touch controls, and intuitive navigation. An application would also integrate interactive map functionality for mobile customers to drive directly to the business location, and click to call function for quicker means of communication, as opposed to a traditional website that would perhaps offer a static map graphic with links to email the business.

1.3.2 Broadband and Deciding Where to Locate

To better determine the impact of broadband on physical business locations, businesses were asked about the importance of broadband for both selecting their location and for remaining in their current location. Responses to the assessment process clearly indicate that availability and suitability of broadband play an important role in corporate decisions to remain in a community, and if a business is moving, which areas it is willing to consider.

- **Almost 40% of businesses say that broadband service was "essential" in selecting their business location, and**
- **Over 58% say broadband is "essential" for remaining in their current location.**

1.3.3 Broadband Benefits and Impacts

Overall, the majority of businesses recognize broadband as important across all benefits dimensions, except telework[12]. The most generally recognized benefits are related to improved efficiency and productivity, as well as improving service to customers. Productivity-related benefits are slightly more valued by businesses than the revenue-related benefits, such as market reach, competitiveness, increasing revenues, and introducing new products.

The net effect of these benefits is to increase competitiveness, productivity and revenues, while reducing costs and improving profitability. **Understanding broadband's importance in contributing specific benefits allows for a more complete understand of broadband's impact.** Further documentation of financial and employment impacts can be found in Section 1.5.

Figure 20 – Importance of Broadband Benefits for Businesses

N = 712

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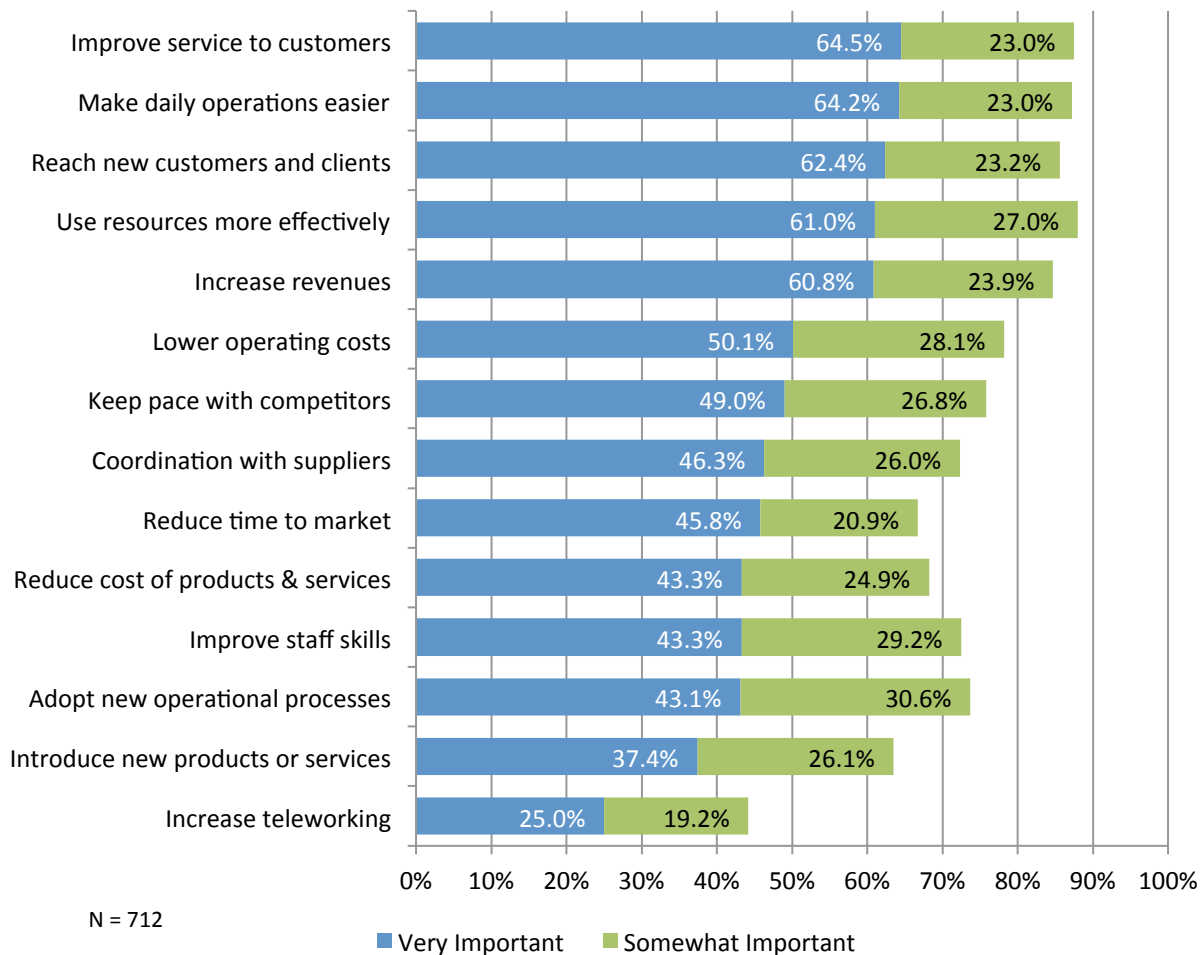
[12] The relatively low importance of telework as a benefit is impacted by the large percentage of small businesses (1-19 employees) that make up the sample and their low use of telework (42.5%).

1.4   Barriers and Adoption Issues

1.4.1 Barriers to Adoption

Businesses were asked to rate the significance of a number of barriers to effectively using broadband Internet in their operations. These barriers inhibit the adoption of esolutions and need to be recognized and overcome if broadband utilization and its benefits are to be achieved.

1.4.2 Expertise and Knowledge Issues

Expertise is needed to implement and use esolutions. Businesses may encounter several interrelated issues in adopting esolutions:

- Lack of internal resource with necessary skills
- Time and effort required to develop expertise
- Lack of local external support resources
- Affordability of local external support resources
- Too much information – not enough time to research options
- Higher priorities to focus on

Businesses were asked to identify which of these issues are critical barriers to progress. Competing priorities and a lack of time/too much information represent the largest barriers, followed by the cost of external supports, lack of internal resources and the high effort required to develop internal expertise.

The assessment also asked businesses to identify more specifically which issues presented a barrier to greater Internet utilization (Figure 21).

Figure 21 – Barriers to Greater Businesses Use of the Internet
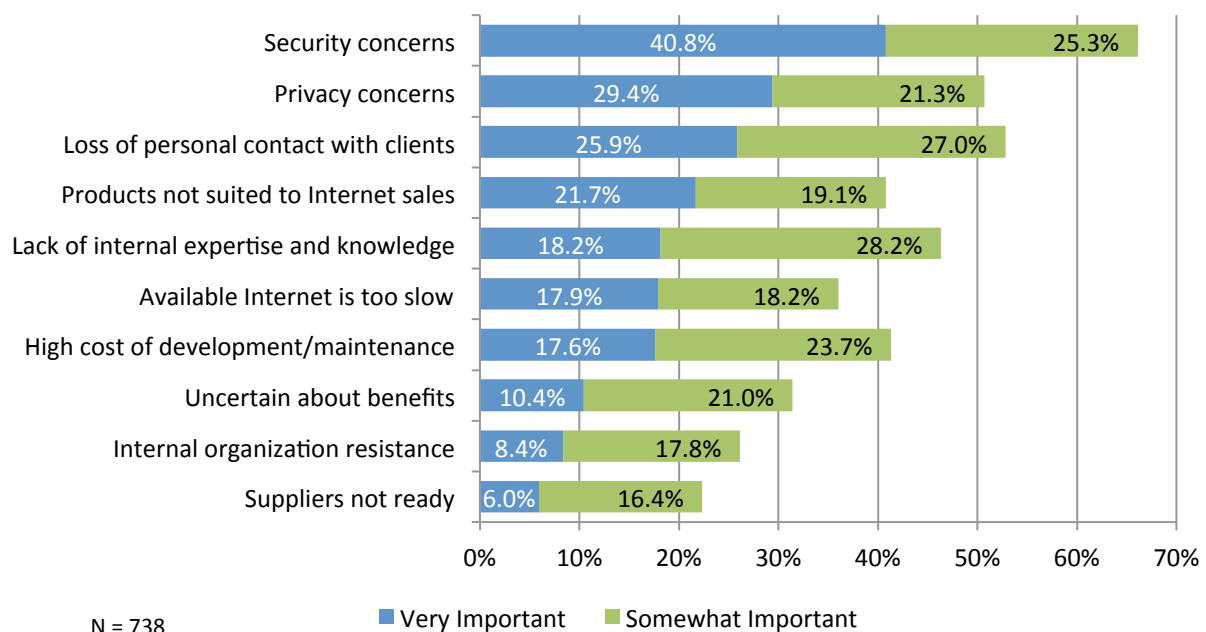
Security and privacy concerns are the two barriers that rate the highest in importance, with more than 40% and 29% of businesses, respectively, rating them as very important barriers. It is worth noting that these two strongest perceived threats are external in nature, perhaps considered even more of a threat because these are somewhat out of the business' control. It is interesting to note that while the emphasis at a policy level continues to be the need to obtain higher connectivity speeds, **"slow Internet" is not a top 5-business barrier to utilization**.

1.4.3 Skills Acquisition

Businesses were asked about which methods they are most likely to use for the internal development of knowledge and expertise for researching, planning or implementing esolutions.

Figure 22 – Preferred Methods for Acquiring Internal Knowledge

N = 693   ■ Very Likely ■ Likely ■ Undecided ■ Unlikely ■ Very Unlikely

Method	Very Likely	Likely	Undecided	Unlikely	Very Unlikely
Online reference materials	40.8%	27.0%	13.9%	8.1%	10.2%
Live webinars with experts	27.7%	26.0%	19.5%	15.2%	11.7%
Direct with service vendors	23.4%	28.6%	17.6%	17.5%	13.0%
In-person info sessions	17.6%	23.4%	23.2%	21.6%	14.1%
One-on-one on location	16.3%	21.9%	22.4%	21.8%	17.6%
Formal online training	15.6%	26.0%	24.4%	18.0%	16.0%
Formal classroom training	10.2%	17.6%	25.4%	28.3%	18.5%

Self-directed methods of knowledge development, such as online research and webinars, are the most likely education methods to be used by the majority of businesses. Notably, formal training methods are less likely to be used, with classroom training the least likely to be used by 46.8% of businesses.

1.5   Financial and Employment Impacts from Internet Use

To assess the impacts of Internet use on the operations, businesses were asked to quantify how using the Internet has affected revenue generation, operating cost savings, and employment. Due to the proprietary and sensitive nature of this information, these questions were optional for respondents in order to maximize participation in the assessment process. As a result, the sample sizes for usable data in these areas is significantly less than for the total set of responses. The largest amount of impact data collected was in relation to employment impacts of the Internet, on which 281 establishments reported data. For financial impacts, 124 and 63 businesses reported data for revenues and operating cost savings related to the Internet, respectively. These data, as reported by individual businesses, suggest the types of impacts that other businesses could also realize.

Businesses were asked to provide their total annual[13] revenues, operating costs, and current employment to provide a baseline for assessment of impacts. They were also asked to provide the changes as a result of using the Internet, specifically:

- **Total Annual Revenue** from the Internet over the past 12-month period.
  - o *Example: This may include direct Internet (online) and income enabled by using the Internet to interact with customers.*
- **Total Annual Cost Savings** from using the Internet over the same period.
  - o *Example: This may include direct labor costs and other operating cost savings through efficiencies in purchasing and new operating processes.*
- **Number of new jobs created** in the past 12-month period and the number of new jobs created that can be attributed to using the Internet.
  - o *Example: Consider the difference to job creation if your organization did not use the Internet.*

In terms of the impact of the Internet on both revenues and cost savings, 124 Arkansas businesses reported that 24.7% of 12-month revenues were generated through the Internet, and 63 businesses in the state reported a 12-month operating cost savings of 6.6% due to their use of the Internet.

Figure 23 – Annual Revenues and Cost Savings from Internet Utilization

Annual Revenue Impacts			
Number of Establishments	Total Annual Revenue ($M)	Annual Revenue from Internet ($M)	Percent Internet Revenue
124	$784	$193	24.7%

Annual Operating Cost Impacts			
Number of Establishments	Total Annual Operating Cost ($M)	Cost Saving from Internet ($M)	Percent Cost Saving
63	$120	$8.5	6.6%

---

[13] Annual figures were requested for the past 12-month reporting period.

As seen in Figure 24, while over 1,682 new positions were created by responding businesses in the preceding 12 months, these businesses also experienced sizeable job reductions, resulting in a net job increase of 1,290 positions. The net job increase attributed to using the Internet (Figure 25) was 461 positions, or 29.4% of all new jobs.

Figure 24 – Summary of Employment Impacts of Business Responses (Full and Part Time combined)

Size of Employer	Number of Businesses	Current Employees	New Jobs Created in Last 12 Months	Lost Jobs	Net Jobs
0 to 19	165	1,266	327	141	186
20 to 49	62	1,980	257	48	209
50 to 99	19	1,245	123	54	69
100 to 499	30	6,847	699	98	601
500 or more	5	3,543	276	51	225
Totals	**281**	**14,881**	**1,682**	**392**	**1,290**

Figure 25 – Summary of Employment Impacts Specific to Internet Use (Full and Part Time combined)

| Size of Employer	New Jobs from Internet Use	Lost Jobs from Internet Use	Net Jobs from Internet Use	New Jobs from Internet Use as Percentage of New Jobs
0 to 19	92	18	74	28.1%
20 to 49	46	6	40	17.9%
50 to 99	48	8	40	39.0%
100 to 499	206	1	205	29.5%
500 or more	102	0	102	37.0%
Totals	**494**	**33**	**461**	**29.4%**

Looking at the size of reporting businesses, Internet use facilitated 28.1% net jobs created by firms with 0-19 employees, 17.9% net jobs from firms of 20-49 employees, 39% of net jobs for firms of 50-99 employees, 29.5% net jobs for 100-499 employees, and 37% net jobs for 500 and more employees.

2 Benchmarks

This report includes comparisons of Internet use between regions by various characteristics, such as industry and business size. To assist in the process of making comparisons, a mechanism was developed for establishing benchmarks. Benchmarks are useful in creating reference points against which the performance of any individual or group can be compared. Strategic Networks Group has developed a benchmarking process based on its Digital Economy index (DEi).

2.1 The Digital Economy Index

The Digital Economy index (DEi) reflects a business' or organization's utilization of 17 different Internet applications and process. These applications and processes (eSolutions) are listed on the following page. Based on the number of applications currently being used by an organization, a composite score is calculated that summarizes how comprehensively each business organization uses Internet-enabled eSolutions. The DEi can be used to compare organizations, regions, or industry sectors.
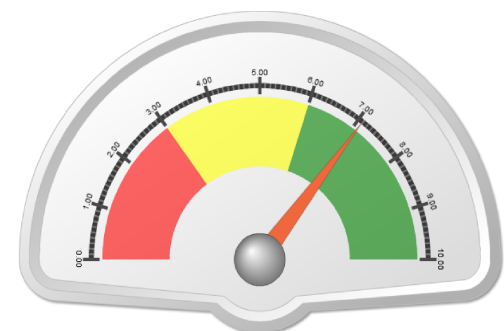
Average DEi Score	Sample Size	Median DEi Score
6.58	1,236	**6.89**

An organization's DEi score (from 0 to 10) captures their utilization of eSolutions, with 10 being the highest possible use. DEi scores are averaged across groups of users by various categories: e.g. a sector's DEi is the average for all organizations in that sector. The DEi is used as a basis for comparison of utilization levels across various dimensions.

Identifying variations in DEi assists in focusing on areas where a deeper assessment is warranted. In areas where DEi is lower than average, indicating lower utilization, an opportunity to increase utilization and benefits to businesses and non-commercial entities exists. On the following page is a list of the utilization categories (esolutions) used to track how organizations use their Internet and broadband connections.

> The term "**esolutions**" refers to the integration of Internet technologies with the computer-based systems and applications within and among organizations for a variety of operational processes. eSolutions encompass not only product delivery and payment transactions (eCommerce) but also all processes that may be facilitated by computer-mediated communications over the Internet.

eSolutions Categories for Businesses and non-commercial entities	
eCommerce Related	**eProcess Related**
Selling goods or services	Purchasing goods or services
Deliver services and content	Supplier communication and coordination
Rich media or service creation	Electronic document transfer
Customer service and support	Staff training and skills development
Advertising and promotion	Teleworking
Social networking	Accessing collaborative tools
Web site for organization	Banking and financial
Research by staff	Government transactions
	Access government information

2.2   Utilization Benchmarks

This report uses both average (mean) and median as benchmarks. For businesses in Arkansas, the average DEi was 6.42 while the median average was 6.70.[14] These scores indicate a middle-of-the-road (median) business in Arkansas was using just less than 12 of the 17 eSolutions noted above. As can be seen in Figure 26, utilizations levels as measured by the DEi did not vary much between businesses, non-profit organizations and government entities.

Figure 26 - Summary of Employment Impacts Specific to Internet Use (Full and Part Time combined)

Utilization (DEi) by Sector			
Region	**Median DEi**	**Average DEI Score**	**Number of Respondents**
Business	6.89	6.58	1236
Non-profit organization	6.89	6.54	201
Government entity	6.8	6.37	95

---

[14] The terms **mean** and **average** refer to the sum of all values divided by the total number of values. The **median** is the central point of a data set. To find the median, list all data points in ascending order and simply pick the entry in the middle of that list.

Looking at the differences in Internet utilization between geographic areas, Figure 27 shows that more urban areas have higher Internet utilization levels than less urban areas (as measured by DEi). Using US Census Bureau categories, the data shows that businesses in isolated small towns[15] have a median DEI score that is .9 less than businesses in Metropolitan areas (equal to approximately 1.5 eSolutions).

Figure 27 – Utilization Benchmarks (DEi) for Businesses by Level of Urbanization

Utilization (DEi) by Level of Urbanization			
Region	Median DEi	Average DEI Score	Number of Firms
Metropolitan	7.2	6.8	741
Micropolitan	6.6	6.6	257
Small Town	6.6	6.2	257
Isolated Small Town	6.3	5.9	96

When geography is examined from a regional perspective (Figure 28), the Southwest region stands out as having the lowest level of utilization. Some of the differences in utilization between regions are probably related to their level of urbanization.

Figure 28 – Utilization Benchmarks (DEi) for Businesses by Region

Utilization (DEi) by Region			
Region	Median DEi	Average DEI Score	Number of Firms
Central	7.3	6.9	411
Western	7.1	6.8	94
White River	7.0	6.9	85
Northwest	6.8	6.3	288
East	6.6	6.2	112
West Central	6.6	6.4	106
Southeast	6.5	6.1	69
Southwest	6.2	6.4	71

The benchmarking process also reveals that smaller businesses consistently perform at lower levels than larger organizations (Figure 29), which is not a surprise given their access to greater resources. The gap in Internet utilization is most pronounced among micro businesses with 4 or less employees. The DEi results for businesses with over 250 employees should be used with great care given the small sample size for that group.

[15] A metropolitan area is defined by the Census Bureau as having a core urban area of over 50,000 with a population density greater than 1,000 people per square mile. A micropolitan area has a population of 10,000 to 49,999. A small town has a population of 2,500 to 9,999. The category of "isolated small town" includes the remainder.

Figure 29 – Utilization Benchmarks (DEi) for Businesses by Size of Business

Utilization (DEi) by Size			
Employment Range	**Median DEi Score**	**Average DEI Score**	**Number of Firms**
1 - 4 employees	6.5	6.1	370
5 to 9	7.0	6.6	158
10 to 19	7.2	7.0	90
20 - 49	7.8	7.3	105
50 - 99	8.1	7.4	37
100 - 249	7.8	7.7	31
250 - 499	6.9	7.1	17
500 or more	8.6	7.6	7

Lastly, the benchmarking process identifies differences in Internet utilization among industry sectors (both commercial and non-commercial entities). As seen in Figure 30, the leading adopters of Internet solutions are Information Services, Professional and Technical, and Financial Services industry sectors. This is consistent with similar data obtained in other jurisdictions over the last few years.

The lowest level of Internet utilization is found within the Retail, HealthCare, and Construction industry sectors (though it should be noted that SNG research has shown the construction sector to be intense users of the internet, though they tend to use a smaller set of applications or processes). The Agriculture and Utilities industry sectors had the lowest levels of utilization, but their small sample size makes it difficult to draw conclusions in Arkansas.

Figure 30 – Utilization Benchmarks (DEi) by Industry Sector

Utilization (DEi) by Sector			
Major Industry	**Median DEi Score**	**Ave. DEI Score**	**Number of Firms**
Information	8.1	7.5	49
Professional, Technical and Scientific Services	7.8	7.1	223
Finance and Insurance	7.3	6.7	84
Accommodation and Food Services	7.0	6.4	53
Other services (except public administration)	6.9	6.4	108
Wholesale Trade	6.8	6.7	78
Manufacturing / Processing	6.7	6.6	97
Real Estate	6.6	6.6	83
Administrative and Support Services	6.6	6.2	58
Transportation and Warehousing	6.3	6.2	36
Retail Trade	6.2	6.2	142
Health Care and Social Assistance	6.1	6.1	126
Construction	6.0	6.0	71
Agriculture / Forestry / Fishing	5.6	4.7	15
Utilities	5.4	5.9	19
			1,242

3 Comparative Analysis

This section provides a comparative analysis of the levels of Internet utilization by businesses and organizations in Arkansas as compared to five benchmark states. The tables in this document include results from an assessment carried out across Arkansas from November 2014 to February 2015. These results are compared to results from statewide assessments carried out in five states between 2012 and January 2015. These five states are referred to as "benchmark states" and include one eastern seaboard state and four mid-western states.

Results from these comparisons need to be used cautiously. Each state will have a different socio-economic profile, which strongly influences Internet use. Moreover, data collected in Arkansas is more recent than that from the benchmark states. All things being otherwise equal, one would expect results from Arkansas to show higher levels of Internet utilization as SNG analysis shows that Internet utilization increases with time.

The tables in this section are designed to compare results from Arkansas and the benchmark states. The four tables were chosen because they control for and isolate the key factors of size, location, and industry sector, thereby comparing "apples to apples", as much as possible.

With the preceding design considerations in mind, this section contains four tables with comparisons of:
   1. Different industry sectors[16] from metropolitan areas (populations over 50,000);
   2. Different industry sectors from non-metropolitan areas (populations under 50,000);
   3. Businesses from five different size ranges (number of employees) in metropolitan areas; and
   4. Businesses from five different size ranges in non-metropolitan areas.

In order to make comparisons of Internet utilization, this addendum uses the Digital Economy index (DEi) as described in Section 2.

Keeping in mind that utilization levels would have increased between when data was collected in Arkansas and the Benchmark States (2012 – 2015), the following observations can be made:
   • In both **metropolitan** and **non-metropolitan** areas, benchmark states had similar overall DEi scores to Arkansas. (Note: a number of industry sectors areas contained sample sizes too small for comparisons).
   • In **metropolitan** areas, most industry sectors in Arkansas:
      o had utilization levels similar to their peers in information, finance, professional & technical, manufacturing
      o performed well below their peers in retail, real estate, and transport & warehousing
   • In **non-metropolitan** areas, Arkansas industry sectors that:

---

[16] Industries are based on 2-digit NAICS code level data from USCB County Business Patterns 2011. Full names of industries from NAICS definitions are abbreviated for this table.

- o showed well in comparison to their peers included professional & technical services and real estate
- o performed well below their peers included finance, wholesale trade, health & social services, and manufacturing

Figure 31 - Different industry sectors from metropolitan areas

Major Industry - Metropolitan	Benchmark States		Arkansas		Variance
	Sample Size	Median DEi	Median DEi	Sample Size	
Information	458	7.8	8.1	25	0.29
Finance & Insurance	478	7.6	7.8	47	0.15
Professional & Technical Services	1,467	7.4	7.7	159	0.29
Real Estate	308	7.3	6.4	44	-0.87
Retail Trade	693	7.2	6.1	73	-1.06
Administrative & Support Services	323	7.0	7.0	40	0
Manufacturing / Processing	692	7.0	6.8	50	-0.19
Other services (exc. public admin)	616	7.0	7.2	61	0.19
Wholesale Trade	444	6.9	7.3	52	0.39
Transportation & Warehousing	168	6.8	6.0	21	-0.78
Health Care & Social Assistance	645	6.6	6.6	73	0
Construction	443	6.3	6.5	47	0.16
All sectors	9,797	7.1	7.1	881	0

Figure 32 - Different industry sectors from non-metropolitan areas

Major Industry - Non-Metropolitan	Benchmark States		Arkansas		Variance
	Sample Size	Median DEi	Median DEi	Sample Size	
Finance & Insurance	395	7.28	5.34	37	-1.94
Information	330	7.18	7.28	24	0.10
Manufacturing / Processing	321	7.09	6.5	47	-0.59
Wholesale Trade	164	7.04	5.64	26	-1.40
Real Estate	190	6.6	7.77	39	1.17
Professional & Technical Services	424	6.5	7.77	63	1.27
Retail Trade	462	6.46	6.21	69	-0.25
Other services (exc. public admin)	378	6.31	6.7	47	0.39
Health Care & Social Assistance	410	6.21	5.53	53	-0.68
Construction	243	5.92	5.92	24	0
All sectors	6,094	6.5	6.5	589	0

Figures 3 and 4 demonstrate how commercial businesses in Arkansas compare to their peers and competitors of a similar size and location in the benchmark states. The following observations are highlighted:

- In **metropolitan** areas, Arkansas organizations had slightly higher levels of Internet utilization than the benchmark states, though the slight difference can probably be attributed to Arkansas data being more recent (i.e. 2015 vs 2013 and 2012 data).
- In **non-metro ("rural")** areas, while overall utilization levels were similar, micro businesses (less than 5 employees) performed markedly better than their peers in benchmark states.

Figure 33 - Businesses from five different size ranges in metropolitan areas

Metropolitan Businesses	Benchmark States		Arkansas	
Size of Business by # of Employees	Sample Size	Median DEi	Median DEi	Sample Size
1 – 4	3,263	6.41	6.41	251
5 – 9	1,633	7.09	7.38	113
10 – 19	1,369	7.18	7.38	75
20 – 49	1,372	7.28	8.06	84
50 or more	1,741	7.77	7.86	86
	9,696*	7.09	7.18	908

Figure 34 - Businesses from five different size ranges in non-metropolitan areas

Non-Metro Businesses	Benchmark States		Arkansas	
Size of Business by # of Employees	Sample Size	Median DEi	Median DEi	Sample Size
1 - 4	1,914	5.73	6.36	190
5 - 9	940	6.41	6.21	70
10 - 19	755	6.80	6.31	44
20 - 49	744	6.99	7.18	49
50 or more	1,060	7.38	7.86	44
	6,094*	6.5	6.55	620

Concluding note: a more complete analysis on Internet utilization and connectivity is included in the two reports noted below. These reports also include a description of the methodology used collect data.

- Arkansas eSolutions Benchmarking, February 2015 – This report provides basic data on how businesses and other organizations across Arkansas utilize the Internet. The report highlights differences in Internet utilization that provide allow businesses and organizations to identify where they may be lagging their peers and how they can improve their productivity and profitability.

- Arkansas eStrategies Report, February 2015 – This report builds on the preceding report by identifying key strategies and recommendations for communities and individual businesses across Arkansas.

Appendix A - Data Collection Methods and Results

The core methodology is founded on primary research via data collection through online assessments of businesses and non-commercial organizations. The assessment collects information directly from Internet users in the following categories:

User Profile – information that characterize each respondent for purposes of statistical analysis based on user characteristics, e.g. organization size by employment, time of Internet use; or location.

Internet Utilization – the current and planned uses of the Internet across multiple categories relevant to how businesses and non-commercial entities may use the Internet. The primary type of Internet connection used is also identified for selected cross tabulations with other response data.

Internet Benefits – information on how businesses and non-commercial entities assess the benefits of using the Internet.

Barriers - information on the importance of factors that prevent or inhibit businesses and non-commercial entities from taking full advantage of the Internet. The assessments are made available for online access through one of two means:

- Individual businesses and non-commercial organizations were invited to participate via direct email invitations sent from a large, statewide contact list.
- In addition, businesses and non-commercial organizations were encouraged through a variety of other communications channels to access a link to the assessment.

The overall error margin for statistical analysis is +/- 2.9% (with a 95% Confidence Interval).[17] The sample error margin indicates the accuracy of the statistics derived in relation to how they represent the larger population. Using a 95% Confidence Interval, a statistic should fall within the error margin for 95% of any random samples of the population. The sample error margin is calculated based on the sample size, the population size, and the confidence interval. For 95% confidence interval and for populations much larger than the sample, the sampling error is 0.98 divided by the square root of N, where N is the sample size. For this report all population sizes are much larger than the sample sizes.

The following is an example for interpretation of statistics provided in this report:

- 61.9% of organizations use the Internet for selling goods or services online.
- The sample size for organizations reporting Internet utilization is 745, providing a sample error margin of +/- 3.6% with a 95% confidence interval.

This means that any similar sample of the population of organizations across the state will result in a statistic for selling goods or services one between 58.3% and 65.5% (61.9% +/- 3.6%) 95% of the time. The statistic would fall outside this range 5% of the time for other random samples of the population. In practical terms the sampling error can be taken as the accuracy of the statistic as it applies to the entire population.

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[17] The error margin at 95% Confidence Interval is often referred to as +/- X% accuracy, 19 times out of 20. Error margins increase for detailed analysis that uses subsets of the overall sample. Where applicable, sample sizes and sample error margins are indicated – example: N= 1,428 [2.6%].

Smaller sample sizes result in larger sampling errors. When comparing statistics between two independent samples, the sample errors for each sample must be considered to determine if the difference is significant.

Where the higher end of a statistic (X% + error margin) for sample A is less than the lower end of the same statistic (Y% – error margin) for sample B, the difference can be considered statistically significant. Where the difference between statistics is within the sampling error margin ranges, then such differences may not be real or significant for other random samples of the same sizes. For simplicity of reporting the statistics are stated as given with sample sizes and sampling error margins provided for interpretation.

Appendix B - Glossary

Arkansas eSolutions Benchmarking Report: This report presents the results of assessments of Internet use carried out for the State of Arkansas. The assessments collected information from businesses and non-commercial organizations regarding the availability of broadband (high speed Internet access) and its uses, benefits, drivers and barriers. This largely descriptive report results provide insight into gaps and opportunities for increasing broadband utilization by businesses and non-commercial entities.

Digital Economy Analysis Platform (DEAP): The DEAP has been developed as an online resource that provides clients with access to the data collection results and the ability to customize their analysis across a range of variables, including industry sector or geographic region. The DEAP is accessed online by authorized users. Users are presented with **dashboards** for businesses and CAIs. Each dashboard is organized around a series of **pages** focused on specific topics, e.g. Connectivity, Utilization, DEi, Impacts, etc. Within each page is a set of predefined **reports** that present a chart and/or table of processed results from the datasets.

eSolutions: refers to the integration of Internet technologies with the internal computer-based systems and applications within or among organizations for a variety of operational processes. eSolutions encompass not only product delivery and payment transactions (e-commerce) but also all processes that may be facilitated by computer-mediated communications over the Internet.

eProcess: uses of the Internet which include internal operational uses, such as supplier coordination, training and teleworking.

eCommerce: uses of the Internet which include activities related to the sales, marketing and delivery of products and services; and,

Arkansas Digital Economy Index: The Digital Economy index (DEi) is part of the benchmarking process and provides reference points against which the performance of any individual or group can be compared. The DEi summarizes an organization's utilization of 17 Internet applications and process. Based on the number of applications currently being used by a businesses or CAI, a composite score is calculated that summarizes how comprehensively each organization uses Internet-enabled eSolutions. The DEi can be used to compare organizations, regions, or industry sectors.

Utilization refers to the third stage in the broadband development process. The first stage is providing a community or organization with access (availability) to the Internet. The second stage is adoption or the process whereby a person or organization starts to actually use the Internet. The third stage is utilization whereby a person or organization uses their Internet connection to create value. Many people and organizations have access and have adopted the Internet, but are relatively ineffective in how they use and derive benefits from the Internet. The field of analysis labeled "utilization" explores patterns of Internet use and how these patterns can be enhanced.

Arkansas eStrategy Report

March 2015

Prepared for

Connect Arkansas

A Project of The Arkansas Capital Corporation Group

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Summary and Recommendations

Many communities and counties across Arkansas are dealing with economic dislocation and an aging population[1]. Most rural areas face the additional challenge of the steady shift of population from rural to urban areas[2]. In the face of these challenges, how can communities and businesses maximize their competitiveness, while improving their quality of life?

One area with significant potential is broadband (see Section 2.2 for a definition), which can be leveraged into tangible benefits for communities and both commercial and non-commercial organizations. This report and its companion document, *Arkansas eSolutions Benchmarking[3]*, demonstrates how businesses can become more productive, competitive, and reach into new markets.

The first step in benefiting from broadband is acquiring connectivity or access to the Internet. And once access is acquired, the second step is adoption, whereby businesses and other organizations begin to use their high-speed Internet access on a regular basis. ***The third (and sometimes most difficult to achieve) stage in broadband development is utilization.*** This means using the Internet in increasingly productive ways that bring concrete benefits, such as jobs, new savings and revenues, and improved quality of life. ***This report focuses on utilization as the third stage of broadband development.***

Utilizing Broadband

This report reveals that the ability to utilize or leverage broadband varies significantly across commercial and non-commercial organizations. Not all communities have been able to turn the potential of broadband into measurable success in terms of jobs, company attraction and retention, an increased tax base and more efficient and effective citizen services. **Many businesses and organizations struggle in their efforts to use the Internet to generate increased revenues.** Turning potential into reality requires skills, training, and both formal and informal support.

In communities that already have a large, diverse, and modern economy and work force, building broadband infrastructure may be sufficient to realize the potential of broadband. However, many industry sectors, communities, and businesses have limited Internet related skills and capacity. Benchmarking data show that for many communities, especially in non-metropolitan areas, utilizing

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[1] *Rural Profile of Arkansas 2013 – Social & Economic Trends Affecting Rural Arkansas*: University of Arkansas, Division of Agriculture, Research and Extension.

[2] See various publications of David McGranahan from the USDA: http://www.ers.usda.gov/ers-staff-directory/david-mcgranahan.aspx.

[3] A summary of the findings from the 2015 benchmarking effort can be found in the *Arkansas eSolutions Benchmarking Report (February 2015)* which is largely descriptive and does not include some of the analysis nor the recommendations in this report.

broadband often lags (Section 2.2), even with state-of-the-art connectivity[4] available. The result is that these communities and businesses miss out on many of the benefits of broadband. More importantly, over time, these communities are at risk of becoming economically less competitive and generally less attractive to households and businesses[5]. It is a utilization gap that can create both an economic divide as well as opportunities for under-utilizers.

This report examines how businesses and non-commercial organizations in Arkansas differ in their utilization of broadband and where they can look to make improvements. The report shows in detail how different industry sectors and business types compare to each other, especially between and within regions. The report provides insights and data that allow communities and organizations to assess where they stand and identify what kinds of actions will improve their performance and benefits.

The report includes recommendations for how the State of Arkansas and its communities can improve utilization of broadband by its businesses and non-commercial organizations, thereby improving their economies and quality of life. Recommendations are broken down into three areas:
1. Gaps and opportunities in use of the Internet and broadband;
2. Key barriers to improving the use and benefits of the Internet and broadband; and
3. The best ways to build skills and abilities.

Analysis and recommendations focus primarily on businesses, although the recommendations may also be applied to non-profit organizations and government entities. A more detailed description of the impacts of Internet utilization on business revenues and employment can be found in the Arkansas eSolutions Benchmarking Report (February 2015) which is a more complete and descriptive presentation of the assessment/survey results, whereas this document is more strategic and prescriptive.

> *This report uses data collected between November 2014 and February 2015 across Arkansas. A total of 1,532 organizations contributed to the broadband benchmarking effort. The organizations consisted of 1,236 businesses, 95 government entities and 201 nonprofits.*

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[4] This statement is supported by data from eSolutions Benchmarking efforts undertaken by Strategic Networks Groups (SNG) in non-metropolitan communities that have had broadband for an extended period of time. The statement is also supported by comments made by Internet Service Providers during rural broadband planning workshops facilitated by SNG.

[5] Almost 40% of businesses participating in the broadband benchmarking effort in Arkansas stated that broadband service was "essential" in selecting their business location, and over 58% say broadband is "essential" for remaining in their current location. *Arkansas eSolutions Benchmarking Report (February 2015), page 20.*

Recommendations

To help stakeholders and communities better understand and use this report, recommendations have been structured around fundamental questions that leaders and decision-makers face in terms of leveraging broadband for the socio-economic benefit of their communities and constituents. The basis for these recommendations can be found in Section 2 of this Report.

1. How important is high-speed Internet access to Arkansas, its communities, and its residents?

In the 21st century, broadband access has become an essential part of a community's infrastructure, a business' internal and external operations, and a household's participation in their community life. Availability and meaningful use of high-speed Internet access are directly tied to a community's viability, competitiveness, and quality of life. However, there are significant differences between communities in quality of Internet connectivity and their productive use of the Internet. Current Internet usage varies widely and is explored in the various sections of this report. Each county or community has its own unique characteristics, assets, and challenges. Consequently, each county or community requires strategies and initiatives that address its unique situation.

> *Broadband was also considered "essential" for selecting location by 40% of businesses, as well as "essential" for remaining in location by 58% of businesses. Benchmarking Data for Aransas, February 2015.*

Recommendation #1: *Each county or community should develop its own strategy and initiatives based on its own characteristics, values, and priorities. Priorities and targets should include infrastructure coverage and capabilities, as well as high levels of adoption of those eSolutions needed to remain competitive. While focus tends to revolve around attracting better availability and speed – spend time to drive utilization of what is available.*

2. Is the availability of high-speed Internet access still an issue for many areas of Arkansas?

While the vast majority of businesses and non-commercial organizations report that they have Internet connectivity, 63.1% of respondents had upload speeds of less than the FCC's new broadband standard of 3 mbps, while 80% failed to meet the FCC broadband download standard of 25 mbps. Moreover, much of the physical Internet infrastructure in non-metro areas consists of older technology that provides Internet speeds and capacity well below that of most Arkansas metropolitan areas. The issue

of poor or no Internet services also remains a critical issue in some rural residential areas. To remain competitive, communities need robust[6] and affordable connectivity that also supports mobile devices.

The use of mobile devices and applications for "untethered access" is expected to continue to grow and become increasingly integrated into how organizations use the Internet to enable additional opportunities for increasing work effectiveness and productivity. The availability of effective mobile Internet access will become increasingly important as an adjunct to wired access for many organizations, especially those with mobile workers.

Recommendation #2: *Undertake efforts at the local level to identify areas without high-speed Internet and to develop local solutions that address the problem. Local and regional initiatives should encourage mobile wireless Internet Service Providers and telecommunications companies to extend 4G and LTE capabilities to areas currently without such service.*

3. Where are the major gaps or weaknesses in utilization of the Internet and its applications?

Key gaps in Internet utilization are related to degree of "rurality," business size, and industry sector. Prioritizing industry sectors and other economic groups must be done within a local, or regional context. Local and county level planning will need to consider additional factors and considerations, such as industry sectors in decline, or regional strategies for developing specific sectors. In general, focus should be on industry sectors that make the largest contribution to the economy and that have the greatest growth potential.

Recommendation #3: *Rather than undertaking broad but untargeted efforts, broadband initiatives should focus on industries that have the highest economic contribution and highest growth potential within each region. Three sectors that should be given priority are health and social services, retail, and construction.*

4. How can we use the Internet's potential to maximize job creation?

Small to medium sized organizations with 1 to 49 employees should be a focus for all regions. This segment is important for the following reasons:

- **It includes 95.2% of all establishments in Arkansas.**
- These organizations experience the **weakest utilization** levels compared to organizations with larger numbers of employees.

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[6] Robust connectivity can be defined as Internet connectivity that is reliable 24 hours a day, with consistent high upload and download speeds that meet the FCC definition of broadband.

- This segment is a dynamic engine for potential employment growth, especially through use of the Internet.
- It has the least internal capacity and expertise to adopt more sophisticated and productive Internet applications.

Recommendation #4:   *Focus on the small-to-medium enterprise segment, particularly 1-19 employees, to increase Internet utilization, drive competitiveness, revenues, and job creation. Particular focus should be on businesses in non-metropolitan areas.*

eSolutions is the term used in this report to refer to the integration of Internet technologies with the internal computer-based systems and applications within or among organizations for a variety of operational processes. eSolutions encompass not only product delivery and payment transactions (e-commerce) but also all processes that may be facilitated by computer-mediated communications over the Internet.

5. In what specific areas do small to medium sized businesses need help?

The Arkansas eSolutions Benchmarking (eSB) process identifies which types of Internet enabled applications and processes are easiest or hardest to adopt, as evidenced in the tables in the latter part of Section 2. By using data on barriers to adoption, action plans can be defined at the regional level to address target groups.

Recommendation #5:   *Initiatives aimed at increasing utilization among the small to medium enterprise segment should focus on the following 8 utilization categories:*
>   *1. Delivery of services and content*
>   *2. Teleworking*
>   *3. Selling goods or services*
>   *4. Accessing collaborative tools*
>   *5. Multimedia & interactive web content*
>   *6. Advertising and promotion*
>   *7. Staff training and skills development*
>   *8. Customer service and support*

6. The importance of developing leadership for broadband initiatives.

The strategic framework presented in this document relies on communities and regional entities to provide initiative in addressing the digital divide in their area. In non-metropolitan areas, lack of capacity and leadership has the potential to limit the effectiveness of a community-based approach. Consequently, ***a strategic objective for adequate broadband service is the development of motivated leadership and institutional capacity for broadband initiatives.***

"Local champions" are a critical component for the success of broadband initiatives. It is increasingly rare for local government leaders to be unaware or uninterested in the desirability of having good Internet access throughout their jurisdiction. However, interest and awareness has frequently not translated into action in communities where financial resources are constrained, technical knowledge is missing, and leadership is in short supply.

Recommendation #6: *Communities and counties should facilitate broadband leadership. Important elements of leadership and capacity development at the community level include:*
- *Recruitment of individuals with the interest, energy, and time needed to provide leadership.*
- *Empowerment of leaders by providing official sanction and support from elected officials and key community organizations.*
- *A mechanism for accountability for leaders to ensure they receive the support needed from participating organizations.*
- *Educational and learning opportunities for leadership so they can acquire the knowledge and skills for developing goals, actions and tasks related to the digital divide in their area.*
- *Institutional support from organizations with the capacity for organizing meetings, ensuring effective communications, and providing logistical support.*

Checklist for Developing Community Leadership

Individual leadership
- Community leaders and elected officials understanding benefits and impacts of broadband
- At least three committed leaders.
- Leaders that have the influence to enlist community support.
- Leaders committed to obtaining the resources for implementation.

Organizational leadership and capacity
- One or more lead organizations have been identified.
- The lead organization(s) are willing to develop partnerships for implementation and operation.
- Personnel within lead organization are identified and available to provide leadership and support.

Shared Vision
- Leadership (individual and organizational) has a shared vision of the broadband initiative.

Community support:
- Benefits of broadband are understood and supported by local businesses and key organizations.
- There has been community engagement on the benefits of broadband and in the level of support for a broadband initiative.

1. Starting Points

1.1 Organization and Objectives of the Report

This report is designed to be a catalyst for leveraging broadband through actionable intelligence. The chart below outlines the steps used in this report to move from descriptive data to detailed information on targets, priorities, and strategies. The goal of the regional analysis of broadband in Arkansas is to:

1. Identify which segments of the economy utilize the Internet to a greater or lesser degree.
2. Prioritize the segments that show utilization gaps based on importance to the economy and opportunity to address the gaps.
3. Identify specific uses of the Internet that should be addressed to close the gaps, resulting in effective actions that are targeted where they will have the most impact.
4. Identify the barriers to improved Internet utilization, as well as the best means to overcome them.

Leveraging Broadband for Economic and Social Development

Comparison of Utilization in Arkansas

Understanding Utilization by Organizational Characteristics

Identify Gaps and Opportunities; prioritize industry sectors

For priority industries and businesses, identify specific gaps and opportunities

Identify barriers and learning preferences specific to those industries and businesses

Arkansas e-Strategy: A Foundation for Broadband Initiatives

Increasing focus on priority issues and effective action plans for greatest impact

1.2   What is Broadband?

Broadband refers to a high-speed, always-on connection to the Internet. ***Recently, the FCC defined broadband as 25 megabits per second (mbps) download and 3 mbps upload***[7]. The FCC defined the following "Internet speed tiers." The primary factors that people consider when deciding what type of broadband Internet service to subscribe to include service availability, connection speed, technology, and price.

FCC Speed Tier Download Speeds Broadband		
	From	To
1st Generation	200 Kbps	768 Kbps
Tier 1 Broadband	768 Kbps	1.5 Mbps
Tier 2 Broadband	1.5 Mbps	3 Mbps
Tier 3 Broadband	3 Mbps	6 Mbps
Tier 4 Broadband	6 Mbps	10 Mbps
Tier 5 Broadband	10 Mbps	25 Mbps
Tier 6 Broadband	25 Mbps	100 Mbps
Tier 7 Broadband	Greater than 100 Mbps	

FCC Activity Minimum Recommended Download Speeds(Mbps)	
Activity	Minimum Speed Recommended (megabits per second)
Email	0.5
Web browsing	0.5
Job searching, navigating government websites	0.5
Interactive pages and short educational videos	1
Streaming radio	Less than 0.5
Phone calls (VoIP)	Less than 0.5
Standard streaming videos	0.7
Streaming feature movies	1.5
Basic video conferencing	1
HD-quality streaming movie or university lecture	4
HD video conference and tele-learning	4
Game console connecting to the Internet	1
Two-way online gaming in HD	4 symmetrical
Lower definition telemedicine	0.6-1 symmetrical
HD Telemedicine (diagnostic imaging)	5-10+ symmetrical

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[7] http://www.washingtonpost.com/blogs/the-switch/wp/2015/01/29/the-fcc-has-set-a-new-faster-definition-for-broadband/

1.3   The Digital Economy index (DEi)

This report includes comparisons of Internet use between regions by various characteristics, such as industry sector and business size. To assist in the process of making comparisons, a mechanism was developed for establishing benchmarks. Benchmarks are useful in creating reference points against which the performance of any individual or group can be compared. Strategic Networks Group has developed a benchmarking process based on its Digital Economy index (DEi).

The Digital Economy index (DEi) reflects an organization's utilization of a range of Internet applications and process: 17 for organizations. These applications and processes (eSolutions) are listed below. Based on the number of applications currently being used by an organization, a composite score is calculated that summarizes how comprehensively each organization uses Internet-enabled eSolutions. The DEi can be used to compare organizations, regions, or industry sectors.

An organization's DEi score (from 0 to 10) captures their utilization of eSolutions, with 10 being the highest possible use. DEi scores are averaged across groups of users by various categories: e.g., a sector's DEi is the average for all organizations in that sector. The DEi is used as a basis for comparison of utilization levels across various dimensions.

Identifying differences in DEi assists in focusing on areas where a deeper assessment is warranted. In areas where DEi

is lower than average, indicating lower utilization, there is an opportunity to increase utilization and benefits.
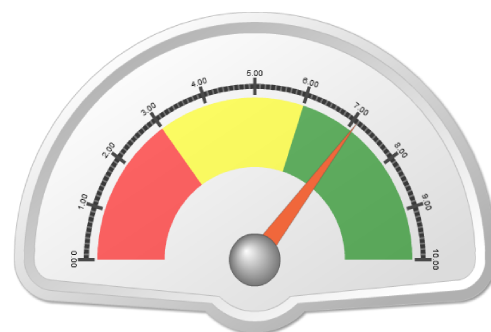
Average DEi Score	Sample Size	Median DEi Score
6.58	1,236	**6.89**

DEi Meter from dashboard of the Digital Economy Analytics Platform reflecting businesses in Kansas.

The Color Coding for DEi Scores: To better show how industry sectors perform, the DEi tables in this report are color coded from the highest (**green**) to lowest (**red**) to highlight how DEi scores compare. **The color-coding (green to red)** allows one to quickly compare groups based on how utilization varies.

Highest
2
3
4
5
6
Lowest

DEi comparisons can be useful for different purposes, for example:

- Broadband planners and economic development agencies can compare DEi benchmarks between different types of organizations, e.g., industry sectors or size of businesses. This can provide insights into which businesses have low utilization and could benefit from "catching up" to their peers. They can also compare DEi benchmarks on a regional basis to prioritize geographic areas.
- Providers of broadband services and infrastructure can use DEi benchmarks to gain insights into where high utilization levels exist and where low utilization level need to be addressed in order to promote the greatest use from their broadband investments.

eSolutions Categories for Businesses and Organizations	
e-Commerce Related	*e-Process Related*
Selling goods or services	Purchasing goods or services
Deliver services and content	Supplier communication and coordination
Multimedia & interactive web content	Electronic document transfer
Customer service and support	Staff training and skills development
Advertising and promotion	Teleworking
Social networking	Accessing collaborative tools
Web site for organization	Banking and financial
Research by staff	Government transactions
	Access government information

2. Broadband Utilization by Organizations

Among businesses and non-commercial organizations there is wide range of utilization of Internet infrastructure. This report explores how productive use of the Internet and esolutions is related to the size of a community or region, and the types of industry sectors that make up its economy. The data presented in this section show how the economic composition of Arkansas and its communities impacts Internet use, as well as the ability to benefit from the potential that the Internet offers to communities and organizations. The assessment of Internet utilization reviewed in this report includes commercial and non-commercial organizations across all industry sectors and employment sizes.

To understand why communities and regions differ in their Internet utilization levels, it is very instructive to explore:

1. How utilization varies by industry and sector.
2. How employment size affects utilization.
3. How the degree of urbanization within each region is related to Internet utilization.
4. The Internet applications and processes slowest to be adopted.

Because each community and country is distinct in important ways, an important strategic decision is to develop initiatives at the local or regional level. While state government resources can play an important role and state policies and regulations provide a common framework, initiatives have proven to be most effective when driven by and design by local and regional stakeholders.

> **Recommendation #1:** *Each county or community should develop its own strategy and initiatives based on its own characteristics, values, and priorities. Priorities and targets should include infrastructure coverage and capabilities, as well as high levels of adoption of those eSolutions needed to remain competitive.*

2.1.1   Internet Connectivity

While this report focuses primarily on how commercial and non-commercial organizations utilize the Internet to derive concrete benefits, it is impossible to ignore the ongoing importance of the quality of the broadband infrastructure that organizations have available to them. As noted in the Arkansas eSolutions Benchmarking Report, broadband infrastructure is often dated and does not meet the requirements of organizations in the area. Current levels of connectivity fall well short of the FCC definition of broadband. As seen in Figure 9 later in this document, 17.7% of businesses identify inadequate Internet connectivity as a very important barrier to improving their utilization of the Internet.

> **Recommendation #2:** *Undertake efforts at the local level to identify areas without high-speed Internet and to develop local solutions. Local and regional initiatives should encourage mobile wireless Internet Service Providers and telecommunications companies to extend 4G and LTE capabilities to areas currently without such service.*
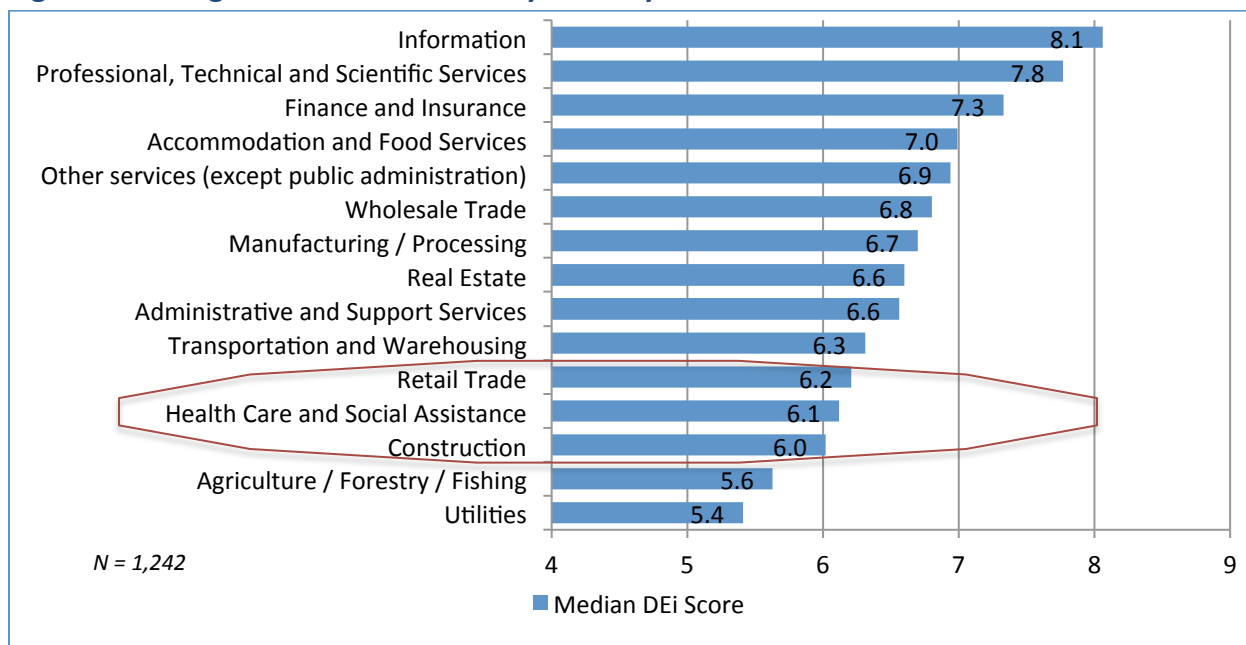
2.1.2 Utilization by Industry

Before delving into the details of how industry sectors perform and vary, it is useful to review the composition of the state economy in Arkansas. This report uses U.S. Census Bureau (USCB) data[8] on annual payroll to gauge the importance of industry sectors as this represents income that flows into the economy. The top four industry sectors are: 1) health care and social assistance, 2) retail trade, 3) manufacturing, and 4) accommodation and food services. The top eight sectors listed in Figure 1 represent 74.2% of total payroll in the state, 62.1% of all organizations and businesses, and 79.8% of all employment.

Figure 1: Top Industry Sectors In Arkansas

Rank	Industry Sector	Rank	Industry Sector
1	Health Care & Social Assistance	5	Administrative & Support Services
2	Retail Trade	6	Transportation & Warehousing
3	Manufacturing / Processing	7	Wholesale Trade
4	Accommodation & food services	8	Construction

Figure 2 illustrates how intensively businesses in each industry sector utilize the Internet. Three industry sectors that have a notably **lower than average utilization** are retail, health and social services and construction. These are the largest, second largest and eighth largest industry sectors in the state.

Figure 2: Average Internet Utilization by Industry Sector

Industry Sector	Median DEi Score
Information	8.1
Professional, Technical and Scientific Services	7.8
Finance and Insurance	7.3
Accommodation and Food Services	7.0
Other services (except public administration)	6.9
Wholesale Trade	6.8
Manufacturing / Processing	6.7
Real Estate	6.6
Administrative and Support Services	6.6
Transportation and Warehousing	6.3
Retail Trade	6.2
Health Care and Social Assistance	6.1
Construction	6.0
Agriculture / Forestry / Fishing	5.6
Utilities	5.4

N = 1,242

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[8] Industries are based on 2-digit NAICS code level data from USCB County Business Patterns 2011. Full names of industries from NAICS definitions are abbreviated for this table. USCB County Business Patterns data does not include Public Administration (government).

2.1.3   Differences in Utilization: Gaps and Opportunities

Differences in utilization of Internet applications and processes (referred to in this report as eSolutions) indicate areas with potential for improvement, given what peers (or competitors) are doing within the same industry sector. A low DEi score suggests firms would benefit from exploring which eSolutions might improve performance.

In Arkansas, some of the industry sectors or groups exhibit low levels of utilization. Addressing low levels of utilization should be a priority if firms are to compete outside their own regional markets, or if there is local competition from outside firms. Businesses and non-commercial organizations with low levels of utilization will be less competitive and productive if they are using fewer eSolutions than firms and organizations elsewhere. However, the process of prioritizing business or sectors should also include assessing its potential for creating new jobs and protecting existing jobs. A competitive and productive company or organization is more likely to retain existing jobs and create new jobs, especially in an expanding industry.

> *Recommendation #3:   Rather than undertaking broad but untargeted efforts, broadband initiatives should focus on industries that have the highest economic contribution and highest growth potential within each region. Three sectors that should be given priority are the health and social services, retail, and construction sectors.*

2.2   What Contributes to the Different Levels of Utilization?

A number of factors help to explain differences in utilization between organizations and between regions. Location of an organization in a non-metropolitan area is one such factor. Organizations (both commercial and non-commercial) outside of a metropolitan area do not benefit from a dense network of supports and skilled labor pools. Consequently, as Figures 4 and 5 show, businesses located outside of a metropolitan area[9] or in a less densely populated region experience a distinct disadvantage, with lower levels of utilization of eSolutions. Knowing which geography areas are likely to have the lower utilization allows governments and industry organization to target their broadband initiatives.

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[9] A metropolitan area is defined by the Census Bureau as having a core urban area of over 50,000 with a population density greater than 1,000 people per square mile. A Micropolitan area has a population of 10,000 to 49,999. A small town has a population of 2,500 to 9,999. The category of "isolated small town" includes the remainder.

Figure 3: Business Internet Usage by Level of Urbanization

	Business DEi Score
Metropolitan	7.2
Micropolitan	6.6
Small Town	6.6
Isolated Small Town	6.3

Figure 4: Business Internet Usage by Region

Region	Median DEi	Number of Firms
Central	7.3	411
Western	7.1	94
White River	7.0	85
Northwest	6.8	288
East	6.6	112
West Central	6.6	106
Southeast	6.5	69
Southwest	6.2	71

Figure 5 highlights a second important factor, organizational size. Internet utilization tends to increase with the size of an organization. This tendency is most pronounced at the one end of the spectrum – very small firms with less than 20 employees. This pattern of lower utilization by smaller firms appears related to the greater resources available to larger entities. The importance of organizational size as a factor in eSolutions utilization is highlighted by the fact that organizations with 1 to 19 employees make up 85 percent of organizations in Arkansas. Lower utilization among this major segment provides a strong argument for making this segment a focus for promoting broadband utilization. Using data from the 2011 U.S. Census, the following table demonstrates the importance of smaller organizations to the regional and state economies.

### Figure 5: Utilization (median DEi Score) by Organizational Size

Number of employees	1 to 19	20 to 49	50 to 99	100 +
Median Dei Score	6.6	7.86	8.06	7.67
% of all Organizations in Arkansas (Census)	85%	9.4%	2.8%	2.5%

The small to medium enterprise (SME) segment is a significant component of statewide and regional economies and tends to be a primary source of new job growth. This segment has the significant opportunity to increase utilization levels for productivity and competitiveness. In general, larger businesses have had access to information and communications technology (ICT) for much longer

periods and have the internal resources to take advantage of these technologies, resulting in higher utilization. As such, larger organizations already have high utilization levels and are less likely to be influenced by external broadband adoption and utilization initiatives.

Taking the two factors of business size and geographic location, it becomes evident that smaller businesses in non-metropolitan areas are at a distinct disadvantage in their efforts to use the Internet as part of their business. Figure 7 graphically demonstrates the impact of size and location on Internet utilization.

Figure 6: Impact of Location on Utilization, by Size of Organization
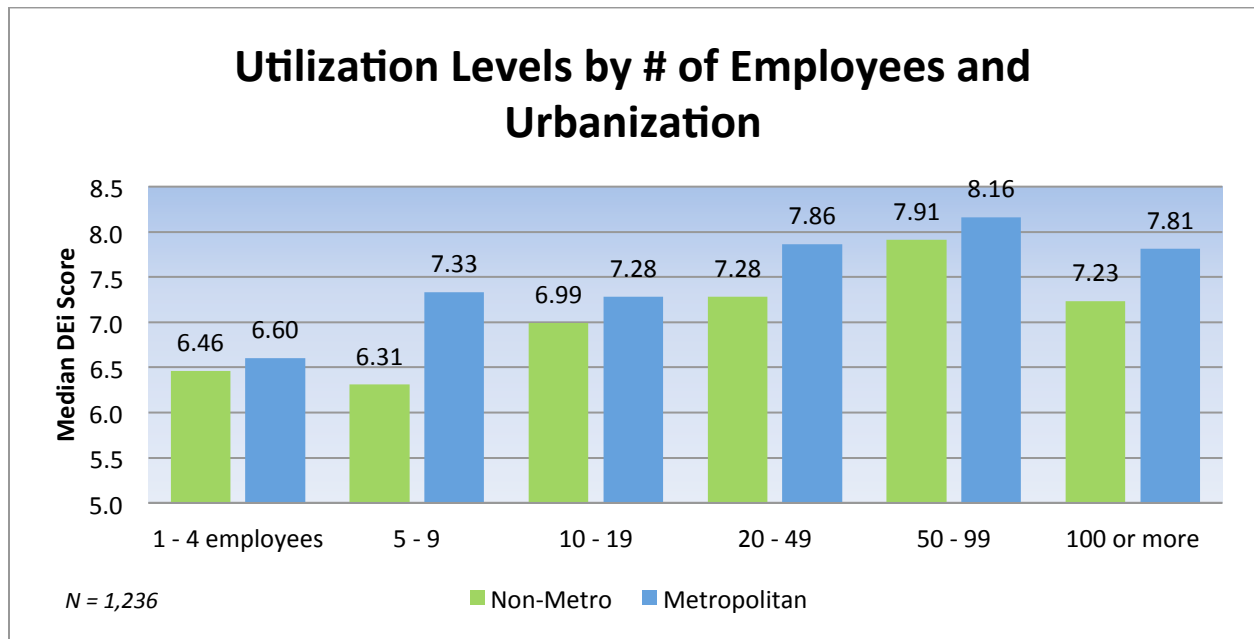
Recommendation #4: *Focus on the small-medium enterprise segment, especially 1-19 employees, to increase Internet utilization, drive competitiveness, revenues, and job creation. Particular focus should be on businesses in non-metropolitan areas.*

2.3   Identifying Priority Internet Applications

Some processes and applications are easier to adopt than others, such as electronic document transfer, staff research, and accessing government information. Adoption levels of these utilizations are high and there is not much difference between sophisticated and less sophisticated users.

While some types of utilization may be less appropriate for small businesses, it is instructive to observe where differences exist in utilization between small and large businesses. The higher utilization levels of larger businesses can provide motivation and potential targets for smaller businesses to achieve. Figure 7 shows utilization levels of different eSolutions for different sizes of businesses: 1-19 employees, 20 to 99 employees, and 100 or more employees. In 14 out of the 17 eSolutions **smaller businesses generally have lower utilization of eSolutions than larger businesses (**the exceptions are banking and financial transactions, social networking, and purchasing goods and services).

Figure 7: Difference in Utilization of Specific eSolutions by Size of Organization

Currently Used Applications and Processes	0 to 19	20 to 99	100 +	Level of Variance*
Electronic document transfer	84.8%	93.0%	92.3%	7.5%
Research by staff	83.8%	90.8%	92.3%	8.5%
Supplier coordination	77.7%	87.5%	90.4%	12.7%
Accessing collaborative tools	60.1%	73.4%	86.5%	26.4%
Web site for organization	78.7%	90.6%	96.2%	17.5%
Access government information	74.2%	78.9%	86.5%	12.3%
Staff training and skills	61.8%	78.1%	82.7%	20.9%
Purchasing goods or services	79.1%	82.8%	78.8%	-0.3%
Customer service and support	62.8%	71.9%	78.8%	16.0%
Social networking	71.7%	74.2%	69.2%	-2.5%
Teleworking	42.5%	60.9%	73.1%	30.6%
Government transactions	61.8%	70.3%	67.3%	5.5%
Banking and financial transactions	77.1%	77.3%	65.4%	-11.7%
Multimedia & interactive web content	42.7%	53.5%	59.6%	16.9%
Advertising and promotion	62.2%	67.2%	59.6%	-2.6%
Selling goods or services	57.3%	60.2%	61.5%	4.2%
Deliver services and content	38.2%	52.3%	46.2%	8.0%
*Variance is calculated as the difference between small firms (0-19 employees) compared to firms with 100+ employees.				

It is very instructive to note where the differences are greatest, for these represent areas where **small businesses could potentially make the greatest gains**. As the table above shows, areas of note include: teleworking; accessing collaborative tools; multimedia &interactive web content; staff training; website for organization; customer service and support; and supplier coordination.

While on average, smaller businesses use the Internet less than larger ones, many smaller businesses are already planning to address these gaps, as seen in Table 8, which shows which eSolutions small businesses were planning to adopt within the next 12 months. There is a strong correlation between where small businesses are lagging and areas where they plan to adopt eSolutions.

Figure 8: Planned Adoption of Specific eSolutions by Small Businesses

Planned Use of eSolutions by Small Businesses with 0 to 19 Employees	
Utilization Category	% of Businesses
Advertising and promotion	16.2%
Multimedia & interactive web content	15.1%
Deliver services and content	13.2%
Customer service and support	12.2%
Accessing collaborative tools	11.4%
Staff training and skills development	9.9%
Social networking	9.4%
Web site for organization	9.4%
Teleworking	8.9%
Selling goods or services	8.2%
Access government information	6.4%
Purchasing goods or services	6.2%
Government transactions	5.7%
Supplier communication and coordination	5.2%
Research by staff	5.0%
Electronic document transfer	5.0%
Banking and financial	4.9%

By combining data from the two previous tables, an assessment can be made of which opportunities offer the greatest potential for small businesses. It is also possible to identify which of these opportunities are already evident to smaller businesses and which opportunities remain under appreciated. Areas with high difference in utilization and low planned use indicate areas where **greater awareness raising may be needed**. Teleworking and supplier coordination fall into this category.

2.4   The Adoption Process

Many types of utilization are more complex and sophisticated, making the process of adoption slower by organizations in general and by smaller organizations in particular. The chart on the next page shows the rate that each type of utilization is adopted by organizations relative to DEi scores. For example, 70 to 90 percent of "average" small businesses are currently using the "quick to adopt" applications and processes noted below. In contrast, only 35 to 62 percent of "average" users will be currently using the "slow to adopt" eSolutions.

Quick to adopt eSolutions	Slow to adopt eSolutions
Access government information	Deliver services or content
Electronic document transfer	Multimedia & interactive web content
Purchasing Goods and Services	Teleworking
Research by staff	Selling goods or services
Web site	Advertise and promote online
Social networking	Access collaborative tools

Recommendation #5: Initiatives aimed at increasing utilization among the small to medium enterprise segment should focus on the following 8 utilization categories:

1. *Delivery of services and content*
2. *Multimedia & interactive web content*
3. *Teleworking*
4. *Accessing collaborative tools*
5. *Advertising and promotion*
6. *Staff training and skills development*
7. *Customer service and support*
8. *Selling goods or services*

2.5 Barriers to Improved Utilization

The preceding analysis has identified which sectors in which geographic areas have the greatest gaps in Internet utilization. As well, additional information has been provided on factors that can aid in prioritizing industry sectors, such as the size of organization. Evidence has also been provided on which specific areas (applications and processes) these industry sectors and priority groups are lagging. Before a plan can be designed to support these priority groups it is important to understand the barriers to adoption of eSolutions. Figure 9 that follows identifies the importance of a range of factors that inhibit the adoption and use of eSolutions by businesses with less than 50 employees – a priority target group.

Although broadband network investments are justified for speed and marketed that way, slow Internet is a 'very important' barrier to only 17.9% of businesses. The **top 5 barriers** that are very important factors for more than 40 percent of organizations are:

1. Security concerns
2. Privacy concerns
3. Loss of personal contact with clients
4. Products not suited to the Internet
5. Lack of internal expertise and knowledge

Figure 9: Barriers to Adoption of eSolutions among Businesses with less than 50 Employees

N = 738   ■ Very Important   ■ Somewhat Important
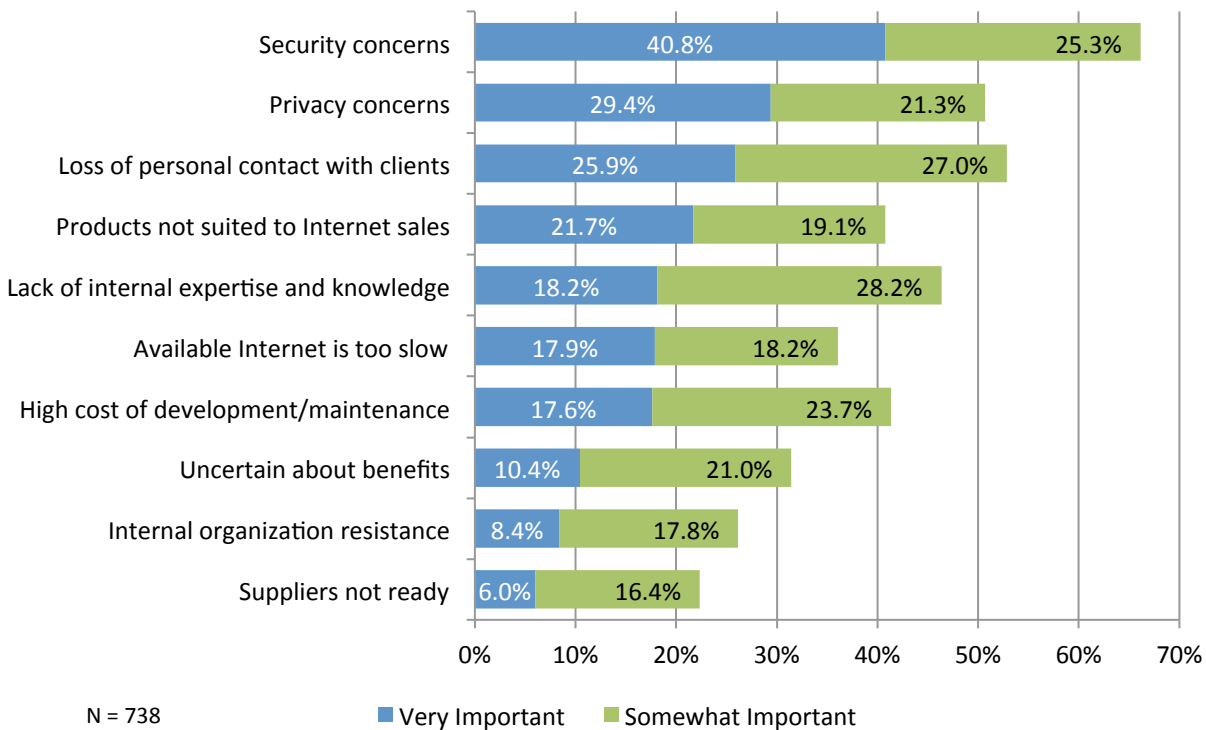
3. Summary and Next Steps

This report analyzes how organizations in Arkansas utilize broadband. It considers different industry sectors, organizational size and regional differences. It also considers what kinds of actions will improve their performance and how they could benefit further from broadband.

The objective of benchmarking utilization of esolutions (Internet-enabled applications) is to provide "actionable intelligence" to governments, stakeholders, and individuals on gaps, barriers and opportunities for growth. Taking action on the recommendations included in this report will enable Arkansas to move towards the realization of further benefits from broadband. However, the strategic framework presented in this document relies on communities and regional entities to provide initiative in addressing the digital divide in their area. In non-metropolitan areas, lack of capacity and leadership has the potential to limit the effectiveness of a community-based approach. Consequently, ***a strategic objective for adequate broadband service is the development of motivated leadership and institutional capacity for broadband initiatives.*** [10].

"Local champions" are a critical component for the success of broadband initiatives. It is increasingly rare for local government leaders to be unaware or uninterested in the desirability of having good Internet access throughout their jurisdiction. However, interest and awareness has frequently not translated into action in communities where financial resources are constrained, technical knowledge is missing, and leadership is in short supply

> *Recommendation #6: communities and counties should facilitate broadband leadership. Important elements of leadership and capacity development at the community level include:*
>
> - *Recruitment of individuals with the interest, energy, and time needed to provide leadership.*
> - *Empowerment of leaders by providing official sanction and support from elected officials and key community organizations.*
> - *A mechanism for accountability for leaders back to organizations providing support and sanction.*
> - *Educational and learning opportunities for leadership so they can acquire the knowledge and skills for developing goals, actions and tasks related to the digital divide in their area.*
> - *Institutional support from organizations with the capacity for organizing meetings, ensuring effective communications, and providing logistical support.*

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[10] The comments in this section regarding possible lack of capacity in non-metropolitan areas and the importance of leadership are based on SNG's experience in broadband planning in rural areas across the US and Canada. Recognition of these issues can also be found in broadband planning reports from a number of states, including Virginia, Kentucky and North Carolina where SNG has worked. A particularly well-articulated statement comes from a state leader in Virginia: "One common characteristic of all Virginia's current broadband projects is the presence of strong, dedicated leadership (individual and/or committee) who understand the broadband imperative and are willing to commit time, energy and scarce resources to insure that their community is not left behind." As quoted in *Community Broadband Planning Strategies*, developed for the Center for Innovative Technology by Strategic Networks Group, January 2013, page 5.

Appendix 1: Glossary

e-Strategy Report: This report examines how organizations in Arkansas differ in their utilization of broadband and where they can look to make improvements. The report shows in detail how different industry sectors and organizational types compare to each other, especially between and within regions. The report provides insights and hard evidence that allows regions and organizations to assess where they stand. The report provides recommendations on strategies for improving their Internet performance and benefits.

eSolutions Benchmarking Technical Report: This report presents the results of survey-based research carried out for the State of Arkansas. The surveys collected information from businesses and organizations on the availability of broadband (high speed Internet access) and its uses, benefits, drivers and barriers. This largely descriptive report results provide insight into gaps and opportunities for increasing broadband utilization by organizations. The policy, planning and program implications for Arkansas and its regions are dealt with in a separate report: the Arkansas e-Strategy Report.

Digital Economy Analysis Platform (DEAP): The DEAP has been developed as an online resource that provides clients with access to the data collection results and the ability to customize their analysis across a range of variables, including industry sector or geographic region. The DEAP is accessed online by authorized users. Users are presented with **dashboards**. Each dashboard is organized around a series of **pages** focused on specific topics, e.g. Connectivity, Utilization, DEi, Impacts, etc. Within each page is a set of predefined **reports** that present a chart and/or table of processed results from the datasets.

eStrategies: e-Strategies are high level plans for achieving one or more goals related to improved access to and utilization of broadband Internet. eStrategies define a course of action that is most likely to successful address opportunities, challenges or barriers related. Strategies are usually seen as distinct from detailed action plans which deal with specific issues of "who, what, when and how".

eSolutions: refers to the integration of Internet technologies with the internal computer-based systems and applications within or among organizations for a variety of operational processes. eSolutions encompass not only product delivery and payment transactions (e-commerce) but also all processes that may be facilitated by computer-mediated communications over the Internet.

e-Process: uses of the Internet which include internal operational uses, such as supplier coordination, training and teleworking.

e-Commerce: uses of the Internet which include activities related to the sales, marketing and delivery of products and services; and,

Arkansas Digital Economy Index (DEi): The Digital Economy index (DEi) is part of the benchmarking process and provides reference points against which the performance of any individual or group can be compared. The DEi summarizes an organization's utilization of a range of 17 Internet applications and process. Based on the number of applications currently being used by an organization, a composite score is calculated that summarizes how comprehensively each organization uses Internet-enabled eSolutions. The DEi can be used to compare organizations, regions, or industry sectors.

Utilization refers to the third stage in the broadband development process. The first stage is providing a community, household or organization with access (availability) to the Internet. The second stage is adoption

or the process whereby a person or organization starts to actually use the Internet. The third stage is utilization whereby a person or organization uses their Internet connection to create value. Many people and organizations have access and have adopted the Internet, but are relatively ineffective in how they use and derive benefits from the Internet. The field of analysis labeled "utilization" explores patterns of Internet use and how these patterns can be enhanced.