Strategic Networks Group

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E-Solutions Benchmarking – Technical Report

Prepared for:

Commonwealth of Kentucky

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1. Executive Summary

1.1 Purpose and Objectives

As part of the statewide broadband mapping project surveys were conducted with businesses, organizations and households to collect information on the availability of broadband (high speed Internet) for verification of service coverage data provided by service providers. In addition to collecting broadband availability data the surveys gathered information on the uses, benefits, drivers, and barriers for broadband to provide insights into gaps and opportunities for increasing broadband utilization by organizations and households.

The purpose of this report is to present the results of the survey-based research for the Commonwealth of Kentucky with focus on the key findings that may be considered in forward planning to influence adoption of broadband-enabled applications and uses, referred to as e-solutions.

E-Solutions
E-solutions 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. E-solutions 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.

1.2 Key findings and analysis

The following are highlights of the statistical findings and analysis of research conducted for the businesses, organizations and households across the Commonwealth of Kentucky.

1.2.1 Businesses and Organizations

Connectivity types used

- DSL – 38%
- Cable – 18%
- T1 – 17%
- Fiber – 13%
- Dial-up – 3%
- Other, fixed wireless, satellite – 11%
- Fiber has highest ratings for **speed**, **reliability**, and **price value**, followed by T1 and fixed wireless.
- **59.5%** of establishments measured **less than 1 mbps upload** speed and **47.6%** measured **less than 3 mbps download** speed
- The average measured speeds for DSL are about 66% of the measured upload speeds for cable and 54% of the measured download speeds for cable

Broadband utilization

- Online transactions
  - 76% buy online
  - 42% sell online
  - 60% government transactions
- 72% staff training
- 48% tele-working
- 42% rich media content – use increases with employment size
- 39% online service delivery – use increases with employment size
- Organizations with fiber or T1 make greater use of broadband
- Overall broadband utilization increases with organization size, from 57.5% to 75.8%
- 54% of organizations use some form of **web-enabled mobile device**
  - Highest use by Educational Services (69%)
  - Lowest use by Accommodation & Food Services (42%)
- 36% of organization consider web-enabled mobile devices **essential**

Top 4 industries for overall utilization of broadband

- Information Services (73.2%)
- Finance & Insurance (67.1%)
- Wholesale Trade (66.0%)
- Manufacturing (64.8%)

Bottom 4 industries for overall utilization of broadband

- Public Administration (47.3%)
- Accommodation & Food Services (57.2%)
- Administrative & Support Services (57.2%)
- Health care & Social Assistance (57.7%)

Broadband Benefits

- Broadband "**essential**" for **selecting location by 33%** of organizations
- Broadband "**essential**" for **remaining in location by 56%** of organizations
- **Top 7 benefits** delivered by broadband

	Commercial Industries	Very Important	Non-commercial Industries	Very Important
1	Ease of Operation	76.8%	Ease of Operation	67.5%
2	Improve Customer Service	74.4%	Resource Efficiency	65.7%
3	Resource Efficiency	72.1%	Improve Staff Skills	57.0%
4	Increase Market Reach	64.7%	Improve Customer Service	56.5%
5	Reduce Operating Costs	64.2%	Adopt New Processes	48.4%
6	Increase Revenue	63.2%	Reduce Operating Costs	41.1%
7	More Competitive	60.5%	Increase Market Reach	40.2%

- **Top barriers** to broadband utilization are **security** (44%) and **privacy** (40%) concerns
  - Greatest concern for Finance & Insurance and Health Care & Social Assistance industries
- **Lack of internal expertise and knowledge** is an important barrier for over 50% of organizations
  - Critical barrier for progress for 17% of organizations

1.2.2 Households

Connectivity Types used

- DSL – 43%
- Cable – 21%
- Dial-up – 18%
- Satellite – 9%
- Fixed Wireless – 4%
- Mobile Wireless – 4%
- Other (fiber, T1) – 1%
- Use of dial-up decreases significantly with increasing household income
- 89% of households access the internet on a daily basis
- **Cable, DSL, and fixed wireless are comparable** in meeting expectations for **speed**, **reliability**, and **price/value**
- **Satellite service has significantly lower ratings** for speed, reliability, and price/value

Rural vs. Non-rural Connectivity

- **Dial-up** use **higher** in rural areas (21%) vs. non-rural (13%)
- **Satellite** use **higher** in rural areas (11%) vs. non-rural (3%)
- **Cable** use **lower** in rural areas (15%) vs. non-rural (37%)

Household Utilization

- **Communications** over the Internet
  - 96% of households use email
  - 85% of broadband households share files over the Internet
  - 20% of broadband households use VoIP
  - 21% of dial-up households would increase their use of Internet communication with broadband
- **Research and information** over the Internet
  - 91% search for **medical** or **health** related information
  - 83% search for **government information** and services
  - 16% of dial-up households would increase their use of the Internet for research with broadband
- **Online transactions**
  - 90% of households **buy goods and services online**
  - 75% of households **pay bills** or **bank online**
  - 50% of households currently or plan to transact with **online government services**
  - 26% of dial-up households would increase their online transactions with broadband
- Broadband for **personal productivity**
  - 46% of households access their workplace from home
  - 44% of households use educational or training courses
  - 23% operate a **home-based business**
  - 20% **tele-work** on a formal basis
  - 21% of dial-up households would increase their use of the Internet for personal productivity with broadband
- Broadband for **entertainment and recreation**
  - 87% of broadband households access the Internet for news and sports information
  - 50% of broadband households view or download video media, listen to radio, or participate in online gaming.

- 43% of dial-up households would increase their use of the Internet for entertainment with broadband

Broadband Benefits

- Between **10% and 30%** of households would seriously consider **relocation for broadband service**
- Broadband benefits
  - Top benefit is improving knowledge and skills by 68% of households
  - Enhancing school learning and being more connected with community by 55% of households
  - Over **65% of households strongly agree** that not having broadband would have a negative impact on their lifestyle
- Learning about using broadband
  - **Preference for online learning** resources over in-person training methods
  - Between 30% and 50% of households **do not know** what online information and resources are available to them

1.3 Relevance for Broadband Planning

The following is a summary of potential areas of focus for increasing adoption and utilization of broadband services. Other factors may also be considered prior to incorporating this information into adoption strategies and plans.

1.3.1 Businesses and Organizations

Industry Perspective

Businesses within commercial sectors show higher utilization of broadband than organizations within non-commercial sectors. For the commercial sector increased utilization should focus on **Construction**, **Retail Trade**, and **Manufacturing**. For the non-commercial sector increased utilization should focus on **Public Administration**, **Health Care & Social Services**, **Administrative & Support Services**, and **Educational Services**.

Organization Size Perspective

Smaller organizations are more challenged by lack of expertise for exploring and implementing e-solutions. Strategies to increase utilization should in part be tailored to addressing the needs of small organizations with limited resources, especially those with less than 20 employees. However, there are a significant number of organizations of all sizes for which the **lack of skilled resources**, both internally and externally, is a **barrier to increased adoption** of e-solutions.

e-Solutions Perspective

Concerns over **security** and **privacy** are important barriers to a large percentage of organizations. Overcoming these concerns through education, support services, and network solutions can build confidence that leads to greater adoption of e-solutions. The focus of e-solutions to date has been more towards internal process and productivity as well as customer service. **Opportunities exist to increase utilization of newer or more sophisticated e-solutions** that create new business opportunities and competitiveness, such as online service delivery, rich media content, and selling online.

1.3.2 Households

Broadband Availability

With at least **18% of households still using dial-up** Internet, this is a gap that can still be addressed through increasing broadband availability, especially in rural areas, with at least 46% of dial-up users willing to subscribe to broadband. **Dial-up households would make significantly greater use of the Internet with broadband** by a wide margin across all utilization categories – increased use ranging from 16% for research to 43% for entertainment.

The **use of cable Internet is significantly lower in rural areas** (15%) compared to non-rural areas (37%), indicating that cable Internet service is a less available broadband option for rural communities. DSL access is comparable between rural and non-rural areas. Increasing cable Internet availability would provide rural communities with greater choice of broadband options. However, if the reach of cable or DSL services cannot be fully extended into unserved or under-served areas then fixed wireless and satellite services will remain the primary broadband options.

While 9% of households use satellite service, mostly in rural areas, **satellite connectivity has the lowest acceptance by households** for speed, reliability, and price/value of all the broadband service options. Fixed wireless is the least used form of access (4%), indicating that there is **opportunity to increase the availability and use of fixed wireless service where other options are not viable**.

Household Internet Uses

The research on household Internet uses provides some key insights into opportunities for further leveraging broadband access capabilities.

Participation in the Digital Economy – The most direct measure of household participation in the digital economy is that **over 90% of household purchase goods and service online**. In addition, over 75% of broadband households use the Internet for paying bills online and for e-banking. This indicates an active willingness to use the Internet for commercial transactions, further reinforced by at least two-thirds of households obtaining music or software online and booking travel arrangements online.

Notably, only 43% of broadband households currently transact with government agencies online. Over 83% of broadband household use the Internet to research government information. Combining these facts with household willingness to transact online for other purposes indicates an **opportunity to increase the delivery of transactional services by all levels of government**.

Health and Education – Over 91% of broadband households research medical and health information online. Given the willingness of households to transact online this leads to **opportunities for delivering tele-health services to households**. Over 72% research educational information for training or schoolwork online. In addition, 44% actively use the Internet for online education and training courses, demonstrating an **ongoing demand and opportunity for the delivery of educational services online**.

The delivery of online health and educations services can be particularly beneficial for more rural communities. For the delivery of these services to be effective for users there must be sufficiently fast and reliable broadband service available.

Income Opportunities – Over **23% of broadband households operate a home-based business**, with another 13% planning to do so. Home-based businesses provide alternative income opportunities, either as the sole source or as a supplement to household income. While less than 14% of dial-up households operate a home business, another 22% would operate a home-based business if they had broadband. For all households this indicates a potential of 36% operating a home-based business for additional household income.

Over **20% of broadband households use the Internet for tele-working** on a formal basis, with another 10% planning to do so. Tele-working opens new employment opportunities within communities where those jobs do not otherwise exist. This contributes to maintaining residents in their community of choice, rather than relocating for employment or seeking less suitable work. Only 7% of dial-up households tele-work, but another 15% would do so with broadband.

Both **home-based businesses and tele-working open new opportunities for households to generate additional income** within their current communities. For local economies this mitigates potential impacts from unemployment and underemployment, while maintaining residence within the community. The availability of sufficiently fast and reliable broadband service is essential for enabling effective operation of home businesses and tele-working.

Household Benefits of Broadband

The overall importance of broadband for households is demonstrated by the fact that over **10% of households would "definitely" relocate** to another community for broadband service if it was not available to them in their current location. Another **18%** would consider relocation **"very likely"**. These are significant statistics from a community perspective, both for retaining and attracting community residents.

The benefit for which broadband is most frequently (68%) cited as "very important" is **improving knowledge and skills** through online education or research. **Enhancing school learning** and being **more connected with the community** are benefits seen as very important by over 55% of households.

Providing a **better balance of personal and work time** is a very important broadband benefit for almost 50% of households. **Broadband is very important for the choice of living location for 36% of households**. This reinforces the responses for the likelihood of relocating to another community to obtain broadband service. Broadband is considered very important for the **ability to earn additional income by over 31% of households**. This is a similar level as those households that currently either tele-work or have a home-based business (39% combined).

Over **65% of households strongly agree that not having broadband would have a negative impact on their lifestyle**. This is a strong endorsement of the importance of broadband and the extent to which broadband has become an integral part of peoples' lives. There is general agreement that services are more accessible due to broadband and that broadband contributes to greater employment opportunities and a stronger local economy.

2 Introduction

The purpose of this report is to present the results of the survey-based research for the Commonwealth of Kentucky with focus on the key findings that may be considered in forward planning to influence adoption of broadband-enabled applications and uses, referred to as e-solutions. The report is organized in the following major sections:

Methodology Overview – A brief description of the key methods used and scope of research and analysis to provide context for the key findings.

Key Findings – Businesses and Organizations – Highlights and in depth analysis of information provided by businesses and organizations, including selected sector breakdowns.

Key Findings – Households - Highlights and in depth analysis of information provided by households, including selected demographic breakdowns.

Summary of Key Findings – A recap of key findings that have relevance for planning of broadband adoption initiatives.

Detailed appendices are included to provide supplemental reference information on survey deployment statistics and results of responses to survey questions.

3 Methodology Overview

The core methodology is founded on primary research via data collection through surveys of businesses, organizations, and households. Due to the distinct nature of the uses and benefits of different categories of Internet users, separate and distinct surveys are used for businesses/organizations (Business Survey) and for households (Household Survey). While the nature and purpose of the question sets are parallel for each survey, the questions are formulated in contexts specific and relevant to each of these basic user categories.

Both the business survey and the household survey are designed to collect 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, household income, time of Internet use, etc.

Internet utilization – the current and planned uses of the Internet across multiple categories relevant to how organizations and households 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 organizations and households assess the benefits of using the Internet.

Barriers - information on the importance of factors that prevent or inhibit organizations and households from taking full advantage of the Internet.

The surveys are made available for online access and individual organizations and households are invited to participate via direct email invitation to large, statewide contact lists. In order to maximize participation and response rates the email deployment is typically augmented with additional communication supported by the client organizations, including:

- **Press release** – a formal announcement by the client organization endorsing the survey initiative to increase awareness and promote participation, with proactive media follow-up.
- **Local support channels**, typically business, industry, and social organizations that can both endorse the survey initiative and utilize their networks to encourage participation.

For this project a press release was issued after the initial deployment of email invitations, and no other promotion and awareness activities were undertaken.

Email invitations were sent to over 26,000 organizations and 79,000 households across the state. The household deployment was weighted towards the more rural regions of the state, with approximately 75% of invitations going to rural households.

For the purposes of the analysis contained in this report, **completed survey responses** were received from **1,441 businesses and organization**s and from **1,191 households**. Additional partially completed surveys that provide usable responses are also included, adding to the response counts for some questions.

For these survey sample sizes the overall error margin for statistical analysis are +/- 2.6% for organizations and +/- 2.8% for households (with a 95% Confidence Interval)[1].

4 Key Findings – Businesses and Organizations

The following analysis is based on survey responses from 1,529 businesses and organizations across the Commonwealth of Kentucky. The results focus on key findings related to Internet usage, benefits, and barriers, with selected results broken down by key respondent characteristics, such as industry, employment size, and connectivity type. Complete survey results are also provided in Appendix 2 for reference.

4.1 Organization Profiles and Connectivity

4.1.1 Respondent Characteristics

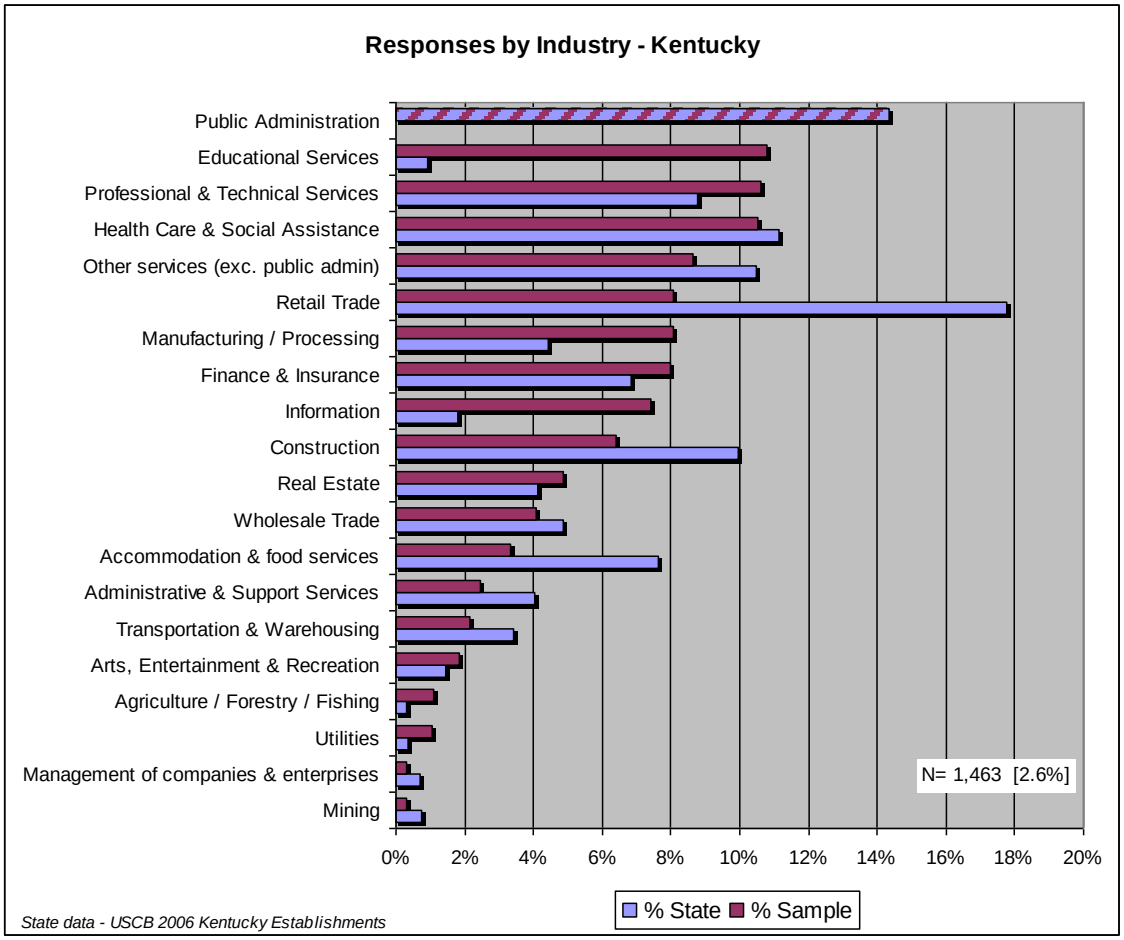
The sample includes data from businesses and organizations from 101 counties across the state. In addition, the sample represents survey responses from businesses and organizations across all 19 industries classified by NAICS[2]. This profile includes commercial businesses non-commercial organizations, such as government entities, educational institutions, and non-profit organizations.

[1] 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%].

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

The following figure shows the breakdown of survey responses by industry[3] with comparison to the state profile of establishments[4].

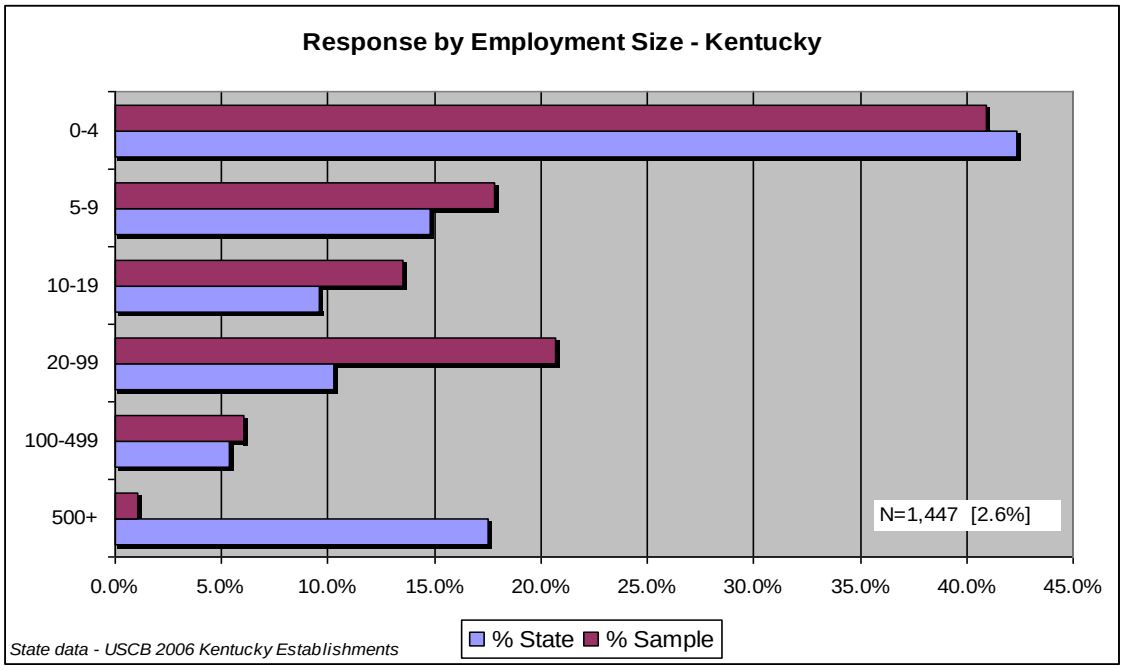
Figure 1 – Organization Survey Responses by Industry



The following figure shows the breakdown of survey responses by establishment employment size range with comparison to the state profile of establishments.

[3] Please refer to Appendix 2 for a breakdown of sample responses by Industry.
[4] State data source: US Census Bureau County Business Patterns 2006 – Number of establishments. Note: USCB County Business Patterns data does not include data for Public Administration.

Figure 2 – Organization Survey Responses by Establishment Employment Size



While large organizations with establishments of more than 500 employees are under-represented in the sample, such organizations generally have a long-standing use of broadband technologies and applications and are not representative of the majority (82.5% under 500 employees) of organizations that make up the state economic activity.

4.1.2 Connectivity Characteristics

The survey sample includes a broad mix of Internet connectivity technologies, including a small number of organizations using dial-up Internet connections. The following figures summarize the Internet technologies used.

Figure 3 – Connectivity Types Used by Establishments

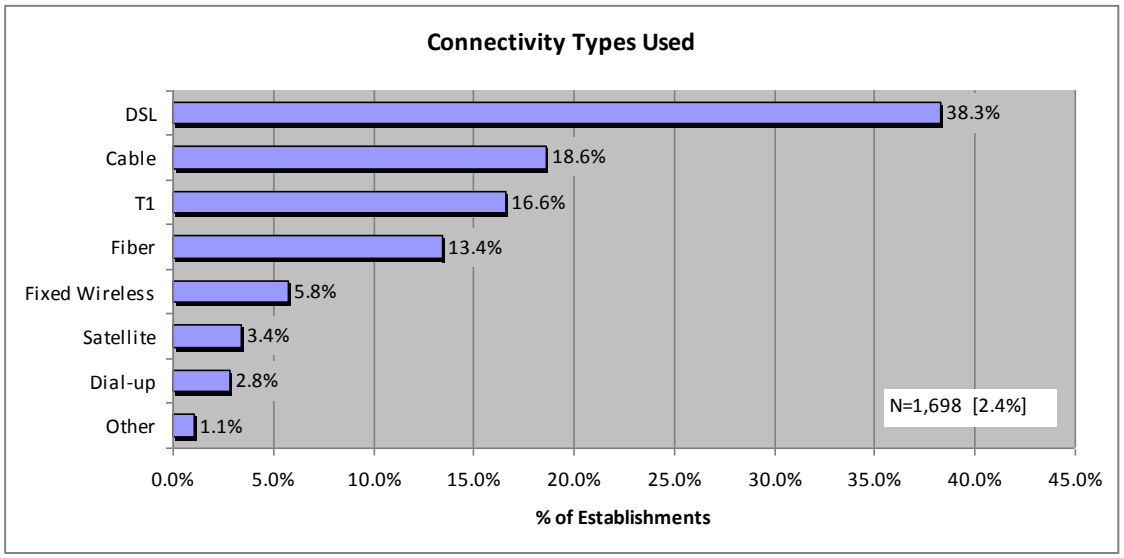
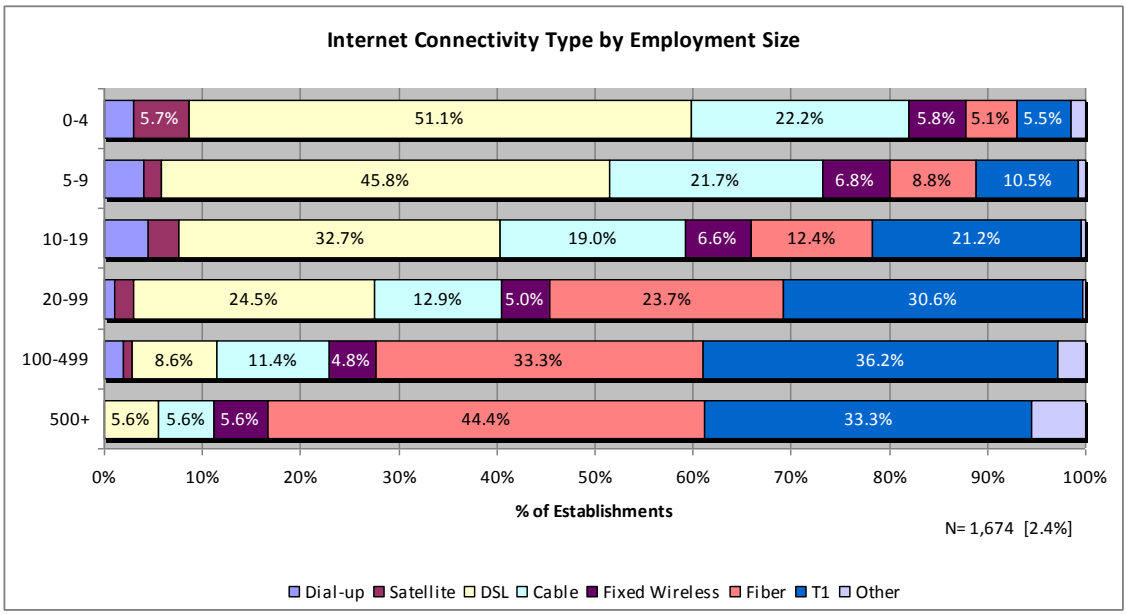


Figure 4 – Connectivity Type by Employment Size



Small enterprises are the largest users by percentage of DSL and cable Internet technologies. The percentage of organizations using these technologies decreases with increasing employment size, where other technologies with higher capacity and/or better capacity cost performance find increasing use.

Dial-up and Satellite – A small percentage of organizations use dial-up (2.9%) and satellite (3.5%) connections, most likely due to other forms of high-speed access being unavailable. 69% of dial-up users identified lack of availability as a reason for not subscribing to a broadband service.

DSL and Cable – DSL and cable Internet services are the predominant technologies used by small enterprises (less than 20 employees) and the technologies of choice for very small enterprises (73%). Only 20% of medium-sized (100-499) enterprises use either DSL or cable services.

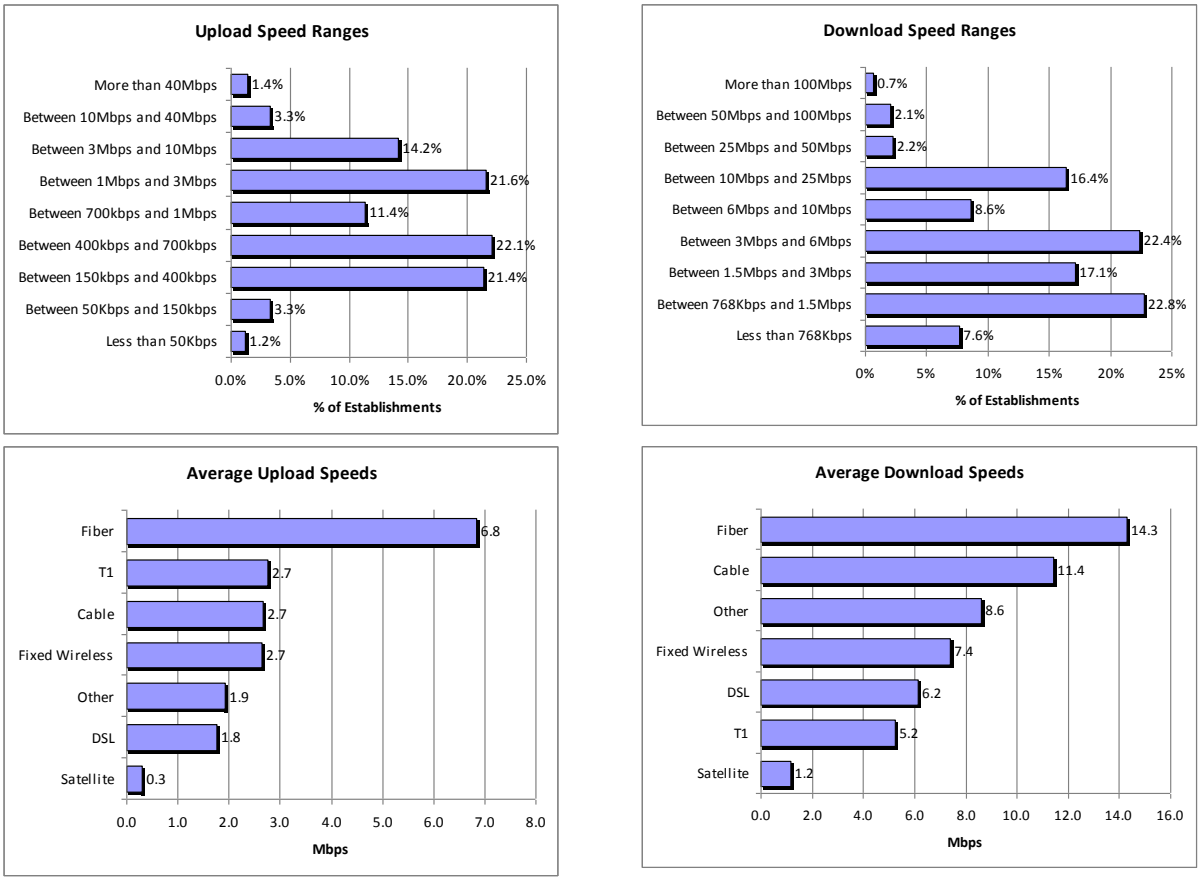
Fixed Wireless – Fixed wireless access is used by less than 6% of organizations overall and may be predominantly used in locations where other broadband options may be limited or do not exist.

Fiber – The use of fiber Internet technologies increases steadily with business size and used by 13% of organizations overall. This trend may be influence by a combination of connectivity cost and the increasing capacity demands of larger enterprises. In addition, fiber connectivity has less geographic penetration compared to other technologies, especially in more rural areas.

T1 and other technologies – T1 services are used by organizations of all sizes, with the highest use in the 100-499 employee range (36%). The relatively high use of T1 is likely due to its longstanding availability and legacy system that continue to use T1 effectively despite the availability of newer technology options. “Other” technologies, such as DS3, Metro Ethernet services, and private enterprise networks, tend to take a larger share for large enterprises.

Organizations were provided the option to take a speed test to measure the upload and download speeds of their connections. The following charts provide a summary of the speed test results for upload and download speed ranges and average upload and download speed by connectivity type.

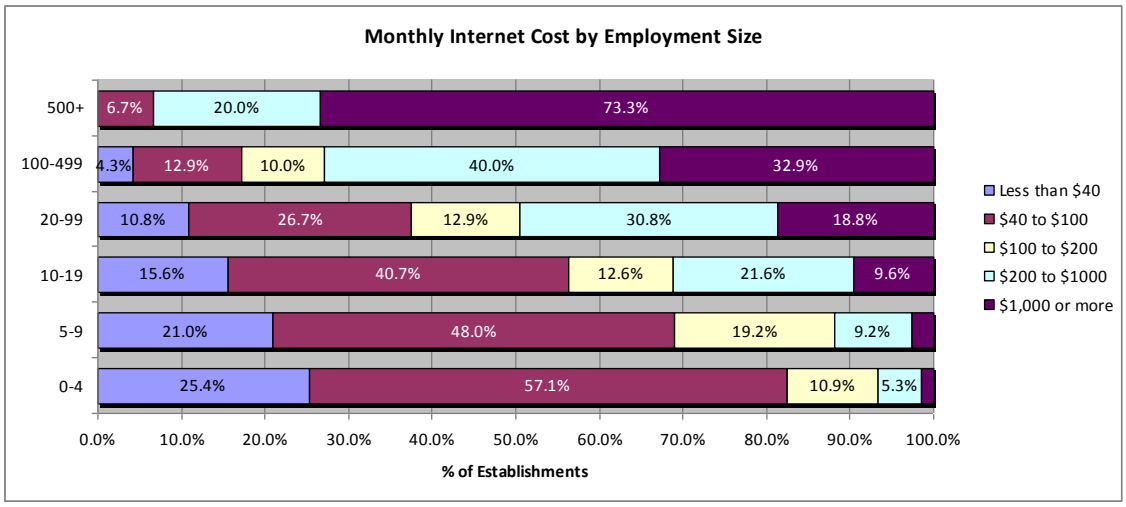
Figure 5 – Speed Test Results - Organizations



59.5% of establishments measured **less than 1 mbps upload** speed and **47.6%** measured **less than 3 mbps download** speed. The average measured **speeds for DSL are about 66% of the measured upload speeds for cable** and **54% of the measured download speeds for cable**.

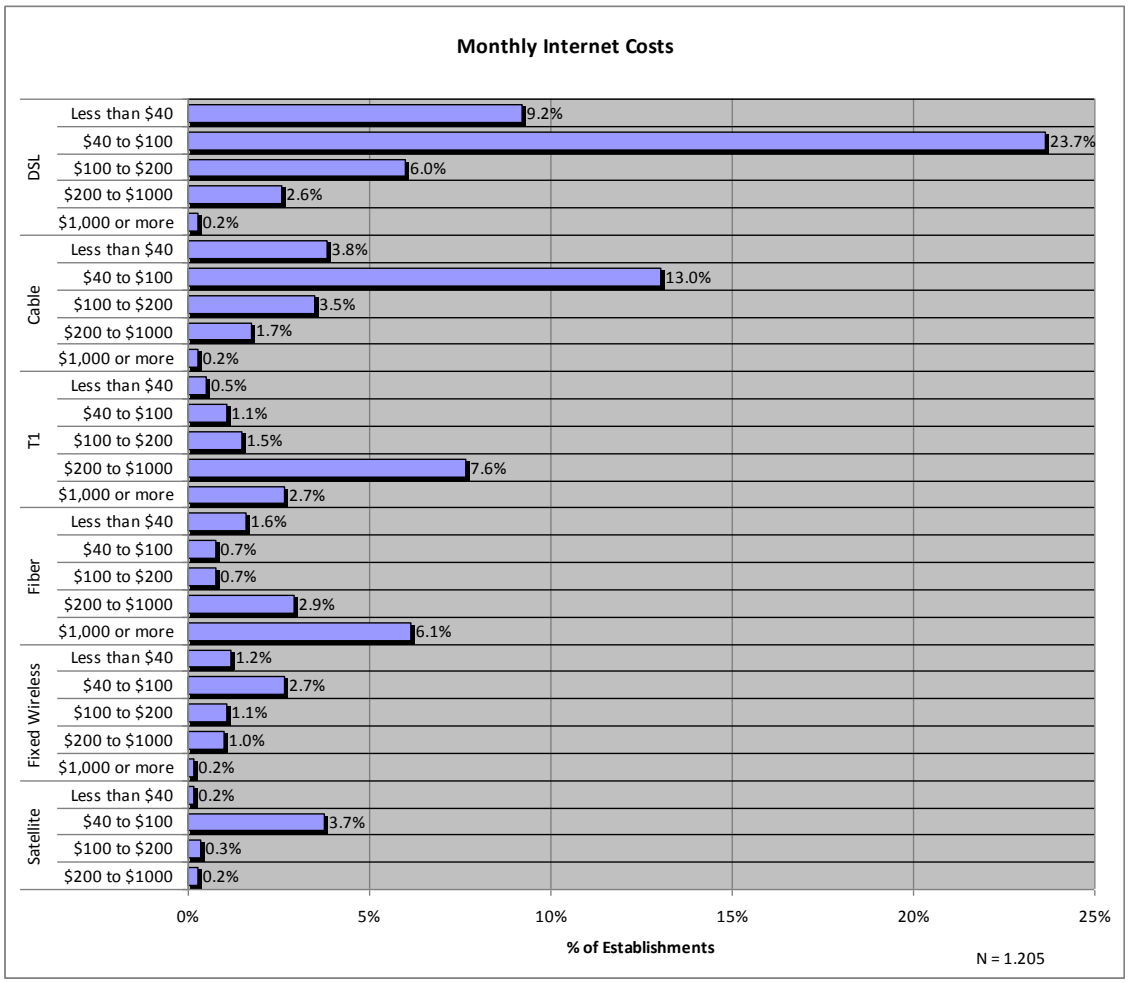
Monthly Internet connectivity costs vary by organization size and by type of connectivity.

Figure 6 – Monthly Internet Costs by Employment Size



As one would expect, the monthly expenditures of Internet connectivity increase with organization size. Over 83% of very small organizations spend less that $100 per month, while 73% of large organizations spend $1,000 or more per month.

Figure 7 – Monthly Internet Costs by Connectivity Type



Monthly cost for all connectivity types varies across all price ranges. However, the majority of DSL, Cable, Fixed Wireless, and Satellite users spend between $40 and $100 per month. The majority of T1 users spend between $200 and $1,000 per month and the majority of Fiber users spend more than $1,000 per month.

Organizations were asked to rate how well their current Internet service meets their needs in terms of speed, reliability, and value.

Figure 8 – Reliability of Connection

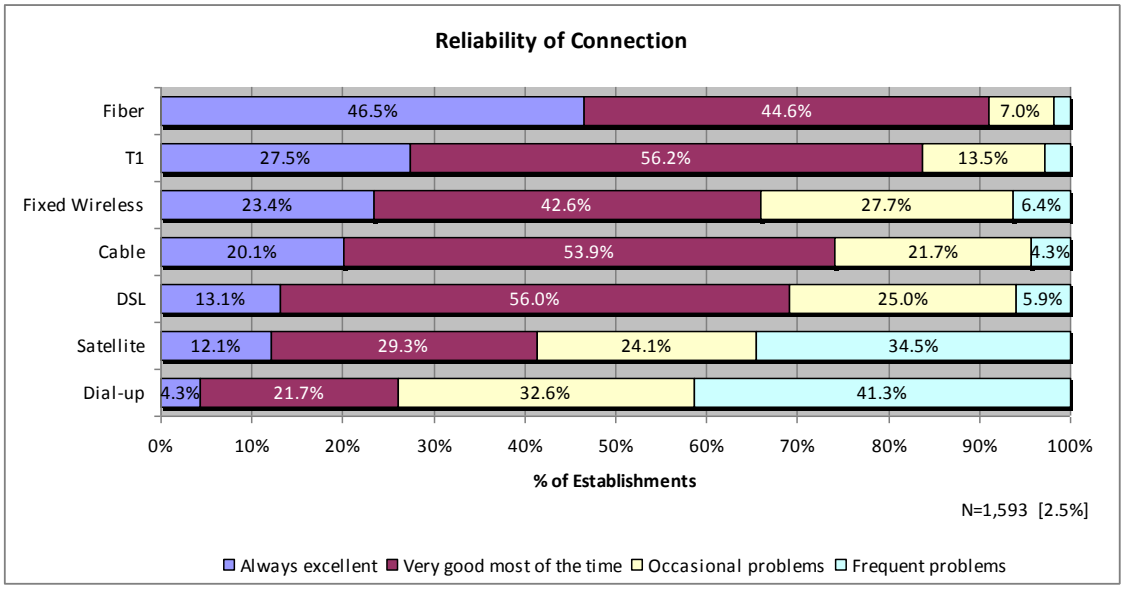


Figure 9 – Speed of Connection

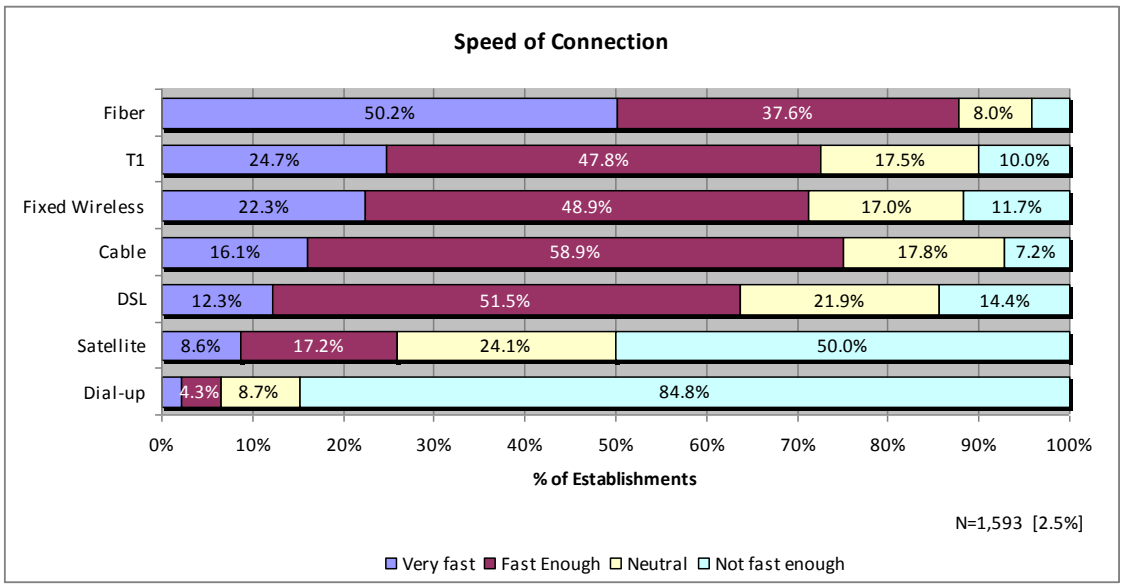
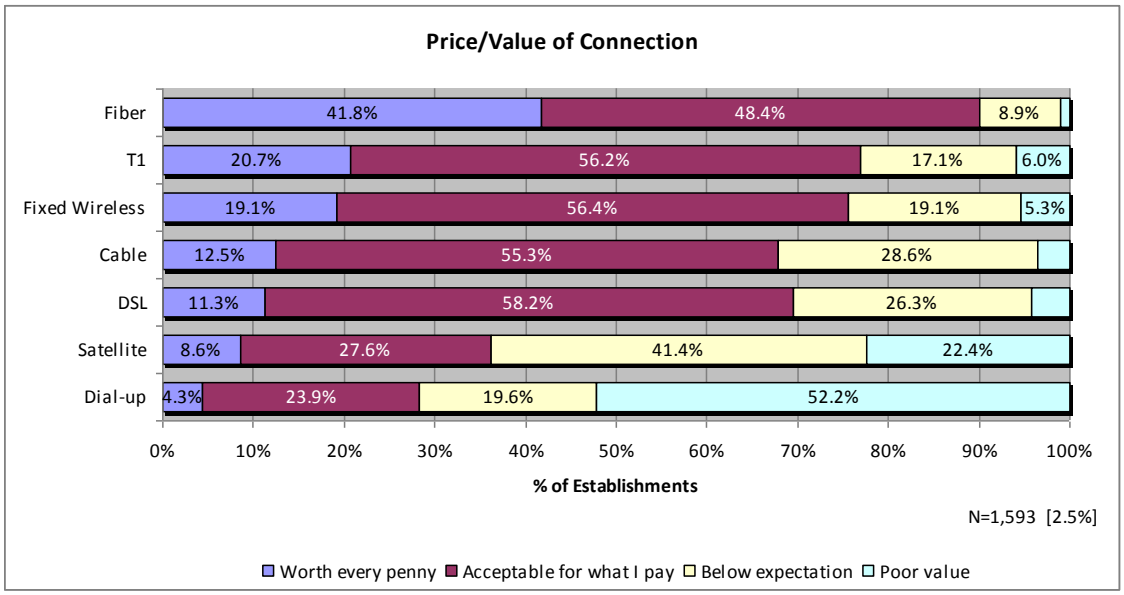


Figure 10 – Price/Value of Connection



In all three categories, the highest ratings of service satisfaction in meeting user needs are for Fiber, followed by T1, Fixed Wireless, Cable, and DSL. Satellite service has poor ratings in comparison to other high-speed connectivity options. Dial-up service, shown for comparative purposes, is the least reliable and considered poor value by over 52% of users even at its relatively low cost, and considered “fast enough” by less than 7% of users.

4.2 Broadband Utilization and Benefits

4.2.1 Broadband Utilization

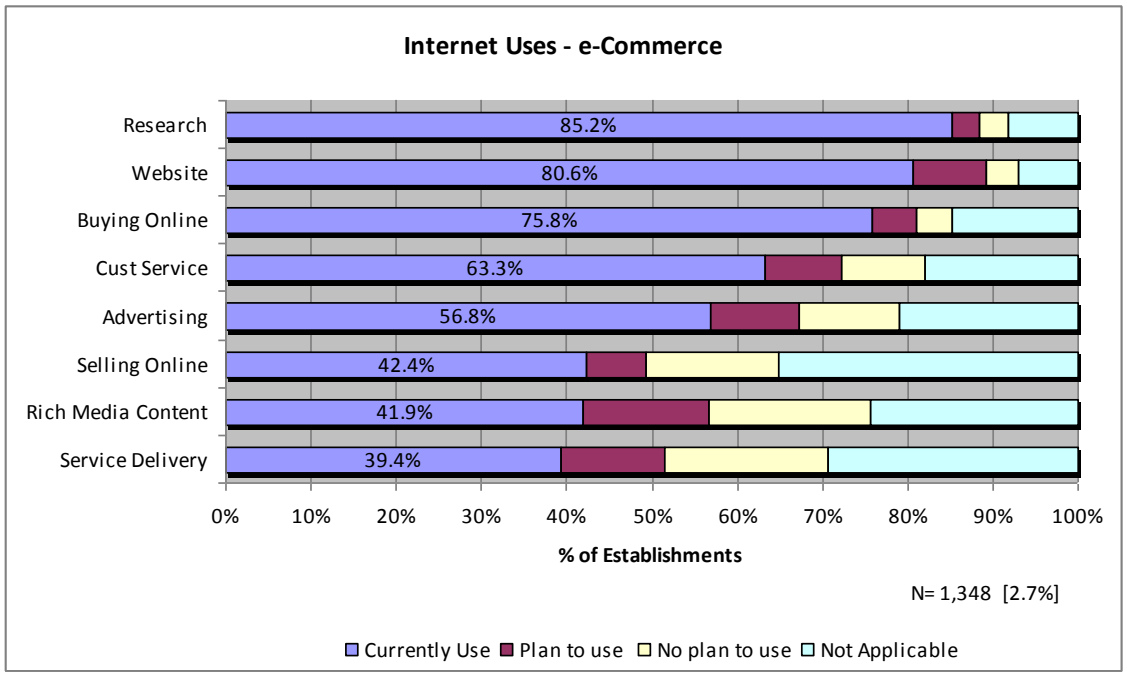
The survey of businesses and organizations explores the uses of the Internet in two major e-solutions categories:

- **e-Commerce** uses, which include activities related to the sales, marketing, and delivery of products and services; and,
- **e-Process** uses, which include internal operational uses, such as supplier coordination, training, and tele-working.

The extent to which organizations use these e-solutions provides an indication of their engagement in the digital economy and the level of adoption of practical applications that leverage broadband capacity. The following figures summarize the uses of broadband by businesses and organizations with selected breakdowns by organization characteristics to show differences in broadband utilizations for different segments.

The following figures show the current and planned uses of broadband for all businesses and organizations.

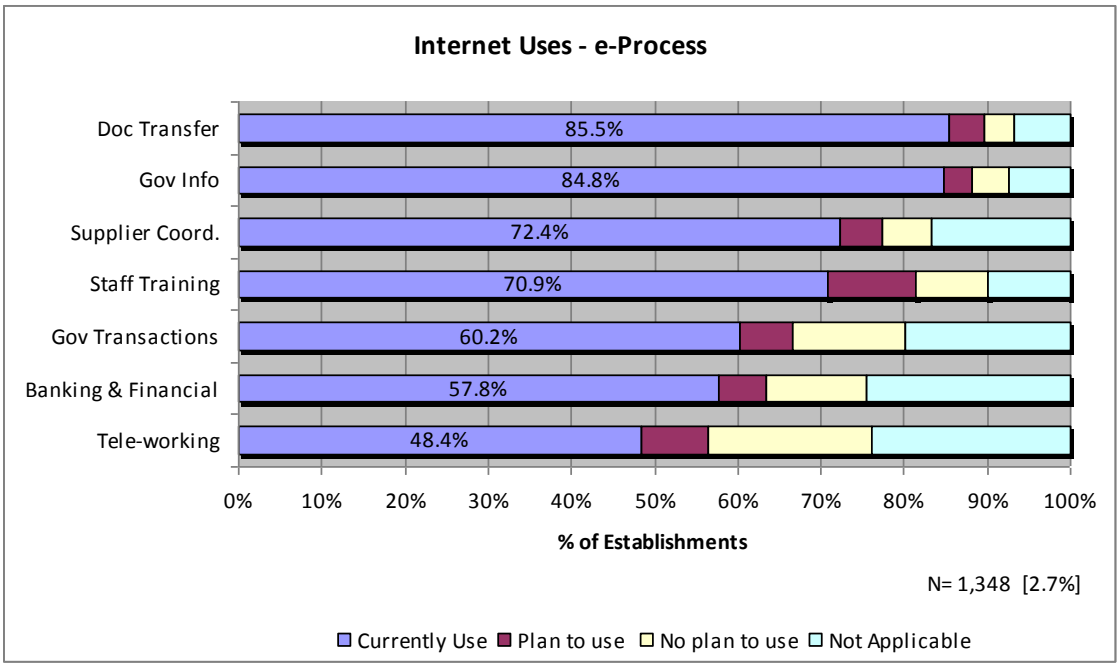
Figure 11 – e-Commerce Uses of Broadband



The most common usage of broadband by organizations is for the research of information. Over 80% of organizations have a website, with an additional 8.5% planning to implement a website within the next 12 months.

Over 42% of organizations sell goods and services online, while almost 76% of organization use the Internet to purchase goods and services online. It should be noted that the sample included non-commercial organizations for which online sales may not be applicable.

Figure 12 – e-Process Uses of Broadband



Approximately 85% of organizations use broadband for the transfer of large files and for access to government information online. In addition, over 60% of organizations use broadband to conduct transactions with government entities.

Broadband offers additional opportunities for uses that can be transformational for how organizations conduct their operations. Over 72% of organizations use broadband for coordination with suppliers and over 70% use broadband for training of employees. Over 48% use broadband for employee tele-working, with less than 24% considering this working arrangement not applicable to their organization. All of these uses provide opportunities for organizations to gain operational efficiencies and cost savings.

4.2.1.1 Utilization Variations by Size of Organization

Broadband utilization can vary by organization size, with larger organizations often having greater demand and resources to adopt increasingly sophisticated e-solutions. The following figures show the current levels of e-commerce and e-process uses by employment size ranges.

The broadband uses that show the greatest increase in utilization with organization size are:

- Selling online
- Buying online
- Delivery of services and rich media content
- Supplier coordination
- Staff training
- Tele-working

Opportunities exist to increase utilization of e-solutions in these areas with small and medium enterprises (SME).

Figure 13 – e-Commerce Uses of Broadband by Employment Size

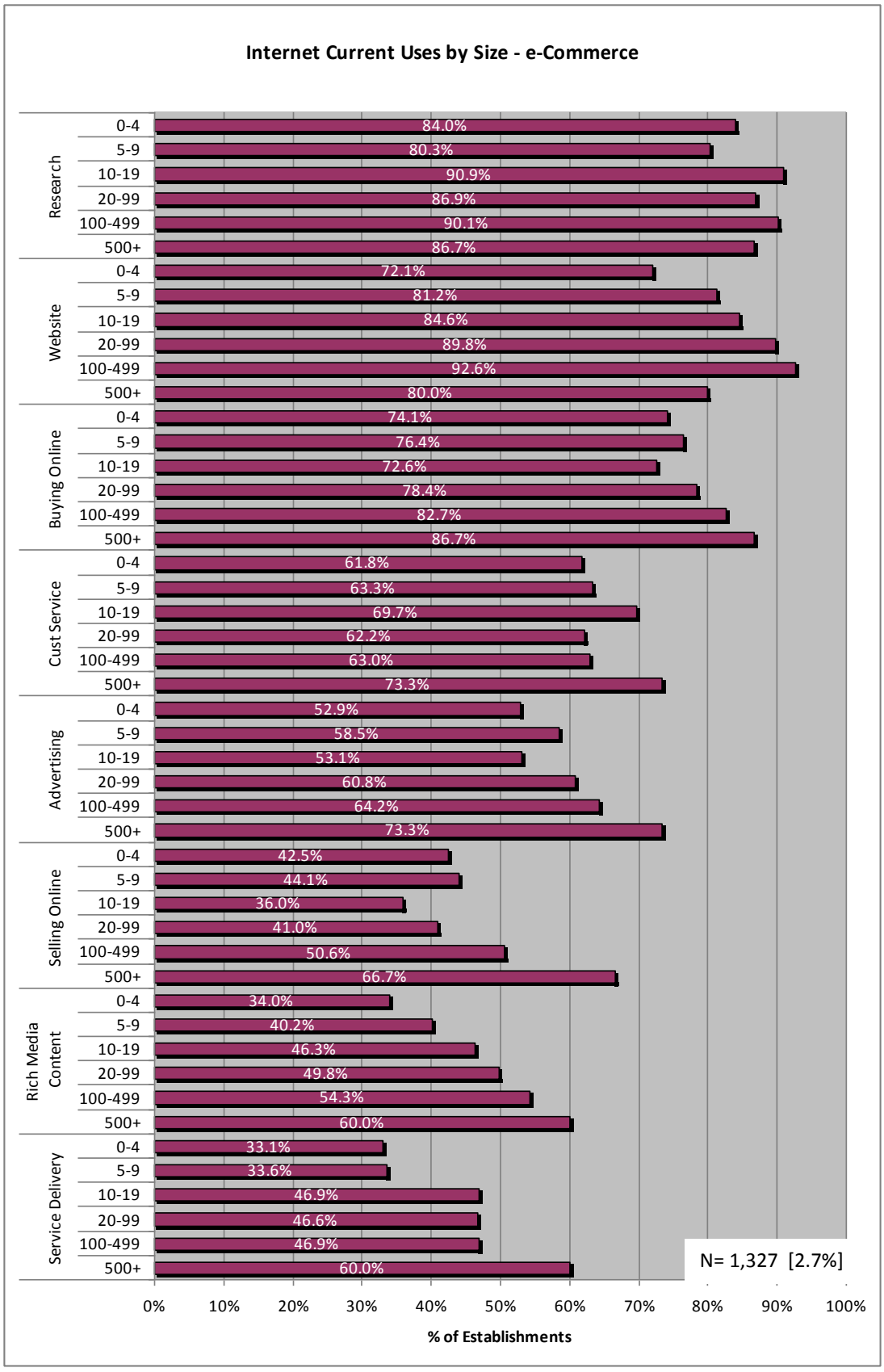
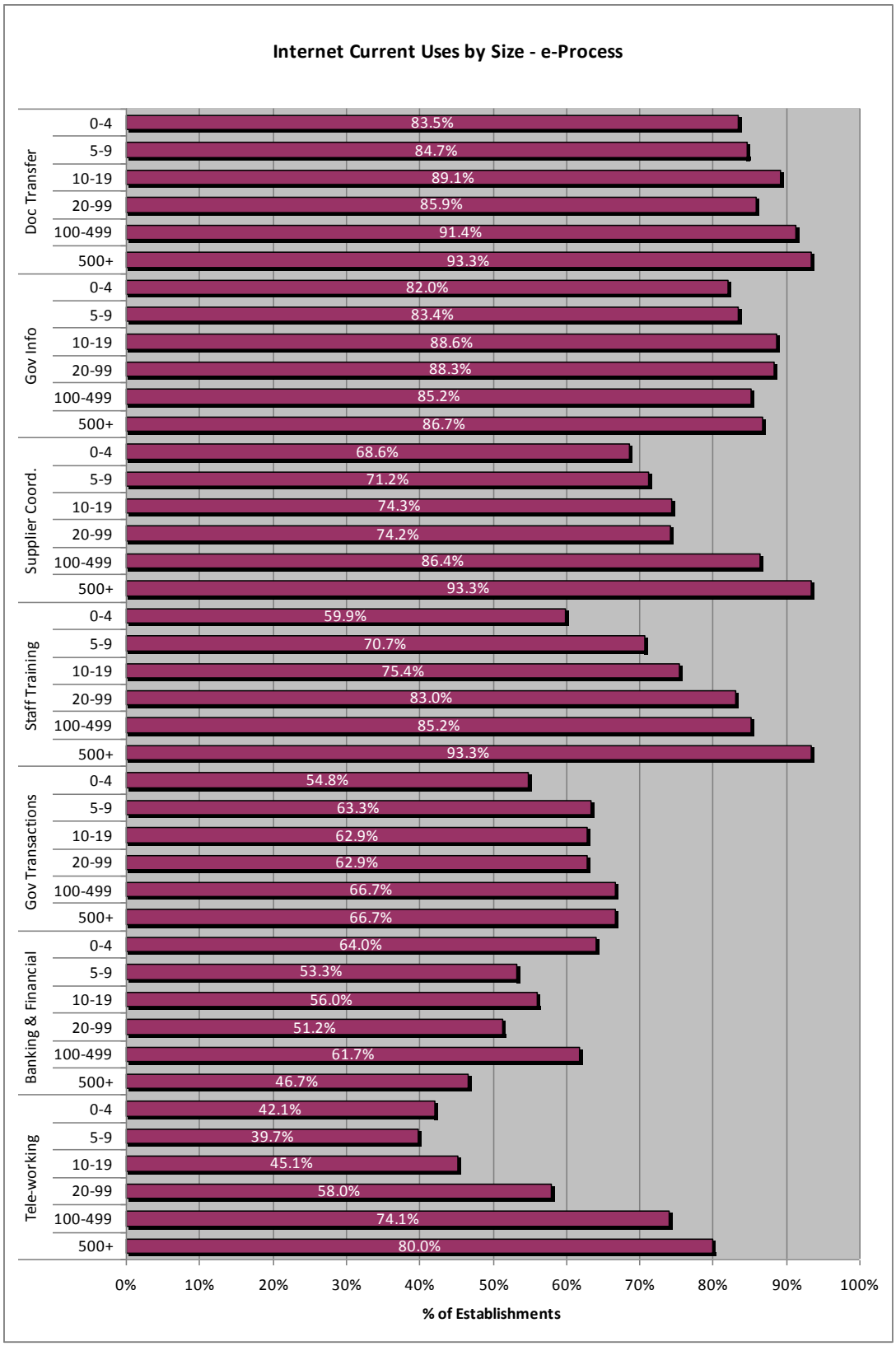
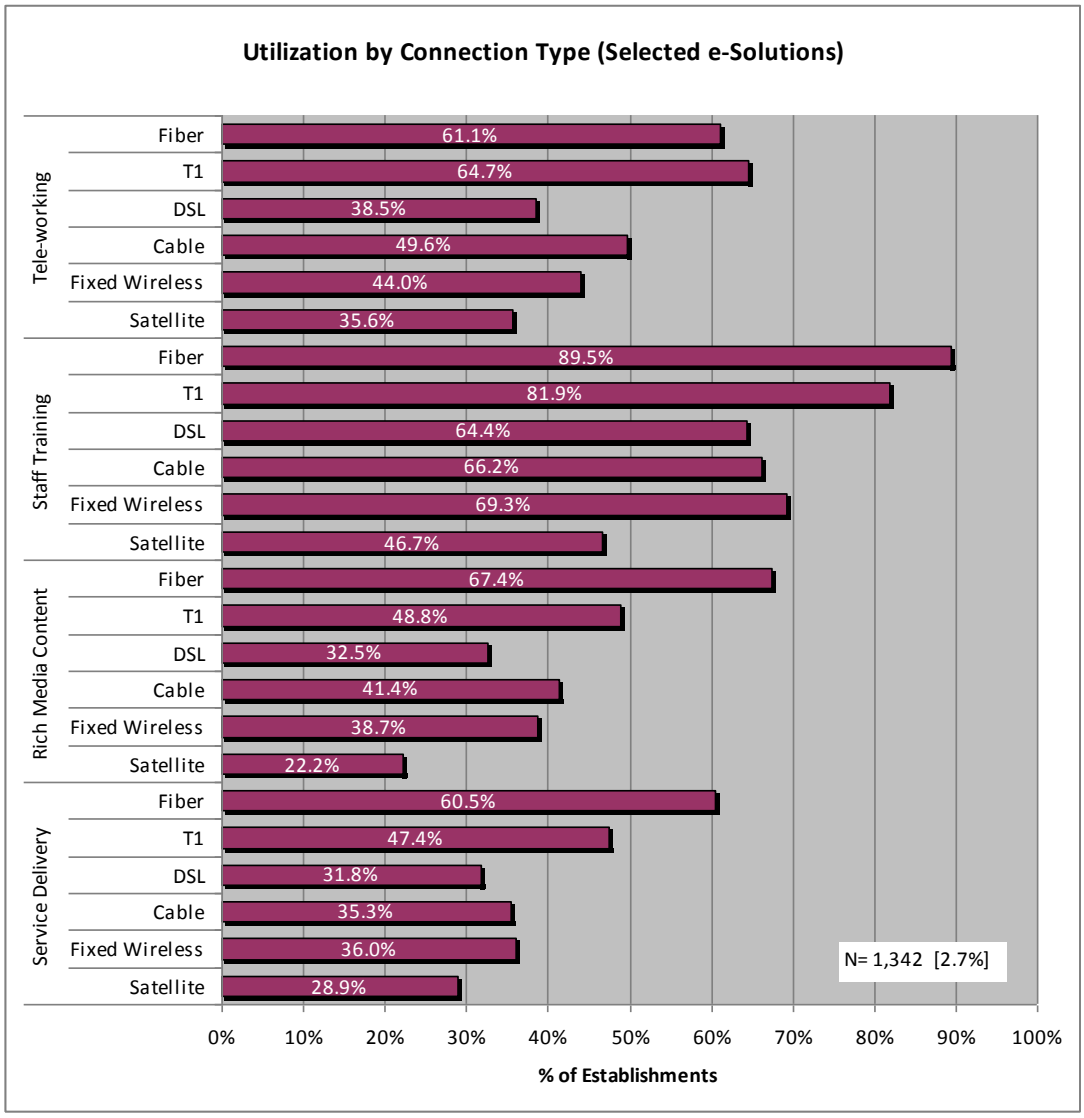


Figure 14 – e-Process Uses of Broadband by Employment Size



In general, there is no significant difference in e-solutions utilization by organizations using different Internet connectivity technologies. However, the following figure shows four e-solutions for which utilization appears to be affected by the type of Internet connection used.

Figure 15 – Utilization by Connection Type



For these four e-solutions, the greatest utilization tends to be by fiber and T1 users, with DSL, cable, and fixed wireless forming a second tier, and satellite users generally showing the least utilization. While the correlation between connectivity type, organization size, and utilization level may also be a factor in this variation, it is worth noting that these e-solutions have particular value for organizations located in more remote and non-urban areas. Such areas also often have the fewest options for broadband connectivity.

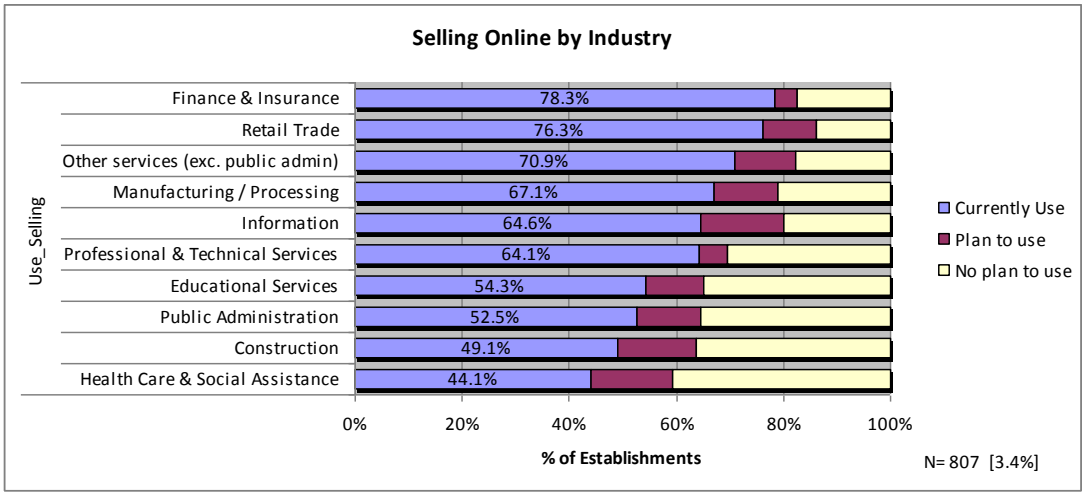
4.2.1.2 Utilization Variations by Industry

As with organization size, some e-solution utilizations vary with industry while others are used at similar levels by all industries. The utilizations that show little variation by organizations across industries are shown in the following table, with the average percentage of organizations that view the e-solution as applicable to them.

e-Solution	**% of Establishments**	**Sample Size**[5] [Error Margin]
Buying Online	89.2%	N= 924 [3.2%]
Research	93.1%	N= 999 [3.1%]
Access Government Information	92.7%	N= 1024 [3.1%]
Online Government Transactions	76.1%	N= 883 [3.3%]
Document Transfer	91.9%	N= 1019 [3.1%]
Supplier Coordination	87.0%	N= 899 [3.3%]

e-solutions for which variations in utilization exist across industries are shown in the following figures. The results shown are for organizations that said **the e-solution is applicable to them**. The industries shown are those for which a sufficient sample exists for reliable comparison.

Figure 16 – Selling Online by Industry



[5] Note: Sample sizes vary because "not applicable" responses are not included in these utilization frequency calculations. The intent is to show utilization for those organizations that say it is applicable.

Figure 17 – Website by Industry

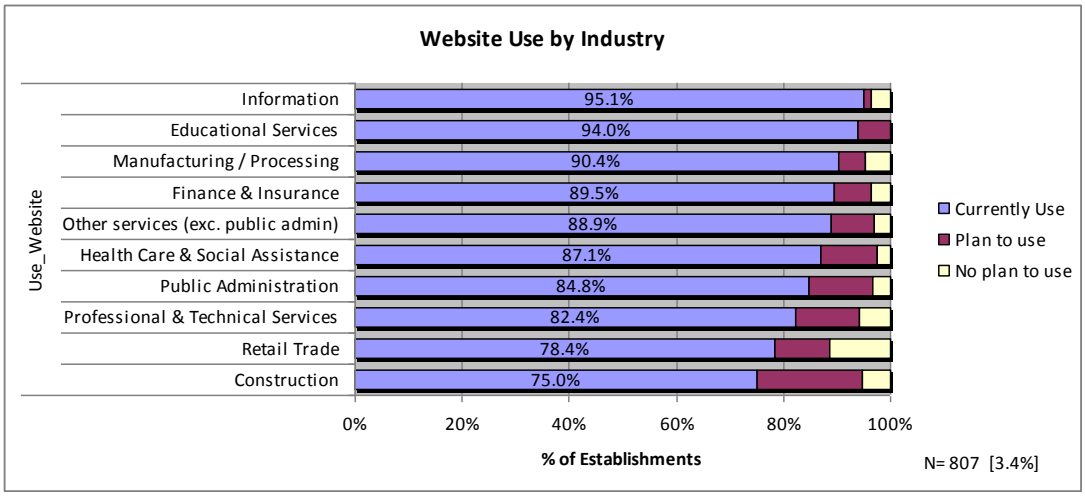


Figure 18 – Advertising Online by Industry

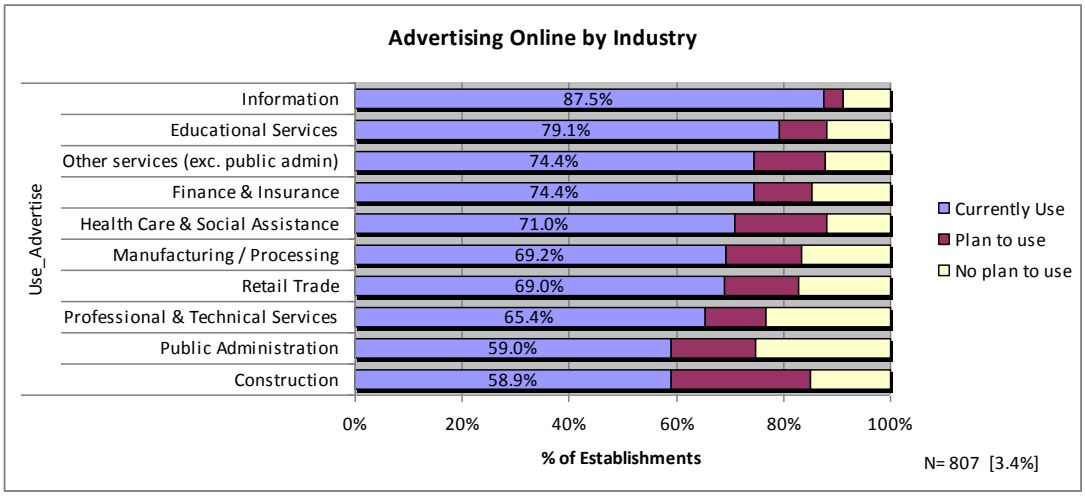


Figure 19 – Customer Service by Industry

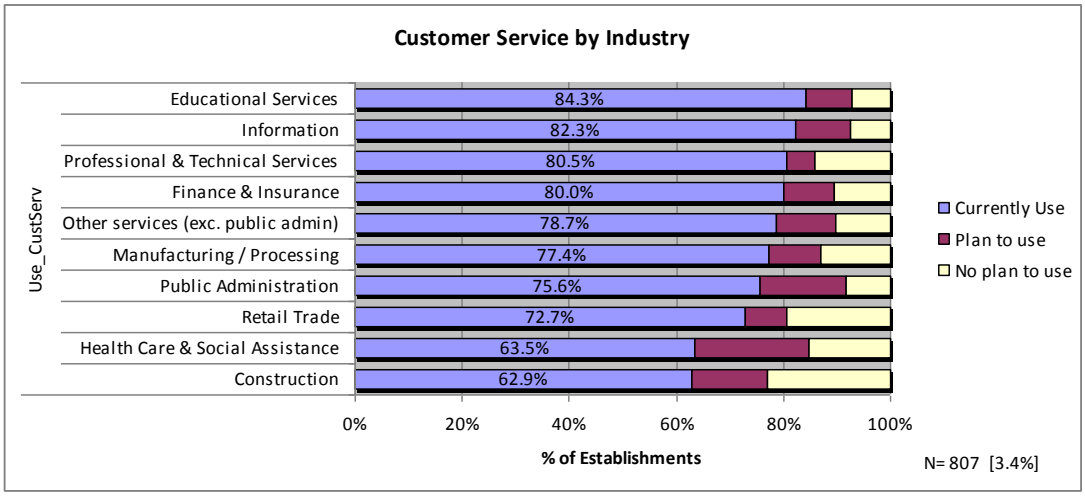


Figure 20 – Online Service Delivery by Industry

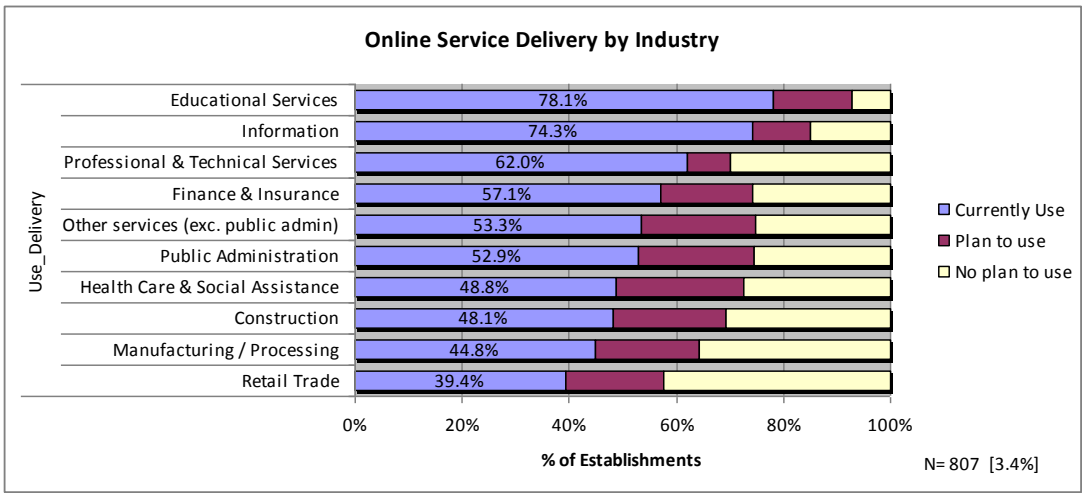


Figure 21 – Rich Media Content by Industry

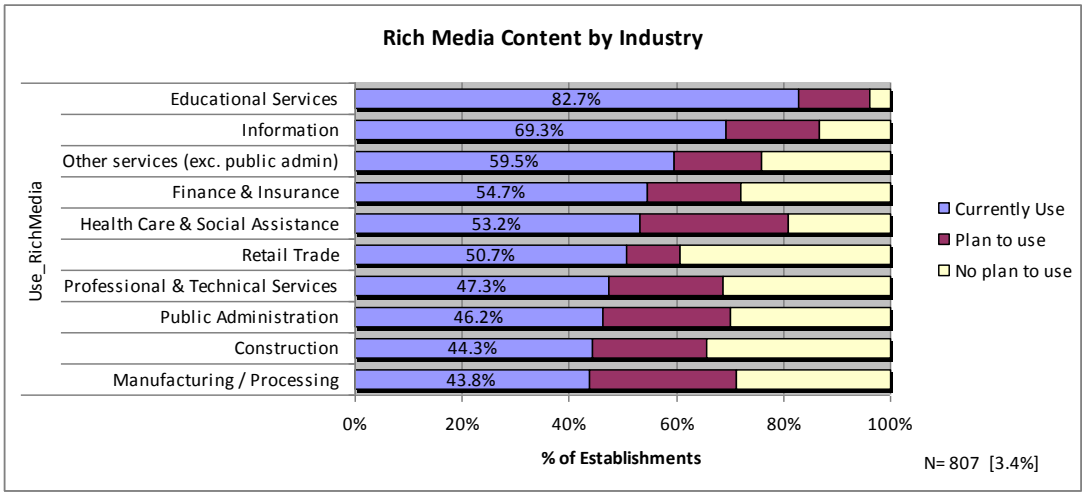


Figure 22 – Staff Training by Industry

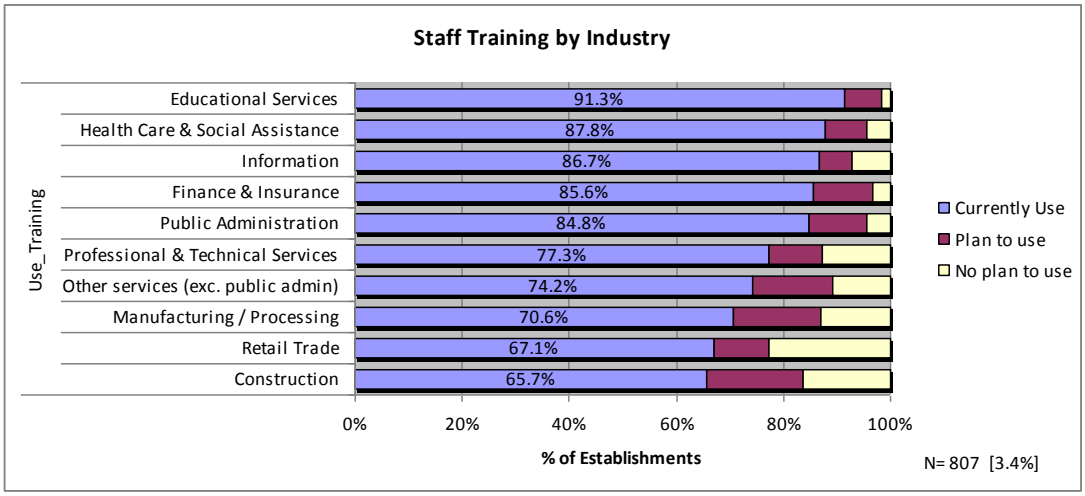


Figure 23 – Tele-working by Industry

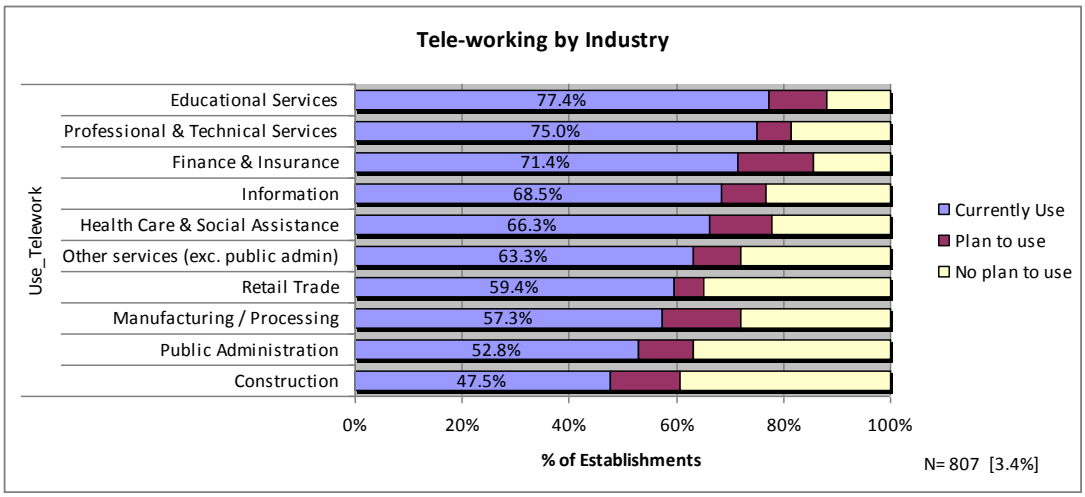
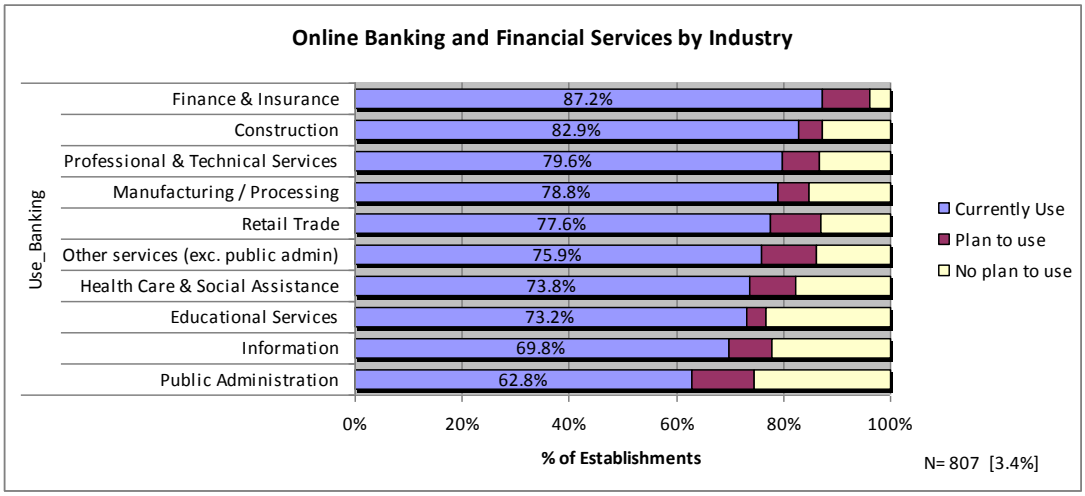


Figure 24 – Banking and Financial Services by Industry



Opportunities exist for increasing the utilization of e-solutions in certain industries. The following table identifies those industries for which utilization falls below the overall average for each e-solution.

Figure 25 – Opportunities for Increase Utilization by Industry

E-Solution	Construction	Educational Services	Finance & Insurance	Health Care & Social Assistance	Information	Manufacturing / Processing	Other services (exc. public admin)	Professional & Technical Services	Public Administration	Retail Trade
Selling Online	■	■		■					■	
Service Delivery	■			■		■	■		■	■
Rich Media Content	■		■	■		■		■	■	■
Customer Service	■			■					■	■
Advertising Online	■					■		■	■	■
Website	■							■	■	■
Banking and Financial		■		■	■		■		■	
Staff Training	■					■	■	■		■
Tele-working	■					■	■		■	■

"Filled" cells indicate utilization below the overall average for the e-solution.

Above Average (overall): **Finance & Insurance**, **Information**, and **Educational Services**.

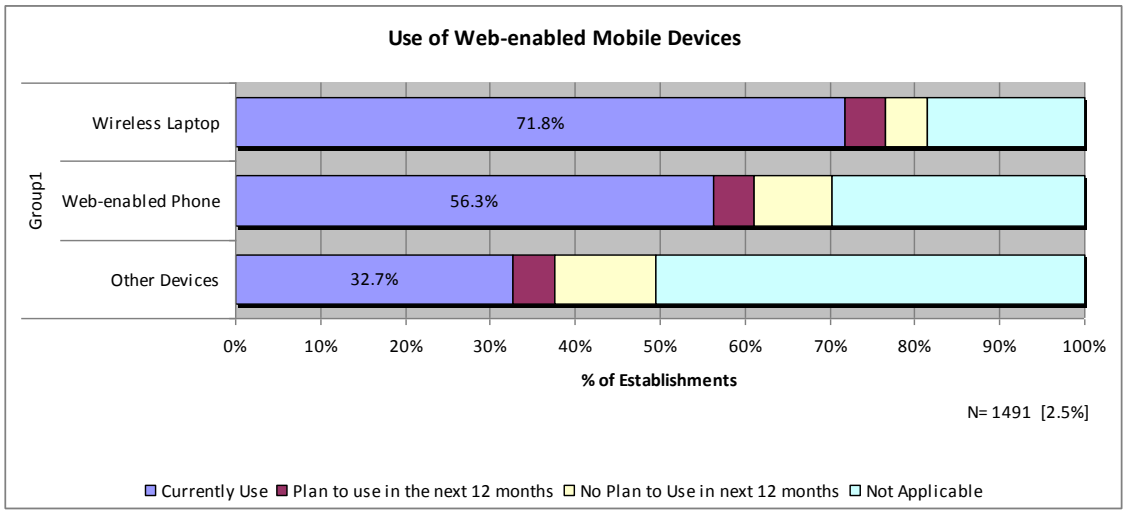
Below Average (overall): **Construction, Retail Trade,** and **Public Administration** (government).

Some e-solutions may be relatively more important or a more natural and practical "fit" for organizations in certain industries. However, the above table indicates where utilization gaps may exists and that can be addressed through outreach and adoption efforts targeted at selected industries.

4.2.1.3 Utilization of Mobility Services

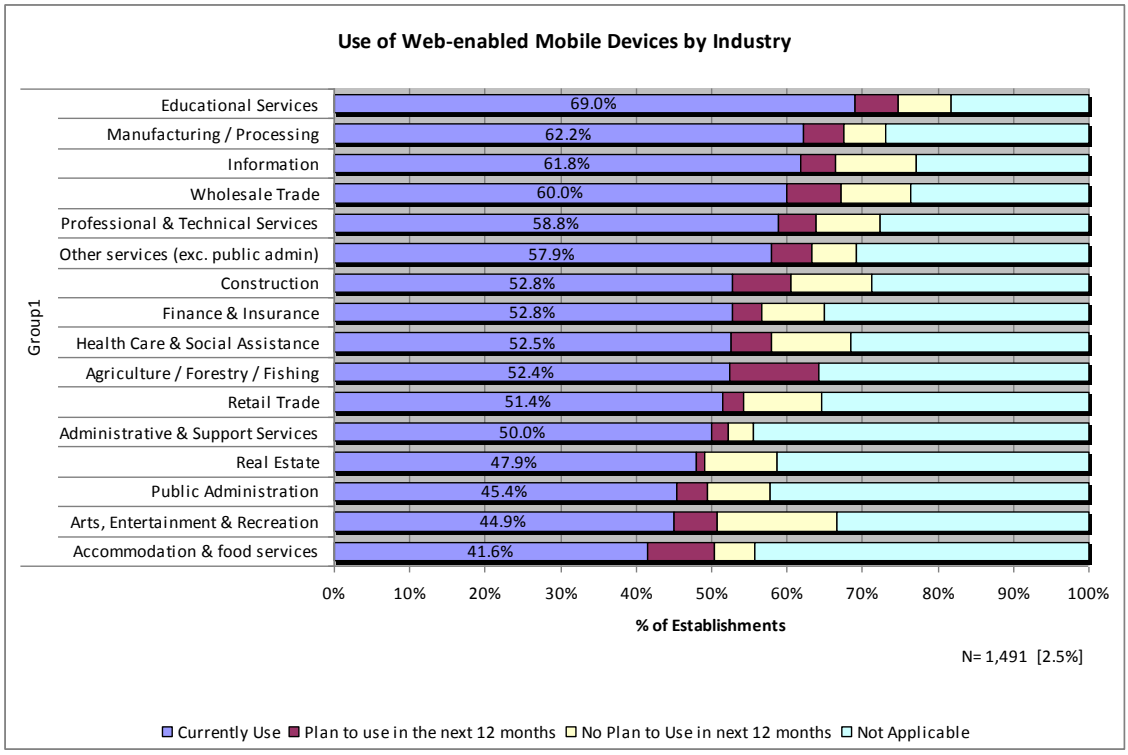
Organizations provided the following information on the utilization of mobility devices for Internet access and the importance of mobility functions to their organizations.

Figure 26 – Use of Web-enabled Mobile Devices



Over 54% of organizations use some form of web-enabled mobile device, with 72% using a web-enabled laptop computer. The greatest use of mobile devices for web access is in the Educational Services industry. Usage by industry is shown in the following figure.

Figure 27 – Use of Web-enabled Mobile Devices by Industry

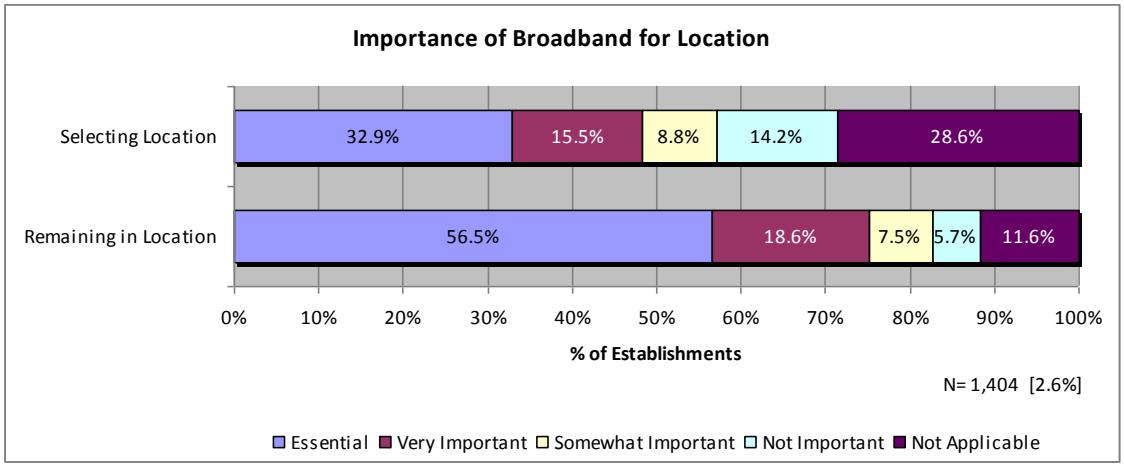


The use of mobile devices for web access is considered essential by 36% of organizations and very important by another 24% or organization. The utilization and reliance on mobile devices for increasingly sophisticated online interactions indicates a trend that mobile Internet access is an important complement to fixed broadband technologies for organizations.

4.2.2 Broadband benefits and Impacts

While it is important to understand patterns of utilization of broadband to identify gaps and opportunities for increased adoption of e-solutions, it is equally important to understand the benefits and impacts of broadband utilization on businesses and organizations. To provide a perspective on the overall importance of broadband organizations were asked about the importance of broadband for both selecting their location and for remaining in their current location.

Figure 28 – Importance of Broadband for Location



There are many factors that influence the choice of business location, and relocating a business is a major decision that will not be determined by one single factor such as broadband availability. However, the fact that **33% of organizations** say that the availability of broadband services was **"essential" for selecting their business location**, and over **56% say broadband is "essential" for remaining in their current location** demonstrate that broadband availability is a very strong influence on location. These statistics are of particular interest to communities, local governments, and economic development organizations that have an interest in maintaining their business base and in attracting new businesses to their regions.

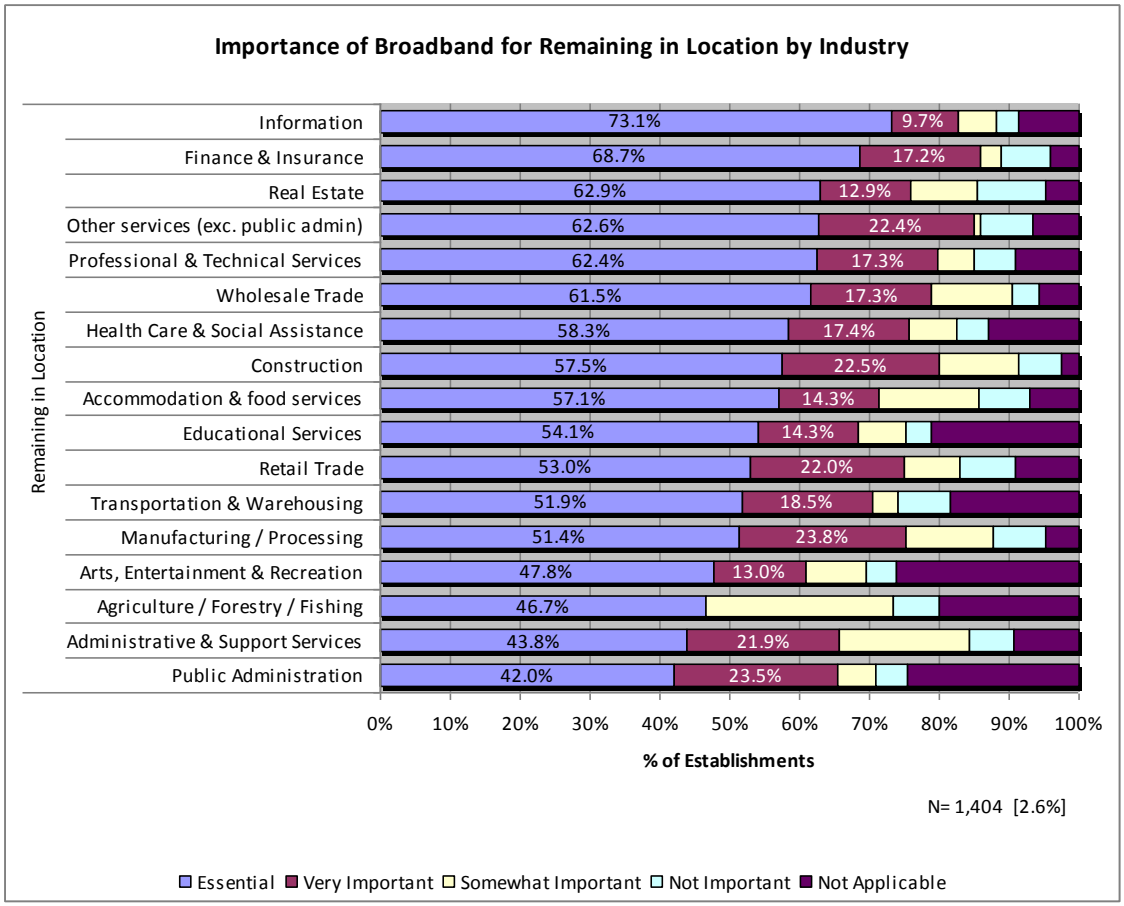
It can be reasonably argued that even considering other factors, a meaning portion of businesses would seriously consider relocation if sufficient broadband connectivity is not available. Similarly, the lack of sufficient broadband services can be expected to be a significant impediment to attracting new business to a community.

These statistics are relatively unaffected by the size of organization, despite the fact that relocation is a much greater undertaking for larger organizations. In addition, these statistics are relatively insensitive to how long the organization has been in their current location.

It stands to reason that the importance of broadband for location varies with industry and the type of organization. Businesses and organizations that depend on location for their products, such as tourism

or agriculture, or to provide services to their client base, such as government offices and support service, may consider broadband less important than other factors for location. However, all industries show a high level of importance of broadband for remaining in their current location as illustrated in the following figure.

Figure 29 - Importance of Broadband for Remaining in Location by Industry



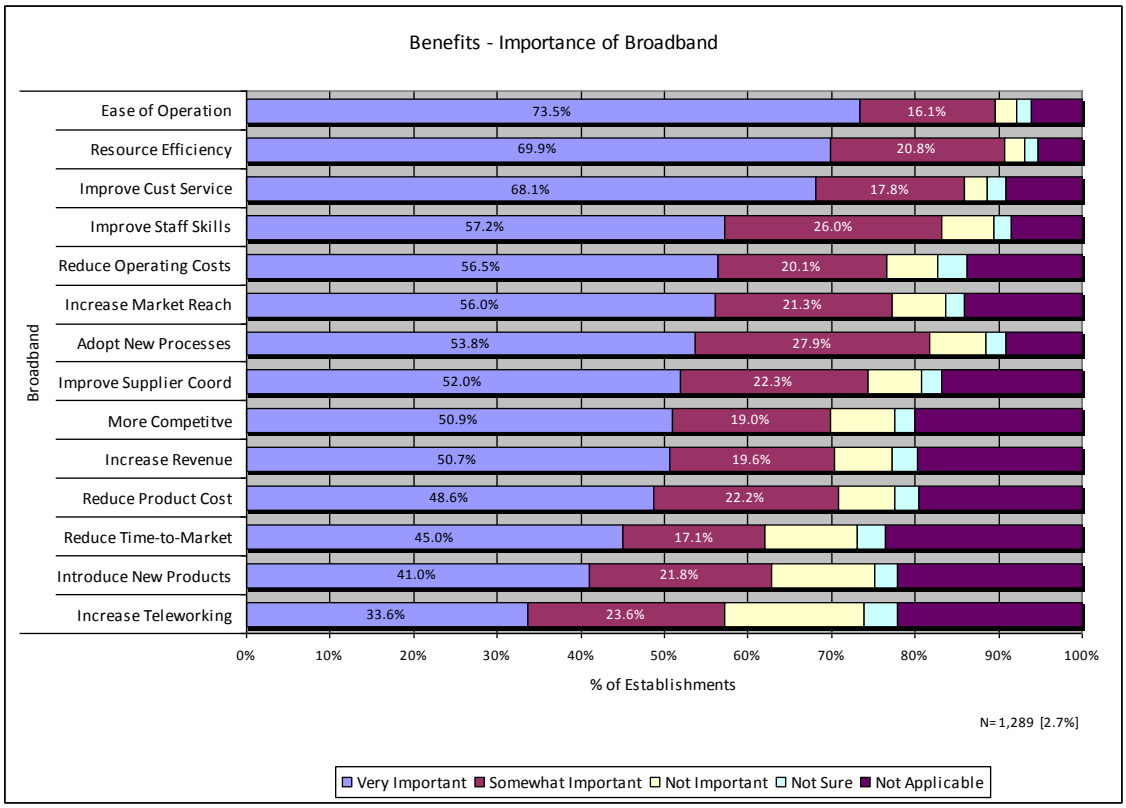
Organizations were asked to identify the importance of broadband for delivering benefits to their operations in a variety of dimensions generally relevant to most organizations regardless of their industry or business model. This provides a qualitative methods of determining the impact that broadband has on organizations and the benefits they derive from utilization of e-solutions.

The benefits dimensions are:

- **Ease of Operation** – making overall day-to-day operations easier
- **Resource Efficiency** – using existing resources more effectively
- **Improve Cust Service** – improving service to customers and clients
- **Reduce Operating Costs** – lower overall operating costs
- **Improve Staff Skills** – Improving staff skills (training or certification)
- **Increase Market Reach** – reach new customers and clients
- **Adopt New Processes** – ability to adopt new processes for operations
- **Improve Supplier Coord** – Improving coordination with suppliers
- **Increase Revenue** – opportunity to increase sales and revenues
- **More Competitive**- keep pace with competitors
- **Reduce Product Cost** – reducing costs of products and services
- **Reduce Time-to-Market** – reduce time-to-market for products and services
- **Introduce New Products** – ability to introduce new products and services
- **Increase Tele-working** – increasing the use of tele-working

The net effect of these benefits is to increase competitiveness and productivity and, where applicable, increase organizational revenues, reduce costs, and improve profitability. Understanding the importance of broadband in contributing to these benefits provides an indication of broadband's impact.

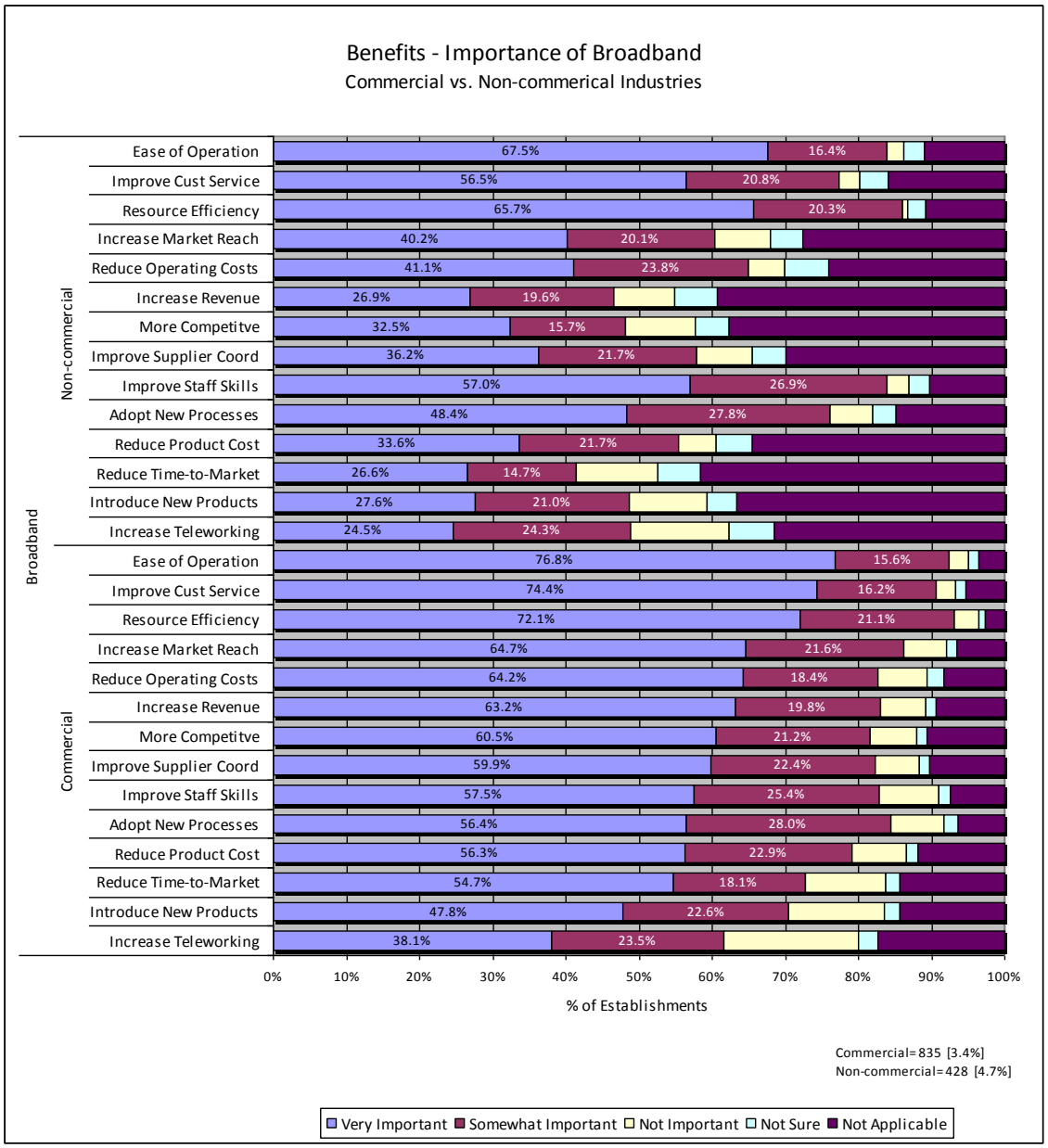
Figure 30 – Importance of Broadband for Organizational Benefits



Overall, the majority of organizations recognize broadband as "very important" across all benefits dimensions. The most generally recognized benefits are in the areas of improved efficiency and productivity. The most recognized external-facing benefit of broadband is in improving service to customers. Productivity-related benefits are recognized by more organizations than the revenue-related benefits, such as market reach, competitiveness, increasing revenues, introducing new products, etc.

In comparing commercial businesses with organizations that are "non-commercial"[6], i.e. less commercially focused, the difference in how broadband delivers benefits for these two groupings becomes apparent.

Figure 31 – Broadband Benefits – Commercial vs. Non-commercial organizations



[6] The non-commercial grouping includes organizations in: Public Administration, Administrative and Support Services, Health & Social Assistance, and Educational Services. While there remains a commercial component to some organizations within these industries, the generation of revenues and profits generally has lower emphasis.

Two major observations can be made from Figure 31:

1. The importance of broadband is recognized to a greater degree by commercial businesses for all benefits dimensions; and,
2. market, revenue, and competitive benefits are recognized in importance by a much higher percentage of commercial businesses than non-commercial organizations.

The difference can be seen in **the top seven "Very Important" benefits**:

	Commercial	**Very Important**	**Non-commercial**	**Very Important**
1	Ease of Operation	76.8%	Ease of Operation	67.5%
2	Improve Customer Service	74.4%	Resource Efficiency	65.7%
3	Resource Efficiency	72.1%	Improve Staff Skills	57.0%
4	Increase Market Reach	64.7%	Improve Customer Service	56.5%
5	Reduce Operating Costs	64.2%	Adopt New Processes	48.4%
6	Increase Revenue	63.2%	Reduce Operating Costs	41.1%
7	More Competitive	60.5%	Increase Market Reach	40.2%

Making day-to-day operations easier remains the top benefits for both groups of organizations. However, non-commercial industries tend to see benefits more in terms of operational efficiencies, while market reach, revenue, and competitiveness take on more significance for commercial businesses, as may be expected.

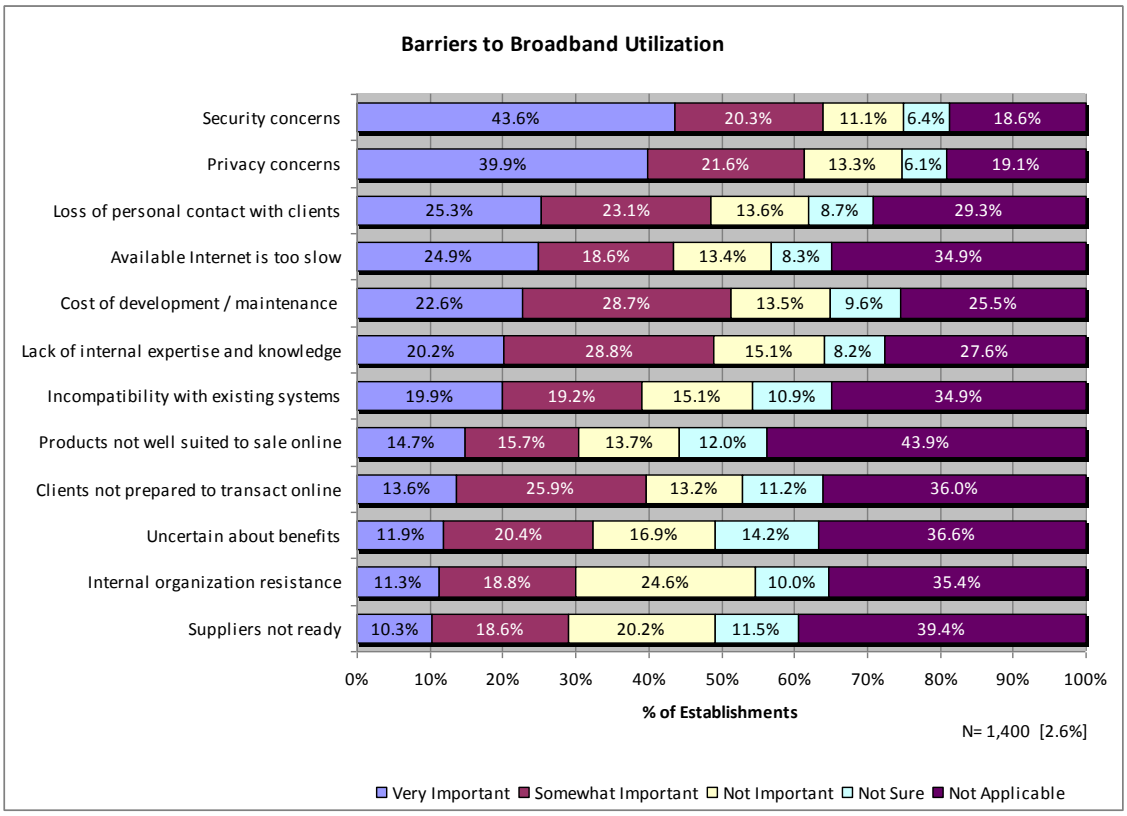
For the majority of broadband benefits there is no significant difference in the importance of broadband based on organizations size. Two exceptions are improving supplier coordination and increasing tele-working, both of which increase in importance with increasing employment size.

4.3 Barriers and Adoption Issues

4.3.1 Barriers to Adoption

Organizations were asked to rate the importance of a number of factors that may **inhibit or prevent their ability to integrate the use of broadband Internet into their organization's operations**. These factors are barriers to the adoption of e-solutions that must be recognized and overcome to increase broadband utilization.

Figure 32 – Barriers to Broadband Utilization

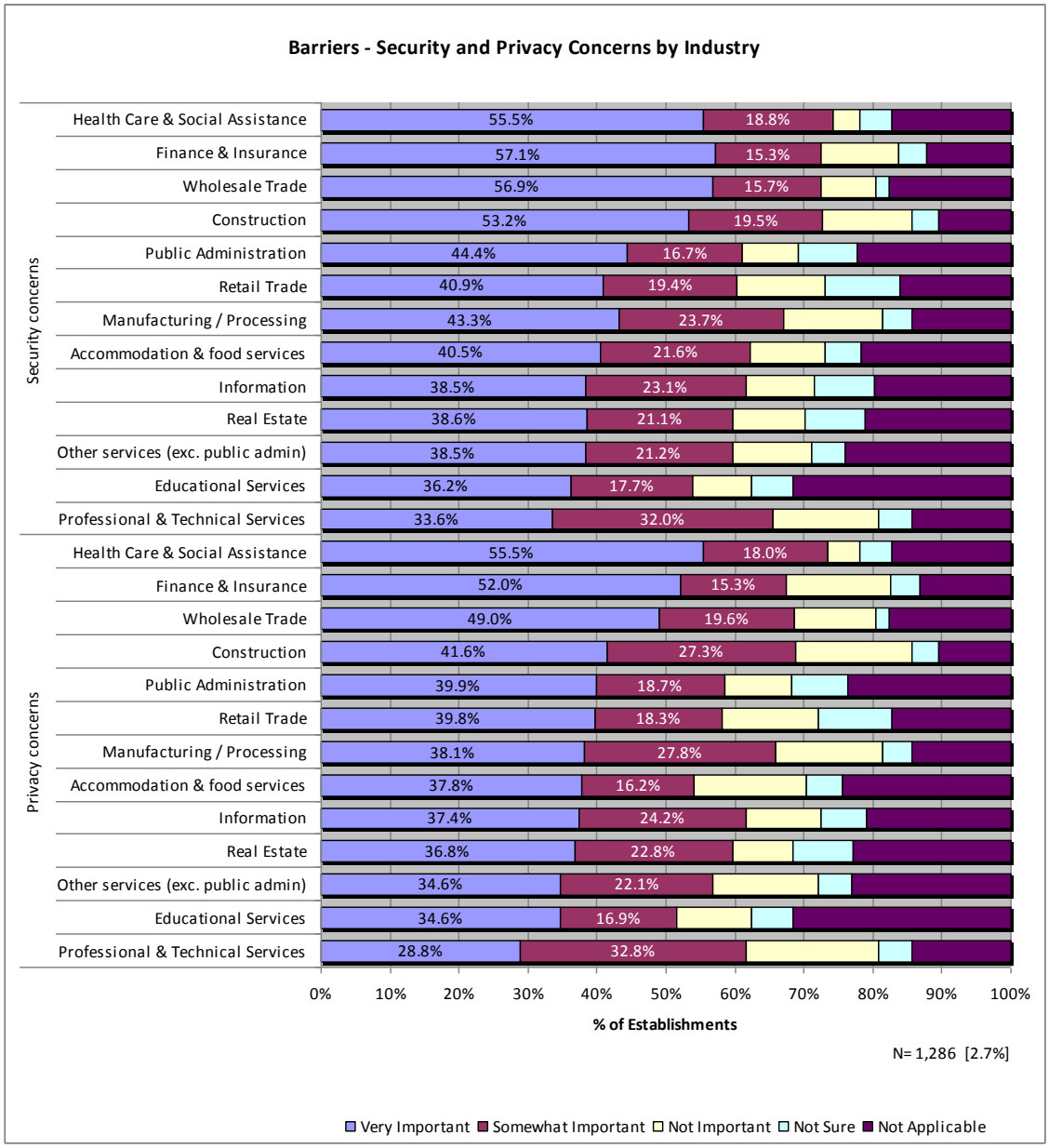


Two related barriers that rate the highest in importance are security concerns and privacy concerns, considered very important by more than 40% of organizations. Over 25% of organizations view the potential loss of personal contact with their clients as a very important barrier. A similar number of organizations feel that the speed of their available Internet connection is an inhibiting factor.

A barrier of particular interest is the lack of internal expertise and knowledge, which is a very important or somewhat important barrier for almost 50% of organizations. Not only is this important as a barrier to address in its own right, but addressing expertise and knowledge related to e-solutions can mitigate some of the other barriers, including security and privacy concerns, uncertainty about broadband benefits, and overcoming internal organization resistance. The nature of the expertise and knowledge barrier will be explored in greater detail in the following section.

It may be expected that the importance of some barriers will vary with business size, while others may vary with industry.

Figure 33 – Security and Privacy Concerns by Industry



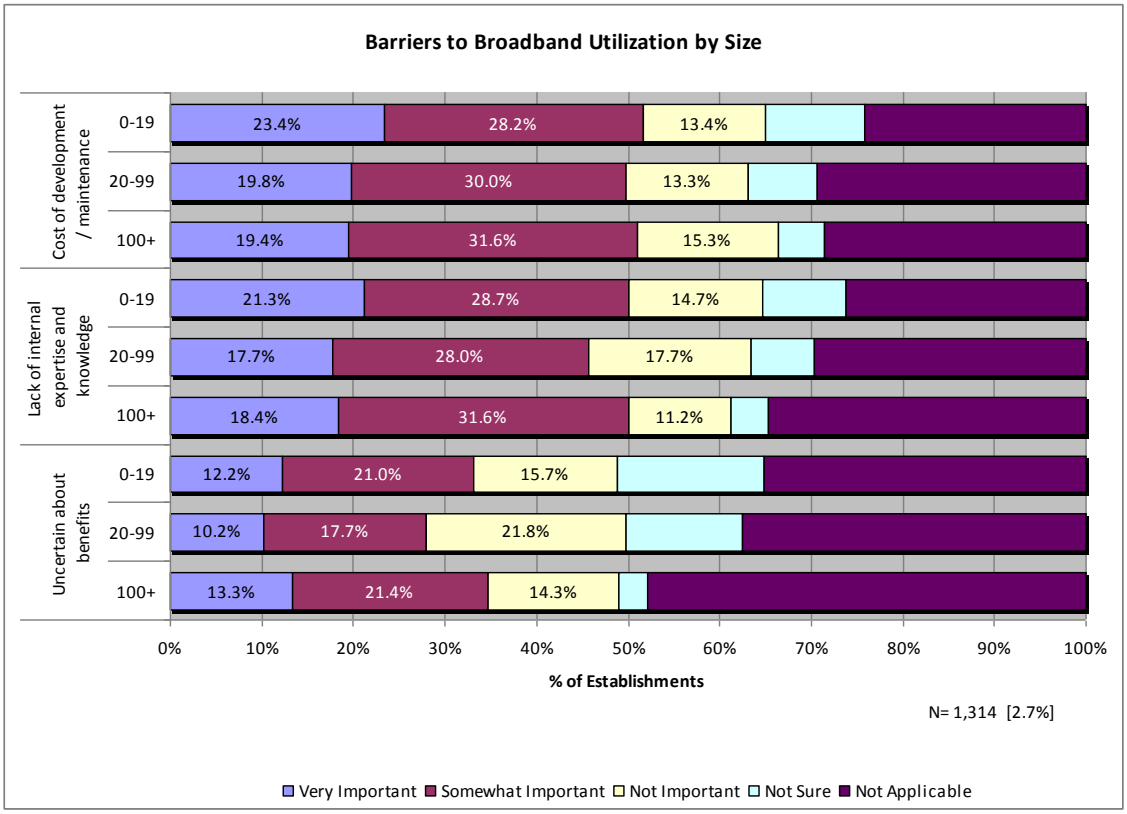
It may not be surprising that the two industries for which security and privacy concerns are of greatest importance are Finance & Insurance and Health Care & Social Assistance. Many organizations within both industries deal with sensitive and private information as a central part of their operations.

Organization employment size will influence both the financial and human resources available for adopting e-solutions. The key barriers that may be expected to vary with organization size are:

- Cost of development and/or maintenance of e-solutions
- Lack of internal expertise and knowledge
- Uncertainty about the benefits of e-solutions

The importance of these barriers does, in fact, increase with decreasing organization size, but not by a large margin. It is noteworthy that these barriers persist even for medium and large sized organization by a significant amount.

Figure 34 – Barriers to Broadband Utilization by Employment Size



Over 20% of organizations consider their lack of internal expertise and knowledge a very important barrier to the adoption of e-solutions, with 50% of small business viewing this a very important or somewhat important.

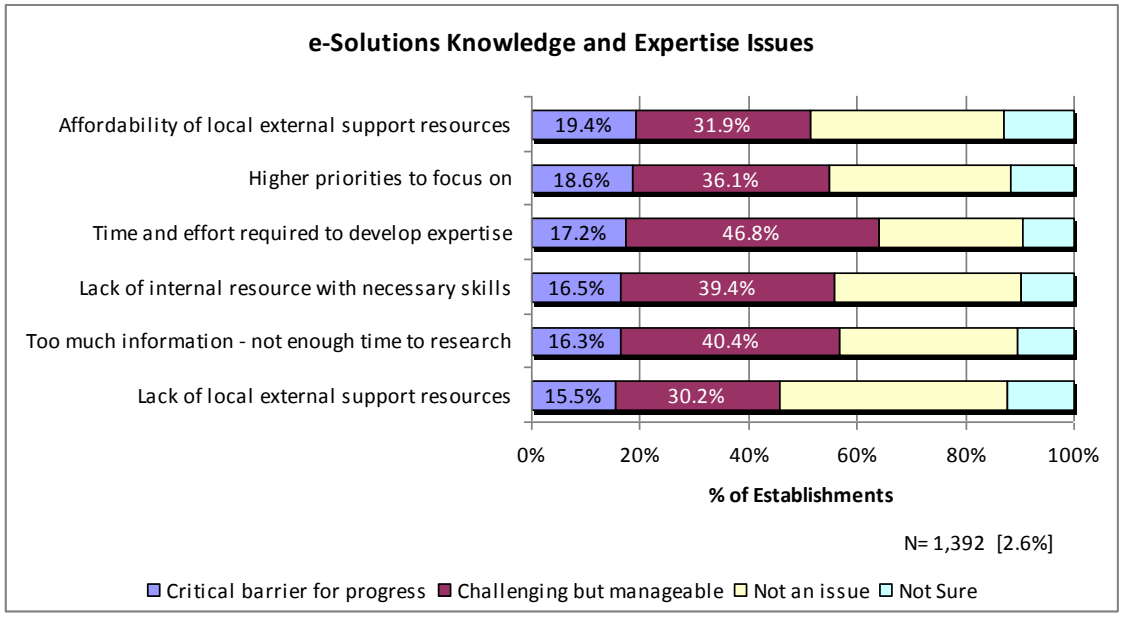
4.3.2 Expertise and knowledge Issues

The knowledge and expertise related to the implementation and use of e-solutions available to an organization is a key factor in the level of broadband utilization achieved. There are several inter-related issues that organizations may encounter in moving forward with e-solutions:

- 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

Organizations were asked to identify which of these issues are critical barriers to progress, challenging but manageable, or not an issue for them.

Figure 35 – e-Solutions Expertise and Knowledge Issues



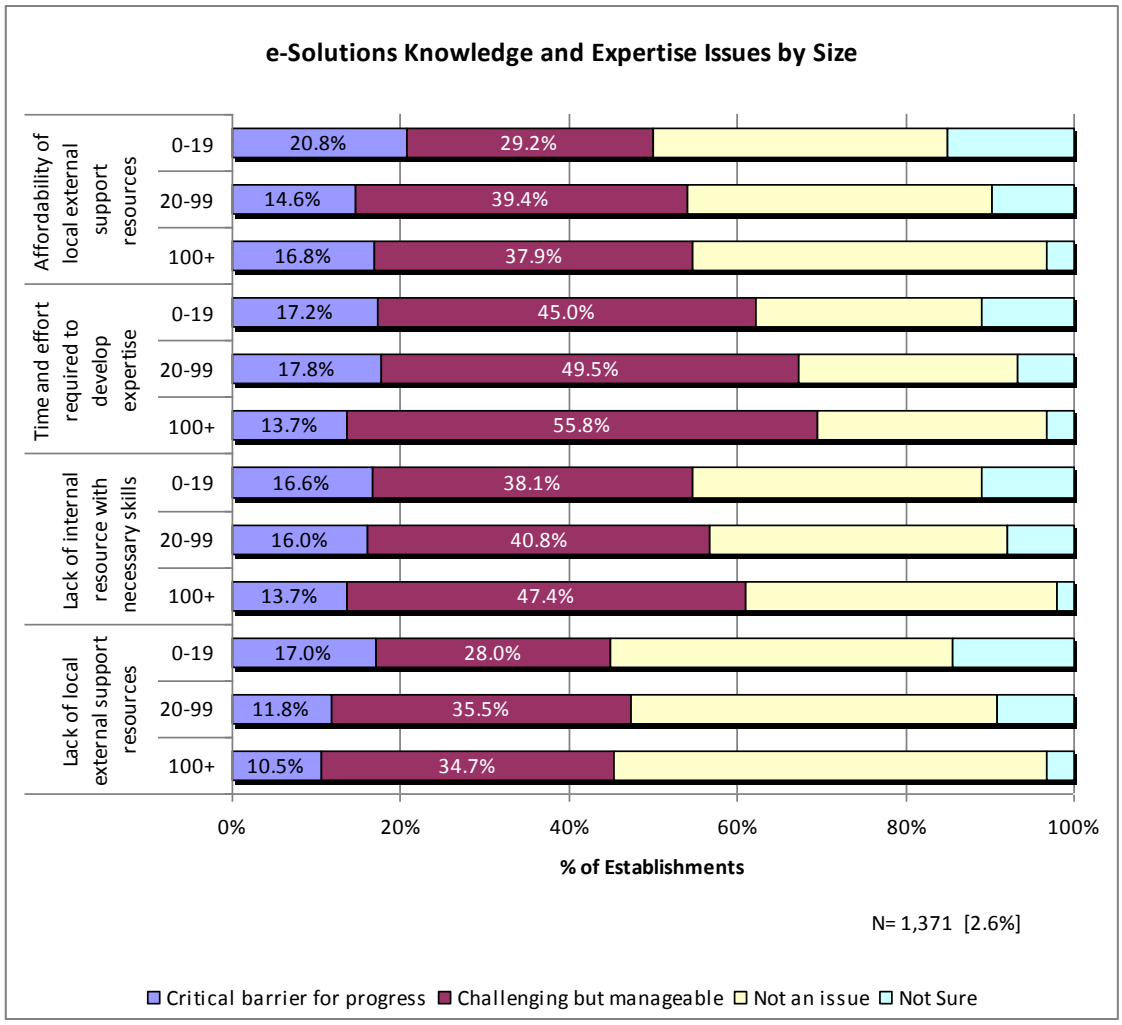
Overall, e-solutions expertise and knowledge issues are **critical barriers for over 17% of organizations**, and **critical or challenging for almost 55% of organizations**. This is an important statistic for developing strategies that target increased utilization of broadband and greater adoption of e-solutions.

It is important to recognize that while these issues are presented as separate responses, they are not totally independent of each other. Lack of time to research options may be an outcome of lack of internal resources. Higher priorities on which to focus may lead to issues of time and effort required to develop expertise. Both of these may lead to issues of availability and affordability of external resources.

Given that expertise and knowledge within an organization is intimately tied to its human resources, a key question is to what extent these issues change with the size of organization. In fact, the lack of

appropriately skilled resources, both internal and external, is more often a critical issue for small businesses, these issues continue to exist for organizations with over 100 employees.

Figure 36 - e-Solutions Expertise and Knowledge Issues by Employment Size



While different strategies may be required to address e-solutions expertise and knowledge for small organizations versus large organization, both segments show gaps and opportunities to increase e-solutions adoption through training and support resources.

5 Key Findings - Households

The following analysis is based on survey responses from 1,379 households across the Commonwealth of Kentucky. The results focus on key findings related to Internet usage, benefits, and barriers, with selected results broken down by key respondent characteristics, such as household income, connectivity type, and rural vs. non-rural regions. Complete survey results are also provided in Appendix 3 for reference.

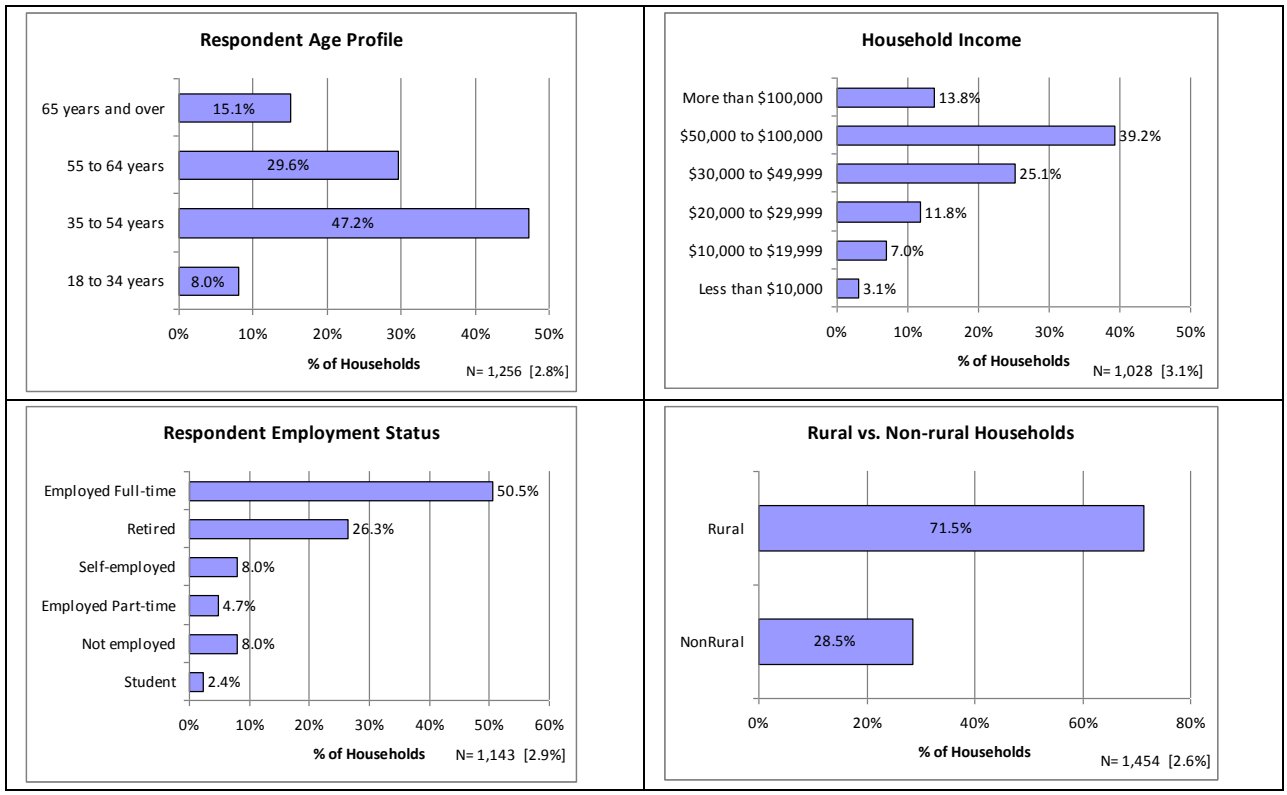
5.1 Household Profiles and Connectivity

5.1.1 Respondent Characteristics

The household sample includes data from at least 100 counties. In order to compare results between rural and non-rural areas of the state, the survey deployment was targeted for an approximate split of 70% rural and 30% non-rural. This was also done to ensure that results were not overly biased towards the more heavily populated urban areas.

The household sample represents a good mix of demographics based on age, household income, and employment status. 71.5% of survey response came from household located in rural areas[7].

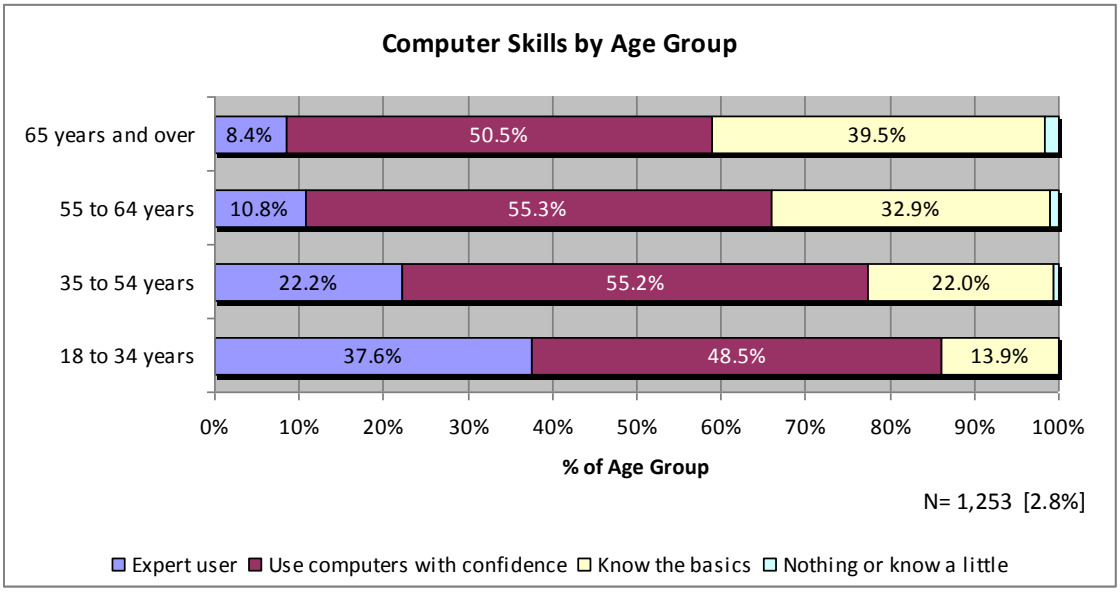
Figure 37 – Household Demographics



[7] Rural areas are based on 5-digit zip codes that have more than 70% rural households. For Kentucky, this included 568 zip codes that represent 29.3% of total households in the state. The remaining 141 zip codes are considered non-rural for this research.

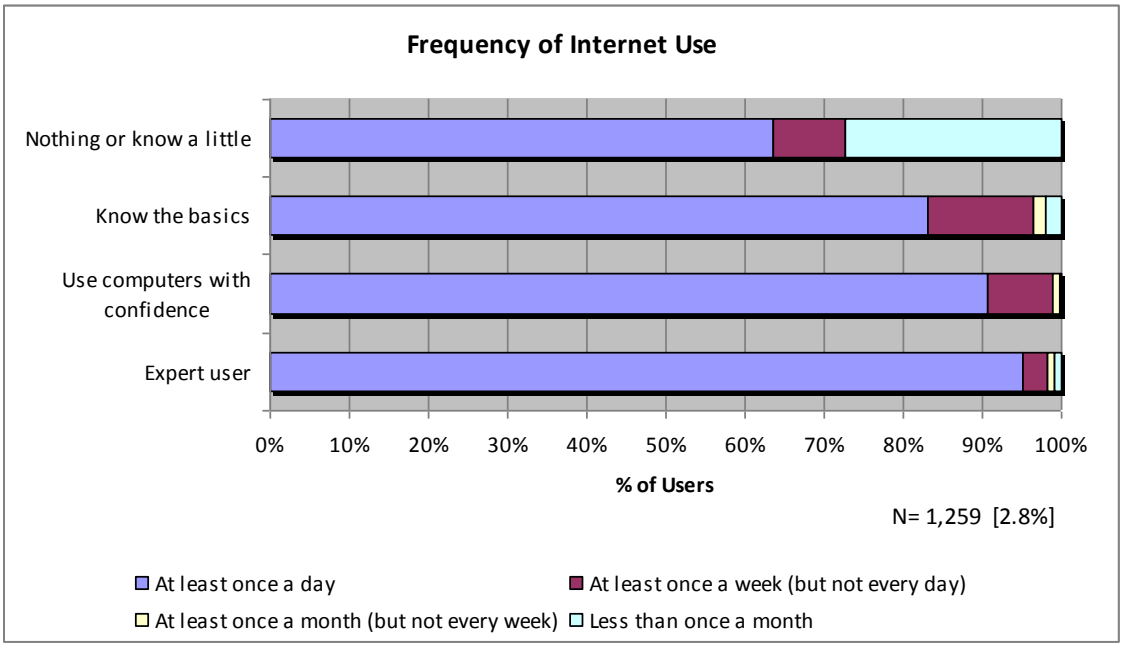
Computer skill levels, and their implications for using the Internet, provide an important frame of reference when evaluating and affecting the utilization of broadband services. As one might expect the level of computer expertise increases for younger age groups. For Kentucky, 39.5% of those over the age of 65 “know the basics”, whereas 37.6% of respondents under age 34 consider themselves “expert users”.

Figure 38 – Respondent Computer Skills by Age group



The more knowledgeable and confident people are in using the computer, the more frequently the use the Internet. However, even 64% of those who know little about computers access the Internet on a daily basis. Overall, **89% of households access the Internet daily**.

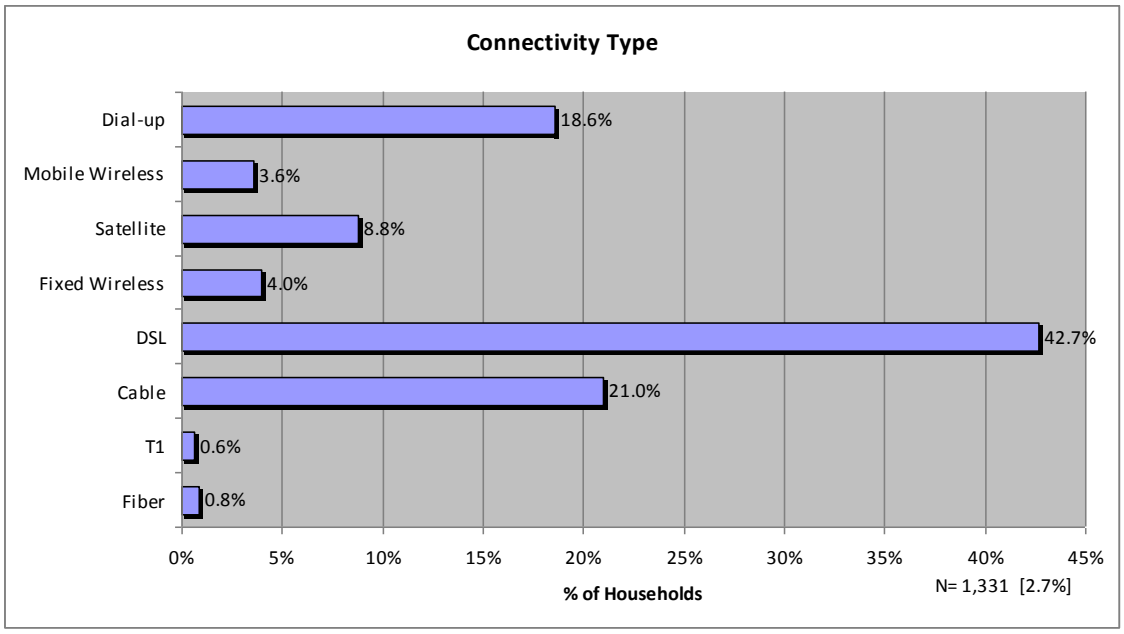
Figure 39 – Frequency of Internet Use vs. Computer Skills



5.1.2 Connectivity Characteristics

The survey sample includes a broad mix of Internet connectivity technologies, including a small number of households using T1 and fiber Internet connections. Over 18% of households surveyed use dial-up Internet access, providing a useful sample for comparisons between dial-up and broadband users. The following figures summarize the Internet technologies used.

Figure 40 – Connectivity Types Used by Households



The predominant technologies used are DSL at 42.7% of households and cable connections used by 21% of households. A small number of households use fiber access, which may reflect limited availability of fiber technologies at this time.

Satellite and fixed wireless access are used by less than 13% of households combined, and less than 4% use mobile wireless as their primary method of Internet access. When comparing the connectivity types used in rural vs. non-rural areas, the mix of technologies changes significantly.

For rural areas, DSL remains the predominant technology used by over 44% of households. Significantly higher percentages of rural households use satellite and dial-up Internet services, most likely because other forms of high-speed Internet are not available. Only **13% of dial-up users do not plan to get broadband** service, with **the primary reason (78%) being that broadband service was not available to them**. At least 46% of dial-up households would subscribe to broadband if it was available to them, and potentially 96% would take broadband service. It is also noteworthy that the use of cable Internet is much lower in rural areas, which may also be an indication of more limited availability of this technology for rural households.

The use of fixed wireless access is not significantly different for rural vs. non-rural areas, while mobile wireless Internet is used to a slightly higher degree as a primary method of Internet access.

Figure 41 – Connectivity Types used – Rural vs. Non-rural Households

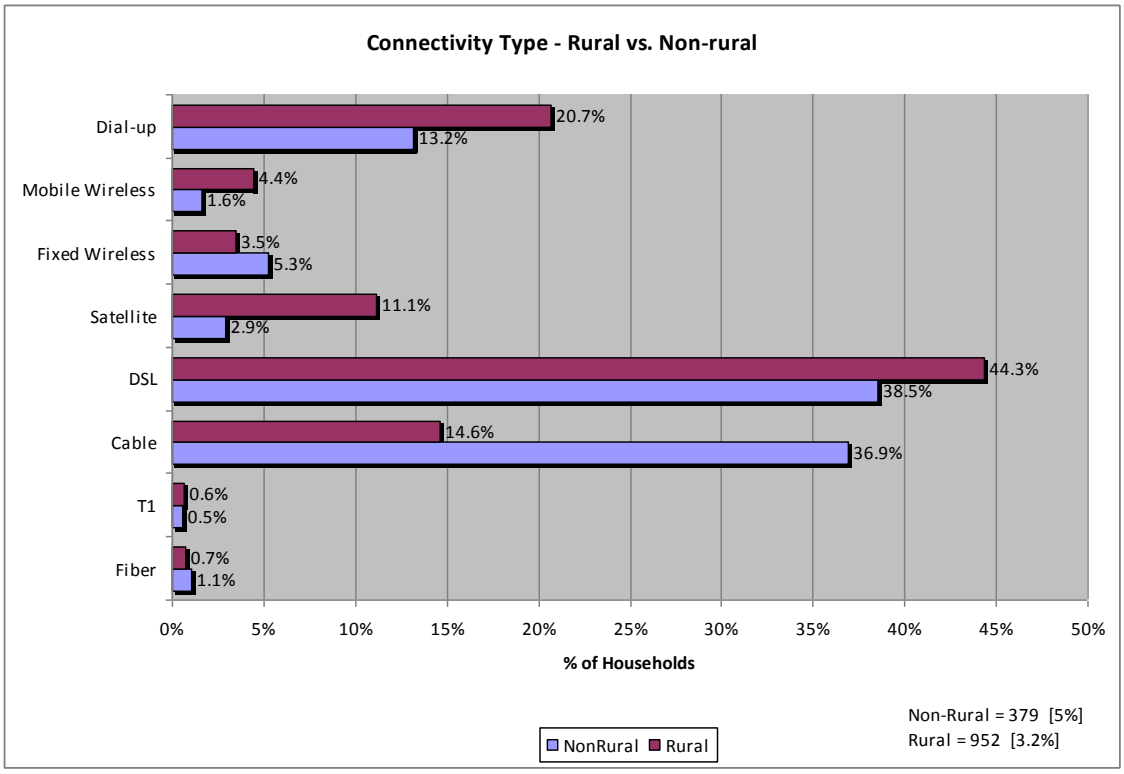
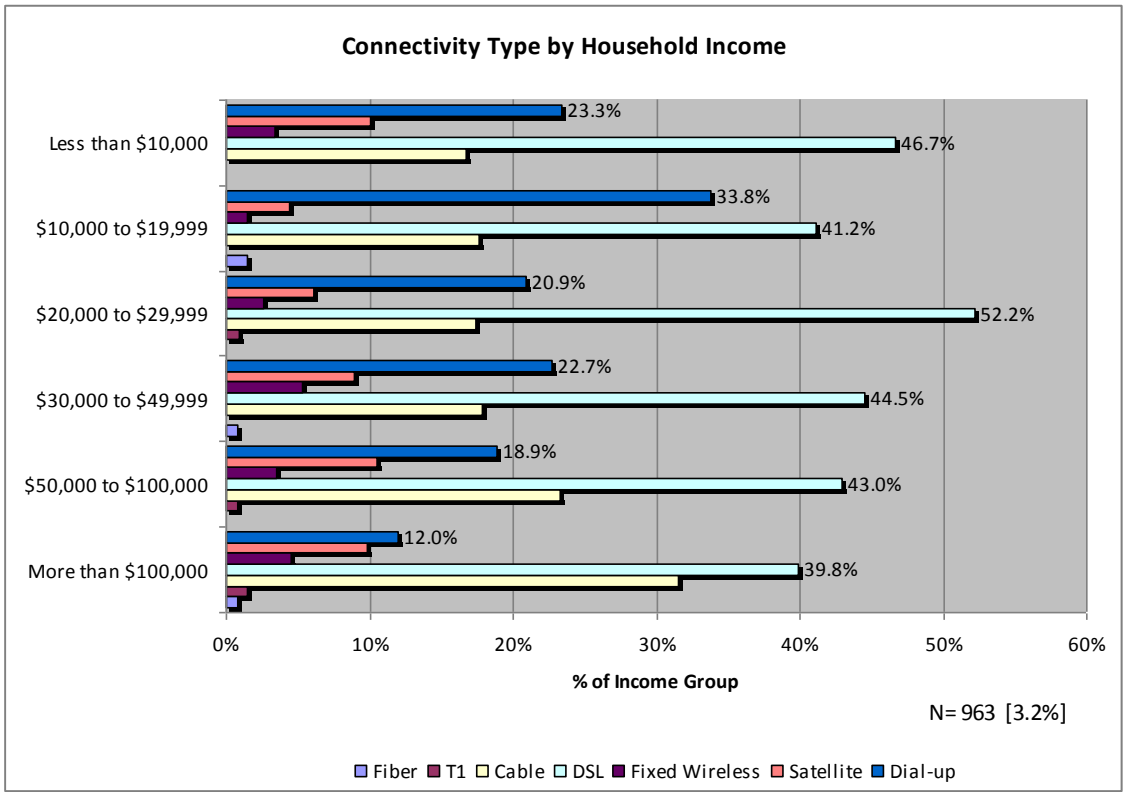


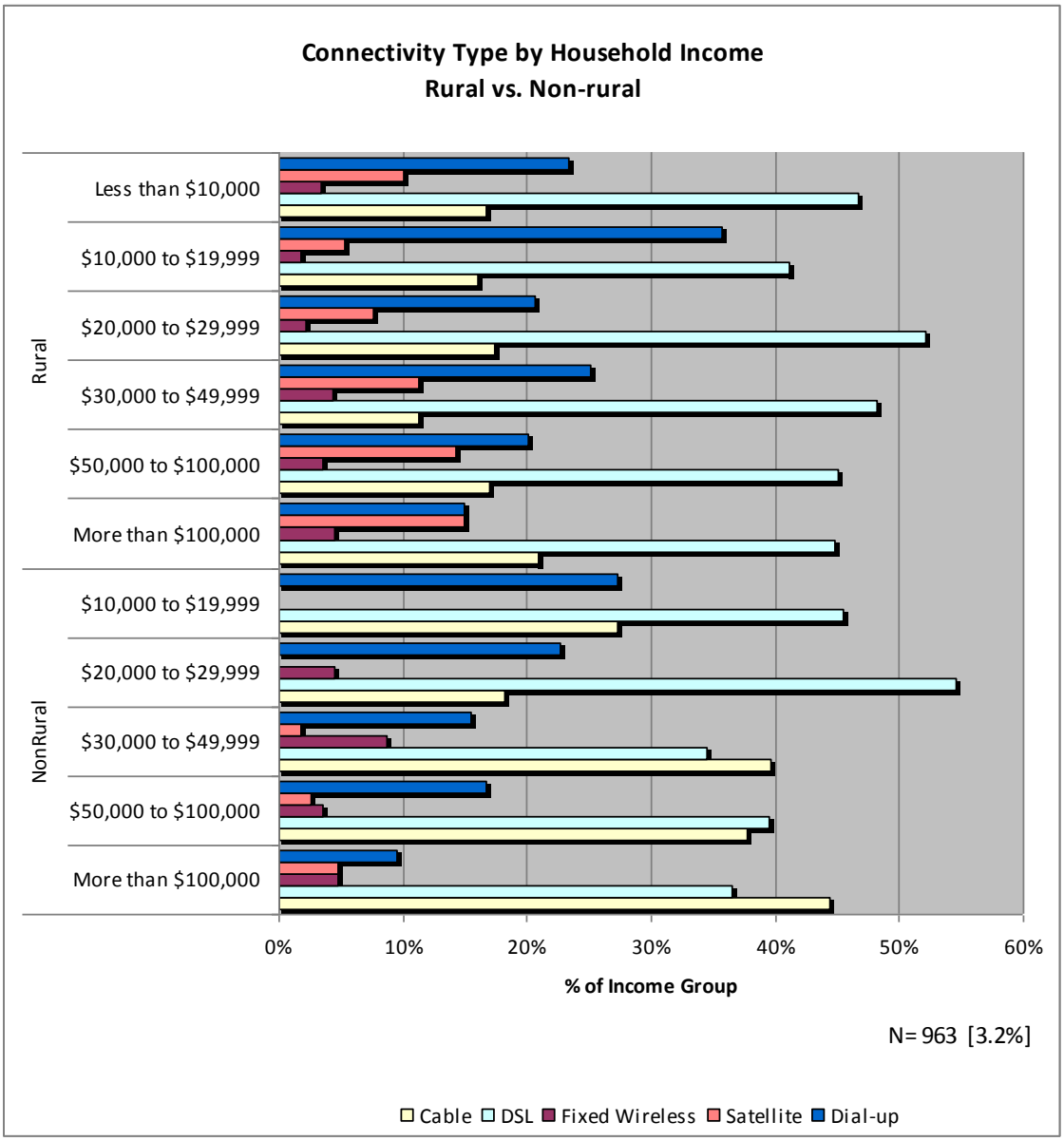
Figure 42 – Connectivity Type by Household Income



The type of connectivity used shows some variation based on household income. The use of DSL is relatively consistent across all income groups, ranging between 40% and 50% of households. The use of cable services tends to increase in higher income groups, while the dial-up Internet is used more by lower income households. However, these tendencies are not only influenced by service costs but also by availability.

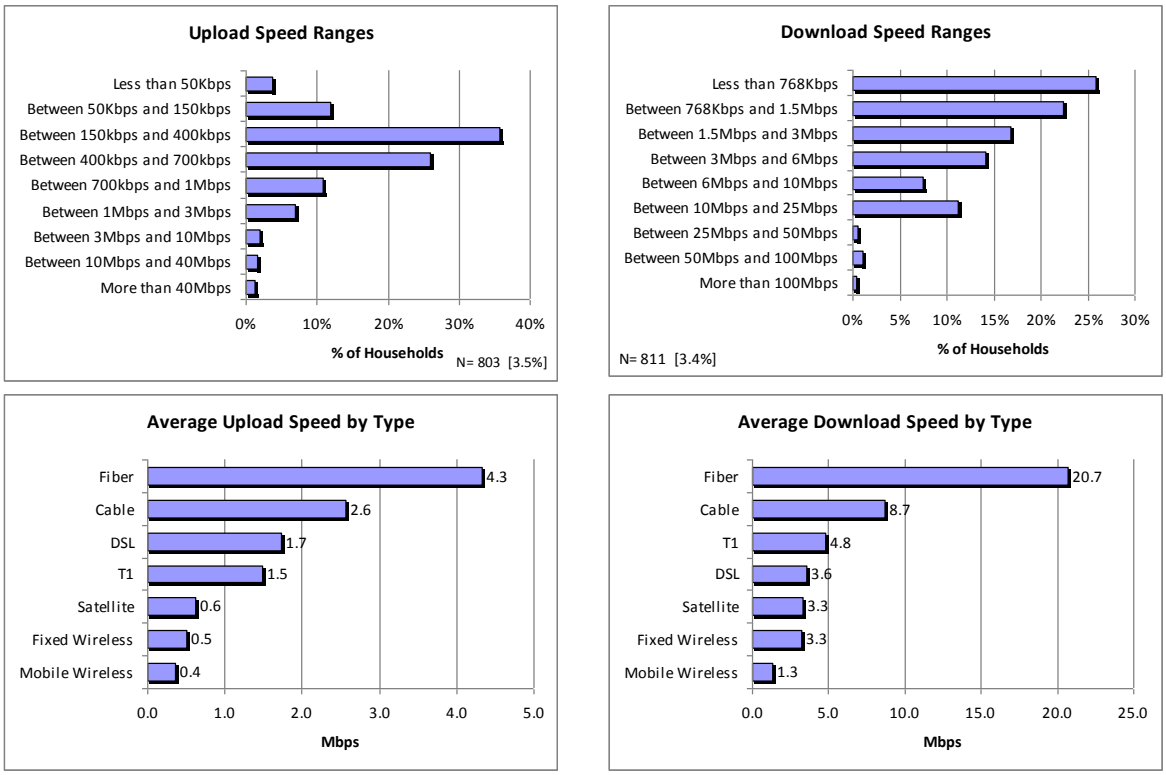
For non-rural areas, where broadband options are generally more available, the trend of dial-up use by income groups is clearer. In addition, both cable and DSL show similar usage levels for higher income households, whereas DSL appears to be the more favoured over cable for lower income households.

Figure 42 – Connectivity Type by Household Income – Rural vs. Non-rural



Households were provided the option to take a speed test to measure the upload and download speeds of their connections. The following charts provide a summary of the speed test results for upload and download speed ranges and average upload and download speed by connectivity type.

Figure 43 – Speed Test Results - Households



The monthly cost of household Internet access varies with technology. Households report a wide range of monthly Internet costs for each technology as shown in Figure 44. However, the most common forms of broadband access – DSL, cable, fiber, and fixed wireless – have very similar median cost ranges and, for the majority of households, fall in the range of $30 to $50 per month. Satellite and mobile wireless Internet services tend to fall in the $50 to $80 per month range, while dial-up service is of course the lowest cost option.

Figure 44 – Monthly Cost of Internet Access

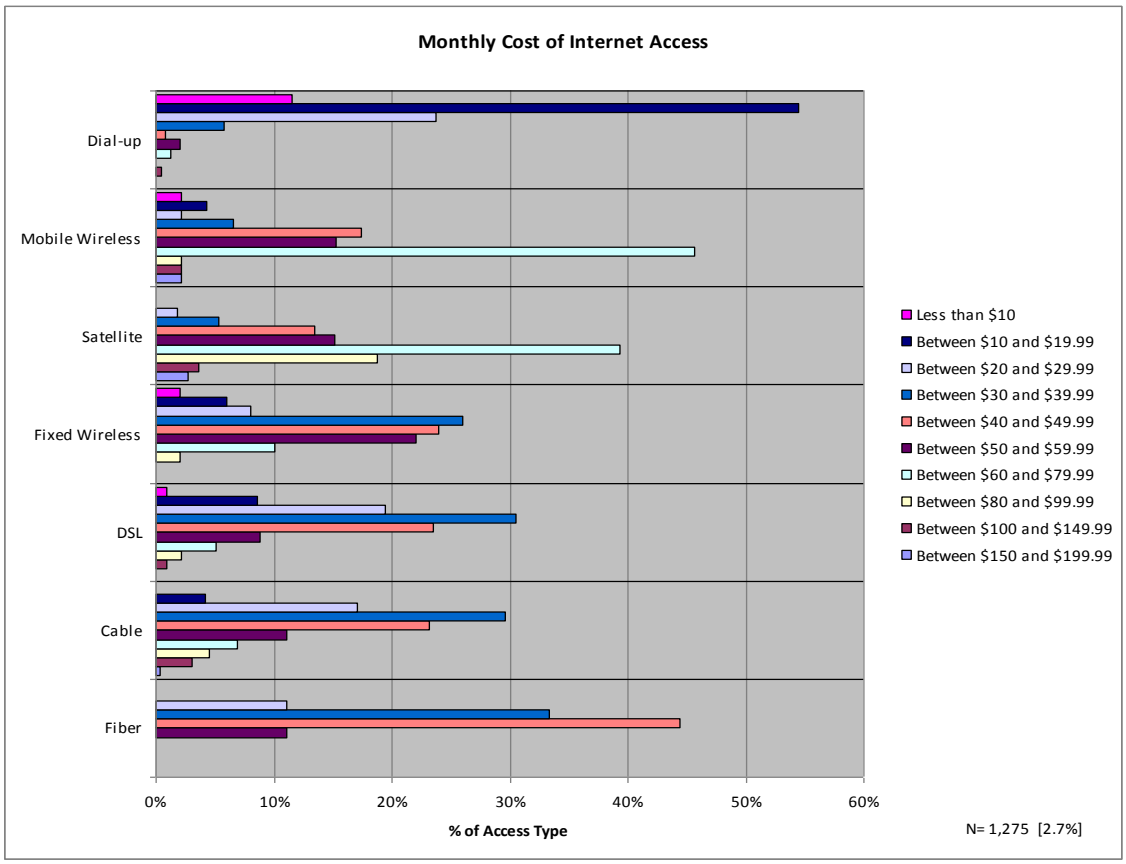
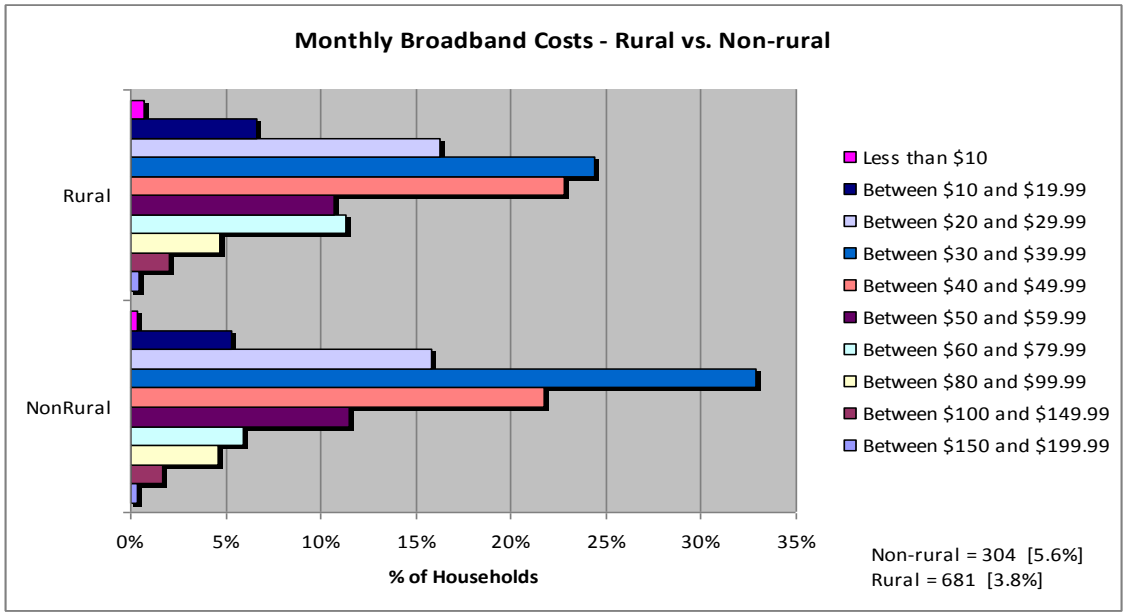


Figure 45- Monthly Internet costs - Rural vs. non-rural



There is little difference in the median monthly costs between rural and non-rural households. However, 29% of rural households spend more than $50 per month compared to 22% of non-rural households.

Households were asked to rate how well their current Internet service meets their needs in terms of speed, reliability, and value. Fiber rates the best of the broadband options, however there are very few households using fiber at this time. Cable, DSL, and fixed wireless are comparable in terms of meeting household needs and expectations for speed, reliability, and price/value. Reliability is generally poor for both dial-up and satellite Internet, contributing to poor ratings on price/value expectations. In addition, of the broadband technology options satellite has the highest percentage of users saying it is not fast enough.

Figure 46 – Reliability of Connection

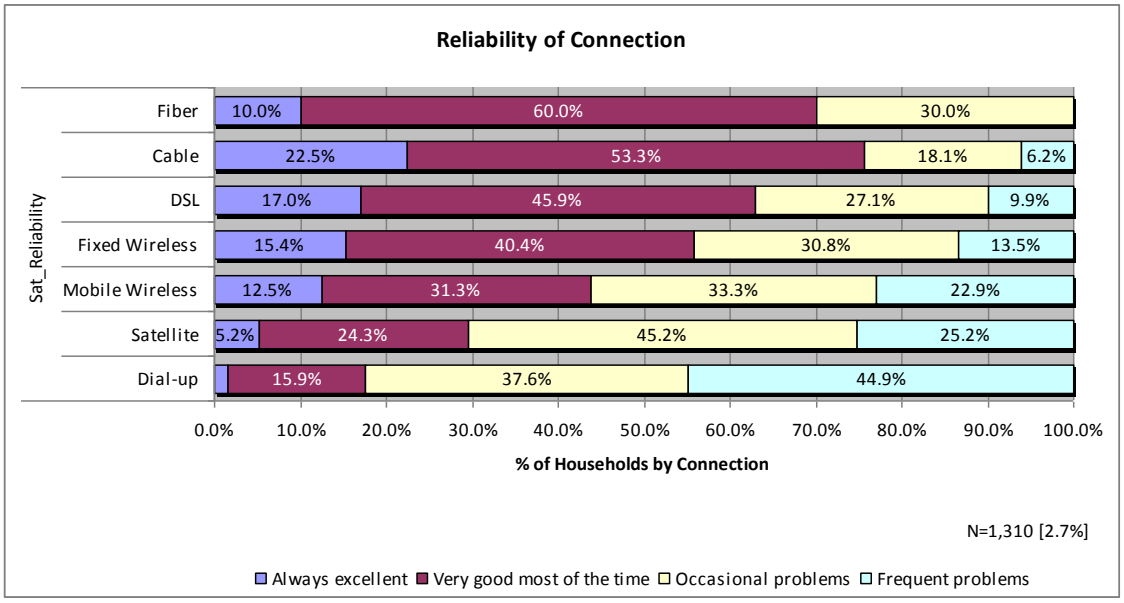


Figure 47 – Speed of Connection

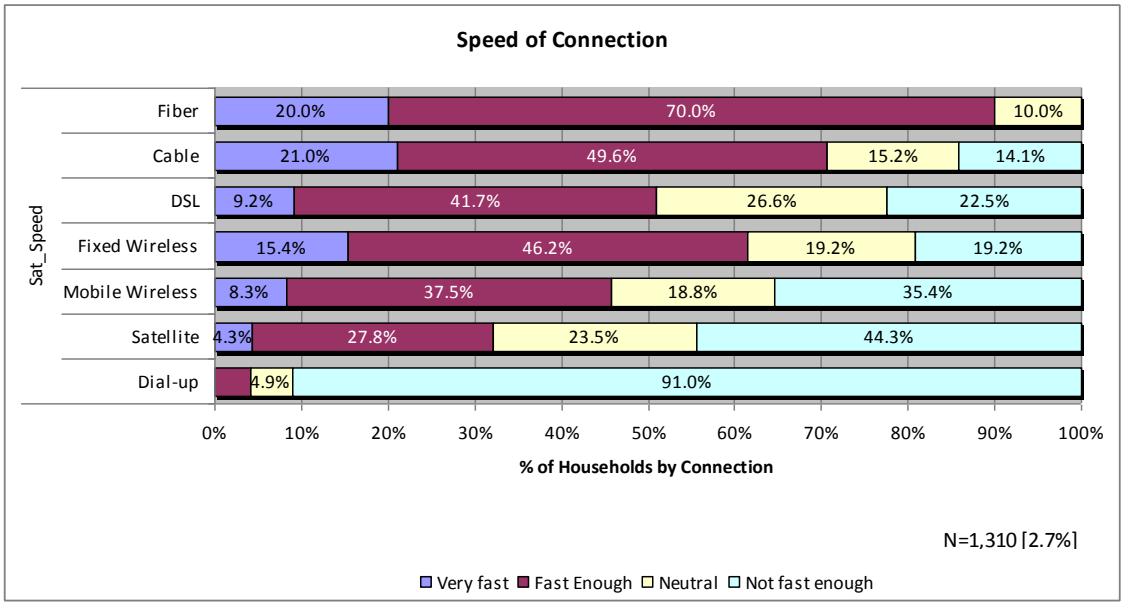
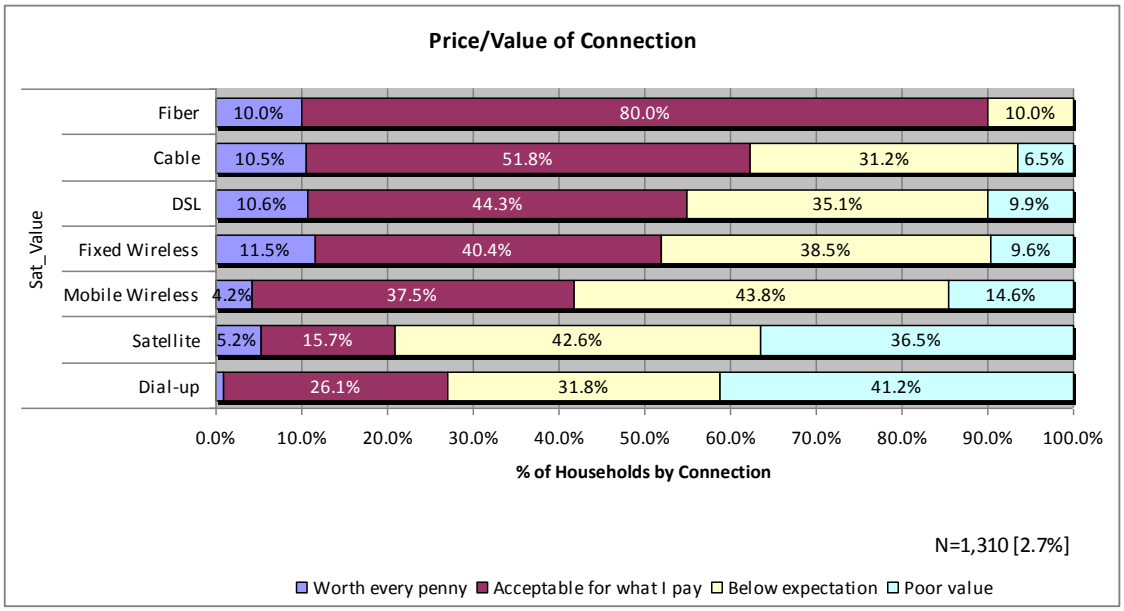


Figure 48 – Price/Value of Connection



5.2 Broadband Utilization and Benefits

The survey of households explores how the Internet is used and the benefits and impacts of broadband for households and their community.

5.2.1 Broadband Utilization

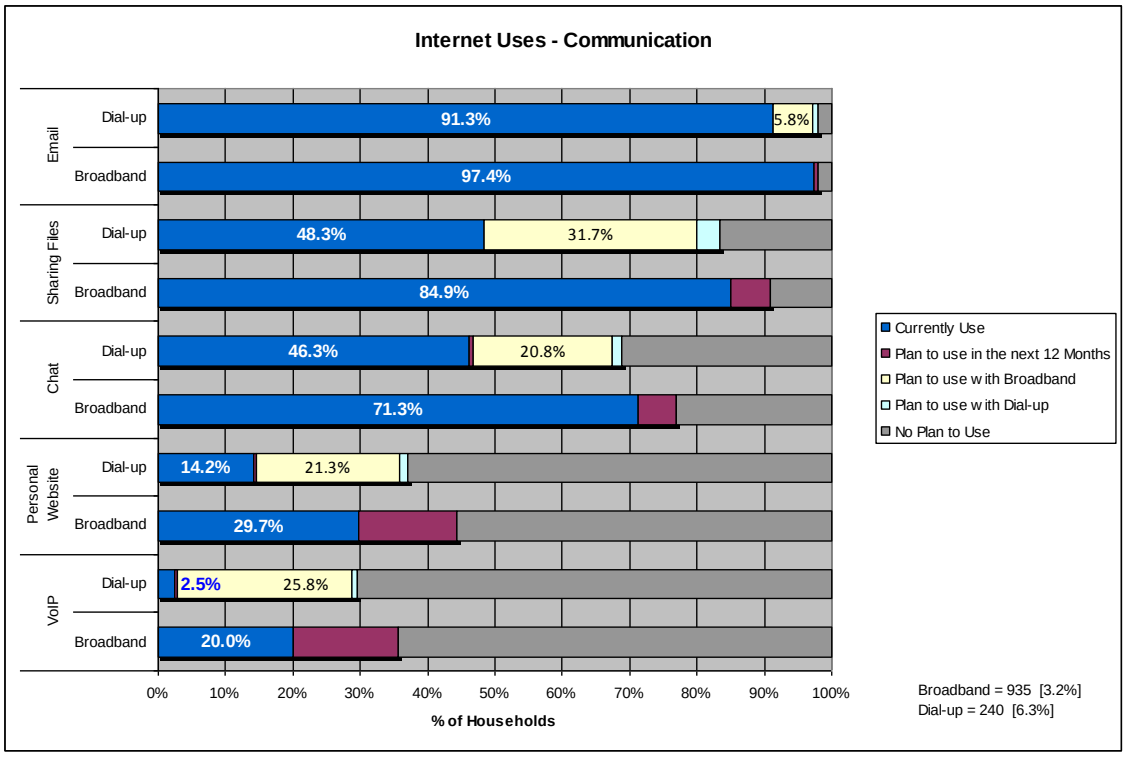
Household utilization is examined in five major categories:

- Communication
- Research and information
- Online transactions
- Personal productivity
- Entertainment and recreation

Households are asked about their current uses of the Internet as wells as their planned use over the next 12 months. Results are included for both dial-up users and households with broadband connections. For each usage category households with dial-up connections are also asked whether they plan to use with dial-up or plan to use with broadband. Some uses, especially those that require high-speed and bandwidth, would not be seriously considered use over a dial-up connection. By asking dial-up users if they plan to use with broadband provides a more accurate perspective on household demands and potential drivers for broadband adoption by dial-up households.

Since over 18% of households use dial-up service the results for each utilization category are compare dial-up utilization with broadband utilization. As will be seen in the following figures the sum of current utilization and planned use with broadband by dial-up users tracks closely with current use by broadband households. Once dial-up users have access to broadband services one can expect their utilization to increase accordingly.

Figure 49 – Household Internet Uses - Communication



The use of email for communication is very high for both dial-up and broadband households (96% overall). This is not surprising as email is a longstanding basic Internet communication method that does not have high demands on connection speed or bandwidth for effective use.

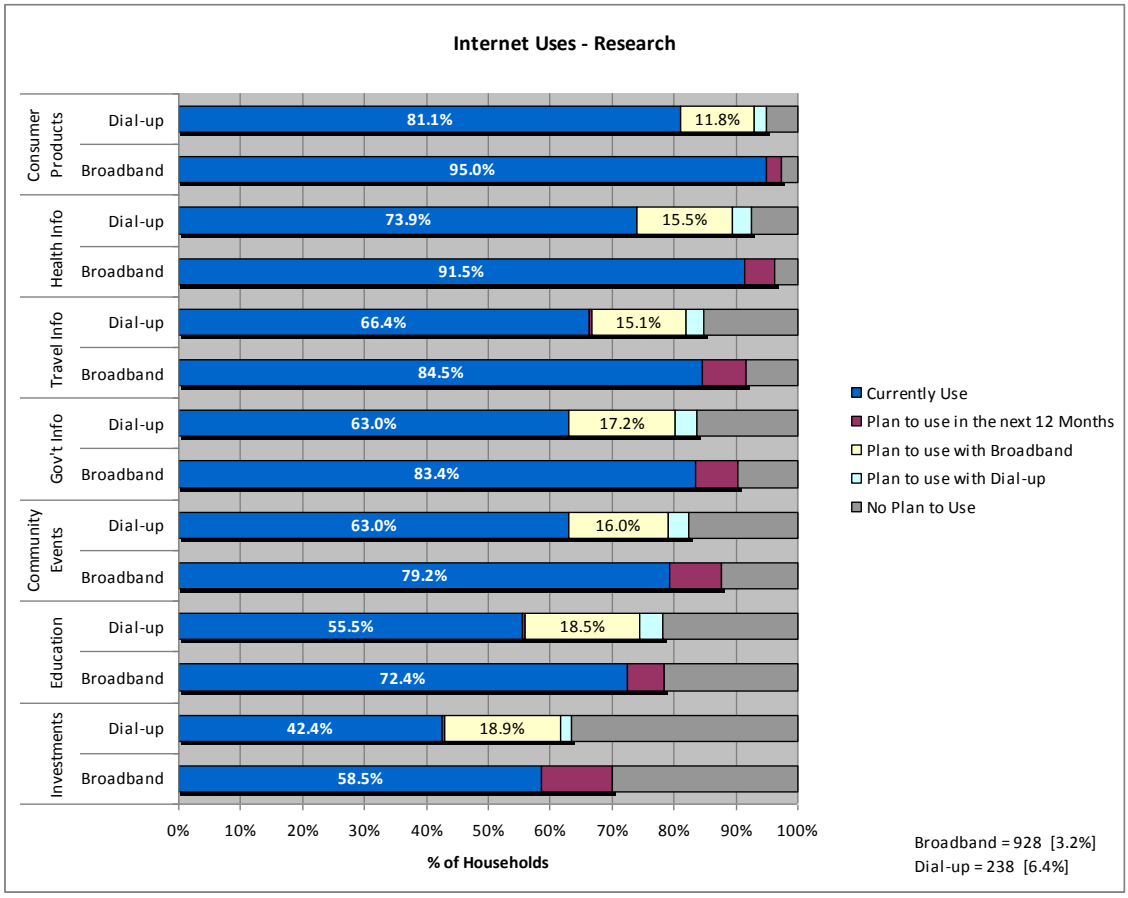
Sharing information online, such as photos, videos, personal blogs, etc., is more effective and convenient with broadband and is used by almost 85% of broadband households compared to 48% of dial-up users (77.5% overall). Over 71% of broadband households and 46% of dial-up households uses online chat, which includes participating in social network, chat groups, and instant messenger applications. Another 21% of dial-up households would use chat services if they had broadband.

Less than 30% of households use a personal website and only 20% of broadband households currently use the Internet for voice communication. Moreover, 70% of broadband households do not plan to use the Internet for voice communication (VoIP) even though broadband provides the capacity for real-time voice communication and many VoIP services exist.

Households were asked about their uses of the Internet for research and accessing information in several topical areas. Information research over the Internet is generally high for all areas for both dial-up and broadband households, with over 77% of households using the Internet for research in at least one area. On average an additional **16% of dial-up households would increase their use of the Internet for research with broadband**.

For broadband households the highest uses of Internet research are for researching consumer goods and services (e.g. product information, comparing products, etc.) at 95%, and searching for medical or health related information at 91.5%. The latter category demonstrates a level of comfort in acquiring health information over the Internet and the **potential for delivering tele-health services to households**.

Figure 50 – Household Internet Uses - Research



Over 83% of broadband households use the Internet to search for government information and services, providing a large base for **increasing citizen engagement for all levels of government** through delivery of online information and services.

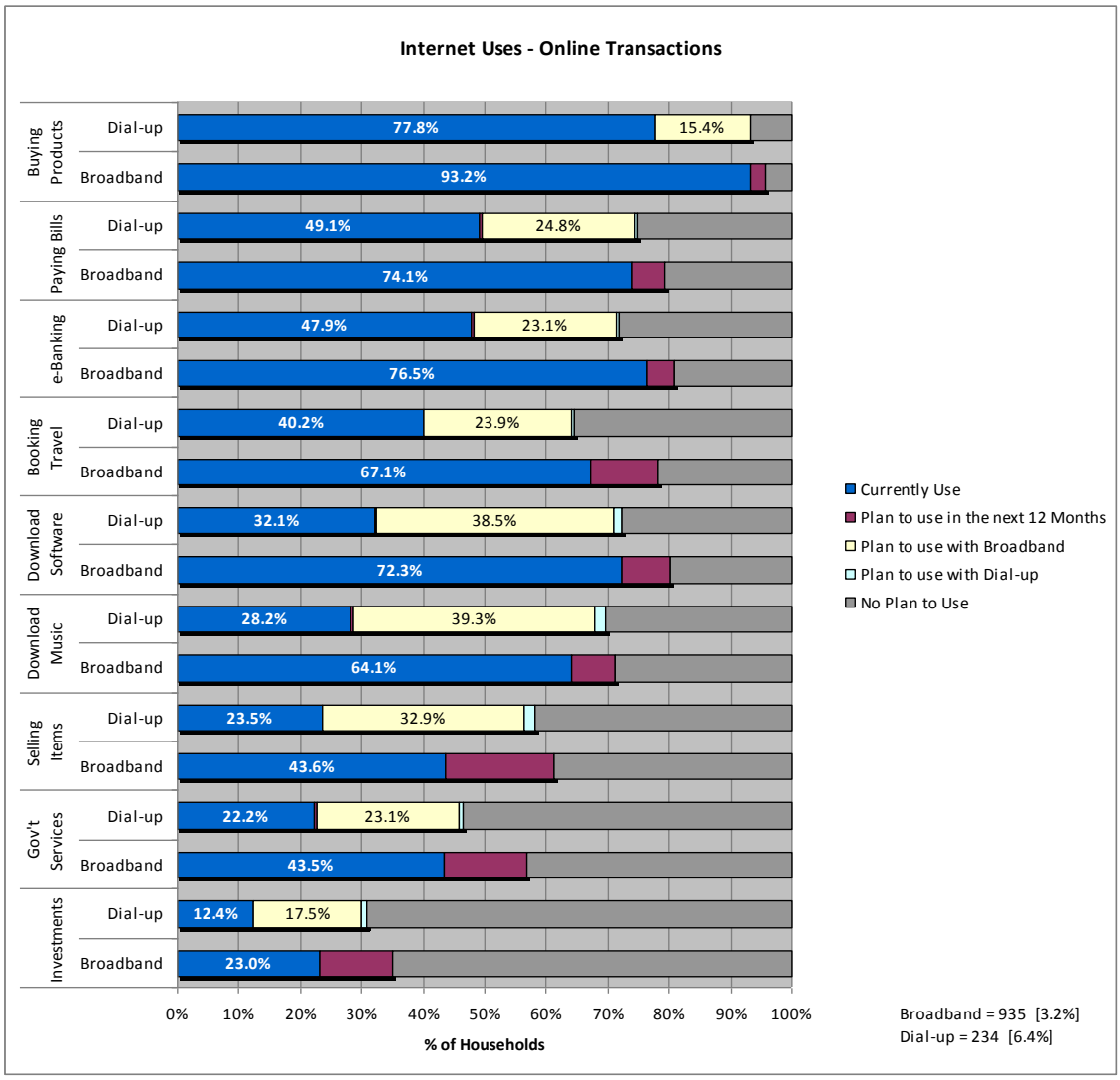
Over 72% of broadband households use the Internet for research for education, training or schoolwork. This indicates a strong potential for leveraging the Internet for education and training support uses.

Using the Internet for research and accessing information online is beneficial for increasing awareness and knowledge in these areas. This leads to the potential for actually making transactions online, whether this is for purchasing goods and services, paying household bills, accessing government services, or selling items online. Households were asked about their use of online transactions in the following areas:

- Buying goods and services online
- Selling items (online classified ads, auctions, etc.)
- Online trading / investment management
- Electronic banking
- Paying bills
- Transactions (e.g. taxes, licenses) with government agencies
- Obtaining or saving music
- Obtaining or saving software
- Booking travel arrangements

By far the largest use of online transactions is for buying goods and services, with 93% of broadband households and almost 78% of dial-up households. This averages to **over 90% participation by households in the digital economy** (e-commerce). In addition, more than 50% of households either currently or plan to sell items online.

Figure 51 – Household Internet Uses – Online Transactions



Approximately **3 out of 4 broadband households also use the Internet to pay bills online and for online banking**, another strong indication of household willingness to participate in the digital economy. While dial-up household participation is lower in these areas, they would likely match this level were they to have broadband access.

In comparing dial-up and broadband households there is a significant unmet demand and opportunity for increased online transactions by dial-up households, especially for purchasing and downloading music and software.

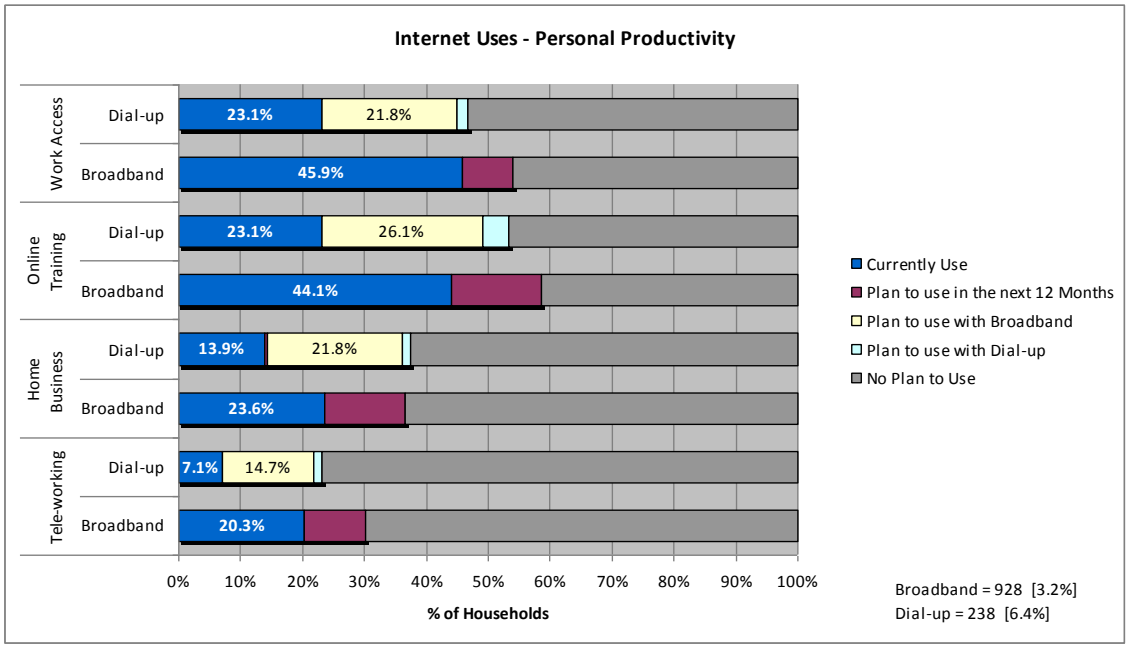
While approximately 50% of households currently or plan to conduct online transactions with government agencies, there is clearly an **opportunity to increase the delivery and use of online government services** of a transactional nature, such as online applications, licensing, and paying bills.

Households were asked about how they use the Internet for personal productivity for:

- Educational or training courses (remote learning or supplemental courses from home)
- Accessing workplace from home (occasional use)
- Tele-working (formal workplace all or part of normal work hours)
- Home-based business (full-time or part-time)

Utilization of the Internet for personal productivity is generally lower than the other usage categories. This can be attributed to a number of reasons, primarily in that the uses will not be applicable to all households or may not be an option available to them. For example, accessing the workplace would not be applicable to those who are retired, self-employed, students, or unemployed. Only a certain portion of the population will be motivated to have a home-based business, and tele-working is not always an option depending on one's occupation or an employer's willingness to allow tele-working. However, the levels of usage in these personal productivity and their implications areas are significant.

Figure 52 – Household Internet Uses – Personal Productivity



As with other Internet uses there is a significant difference in utilization between dial-up and broadband users. This is more than simply a matter of convenience of higher speeds and bandwidth. For these uses the lack of broadband becomes a practical and meaningful impediment. Participation in online training that may include real-time interactions, presentations, and video, is impractical if not impossible with dial-up access. Home-based businesses that are "Internet intensive" or that require continual online access without tying up the telephone line cannot operate effectively with dial-up. Similarly, tele-working requires home-based employees to be able to operate with the same effectiveness and efficiency as they would at their normal workplace.

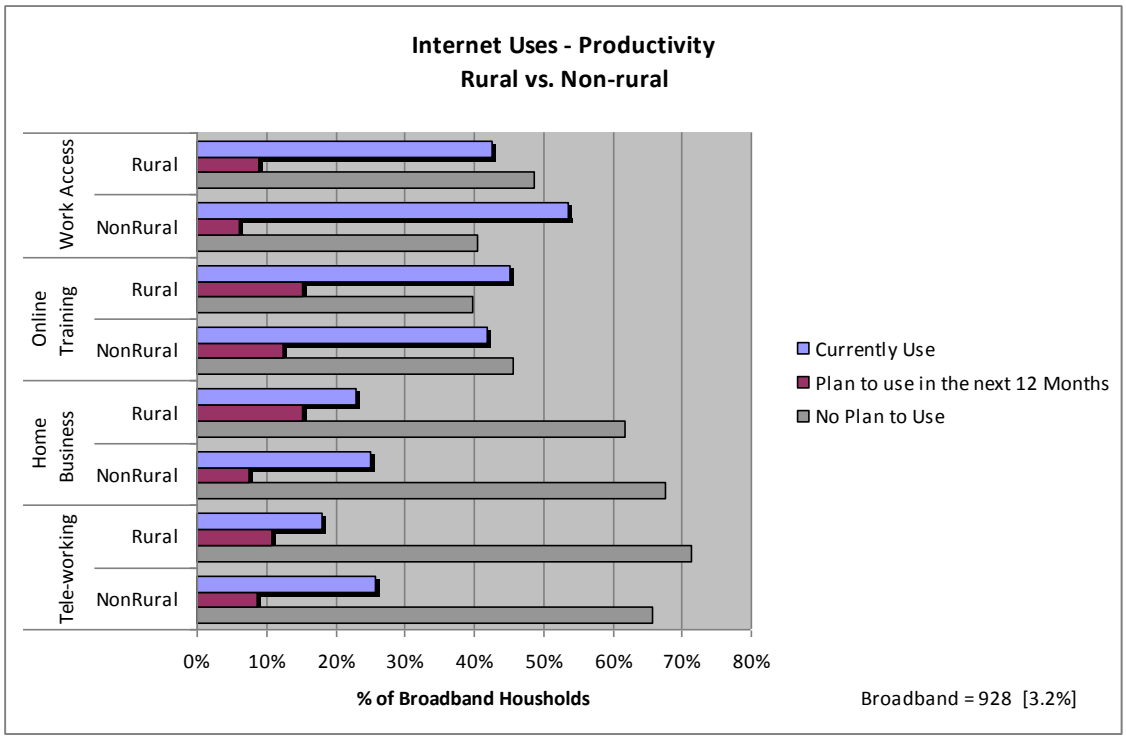
The fact that almost **24% of broadband households operate a home-based business** is a significant number. Home-based businesses provide alternative income opportunities, either as the sole source or as a supplement to household income. Enabling home-based business opportunities through broadband availability, and providing support to those currently or planning to operate home-based businesses, has a meaningful impact on the well-being of household and contributes to the local economy.

Similarly, with **20% of broadband households using the Internet for tele-working** is a significant number that offers several benefits both for households and the community. Tele-working opens new employment opportunities within communities where those jobs do not otherwise exist. This contributes to maintaining residents in their community of choice, rather than relocating for employment or seeking less suitable work. Tele-workers also benefit from improved life-work balance and become more engaged within their community. Communities benefit from increased employment and, indirectly, through economic diversity from employment in industries not located in their community. Home-based workers also spend more within their community and contribute to environmental benefits through reduce commuting.

Since tele-working is not a viable option for some occupations and businesses there are limits to how much tele-working use can be increased. However, policies and initiative that encourage and enable tele-working can deliver positive benefits to households and communities, and this both depends on and drives the need for broadband.

The household survey results show some differences in personal productivity use between rural and non-rural areas. The current use of workplace access and tele-working are actually higher in non-rural areas than for rural areas. Current and planned use of online training is slightly higher for rural households. Households with home-based businesses are similar for rural and non-rural areas, but rural households indicate a higher percentage that plan to operate a home-based business.

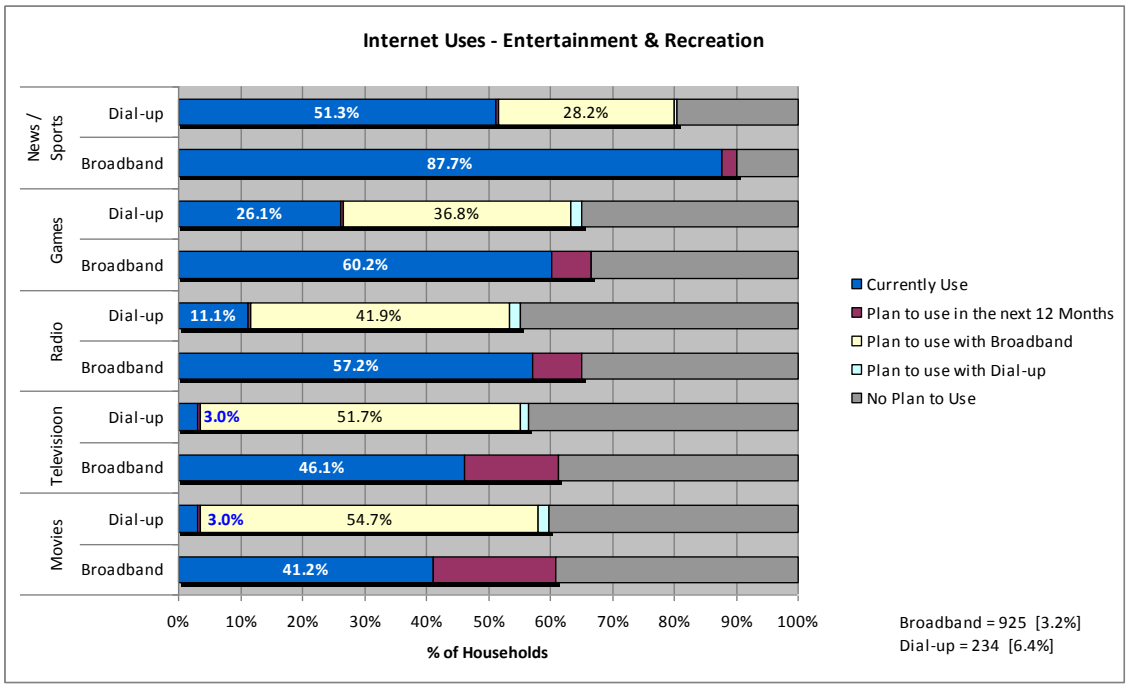
Figure 53 –Personal Productivity for Broadband Households – Rural vs. Non-rural



While the differences between rural and non-rural households are not large, these results show that there is an opportunity to increase the use of the Internet in ways that can have a significant impact for rural communities, especially in the areas of online training and tele-working.

The final category of utilization is for household entertainment and recreation. While these uses have less impact on social or economic benefits they do add value to using the Internet and indicate areas of demand for broadband utilization.

Figure 54 – Household Internet Uses – Entertainment and Recreation



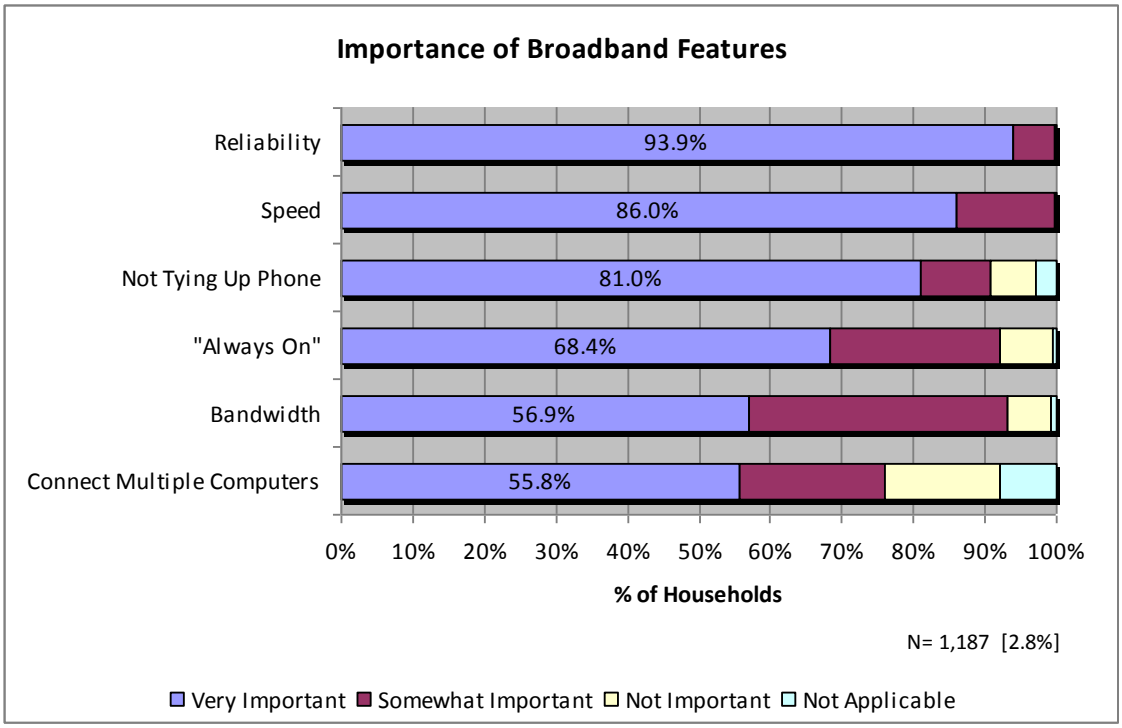
It is clear that these uses, which generally involve either downloading or streaming of high bandwidth media, are used to a much higher degree by broadband households. It is also clear that dial-up households are aware of the uses and a high percentage would plan to use the Internet for these purposes with broadband.

All households, including dial-up and broadband, were asked about which broadband features were most important to them.

- Speed (quick response, less waiting)
- Bandwidth (e.g. for large files or videos)
- Reliability of connection
- "Always on" connection
- Does not tie up phone line
- Connecting multiple household computers

The feature most frequently cited as “very important” was reliability of connection by almost 94% of households. Speed was the second most important feature at 86% of households.

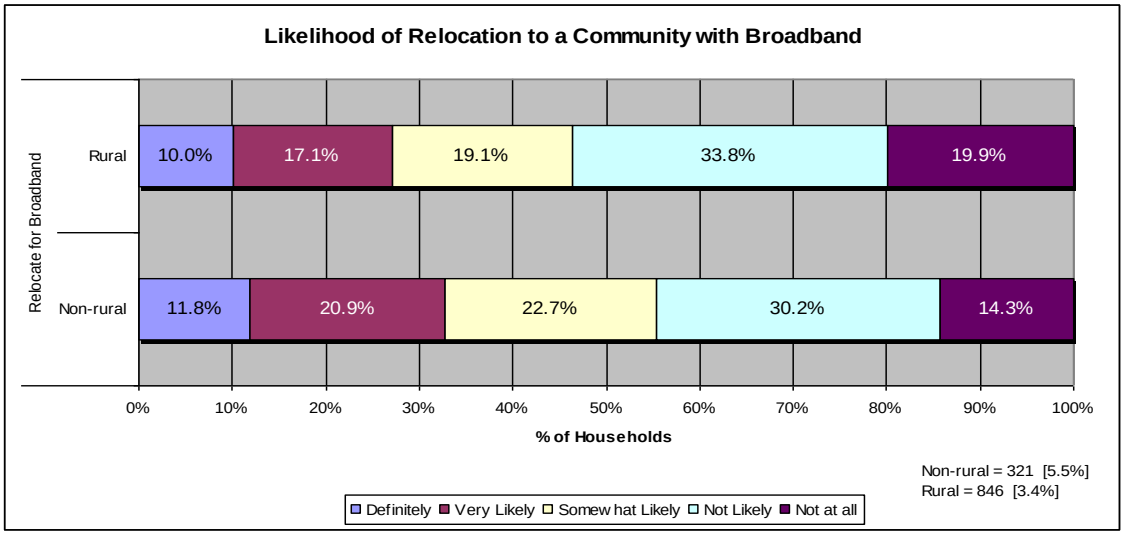
Figure 55 – Importance of Broadband Features for Households



5.2.2 Household and Community Benefits

While it is important to understand patterns of Internet use to identify gaps and opportunities for increased utilization, it is equally important to understand the benefits and impacts of broadband utilization for households and their communities. To provide a perspective on the overall importance of broadband households were asked: ***"Assuming you could never get broadband service, how likely is it that you would leave to relocate to a community that offers broadband?"***

Figure 56 – Likelihood of Relocation to anther Community to get Broadband

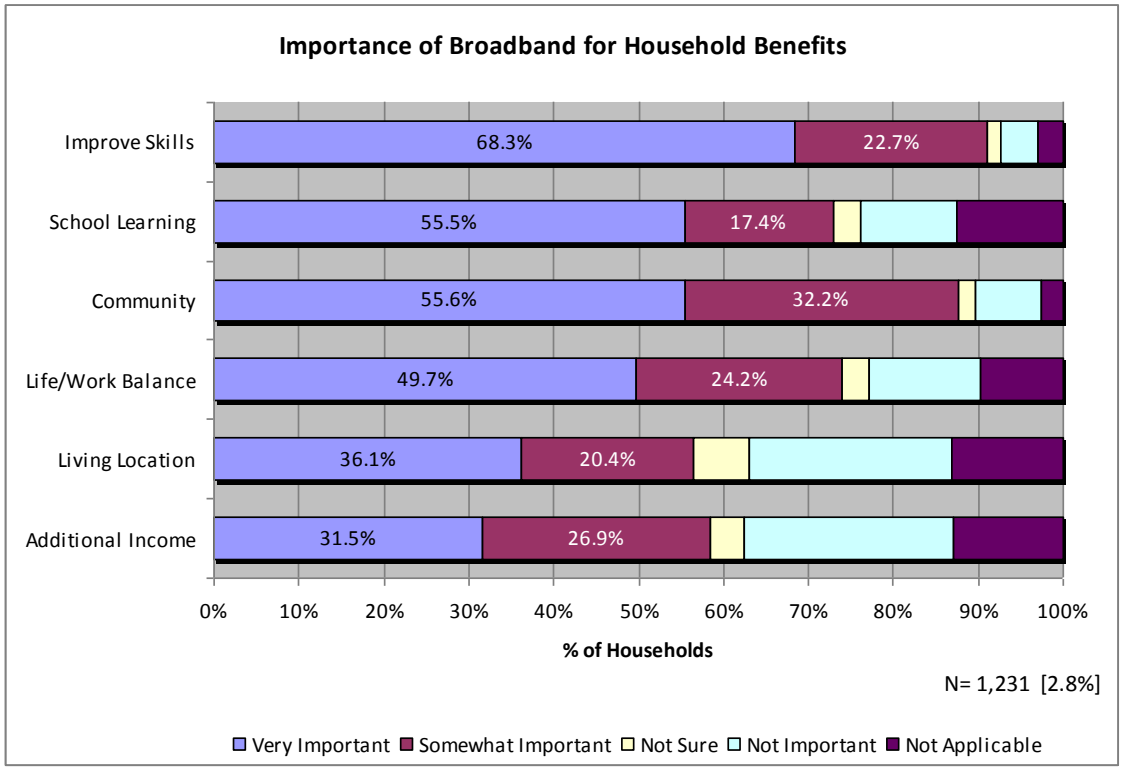


At least **10% of households would definitely relocate** to another community in order to obtain access to broadband services. An additional 18% would consider relocation very likely. The fact that **between 10% and 28% of households would seriously consider relocation for broadband service** is an important fact with significant implications for communities, both in retaining and attracting residents.

Households were asked to rate the importance of broadband for the following household benefits:

- Improves knowledge and skills (through online education and/or research)
- Ability to earn additional income
- Enhances school learning (through research and study)
- More connected with what is happening in the community
- Better balance of personal and work time
- Choice of living location (e.g. for selecting or remaining in your community)

Figure 57 – Importance of Broadband for Household Benefits

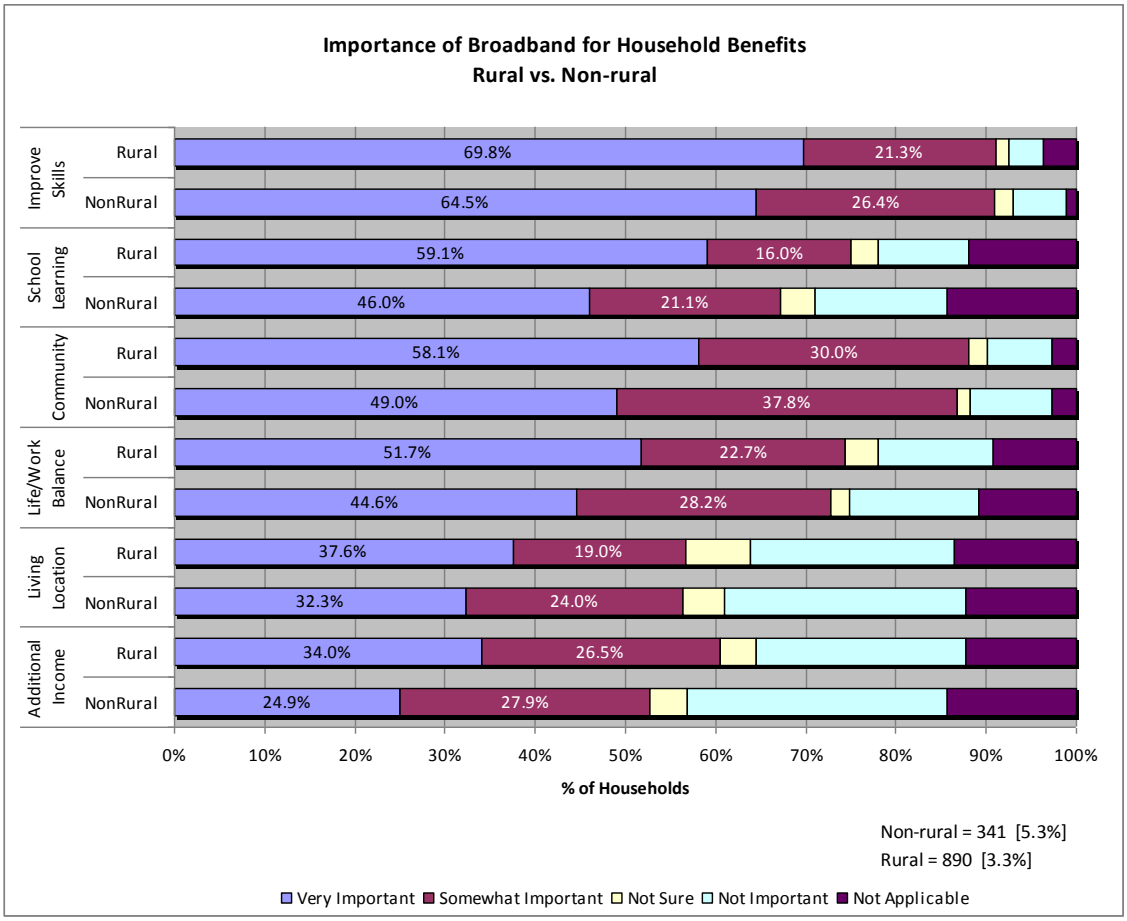


The benefit for which broadband is most frequently (68%) cited as "very important" is **improving knowledge and skills** through online education or research. **Enhancing school learning** and being **more connected with the community** are benefits seen as very important by over 55% of households.

Providing a **better balance of personal and work time** is a very important broadband benefits for almost 50% of households. **Broadband is very important for the choice of living location for 36% of households**. This reinforces the responses for the likelihood of relocating to another community to obtain broadband service. Broadband is considered very important for the **ability to earn additional income by over 31% of households**. This is a similar level as those households that currently either tele-work or have a home-based business (39% combined).

These results vary between rural and non-rural households, with a higher percentage of rural households rating all categories as very important.

Figure 58 – Importance of Broadband for Household Benefits – Rural vs. Non-rural



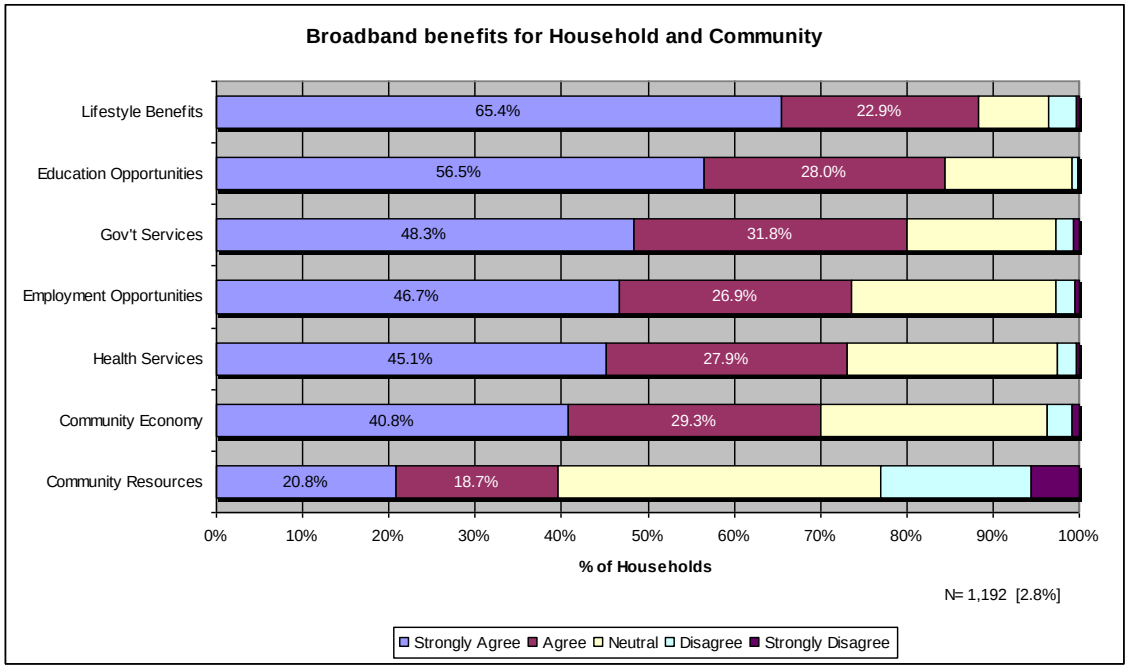
To provide an additional perspective on the importance of broadband, households were asked to provide their level of agreement with the following statements:

- Not having broadband would have a negative impact on my lifestyle.
- Government services are more accessible due to broadband.
- Broadband makes the education opportunities in my community better.
- Broadband makes the health services in my community better.
- Broadband increases employment opportunities for my community.
- There are sufficient resources in my community for learning how to get the most from broadband.
- Broadband has a positive effect on the economy of my community

Over 65% of households strongly agree that not having broadband would have a negative impact on their lifestyle. This is a strong endorsement of the importance of broadband and the extent to which broadband has become an integral part of peoples' lives. There is general agreement that services are more accessible due to broadband and that broadband contributes to greater employment opportunities and a stronger local economy.

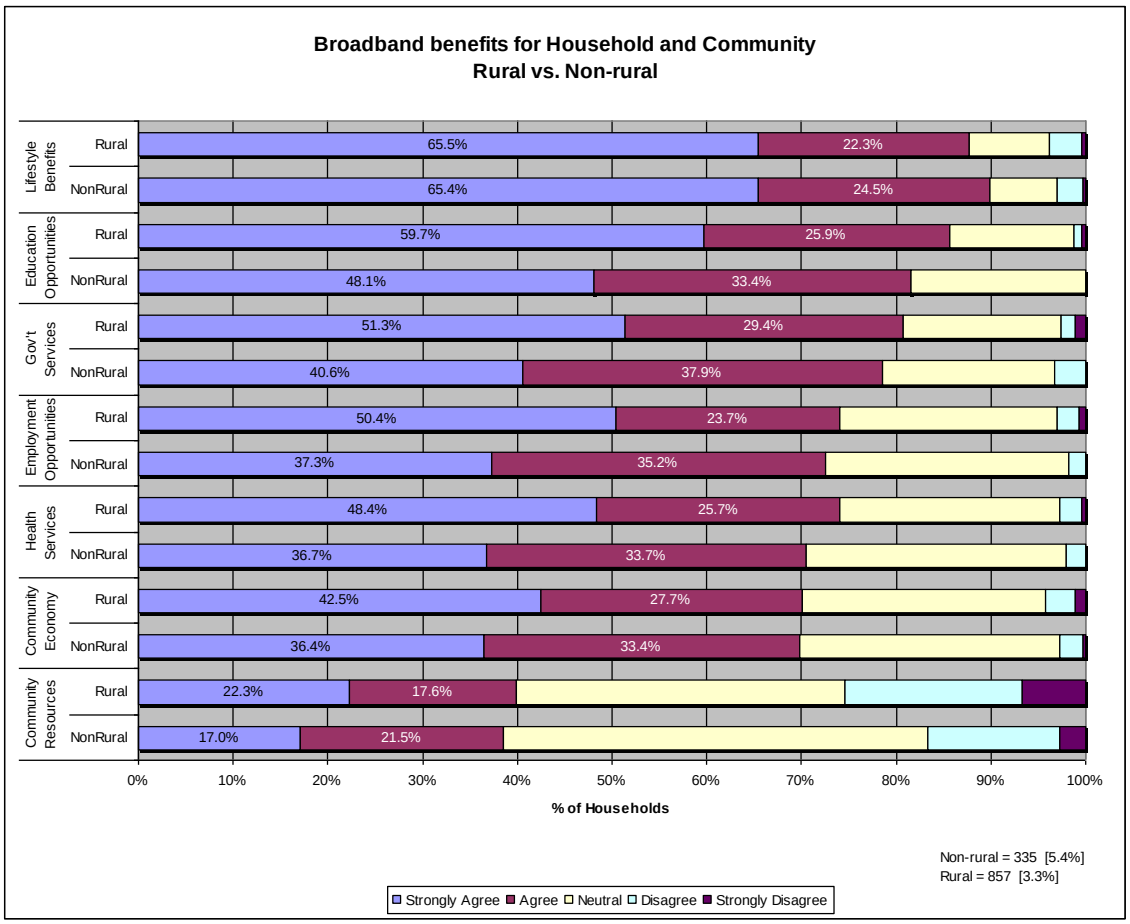
The lowest level of agreement is that “there are sufficient resources in my community for learning how to get the most from broadband”. With only 39% agreeing that there are sufficient resources, there is opportunity to provide additional resources and support to increase broadband utilization.

Figure 59 – Broadband Benefits for Household and Community



In comparing results from rural vs. non-rural households, there is stronger agreement on benefits to rural communities for education and employment opportunities, access to health services and government services, and overall benefits to the local economy. This indicates a greater awareness and recognition of broadband benefits and impacts for rural households.

Figure 60 – Broadband Benefits for Household and Community – Rural vs. Non-rural



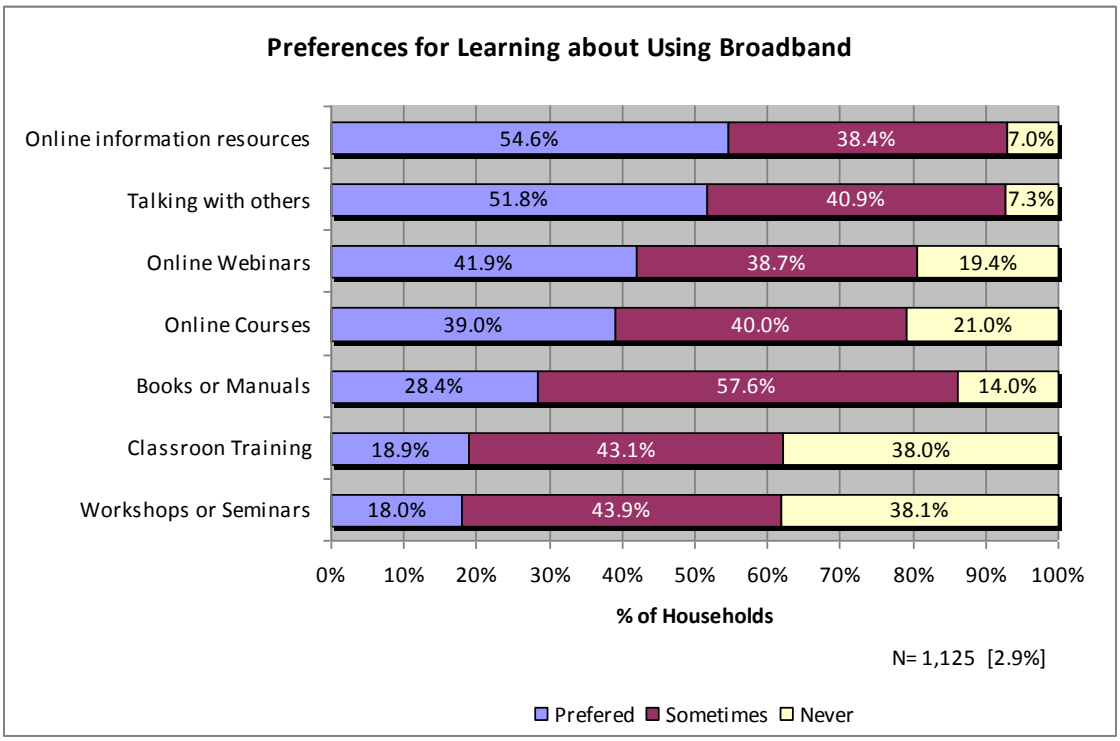
5.3 Barriers and Adoption Issues

For households the focus on issues for adoption of Internet uses was on methods of learning about broadband and availability of resources. Households were asked about their preferences for different learning methods, including:

- Talking with others who have experience
- Books or Manuals
- Workshops or Seminars
- Classroom Training Courses
- Online Information (articles, FAQs, etc)
- Online Tutorials or Webinars
- Online Training Courses

The most preferred methods are self-directed, either by accessing online resources or talking with other people who have experience. The least favoured methods were in-person learning either in formal classroom training or workshops and seminars. These statistics should be considered in any initiatives designed to deliver training and support to households for increasing broadband utilization.

Figure 61 – Preferences for Learning about using Broadband

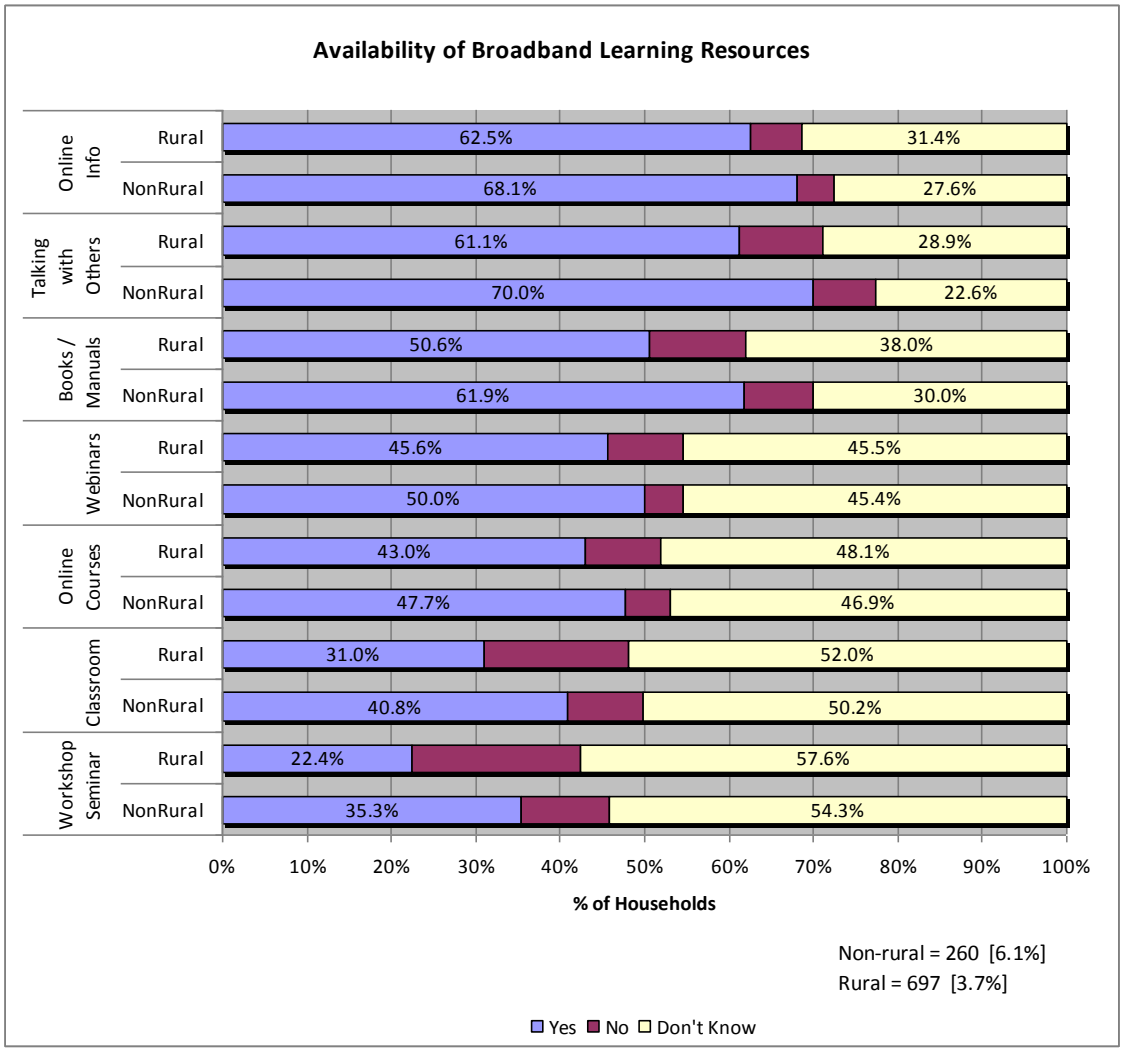


These statistics do not vary significantly between rural and non-rural households. However, there is variation in the availability of learning resources for rural vs. non-rural areas. Certainly, in-person learning methods are seen as less available in rural areas. Online resources are also seen as less available by a small margin, even though availability is not limited by the household location.

What is most significant is that relatively high percentage of households that do not know what learning resources are available to them. **Between 30% and 50% of households do not know what online**

information and resources are available. For addressing broadband adoption and utilization through learning, the first priority is to increase awareness of available resources and to assist in providing access to resources.

Figure 62 – Availability of Broadband Learning Resources



6 Summary of Key Findings

6.1 Business Impacts, Gaps, and Opportunities

Industry Perspective

Businesses within commercial sectors show higher utilization of broadband than organizations within non-commercial sectors. For the commercial sector increased utilization should focus on **Construction**, **Retail Trade**, and **Manufacturing**. For the non-commercial sector increased utilization should focus on **Public Administration**, **Health Care & Social Services**, **Administrative & Support Services**, and **Educational Services**.

Organization Size Perspective

Smaller organizations are more challenged by lack of expertise for exploring and implementing e-solutions. Strategies to increase utilization should in part be tailored to addressing the needs of small organizations with limited resources, especially those with less than 20 employees. However, there are a significant number of organizations of all sizes for which the **lack of skilled resources**, both internally and externally, is a **barrier to increased adoption** of e-solutions.

e-Solutions Perspective

Concerns over **security** and **privacy** are important barriers to a large percentage of organizations. Overcoming these concerns through education, support services, and network solutions can build confidence that leads to greater adoption of e-solutions. The focus of e-solutions to date has been more towards internal process and productivity as well as customer service. **Opportunities exist to increase utilization of newer or more sophisticated e-solutions** that create new business opportunities and competitiveness, such as online service delivery, rich media content, and selling online.

6.2 Household Impacts, Gaps, and Opportunities

Broadband Availability

With **18% of households still using dial-up** Internet, this is a gap that can still be addressed through increasing broadband availability, especially in rural areas, with at least 46% of dial-up users willing to subscribe to broadband. **Dial-up households would make significantly greater use of the Internet with broadband** by a wide margin across all utilization categories – increased use ranging from 16% for research to 43% for entertainment.

The **use of cable Internet is significantly lower in rural areas** (15%) compared to non-rural areas (37%), indicating that cable Internet service is a less available broadband option for rural communities. DSL access is comparable between rural and non-rural areas. Increasing cable Internet availability would provide rural communities with greater choice of broadband options. However, if the reach or cable or DSL services cannot be fully extended into unserved or under-served areas then fixed wireless and satellite services will remain the primary broadband options.

While 9% of households use satellite service, mostly in rural areas, **satellite connectivity has the lowest acceptance by households** for speed, reliability, and price/value of all the broadband service options. Fixed wireless is the least used form of access (4%), indicating that there is **opportunity to increase the availability and use of fixed wireless service where other options are not viable**.

Household Internet Uses

The research on household Internet uses provides some key insights into opportunities for further leveraging broadband access capabilities.

Participation in the Digital Economy – The most direct measure of household participation in the digital economy is that **over 90% of household purchase goods and service online**. Ion addition, over 75% of broadband households use the Internet for paying bills online and for e-banking. This indicates an active willingness to use the Internet for commercial transactions, further reinforced by at least two-thirds of households obtaining music or software online and booking travel arrangements online.

Notably, only 43% of broadband households currently transact with government agencies online. Over 83% of broadband household use the Internet to research government information. Combining these facts with household willingness to transact online for other purposes indicates an **opportunity to increase the delivery of transactional services by all levels of government**.

Health and Education – Over 91% of broadband households research medical and health information online. Given the willingness of households to transact online this leads to **opportunities for delivering tele-health services to households**. Over 72% research educational information for training or schoolwork online. In addition, 44% actively use the Internet for online education and training courses, demonstrating an **ongoing demand and opportunity for the delivery of educational services online**.

The delivery of online health and educations services can be particularly beneficial for more rural communities. For the delivery of these services to be effective for users there must be sufficiently fast and reliable broadband service available.

Income Opportunities – Over **23% of broadband households operate a home-based business**, with another 13% planning to do so. Home-based businesses provide alternative income opportunities, either as the sole source or as a supplement to household income. While less than 14% of dial-up households operate a home business, another 22% would operate a home-based business if they had broadband. For all households this indicates a potential of 36% operating a home-based business for additional household income.

Over **20% of broadband households use the Internet for tele-working** on a formal basis, with another 10% planning to do so. Tele-working opens new employment opportunities within communities where those jobs do not otherwise exist. This contributes to maintaining residents in their community of choice, rather than relocating for employment or seeking less suitable work. Only 7% of dial-up households tele-work, but another 15% would do so with broadband.

Both **home-based businesses and tele-working open new opportunities for households to generate additional income** within their current communities. For local economies this mitigates potential impacts from unemployment and underemployment, while maintaining residence within the community. The availability of sufficiently fast and reliable broadband service is essential for enabling effective operation of home businesses and tele-working.

Household Benefits of Broadband

The overall importance of broadband for households is demonstrated by the fact that over **10% of households would "definitely" relocate** to another community for broadband service if it was not available to them in their current location. Another **18%** would consider relocation **"very likely"**. These are significant statistics from a community perspective, both for retaining and attracting community residents.

The benefit for which broadband is most frequently (68%) cited as "very important" is **improving knowledge and skills** through online education or research. **Enhancing school learning** and being **more connected with the community** are benefits seen as very important by over 55% of households.

Providing a **better balance of personal and work time** is a very important broadband benefits for almost 50% of households. **Broadband is very important for the choice of living location for 36% of households**. This reinforces the responses for the likelihood of relocating to another community to obtain broadband service. Broadband is considered very important for the **ability to earn additional income by over 31% of households**. This is a similar level as those households that currently either tele-work or have a home-based business (39% combined).

Over **65% of households strongly agree that not having broadband would have a negative impact on their lifestyle**. This is a strong endorsement of the importance of broadband and the extent to which broadband has become an integral part of peoples' lives. There is general agreement that services are more accessible due to broadband and that broadband contributes to greater employment opportunities and a stronger local economy.

7 Appendix 1: Data Collection Methods and Results

Surveys were deployed using direct email invitation to households and organizations providing access to online surveys. The initial email invitations were sent on Monday, March 22, 2010, followed by three reminder emails. The surveys were closed on Saturday, May 15.

In addition to direct emails a survey link was included in the State press release to allow for other businesses and organizations to participate. A summary of the survey deployment statistics is shown in the following table.

	Total Org'ns	Rural HH	Non-Rural HH	Total HH	TOTAL	Notes and Definitions:
Distribution						
Contact Panel	26,695	60,646	18,790	79,436	106,131	Initial email contact lists used for distribution
Removed/Failed	34	4	2	6	30	Failed or removed on recipient request
Adjusted Panel	26,671	60,643	18,790	79,433	106,104	Net contact list after removal of contacts
Email Rejected (estimate)	1,331	3,033	940	3,973	5,304	Emails rejected by email systems
Email Received	**25,330**	**57,609**	**17,848**	**75,457**	**100,787**	Invitations delivered to recipient email systems
Email No Response	23,232	56,545	17,431	73,976	97,208	No. of recipients that did not access survey online
Opted Out	26	28	2	30	56	Recipients that removed themselves
Finished Survey	1,410	888	347	1,235	2,645	Respondents that finished the survey (includes declined consent)
Partially Completed Survey	662	148	68	216	878	Respondents that partially completed the survey
Response Status						
Started	2,549	1,195	497	1,692	4,241	Survey opened
Finished - Email	1,410	888	347	1,235	2,645	Finished surveys from email invitations
Finished - Anonymous	78			0	78	Finished surveys from generic link
Declined Consent	47			43	90	Respondents who declined consent
Completed Surveys	1,441			1,192	2,633	Fully completed surveys
Partial Completions - Usable	462			205	647	Partially completed surveys
Total Usable Responses	**1,903**			**1,397**	**3,280**	Total surveys with usable data
Response Rates						
Started	10.1%	2.1%	2.8%	2.2%	4.2%	
Finished	5.9%	1.5%	1.9%	1.6%	2.7%	
Completed Surveys	5.7%			1.6%	2.6%	
Usable Partial Completions	1.8%			0.3%	0.6%	
Total Usable	**7.5%**			**1.9%**	**3.3%**	

Email invitations were sent on behalf of the CIO, Commonwealth Office of Technology.

Despite distribution to a large number of households across the state, the household response rate was just under 2%. Business response rates were more productive at 7.5%. This may reflect the generally higher awareness of the value and importance of high-speed Internet by organizations and the relatively low willingness of households to participate in surveys in general. More comprehensive advance communication and awareness-raising can increase these response rates by 2-3 percentage points.

8 Appendix 2: Survey Results for Businesses and Organizations

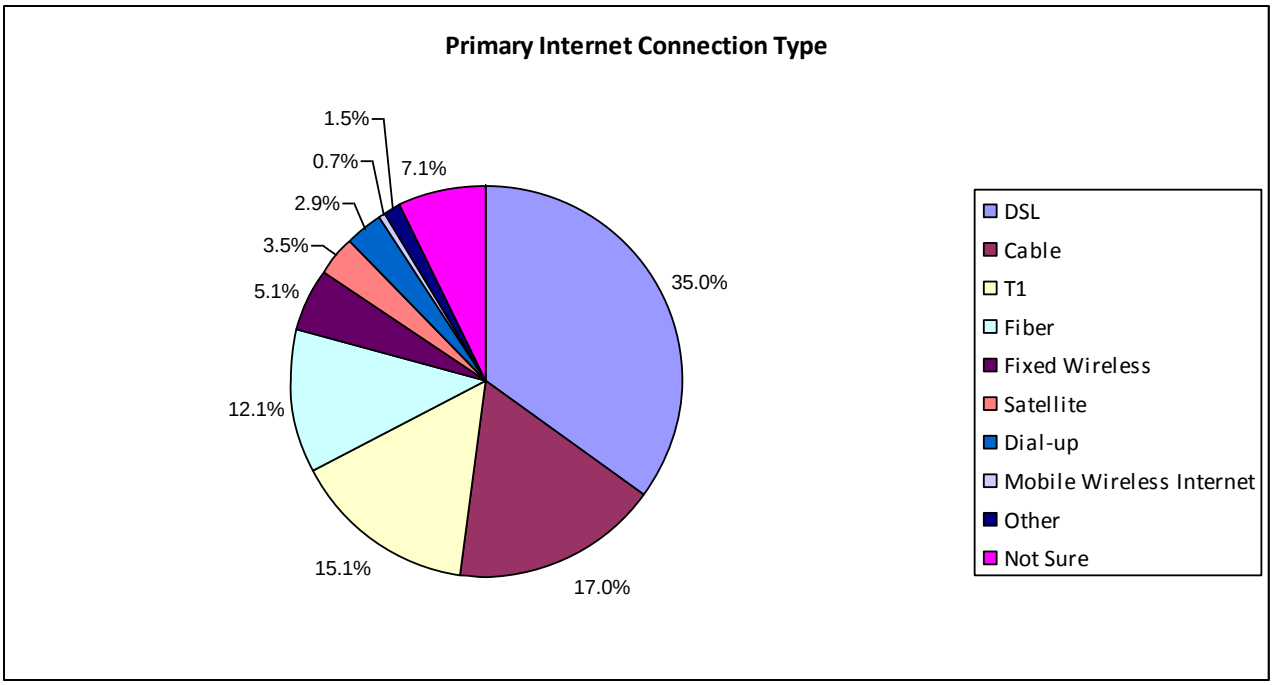
Output report for e-Solutions Benchmarking Business Survey
(Last Modified: 05/25/2010)

1. Respondents consenting to participate in the survey.

Note: This includes both completed and partial survey responses. The number of respondents is identified for each question.

#	Answer		Response	%
1	Yes		2,028	98%
2	No		47	2%
	Total		2,075	100%

2. Primary type of Internet connection used by organization.



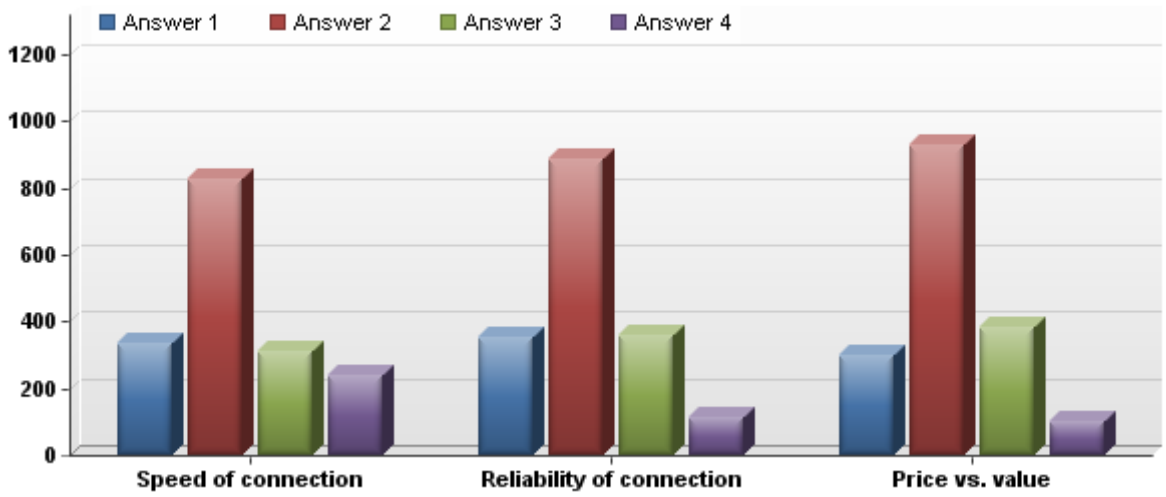
#	Connection Type		Response	%
1	Dial-up (modem over telephone line)		55	2.9%
2	DSL (Digital Subscriber Loop - High-speed Internet over the phone line)		667	35.0%
3	Cable (High-speed Internet over coaxial cable)		323	17.0%
4	Wireless (High-speed Internet over fixed Wireless connection)		98	5.1%

#	Connection Type		Response	%
10	Mobile wireless Internet		13	0.7%
5	T1 connection (1.5 mbps dedicated connection)		287	15.1%
6	Fiber (High-speed Internet over optical fiber connection)		230	12.1%
7	Satellite (High-speed Internet over satellite links)		66	3.5%
8	Other High-speed access (specify type)		29	1.5%
9	Not Sure		135	7.1%
	Total		1903	100.0%

4. Distribution of monthly Internet connection fees

#	Monthly Fee Range		Response	%
1	Less than $10		44	3%
2	Between $10 and $19.99		27	2%
3	Between $20 and $29.99		68	4%
4	Between $30 and $39.99		106	6%
5	Between $40 and $49.99		151	9%
6	Between $50 and $59.99		129	8%
7	Between $60 and $79.99		158	9%
8	Between $80 and $99.99		129	8%
9	Between $100 and $149.99		116	7%
10	Between $150 and $199.99		48	3%
13	Between $200 and $499.99		122	7%
14	Between $500 and $999.99		75	4%
11	$1,000 or more		122	7%
12	Not Sure		425	25%
	Total		1,720	100%

5. Self-assessment of how current Internet service meets organization's needs.



#	Question	Answer 1	%	Answer 2	%	Answer 3	%	Answer 4	%	Responses
1	Speed of connection	Very fast	19.7%	Fast Enough	48.0%	Neutral	18.1%	Not fast enough	14.1 %	1,720
2	Reliability of connection	Always excellent	20.8%	Very good most of the time	51.7%	Occasional problems	20.9%	Frequent problems	6.6%	1,720
3	Price vs. value	Worth every penny	17.5%	Acceptable for what I pay	54.1%	Below expectation	22.4%	Poor value	5.9%	1,720

6. Dial-up Internet subscriber plans to subscribe to broadband within the next 12 months.

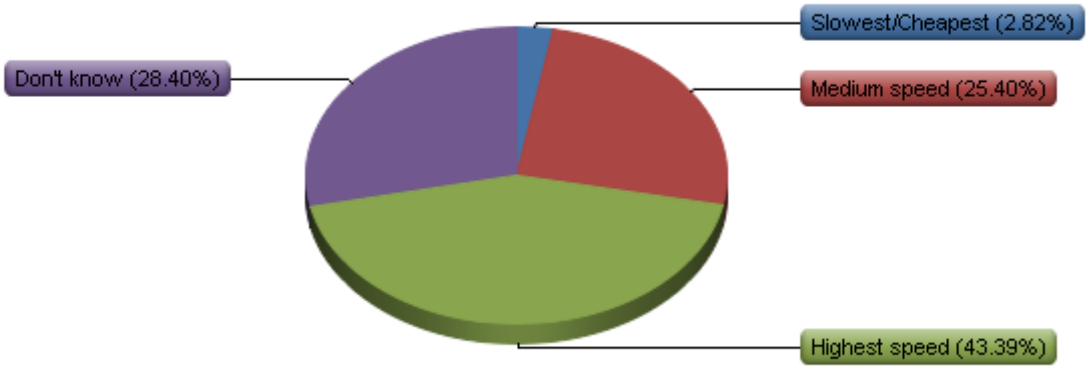
#	Answer		Response	%
1	Yes		14	30%
2	No		9	20%
3	Not Sure		23	50%
	Total		46	100%

7. Reasons not planning to subscribe to broadband.

#	Answer		Response	%
1	Can't get broadband at my location		24	75%
2	Too expensive		5	16%
3	Don't know enough about broadband		3	9%
4	Don't use the Internet very often		0	0%
5	Dial-up meets my needs		3	9%

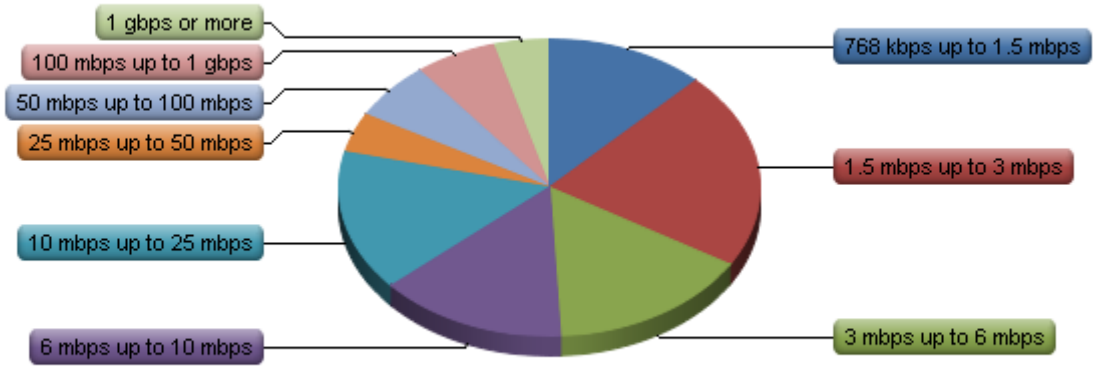
Total Responses	32

8. Broadband service tier.



#	Service Tier		Response	%
1	Slowest/Cheapest		46	3%
2	Medium speed		415	25%
3	Highest speed		709	43%
4	Don't know		464	28%
	Total		1,634	100%

9. Maximum advertised download speed.



#	Max. Download Speed Range		Response	%
1	768 kbps up to 1.5 mbps		82	12%
2	1.5 mbps up to 3 mbps		144	21%
3	3 mbps up to 6 mbps		104	15%
4	6 mbps up to 10 mbps		96	14%
5	10 mbps up to 25 mbps		103	15%
6	25 mbps up to 50 mbps		29	4%
7	50 mbps up to 100 mbps		42	6%
8	100 mbps up to 1 gbps		42	6%
9	1 gbps or more		29	4%
	Total		671	100%

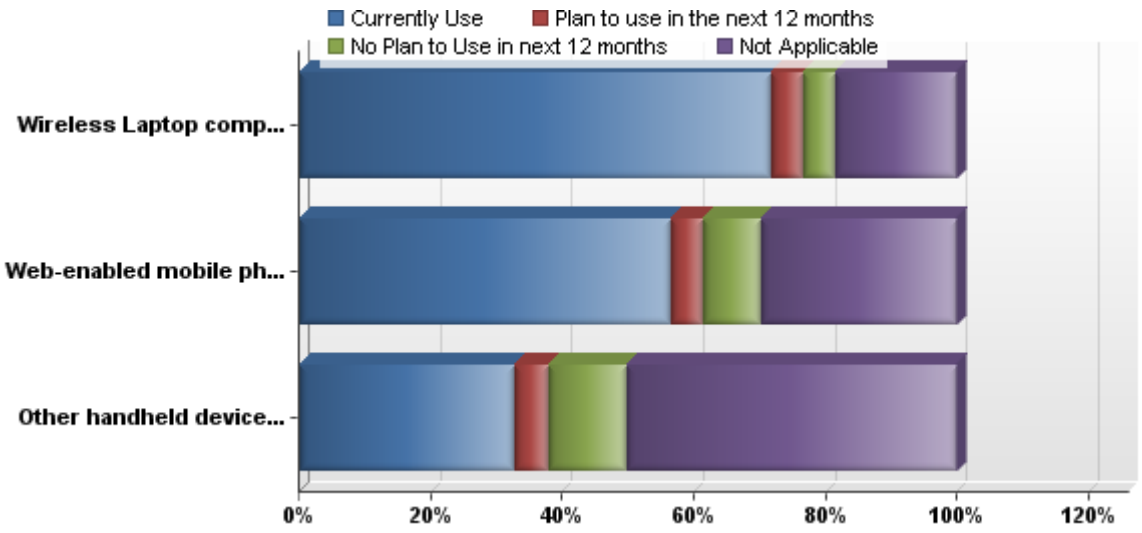
10. Time organization has been operating in current location

#	Time in Current Location		Response	%
1	less than 1 yr		50	3%
2	1 yr up to 2 yrs		67	4%
3	2 yrs up to 3 yrs		118	8%
4	3 yrs up to 4 yrs		82	5%
5	4 yrs up to 5 yrs		88	6%
6	more than 5 yrs		1,125	74%
	Total		1,530	100%

11. Time organization has been using broadband

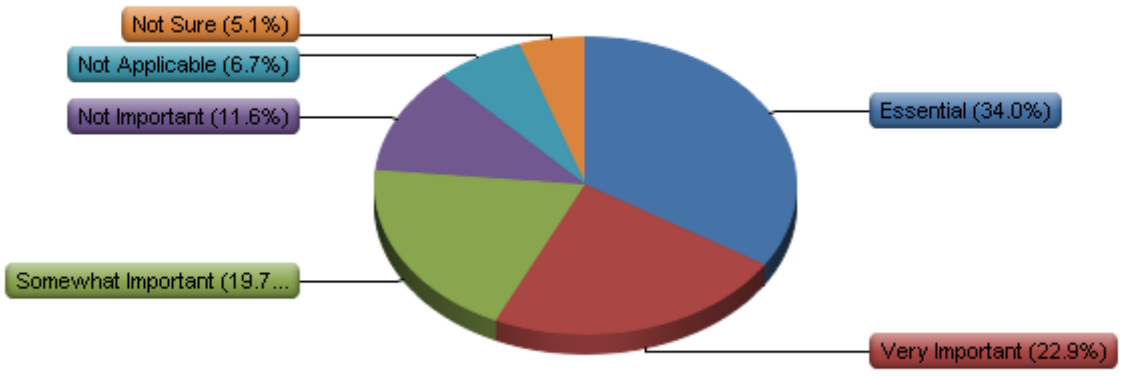
#	Time Using Broadband		Response	%
1	less than 1 yr		35	2%
2	1 yr up to 2 yrs		80	5%
3	2 yrs up to 3 yrs		138	9%
4	3 yrs up to 4 yrs		152	10%
5	4 yrs up to 5 yrs		171	11%
6	more than 5 yrs		920	61%
	Total		1,496	100%

12. Use of mobile web-enabled devices.



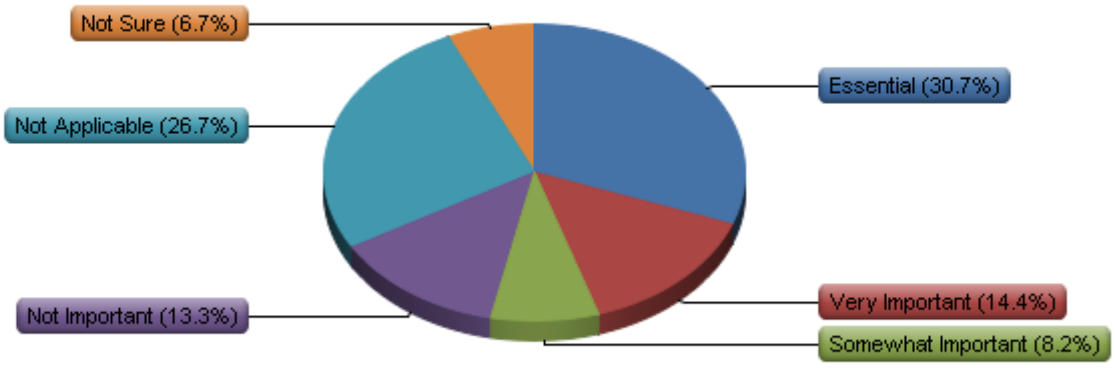
#	Mobile Device	Currently Use	Plan to use in the next 12 months	No Plan to Use in next 12 months	Not Applicable	Responses
1	Wireless Laptop computers	71.7%	4.8%	4.9%	18.6%	1,492
2	Web-enabled mobile phones	56.3%	4.8%	9.0%	29.9%	1,406
3	Other handheld devices	32.7%	5.0%	11.9%	50.4%	1,281

13. Importance of mobile web functions to organization



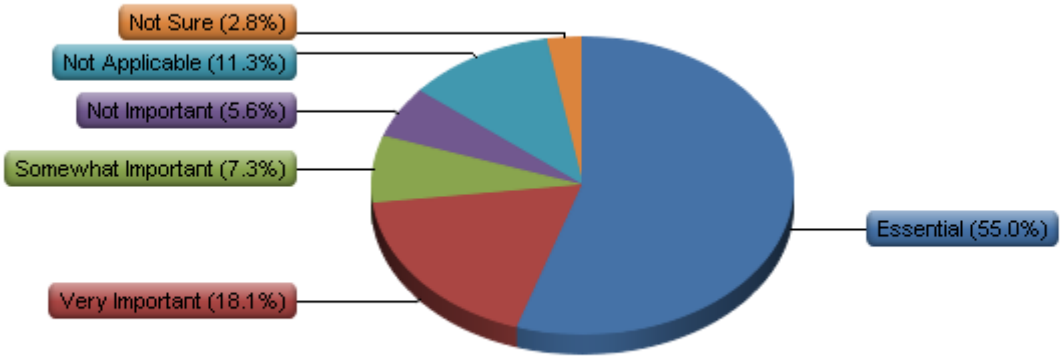
#	Mobile Importance		Response	%
1	Essential		515	34%
2	Very Important		347	23%
3	Somewhat Important		298	20%
4	Not Important		175	12%
5	Not Applicable		102	7%
6	Not Sure		78	5%
	Total		1,515	100%

14. Importance of broadband Internet availability in selecting location



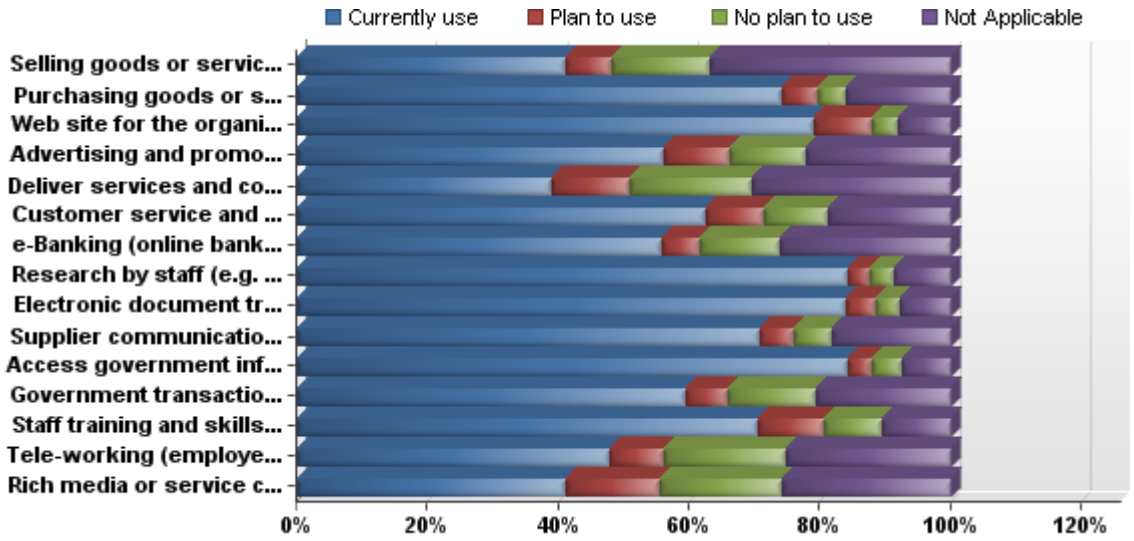
#	Selecting Location		Response	%
1	Essential		462	31%
2	Very Important		217	14%
3	Somewhat Important		124	8%
4	Not Important		200	13%
5	Not Applicable		402	27%
6	Not Sure		101	7%
	Total		1,506	100%

15. Importance of broadband Internet connectivity for remaining in location



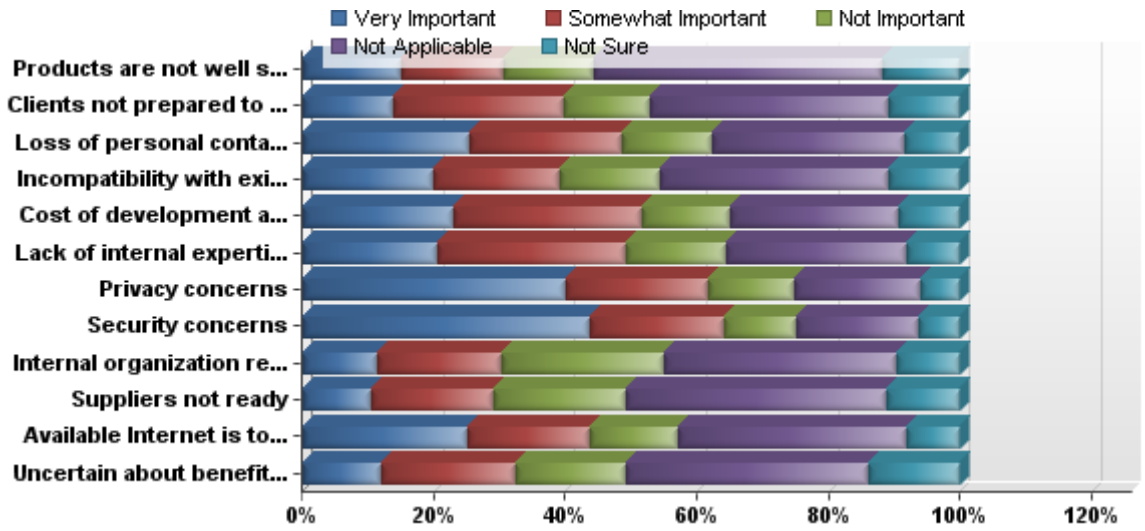
#	Remaining in Location		Response	%
1	Essential		828	55%
2	Very Important		272	18%
3	Somewhat Important		110	7%
4	Not Important		84	6%
5	Not Applicable		170	11%
6	Not Sure		42	3%
	Total		1,506	100%

16. Current and planned uses of the Internet.



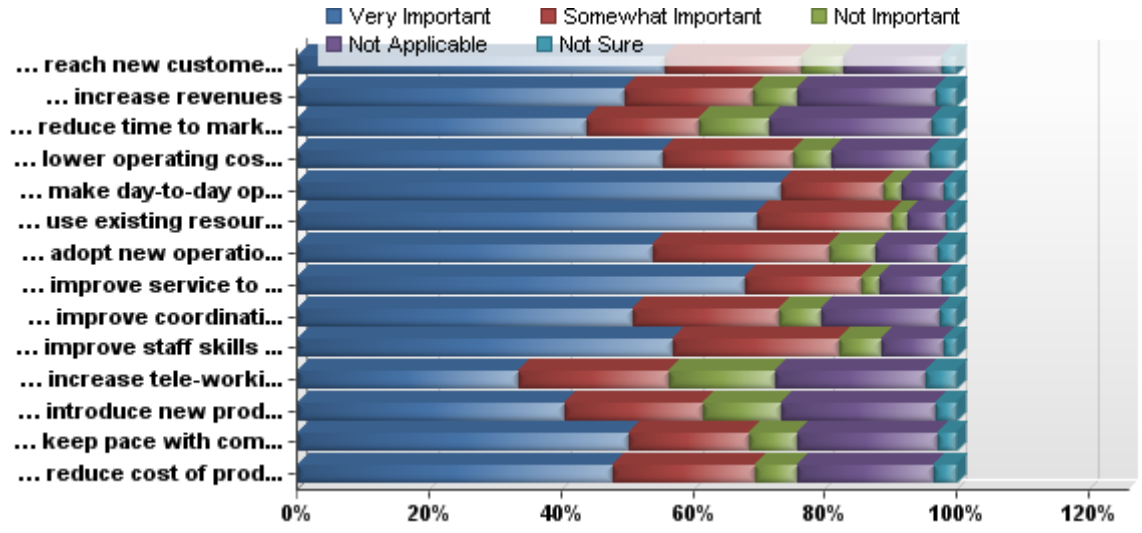
#	Internet Uses	Currently use	Plan to use	No plan to use	Not Applicable	Responses
1	Selling goods or services with or without on-line payment	41.1%	6.9%	15.1%	36.9%	1,470
2	Purchasing goods or services with or without on-line payment	74.0%	5.6%	4.2%	16.1%	1,470
3	Web site for the organization	79.1%	8.8%	3.9%	8.1%	1,470
4	Advertising and promotion online	56.0%	10.1%	11.5%	22.4%	1,470
5	Deliver services and content (e.g. video streaming, digitized products)	38.9%	12.0%	18.5%	30.6%	1,470
6	Customer service and support	62.6%	8.7%	9.9%	18.8%	1,470
7	e-Banking (online banking and financial services)	55.7%	5.9%	12.1%	26.3%	1,470
8	Research by staff (e.g. market or technical information)	84.1%	3.3%	3.6%	8.9%	1,470
9	Electronic document transfer	83.8%	4.6%	3.7%	7.8%	1,470
10	Supplier communication and coordination	70.7%	5.2%	5.9%	18.3%	1,470
11	Access government information (e.g. information, downloads, requests)	84.3%	3.6%	4.4%	7.7%	1,470
12	Government transactions (e.g. payments, form submission)	59.5%	6.3%	13.5%	20.6%	1,470
13	Staff training and skills development	70.3%	10.3%	8.8%	10.7%	1,470
14	Tele-working (employees work from home)	47.6%	8.4%	18.6%	25.4%	1,470
15	Rich media or service creation (e.g. multimedia content, interactive tools)	41.2%	14.3%	18.5%	26.1%	1,470

17. Factors in limiting or preventing ability to integrate the use of broadband Internet into organization's operations



#	Barriers	Very Important	Somewhat Important	Not Important	Not Applicable	Not Sure	Responses
1	Products are not well suited to sale via the Internet	14.8%	15.7%	13.7%	43.8%	12.0%	1,401
2	Clients not prepared to transact online	13.6%	26.0%	13.2%	36.0%	11.2%	1,401
3	Loss of personal contact with clients	25.3%	23.1%	13.6%	29.3%	8.7%	1,401
4	Incompatibility with existing systems (including customers and suppliers)	19.8%	19.3%	15.1%	34.9%	10.9%	1,401
5	Cost of development and/or maintenance is too high	22.7%	28.7%	13.5%	25.5%	9.6%	1,401
6	Lack of internal expertise and knowledge	20.3%	28.8%	15.1%	27.6%	8.2%	1,401
7	Privacy concerns	39.9%	21.6%	13.3%	19.1%	6.1%	1,401
8	Security concerns	43.6%	20.3%	11.1%	18.6%	6.4%	1,401
9	Internal organization resistance	11.3%	18.8%	24.6%	35.3%	10.0%	1,401
10	Suppliers not ready	10.3%	18.6%	20.2%	39.3%	11.5%	1,401
11	Available Internet is too slow	24.8%	18.6%	13.4%	34.8%	8.3%	1,401
12	Uncertain about benefits	11.9%	20.4%	16.8%	36.6%	14.2%	1,401

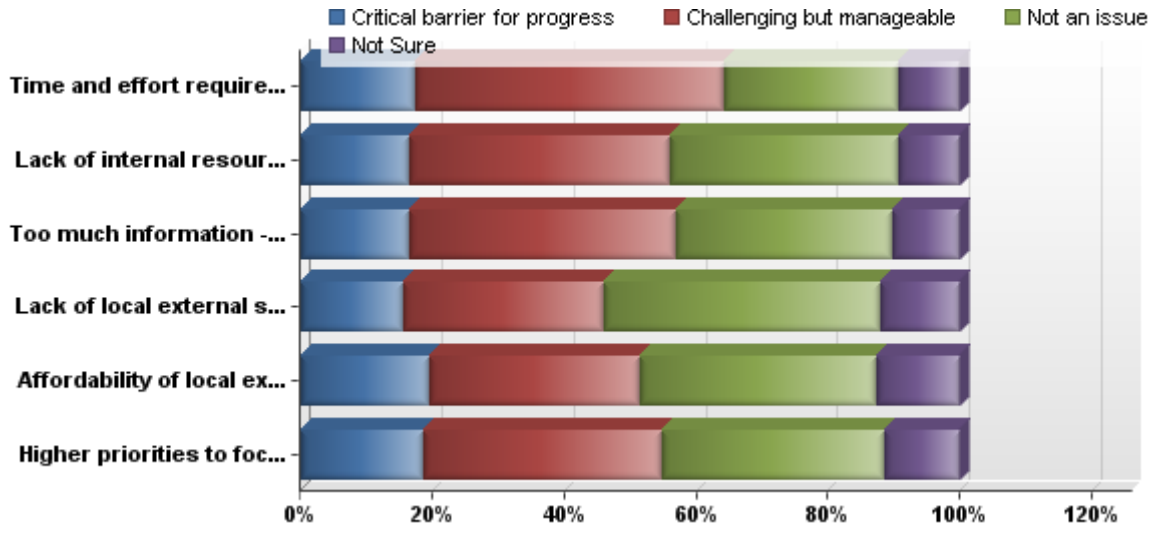
18. Importance of the Internet for organization's operations.



#	Internet benefits	Very Important	Somewhat Important	Not Important	Not Applicable	Not Sure	Responses
1	Reach new customers and clients	55.5%	20.8%	6.1%	14.9%	2.6%	1,406
2	Increase revenues	49.6%	19.3%	6.8%	20.9%	3.4%	1,406
3	Reduce time to market for	43.9%	16.8%	10.7%	24.7%	4.0%	1,406

#	Internet benefits	Very Important	Somewhat Important	Not Important	Not Applicable	Not Sure	Responses
	products or services						
4	Lower operating costs	55.2%	19.9%	5.8%	14.9%	4.2%	1,406
5	Make day-to-day operations easier	73.1%	15.7%	2.5%	6.6%	2.1%	1,406
6	Use existing resources more effectively	69.6%	20.4%	2.3%	5.8%	1.8%	1,406
7	Adopt new operational processes	53.7%	26.8%	6.9%	9.6%	3.0%	1,406
8	Improve service to customers and clients	67.7%	17.6%	2.8%	9.5%	2.4%	1,406
9	Improve coordination with suppliers	50.9%	22.0%	6.4%	17.9%	2.8%	1,406
10	Improve staff skills (training or certification)	56.9%	25.2%	6.4%	9.2%	2.3%	1,406
11	Increase tele-working	33.4%	23.0%	16.1%	22.8%	4.8%	1,406
12	Introduce new products or services	40.3%	21.1%	11.7%	23.4%	3.4%	1,406
13	Keep pace with competitors	50.0%	18.3%	7.2%	21.5%	3.0%	1,406
14	Reduce cost of products and services	47.7%	21.6%	6.3%	20.7%	3.6%	1,406

19. Importance of obtaining the expertise and knowledge required for utilizing e-solutions. Definition: 'e-solutions' refers to the use of computer applications and/or systems that integrate an organization's functions with Internet connectivity (e.g. online orders, client support, supplier interactions, etc.)



#	Expertise and Knowledge Issues	Critical barrier for progress	Challenging but manageable	Not an issue	Not Sure	Responses
1	Time and effort required to develop expertise	17.2%	46.8%	26.5%	9.5%	1,393
2	Lack of internal resource with necessary skills	16.5%	39.3%	34.5%	9.6%	1,393
3	Too much information - not enough time to research options	16.4%	40.3%	32.9%	10.4%	1,393
4	Lack of local external support resources	15.6%	30.2%	41.9%	12.3%	1,393
5	Affordability of local external support resources	19.5%	31.9%	35.8%	12.9%	1,393
6	Higher priorities to focus on	18.6%	36.2%	33.5%	11.7%	1,393

20. County Distribution

County	Total	County	Total	County	Total
Adair	7	Grant	10	Montgomery	13
Allen	14	Graves	17	Morgan	3
Anderson	8	Grayson	15	Muhlenberg	19
Ballard	8	Greenup	14	Nelson	16
Barren	26	Hardin	52	Ohio	6
Bell	10	Harlan	22	Oldham	16
Boone	51	Harrison	11	Owsley	3
Bourbon	9	Henderson	19	Pendleton	8
Boyd	25	Henry	14	Perry	13
Boyle	13	Hickman	2	Pike	24
Bracken	2	Hopkins	25	Powell	4
Breathitt	12	Jackson	6	Pulaski	39
Breckinridge	12	Jefferson	306	Robertson	2
Bullitt	14	Jessamine	17	Rockcastle	7
Butler	8	Johnson	11	Rowan	12
Calloway	23	Kenton	64	Russell	19
Campbell	18	Larue	12	Scott	18
Carlisle	3	Laurel	22	Shelby	17
Carroll	10	Lee	8	Simpson	10
Carter	7	Letcher	7	Spencer	6
Christian	25	Lewis	4	Taylor	14
Clark	25	Lincoln	5	Todd	7
Clay	1	Livingston	8	Trigg	8
Clinton	8	Logan	15	Union	4

County	Total	County	Total	County	Total
Crittenden	6	Madison	39	Warren	71
Daviess	45	Marion	7	Washington	3
Edmonson	2	Marshall	19	Wayne	15
Estill	8	Martin	6	Webster	3
Fayette	193	Mason	9	Whitley	19
Fleming	5	Mc Lean	5	Wolfe	8
Floyd	14	McCracken	46	Woodford	9
Franklin	80	Meade	9	[Not Tallied]	78
Fulton	8	Mercer	10	[No Value]	24
Gallatin	5	Metcalfe	6		
Garrard	5	Monroe	5		

21. Industry Distribution

NAICS	Total	%	Industry Category	Sample Error Margin
11	14	1.0%	Forestry, Fishing, Hunting, and Agriculture Support	-
21	4	0.3%	Mining	-
22	13	0.9%	Utilities	-
23	80	5.5%	Construction	10.0%
31-33	101	6.9%	Manufacturing	9.8%
42	51	3.5%	Wholesale Trade	13.7%
44-45	101	6.9%	Retail Trade	12.5%
48-49	27	1.8%	Transportation and Warehousing	-
51	93	6.4%	Information	10.2%
52	100	6.8%	Finance and Insurance	9.8%
53	61	4.2%	Real Estate and Rental and Leasing	12.5%
54	133	9.1%	Professional, Scientific, and Technical Services	8.5%
55	4	0.3%	Management of Companies and Enterprises	-
56	31	2.1%	Administrative and Support and Waste Management and Remediation Services	-
61	135	9.2%	Educational Services	8.4%
62	132	9.9%	Health Care and Social Assistance	8.5%
71	23	1.6%	Arts, Entertainment, and Recreation	-
72	42	2.9%	Accommodation and Food Services	15.1%
81	108	7.4%	Other Services (except Public Administration)	9.4%
92	210	14.4%	Public Administration	6.8%
TOTAL	1,463	100%	-	2.6%

(Sample error margins not provided for very small samples)

9 Appendix 3: Survey Results for Households

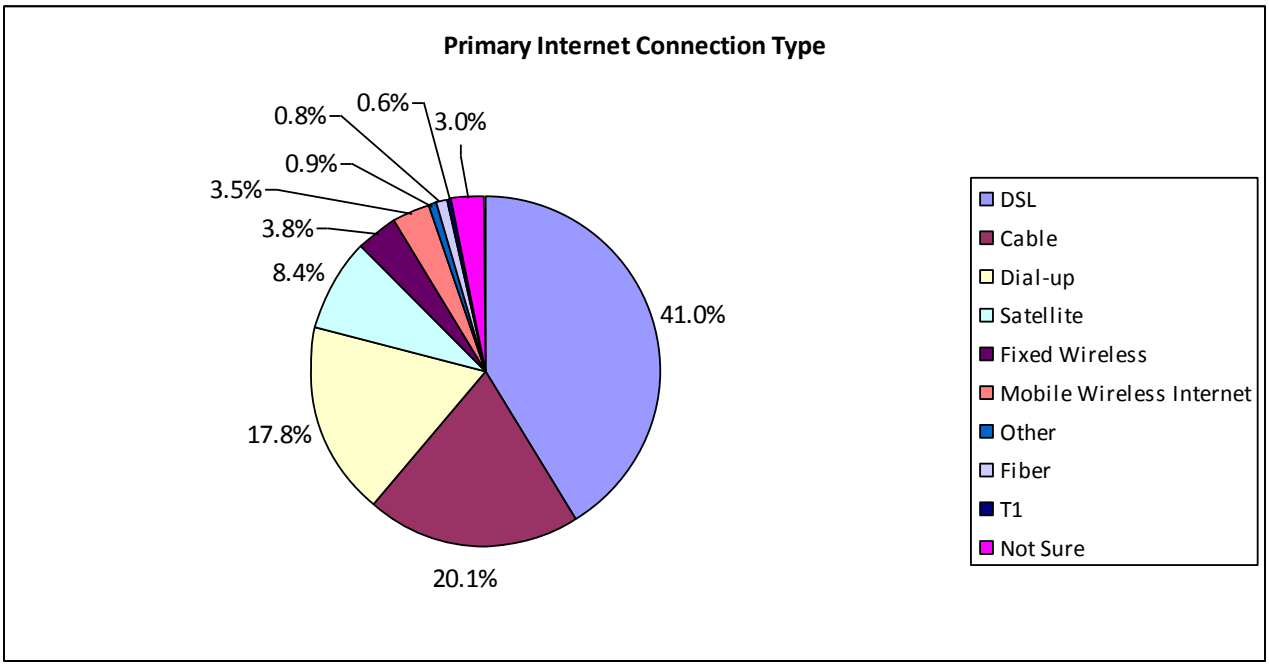
Output Report for e-Solutions Benchmarking Household Survey
(Last Modified: 05/25/2010)

1. Respondents consenting to participate in the survey.

Note: This includes both completed and partial survey responses. The number of respondents is identified for each question.

#	Answer		Response	%
1	Yes		1,409	97%
2	No		45	3%
	Total		1,454	100%

2. Primary type of Internet connection used by household.



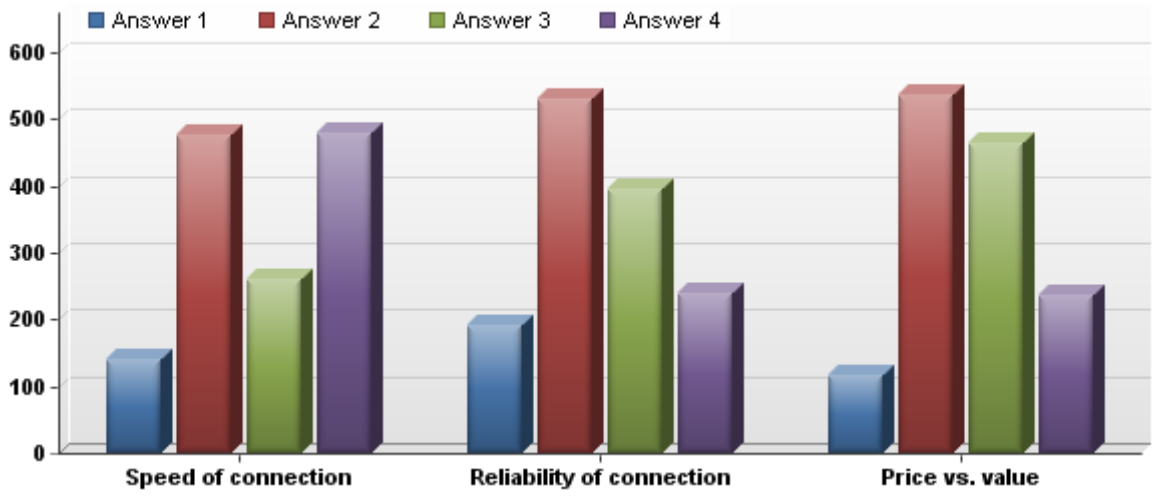
#	Connection Type		Response	%
1	Dial-up (modem over telephone line)		247	17.8%
2	DSL (Digital Subscriber Loop - High-speed Internet over the phone line)		568	41.0%
3	Cable (High-speed Internet over coaxial cable)		279	20.1%
4	Fixed Wireless (High-speed Internet over fixed Wireless connection)		53	3.8%
10	Mobile wireless Internet		48	3.5%
5	T1 connection (1.5 mbps dedicated		8	0.6%

	connection)		
6	Fiber (High-speed Internet over optical fiber connection)	11	0.8%
7	Satellite (High-speed Internet over satellite links)	117	8.4%
8	Other High-speed access (specify type)	13	0.9%
9	Not Sure	41	3.0%
	Total	1,385	100.0%

3. Distribution of monthly Internet connection fees

#	Monthly Internet Fee	Response	%
1	Less than $10	37	3%
2	Between $10 and $19.99	199	15%
3	Between $20 and $29.99	228	17%
4	Between $30 and $39.99	290	21%
5	Between $40 and $49.99	235	17%
6	Between $50 and $59.99	123	9%
7	Between $60 and $79.99	122	9%
8	Between $80 and $99.99	48	4%
9	Between $100 and $149.99	21	2%
10	Between $150 and $199.99	5	0%
11	$200 or more	0	0%
12	Not Sure	49	4%
	Total	1,357	100%

4. Self-assessment of how current Internet service meets household needs.



#	Question	Answer 1	%	Answer 2	%	Answer 3	%	Answer 4	%	Responses
1	Speed of connection	Very fast	10.3%	Fast Enough	35.1%	Neutral	19.2%	Not fast enough	35.4%	1,357
2	Reliability of connection	Always excellent	14.1%	Very good most of the time	39.1%	Occasional problems	29.1%	Frequent problems	17.6%	1,357
3	Price vs. value	Worth every penny	8.5%	Acceptable for what I pay	39.6%	Below expectation	34.3%	Poor value	17.5%	1,357

5. Dial-up Internet subscriber plans to subscribe to broadband within the next 12 months.

#	Answer	Response	%
1	Yes	88	36%
2	No	32	13%
3	Not Sure	124	51%
	Total	244	100%

6. Reasons not planning to subscribe to broadband.

#	Answer	Response	%
1	Can't get broadband at my location	25	78%
2	Too expensive	4	13%
3	Don't know enough about broadband	0	0%
4	Don't use the Internet very often	3	9%
5	Dial-up meets my needs	2	6%

Total Responses	32

7. Broadband service tier.

#	Broadband Service Tier	Response	%
1	Slowest/Cheapest	133	12%
2	Medium speed	383	35%
3	Highest speed	404	37%
4	Don't know	186	17%
	Total	1,106	100%

8. Maximum advertised download speed.

#	Max. Download Speed Range	Response	%
1	768 kbps up to 1.5 mbps	111	22%
2	1.5 mbps up to 3 mbps	107	21%
3	3 mbps up to 6 mbps	82	16%

4	6 mbps up to 10 mbps		51	10%
5	10 mbps up to 25 mbps		61	12%
6	25 mbps up to 50 mbps		22	4%
7	50 mbps up to 100 mbps		32	6%
8	100 mbps up to 1 gbps		23	5%
9	1 gbps or more		10	2%
	Total		499	100%

9. Age ranges of individuals residing in household by each age group.

#	Age Group		Response	%
1	4 years and under		95	8%
2	5 to 17 years		393	31%
3	18 to 34 years		366	29%
4	35 to 54 years		689	55%
5	55 to 64 years		453	36%
6	65 years and over		245	20%

Total Responses	1,254

10. Age group of respondent.

#	Age Group		Response	%
1	18 to 34 years		101	8%
2	35 to 54 years		593	47%
3	55 to 64 years		372	29%
4	65 years and over		190	15%
5	Prefer not to respond		6	0%
	Total		1,262	100%

11. Personal level of computer knowledge.

#	Answer		Response	%
1	Nothing or know a little		11	1%
2	Know the basics		342	27%
3	Use computers with confidence		681	54%
4	Expert user		225	18%
	Total		1,259	100%

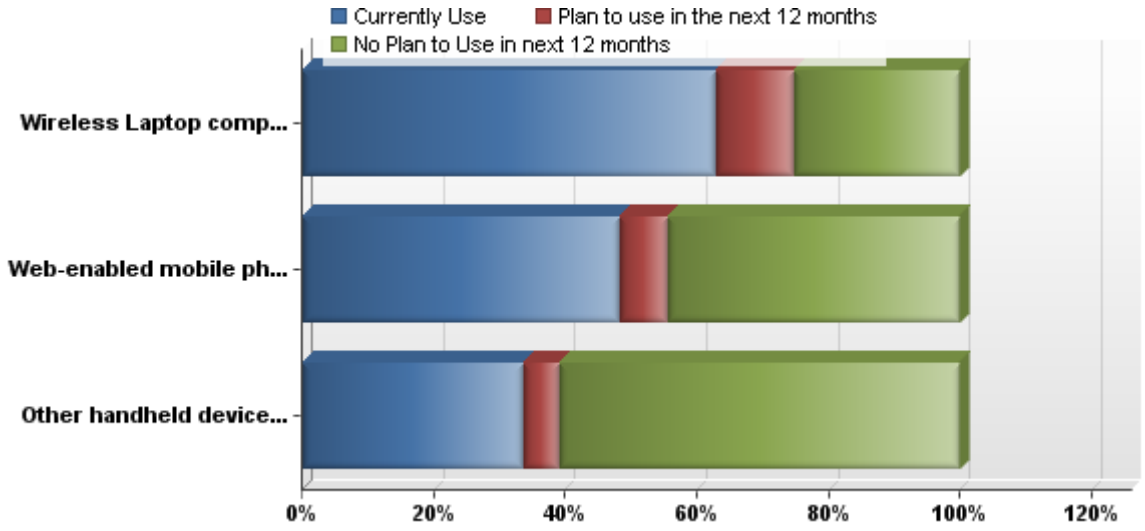
12. Frequency of Internet use.

#	Answer		Response	%
1	At least once a day		1,122	89%
2	At least once a week (but not every day)		111	9%
3	At least once a month (but not every week)		13	1%
4	Less than once a month		13	1%
	Total		1,259	100%

13. Time using the Internet of any type.

#	Answer		Response	%
1	less than 1 yr		14	1%
2	1 yr up to 2 yrs		34	3%
3	2 yrs up to 3 yrs		43	3%
4	3 yrs up to 4 yrs		49	4%
5	4 yrs up to 5 yrs		61	5%
6	more than 5 yrs		1,057	84%
	Total		1,258	100%

14. Use of mobile web-enabled devices.

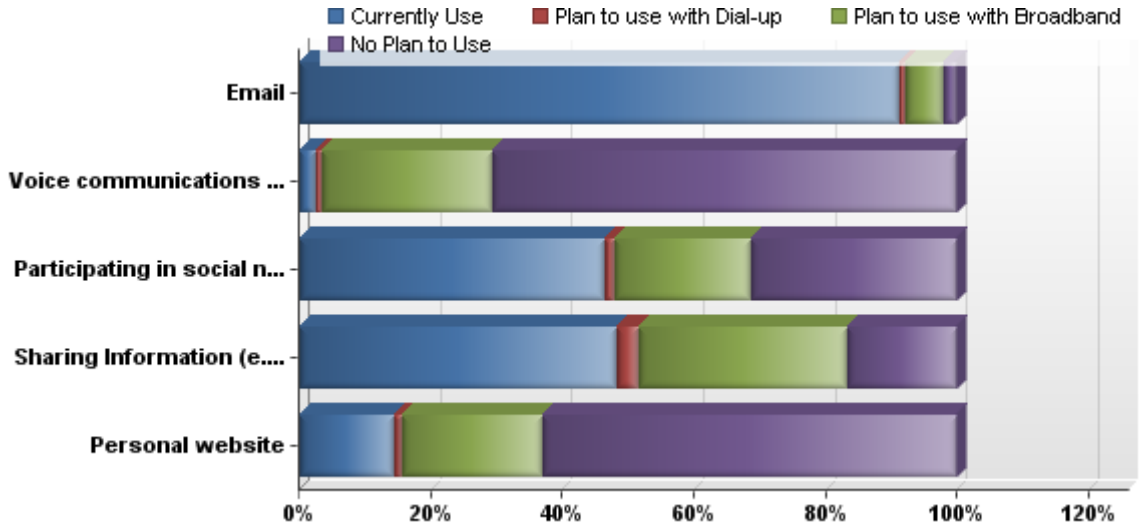


#	Wireless Device	Currently Use	Plan to use in the next 12 months	No Plan to Use in next 12 months	Responses
1	Wireless Laptop computers	62.6%	11.9%	25.5%	1,137
2	Web-enabled mobile phones	48.1%	7.2%	44.7%	984
3	Other handheld devices	33.6%	5.5%	60.9%	852

15. Importance of mobile web functions.

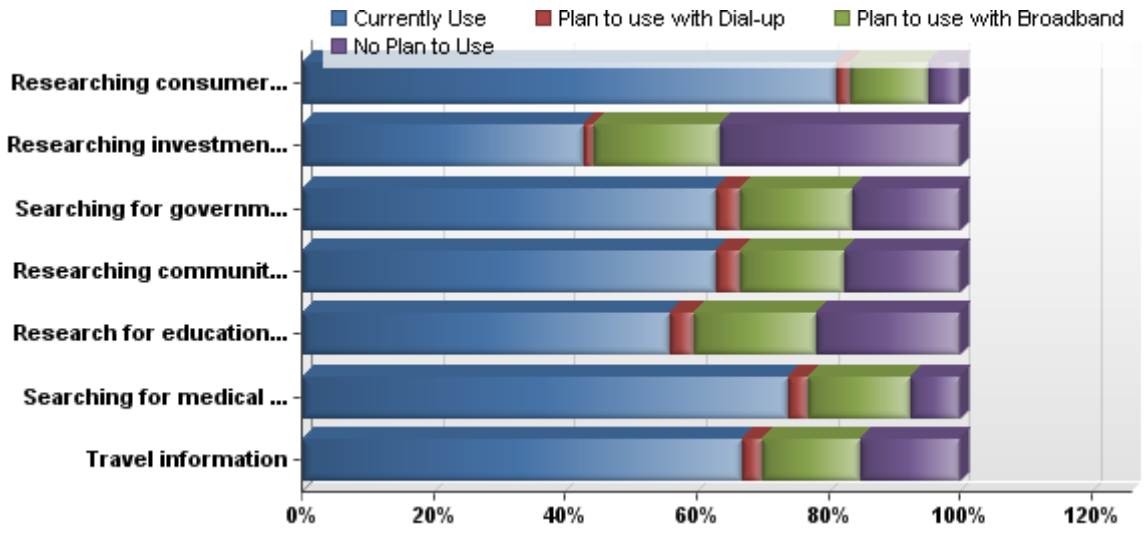
#	Answer		Response	%
1	Essential		251	20%
2	Very Important		293	23%
3	Somewhat Important		335	27%
4	Not Important		379	30%
	Total		1,258	100%

16. Uses of Dial-up Internet for communicating online.



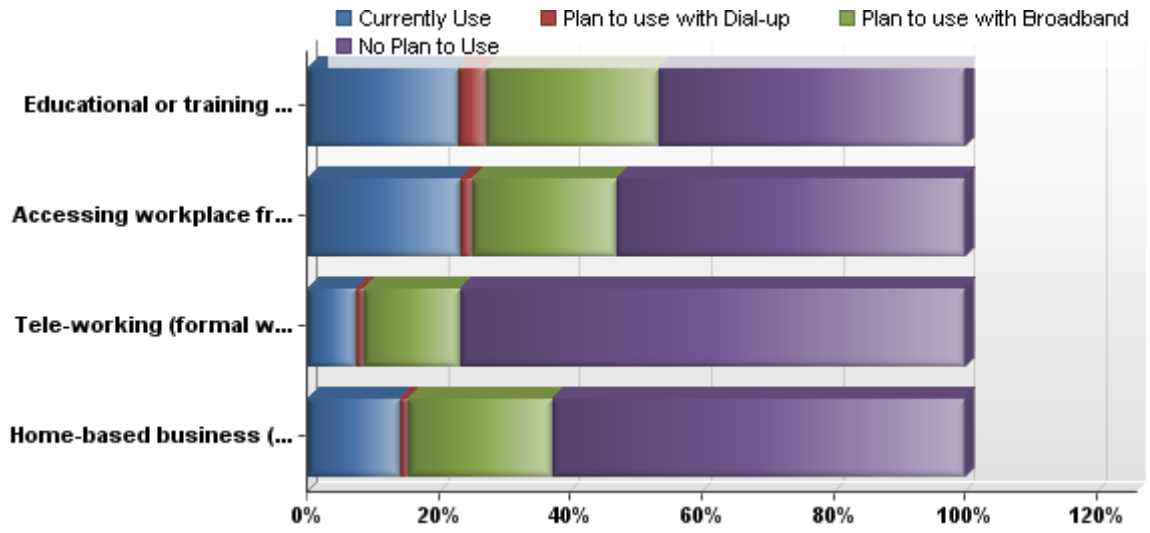
#	Communication Uses	Currently Use	Plan to use with Dial-up	Plan to use with Broadband	No Plan to Use	Responses
1	Email	91.2%	0.8%	5.9%	2.1%	239
2	Voice communications (VoIP using the computer or VoIP phone)	2.5%	0.8%	25.9%	70.7%	239
3	Participating in social networks, chat groups or instant messenger	46.4%	1.3%	20.9%	31.4%	239
4	Sharing Information (e.g. photos, videos, personal blogs)	48.1%	3.3%	31.8%	16.7%	239
5	Personal website	14.2%	1.3%	21.3%	63.2%	239

17. Use of Dial-up Internet for research and information.



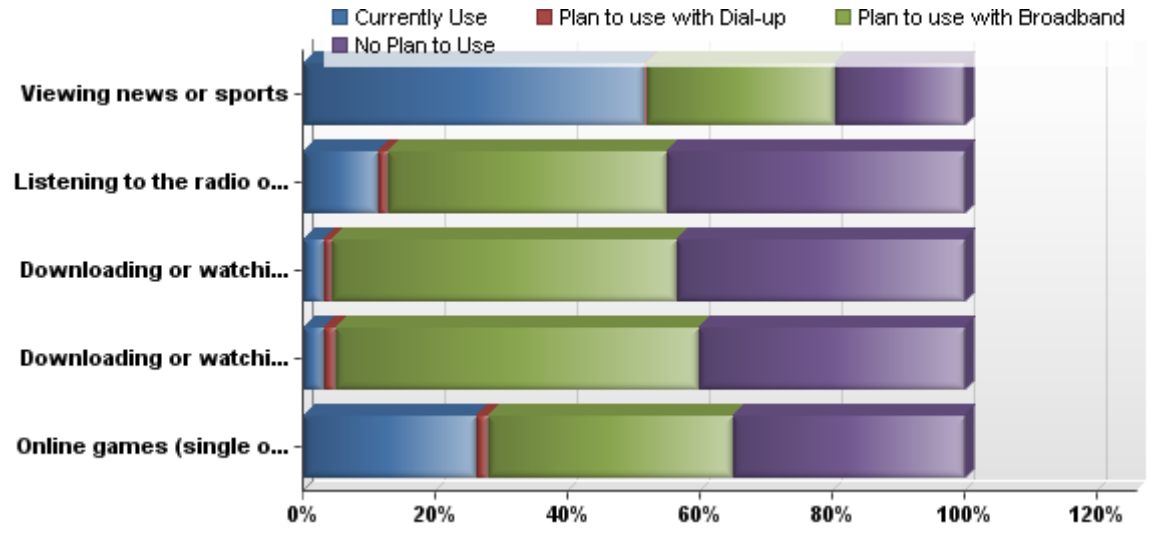
#	Research and Information Uses	Currently Use	Plan to use with Dial-up	Plan to use with Broadband	No Plan to Use	Responses
1	Researching consumer goods and services (re.g. product information, comparing products, etc.)	81.0%	2.1%	11.8%	5.1%	237
2	Researching investments (financial, real estate, etc.)	42.6%	1.7%	19.0%	36.7%	237
3	Searching for government information and services	62.9%	3.4%	17.3%	16.5%	237
4	Researching community events	62.9%	3.4%	16.0%	17.7%	237
5	Research for education, training or school work	55.7%	3.8%	18.6%	21.9%	237
6	Searching for medical or health related information	73.8%	3.0%	15.6%	7.6%	237
7	Travel information	66.7%	3.0%	15.2%	15.2%	237

18. Use of Dial-up Internet for personal productivity.



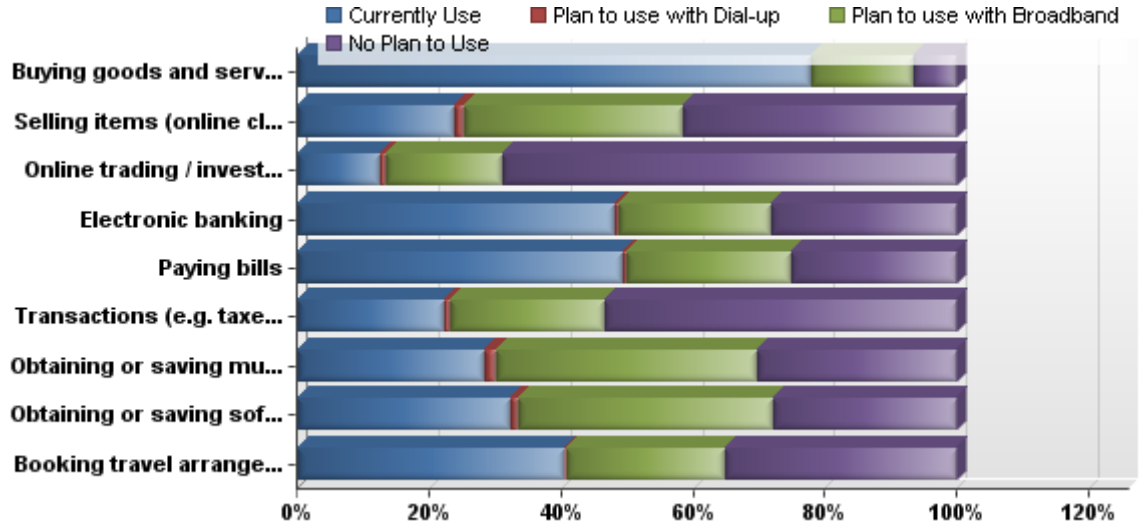
#	Personal Productivity Uses	Currently Use	Plan to use with Dial-up	Plan to use with Broadband	No Plan to Use	Responses
1	Educational or training courses (remote learning or supplemental courses from home)	22.8%	4.2%	26.2%	46.8%	237
2	Accessing workplace from home (occasional use)	23.2%	1.7%	21.9%	53.2%	237
3	Tele-working (formal workplace all or part of normal work hours)	7.2%	1.3%	14.8%	76.8%	237
4	Home-based business (full-time or part-time)	13.9%	1.3%	21.9%	62.9%	237

19. Use of Dial-up Internet for entertainment and recreation.



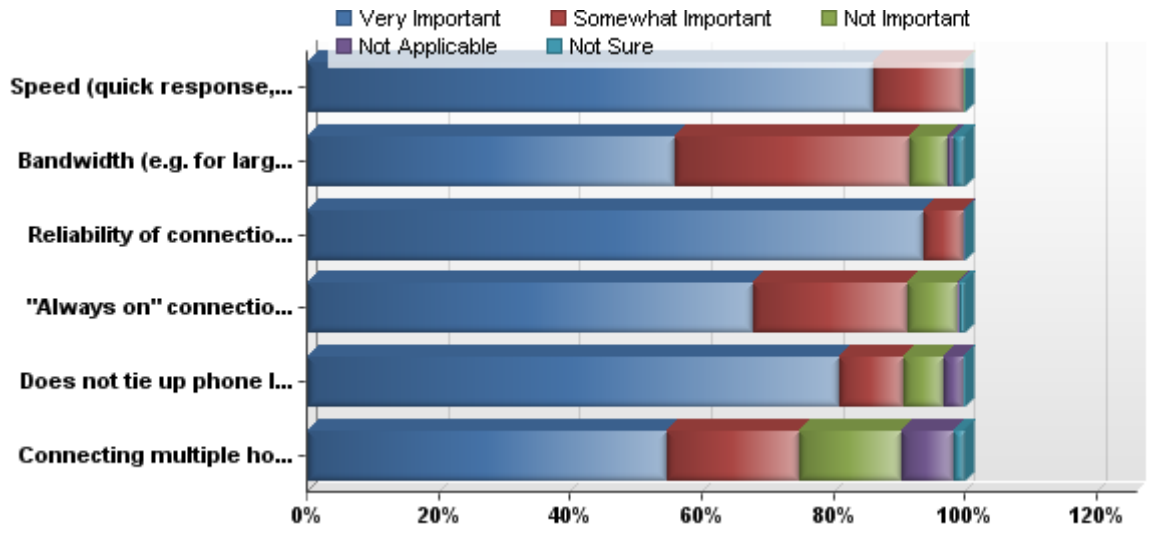
#	Entertainment Uses	Currently Use	Plan to use with Dial-up	Plan to use with Broadband	No Plan to Use	Responses
1	Viewing news or sports	51.5%	0.4%	28.3%	19.7%	233
2	Listening to the radio over the Internet	11.2%	1.7%	42.1%	45.1%	233
3	Downloading or watching television	3.0%	1.3%	51.9%	43.8%	233
4	Downloading or watching a movie	3.0%	1.7%	54.9%	40.3%	233
5	Online games (single or multiplayer)	26.2%	1.7%	36.9%	35.2%	233

20. Use of Dial-up Internet for online transactions.



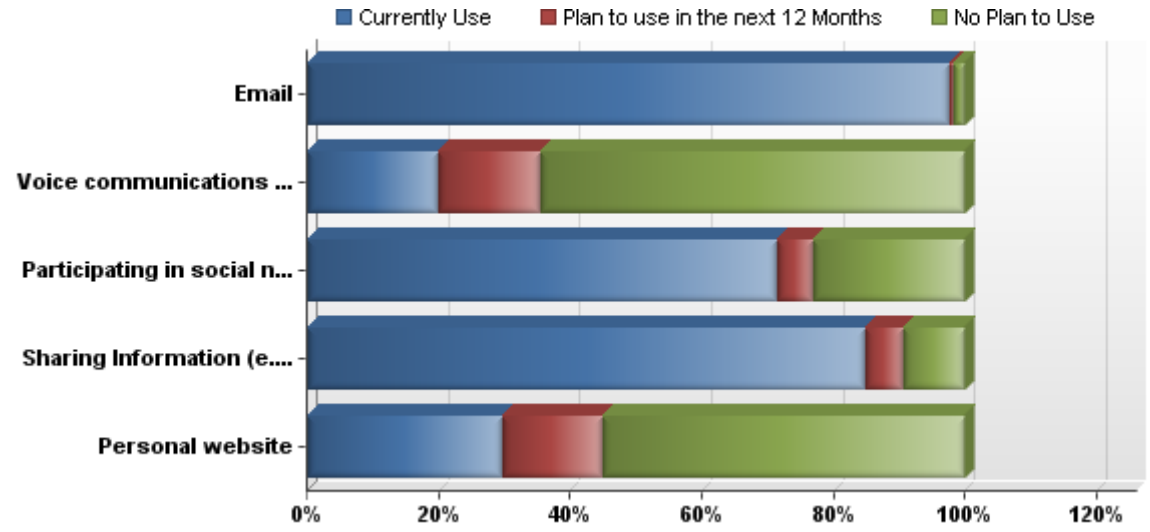
#	Online Transaction Uses	Currently Use	Plan to use with Dial-up	Plan to use with Broadband	No Plan to Use	Responses
1	Buying goods and services online	77.7%	0.0%	15.5%	6.9%	233
2	Selling items (online classified ads, auctions, etc.)	23.6%	1.7%	33.0%	41.6%	233
3	Online trading / investment management	12.4%	0.9%	17.6%	69.1%	233
4	Electronic banking	48.1%	0.4%	23.2%	28.3%	233
5	Paying bills	49.4%	0.4%	24.9%	25.3%	233
6	Transactions (e.g. taxes, licenses) with government agencies	22.3%	0.9%	23.2%	53.6%	233
7	Obtaining or saving music	28.3%	1.7%	39.5%	30.5%	233
8	Obtaining or saving software	32.2%	1.3%	38.6%	27.9%	233
9	Booking travel arrangements	40.3%	0.4%	24.0%	35.2%	233

21. Importance of broadband features for household.



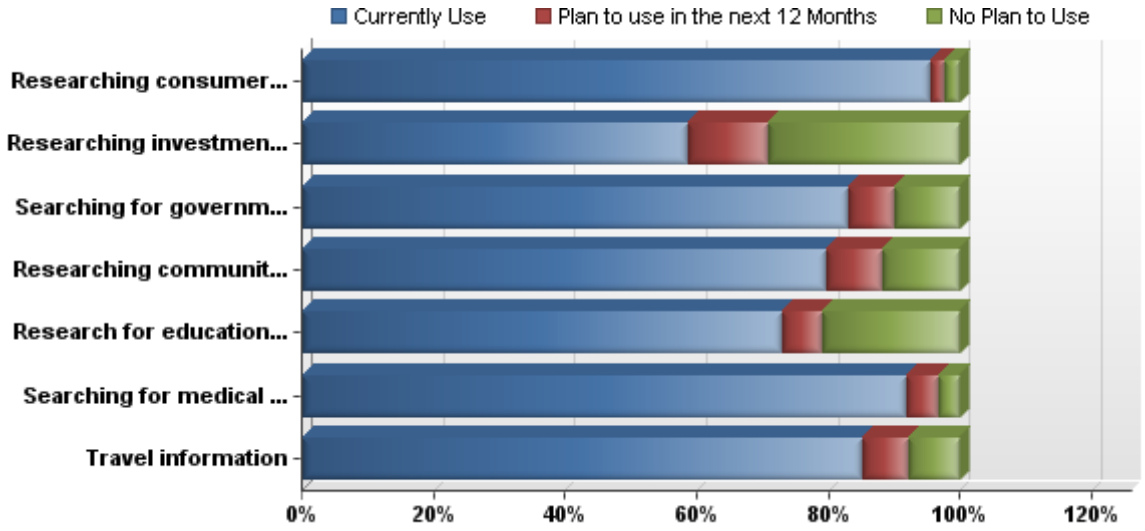
#	Broadband Features	Very Important	Somewhat Important	Not Important	Not Applicable	Not Sure	Responses
1	Speed (quick response, less waiting)	85.8%	13.9%	0.1%	0.1%	0.2%	1,212
2	Bandwidth (e.g. for large files or videos)	55.9%	35.6%	5.8%	0.8%	1.9%	1,212
3	Reliability of connection	93.6%	5.9%	0.1%	0.1%	0.2%	1,212
4	"Always on" connection	67.7%	23.4%	7.5%	0.4%	0.9%	1,212
5	Does not tie up phone line	80.7%	9.7%	6.3%	2.9%	0.4%	1,212
6	Connecting multiple household computers	54.6%	19.9%	15.8%	7.7%	2.1%	1,212

22. Use of broadband Internet for communicating online.



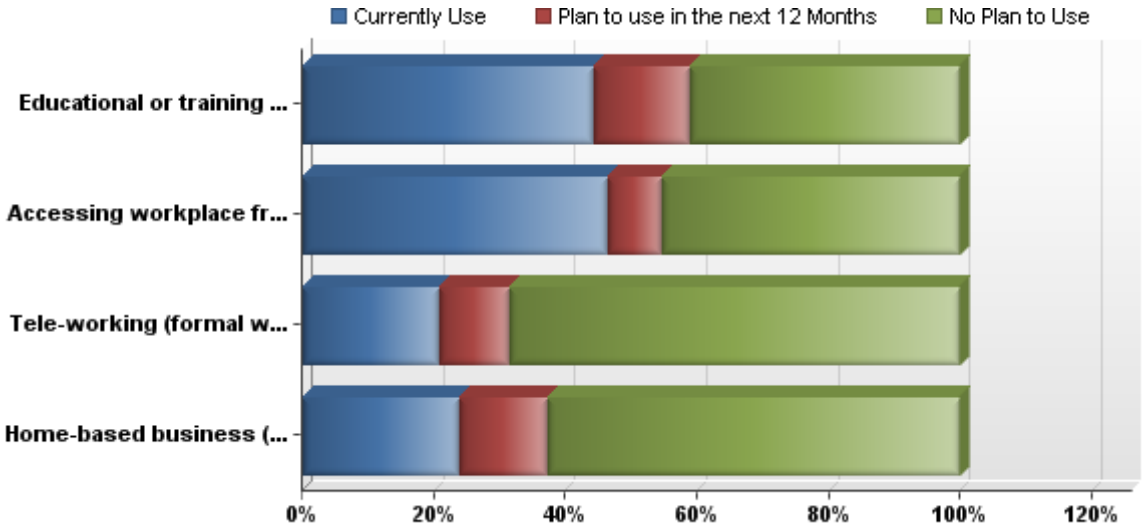
#	Communication Uses	Currently Use	Plan to use in the next 12 Months	No Plan to Use	Responses
1	Email	97.4%	0.6%	2.0%	1,010
2	Voice communications (VoIP using the computer or VoIP phone)	19.8%	15.4%	64.8%	1,010
3	Participating in social networks, chat groups or instant messenger	71.3%	5.3%	23.4%	1,010
4	Sharing Information (e.g. photos, videos, personal blogs)	84.8%	5.8%	9.4%	1,010
5	Personal website	29.6%	15.0%	55.3%	1,010

23. Use of broadband Internet for research and information.



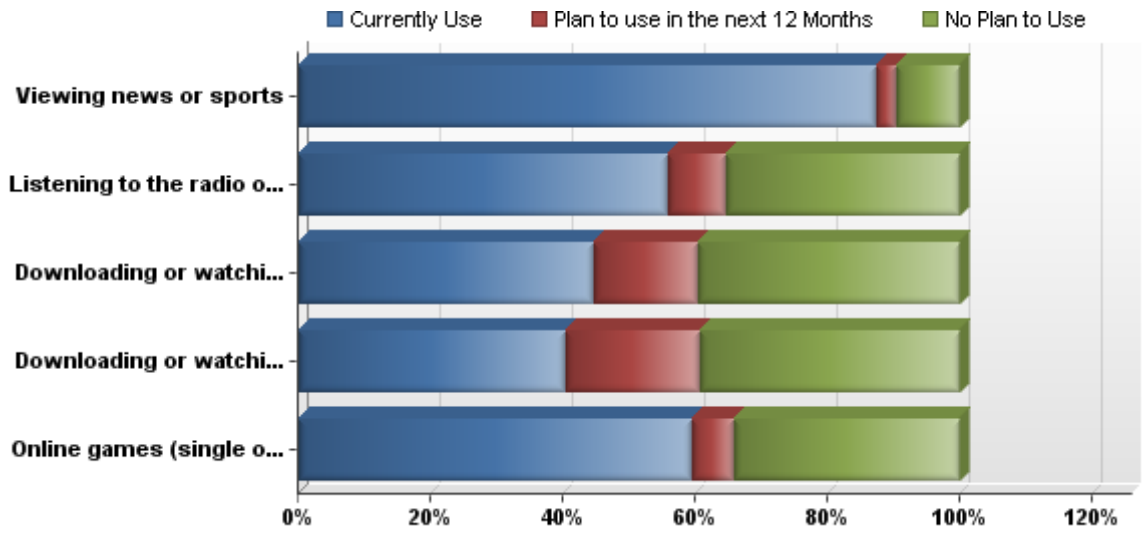
#	Research and Information Uses	Currently Use	Plan to use in the next 12 Months	No Plan to Use	Responses
1	Researching consumer goods and services (re.g. product information, comparing products, etc.)	95.2%	2.2%	2.6%	1,003
2	Researching investments (financial, real estate, etc.)	58.6%	12.1%	29.3%	1,003
3	Searching for government information and services	82.9%	7.0%	10.2%	1,003
4	Researching community events	79.6%	8.5%	12.0%	1,003
5	Research for education, training or school work	72.9%	6.0%	21.1%	1,003
6	Searching for medical or health related information	91.6%	4.9%	3.5%	1,003
7	Travel information	84.8%	7.1%	8.1%	1,003

24. Use of broadband Internet for increasing personal productivity.



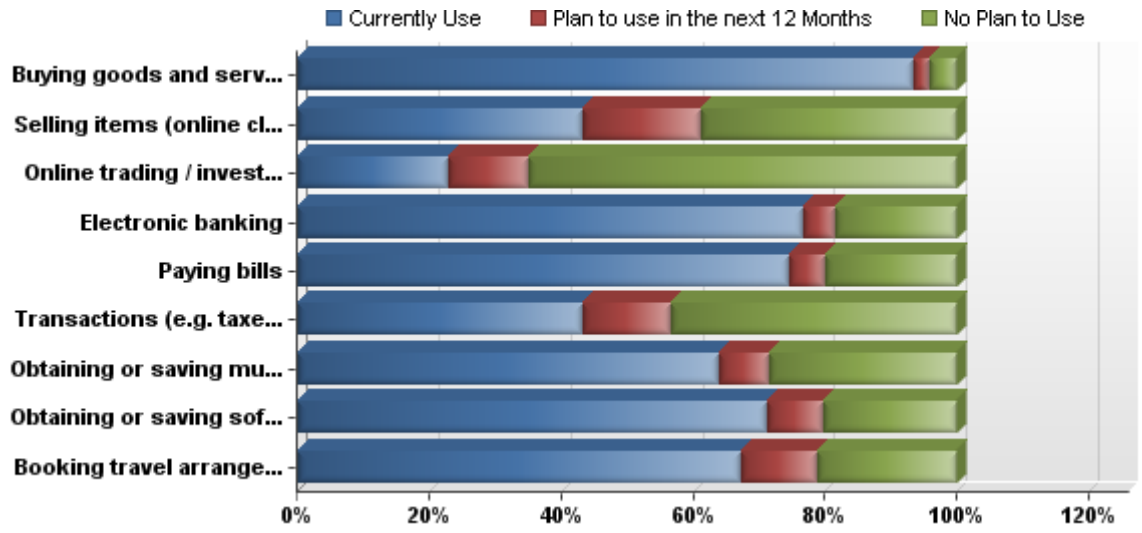
#	Personal Productivity Uses	Currently Use	Plan to use in the next 12 Months	No Plan to Use	Responses
1	Educational or training courses (remote learning or supplemental courses from home)	44.2%	14.8%	41.1%	1,003
2	Accessing workplace from home (occasional use)	46.2%	8.5%	45.4%	1,003
3	Tele-working (formal workplace all or part of normal work hours)	20.6%	10.7%	68.7%	1,003
4	Home-based business (full-time or part-time)	23.8%	13.3%	62.9%	1,003

25. Use of broadband Internet for entertainment and recreation.



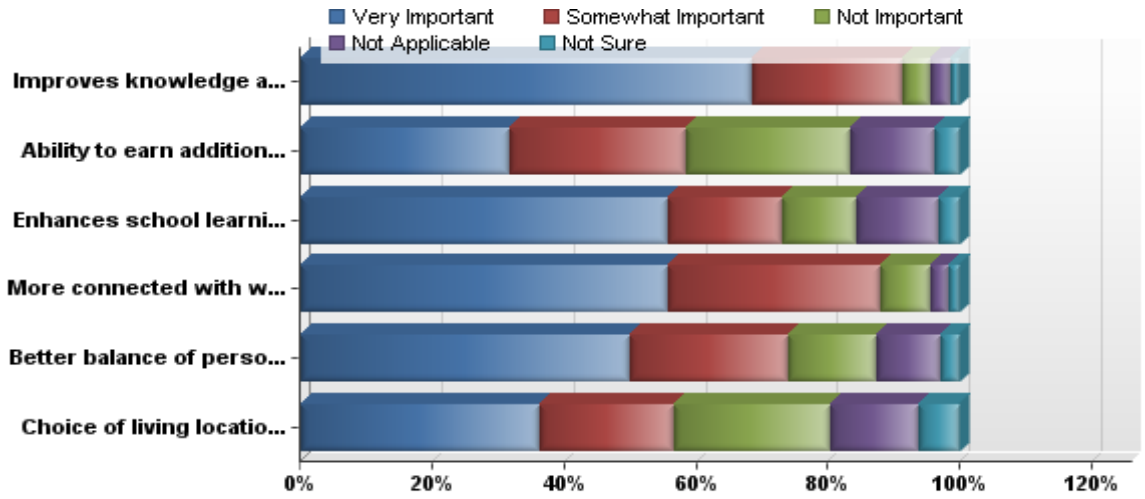
#	Entertainment Uses	Currently Use	Plan to use in the next 12 Months	No Plan to Use	Responses
1	Viewing news or sports	87.3%	2.9%	9.8%	1,000
2	Listening to the radio over the Internet	55.7%	8.7%	35.6%	1,000
3	Downloading or watching television	44.4%	16.0%	39.6%	1,000
4	Downloading or watching a movie	40.4%	20.2%	39.4%	1,000
5	Online games (single or multiplayer)	59.5%	6.2%	34.3%	1,000

26. Use of broadband Internet for online transactions.



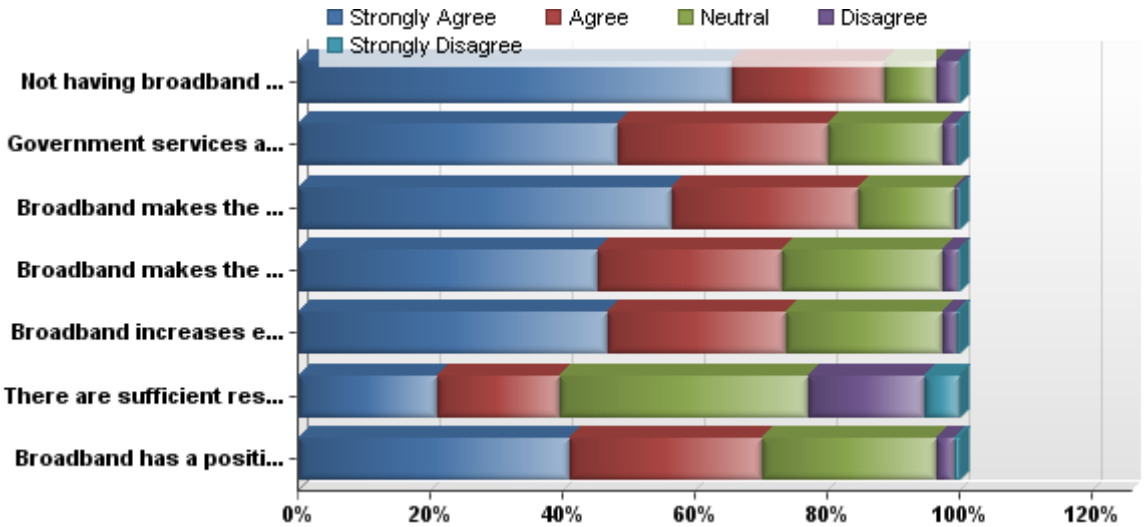
#	Online Transaction Uses	Currently Use	Plan to use in the next 12 Months	No Plan to Use	Responses
1	Buying goods and services online	93.2%	2.5%	4.3%	1,000
2	Selling items (online classified ads, auctions, etc.)	43.0%	18.1%	38.9%	1,000
3	Online trading / investment management	22.7%	12.3%	65.0%	1,000
4	Electronic banking	76.5%	5.0%	18.5%	1,000
5	Paying bills	74.5%	5.5%	20.0%	1,000
6	Transactions (e.g. taxes, licenses) with government agencies	43.2%	13.4%	43.4%	1,000
7	Obtaining or saving music	63.9%	7.5%	28.6%	1,000
8	Obtaining or saving software	71.1%	8.5%	20.4%	1,000
9	Booking travel arrangements	67.1%	11.5%	21.4%	1,000

27. Household lifestyle benefits of Internet.



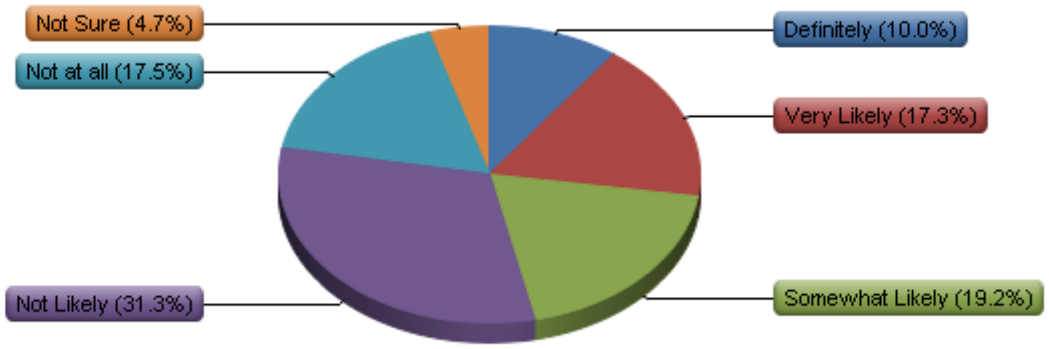
#	Lifestyle Benefits	Very Important	Somewhat Important	Not Important	Not Applicable	Not Sure	Responses
1	Improves knowledge and skills (through online education and/or research)	68.3%	22.7%	4.3%	3.0%	1.6%	1,231
2	Ability to earn additional income	31.5%	26.9%	24.8%	12.8%	4.0%	1,231
3	Enhances school learning (through research and study)	55.5%	17.4%	11.3%	12.6%	3.2%	1,231
4	More connected with what is happening in the community	55.6%	32.2%	7.7%	2.7%	1.9%	1,231
5	Better balance of personal and work time	49.7%	24.2%	13.2%	9.7%	3.2%	1,231
6	Choice of living location (e.g. for selecting or remaining in community)	36.1%	20.4%	23.7%	13.2%	6.6%	1,231

28. Broadband impacts on household and community.



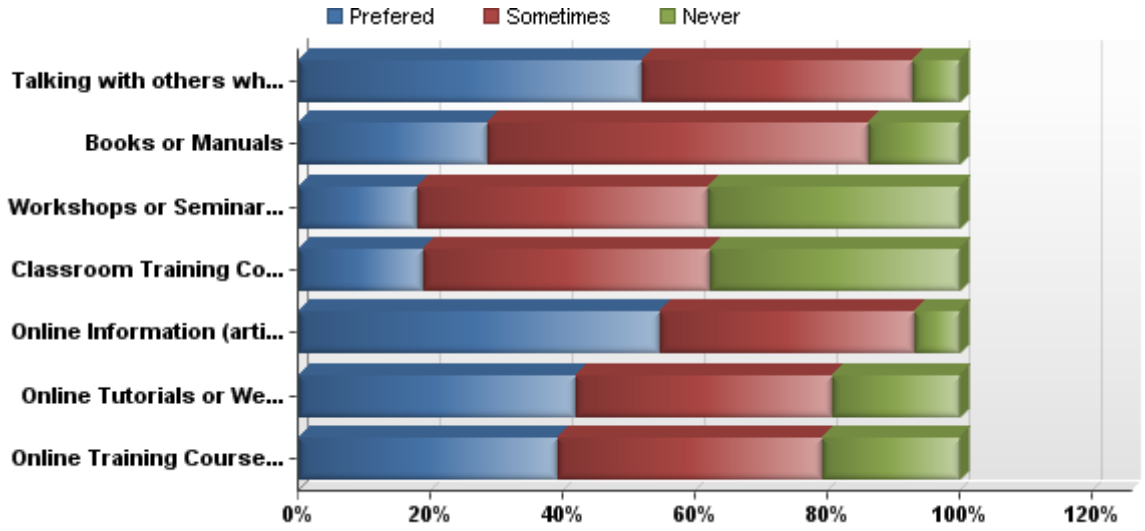
#	Household and Community Impacts	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Responses
1	Not having broadband would have a negative impact on my lifestyle.	65.4%	22.9%	8.1%	3.2%	0.4%	1,192
2	Government services are more accessible due to broadband.	48.3%	31.8%	17.1%	2.0%	0.8%	1,192
3	Broadband makes the education opportunities in my community better.	56.5%	28.0%	14.7%	0.6%	0.3%	1,192
4	Broadband makes the health services in my community better.	45.1%	27.9%	24.3%	2.3%	0.3%	1,192
5	Broadband increases employment opportunities for my community.	46.7%	26.9%	23.7%	2.2%	0.5%	1,192
6	There are sufficient resources in my community for learning how to get the most from broadband.	20.8%	18.7%	37.5%	17.4%	5.5%	1,192
7	Broadband has a positive effect on the economy of my community	40.8%	29.3%	26.2%	2.9%	0.8%	1,192

29. Assuming broadband service not available, likelihood to relocate to a community that offers broadband.



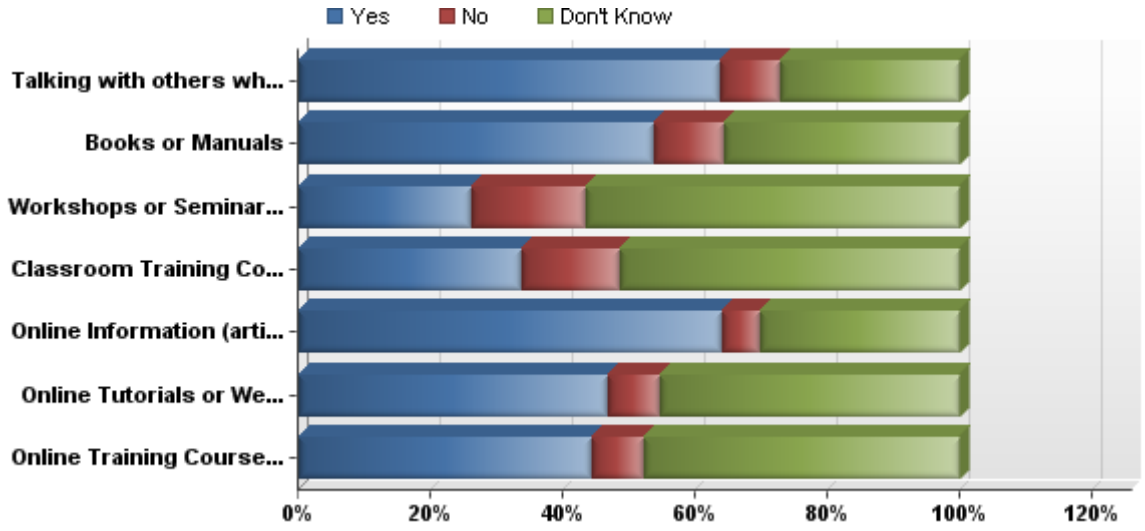
#	Answer		Response	%
1	Definitely		123	10%
2	Very Likely		212	17%
3	Somewhat Likely		235	19%
4	Not Likely		383	31%
5	Not at all		214	17%
6	Not Sure		57	5%
	Total		1,224	100%

30. Preferred methods of learning about using broadband.



#	Learning Mathods	Preferred	Sometimes	Never	Responses
1	Talking with others who have experience	51.8%	40.9%	7.3%	1,124
2	Books or Manuals	28.4%	57.6%	14.0%	1,125
3	Workshops or Seminars	18.0%	43.9%	38.1%	1,111
4	Classroom Training Courses	18.9%	43.1%	38.0%	1,111
5	Online Information (articles, FAQs, etc)	54.6%	38.4%	7.0%	1,120
6	Online Tutorials or Webinars	41.9%	38.7%	19.4%	1,115
7	Online Training Courses	39.0%	40.0%	21.0%	1,110

31. Availability of resources to learn about using broadband.



#	Availability of Learning Resources	Yes	No	Don't Know	Responses
1	Talking with others who have experience	63.5%	9.3%	27.2%	957
2	Books or Manuals	53.6%	10.5%	35.9%	951
3	Workshops or Seminars	26.0%	17.4%	56.7%	944
4	Classroom Training Courses	33.6%	14.9%	51.5%	946
5	Online Information (articles, FAQs, etc)	64.0%	5.6%	30.4%	945
6	Online Tutorials or Webinars	46.8%	7.7%	45.5%	957
7	Online Training Courses	44.3%	7.9%	47.8%	950

32. Annual household income.

#	Household Income		Response	%
1	More than $100,000		142	12%
2	$50,000 to $100,000		403	33%
3	$30,000 to $49,999		258	21%
4	$20,000 to $29,999		121	10%
5	$10,000 to $19,999		72	6%
6	Less than $10,000		32	3%
7	Prefer not to respond		185	15%
	Total		1,213	100%

33. Employment status.

#	Employment Status		Response	%
1	Employed Full-time		577	48%
2	Employed Part-time		54	4%
3	Self-employed		92	8%
4	Not employed		92	8%
5	Student		27	2%
6	Retired		301	25%
7	Prefer not to respond		70	6%
	Total		1,213	100%

34. County Distribution

County	Total	County	Total	County	Total
Adair	8	Greenup	9	Mercer	14
Allen	25	Hancock	6	Metcalfe	16
Anderson	7	Hardin	29	Monroe	13
Ballard	18	Harlan	6	Montgomery	7
Barren	14	Harrison	8	Muhlenberg	13

Bath	3	Hart	19	Nelson	16
Boone	33	Henderson	11	Nicholas	6
Bourbon	4	Henry	9	Ohio	13
Boyd	5	Hopkins	18	Oldham	14
Boyle	9	Jackson	4	Owen	18
Bracken	4	Jefferson	54	Owsley	1
Breathitt	14	Jessamine	5	Pendleton	20
Breckinridge	14	Johnson	9	Pike	34
Bullitt	8	Kenton	14	Pulaski	21
Butler	14	Knott	9	Rockcastle	12
Calloway	15	Knox	12	Rowan	10
Campbell	14	Larue	12	Russell	24
Carlisle	4	Laurel	14	Scott	22
Carroll	6	Lawrence	6	Shelby	21
Carter	8	Lee	12	Simpson	8
Christian	10	Leslie	9	Spencer	19
Daviess	26	Letcher	29	Taylor	3
Edmonson	9	Lewis	9	Todd	12
Elliott	4	Lincoln	10	Trigg	14
Estill	6	Livingston	20	Trimble	12
Fayette	37	Logan	39	Union	10
Fleming	10	Lyon	13	Warren	30
Floyd	17	Madison	12	Webster	5
Franklin	28	Marion	4	Whitley	17
Gallatin	2	Marshall	38	Wolfe	6
Garrard	4	Martin	6	Woodford	9
Grant	16	Mason	5	[Not Tallied]	65
Graves	18	McCracken	20		
Grayson	12	Mc Lean	9		
Green	4	**Meade**	30		

35. Rural vs. Non-rural

Value	Total	%
Non-Rural	415	28.5%
Rural	1039	71.5%