THE RURAL USER’S EXPERIENCE WITH BROADBAND TECHNOLOGY IN
SIX ECONOMIC SECTORS: A PHENOMENOLOGICAL APPROACH

A Thesis in
Community and Economic Development

by
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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science

May 2008
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ABSTRACT

The Internet is a remarkable social instrument. It enables us to commune in virtual forums with people from different nations, to exchange goods without the barriers of language or distance, to provide personal and business services without time constraints, and to increase personal knowledge and community capacity by accessing online data resources. These activities are all newfound economic and social freedoms thanks to the innovation of information and communication technology (ICT).

While urban communities have several Internet delivery models to choose from, rural communities are coping with socio-economic limitations to technological deployment of the Internet. Accessibility to the Internet is hotly debated in current political discussions as catchphrases such as “digital divide” and “net neutrality” describe the disparities between those who can afford the technology and those who are digging deep into pockets to pay for substandard service.

This research seeks to explore the availability and accessibility of business-class broadband in Pennsylvanian rural communities that do not enjoy metropolitan attributes such as an abundance of Internet service providers, a variety of advanced communication infrastructures, and diversity in community actors who demand high-speed Internet services.
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This thesis is dedicated to my mom, who encouraged me to ask questions, to stand for what I believe in, and to enjoy life to the fullest. Thank you for always believing in me.
Chapter 1
What is Going on with Broadband in Rural America?

Introduction

Everett M. Rogers stated, “The social construction of a problem is both a matter of scientific expertise and of political forces.” The construction of the business-class broadband technology “problem” depends largely on which actor is framing it. Economists frame the issue as a demand side or supply side problem. The demand side issue is a suboptimal condition of access, content and utility of information and communication technology, or ICT. The resolution is to aggregate demand for the technology and the services it delivers (Baker 2001). The supply side issue is based on public service imperatives, which for a capitalist economy Malecki suggests increasing employment and developing the local economy (Malecki 1997).

Sociologists frame the problem in terms of presence and adoption. A technology’s presence in a community implies adoption. Business-class broadband’s adoption in a community is a collective action, with the technology a public good. Actors in the community field with technological expertise must collaborate to encourage the usage of ICT (Laudeman 2005) throughout the entire community. Offering ICTs as a public good would help relieve the
inconveniences of the “information poor”, encouraging a build-it-and-they-will-come method of diffusion (Green 2001).

Community and economic developers frame the issue as a new phenomenon introduced in an evolving community setting. Sustainability is paramount in rural communities, especially those that are experiencing a decline in their predominant means of economic prosperity (Brown 2003). The rural community and economic development practitioner puts her planning and community building skills to the test by addressing the broadband technology problem in rural America within the context of economic and sociological theory. This of course must be performed under the umbrella of existing local, state, and federal telecommunication regulations.

What is Business-Class Broadband?

Businesses and institutions within rural communities need Internet access at the business-class broadband level or higher. Residential-class Internet connections are not adequate for rural businesses and institutions to compete in an increasingly global economy (Alter et al. Getting connected: broadband services a key to a vibrant rural America 2007). Broadband technology can be applied in various ways based on the preferences of the user. This convergent nature of business-class broadband has the potential to transform traditional industries into valued competitors in local markets (National Research Council 2002). This is especially significant for existing communities seeking to diversify
their economic base. Business-class broadband is an advanced communication technology, also known as high-speed Internet, that is usually measured as greater than 200 Kbps upstream and downstream (Southern Rural Development Center 2006). The term “business-class broadband” delimits only a portion of the population of broadband users. Institutions such as police departments, banks, hospitals, and schools all provide community services that require always-on accessibility, redundancy in data delivery, and synchronous transfer of large data packets to manage online exchanges. Various Internet service providers market this level of broadband delivery as “business-class”. In the context of this research, broadband technology is the type of technology Internet service providers refer to as business-class broadband.

Section 706 of the U.S. Telecommunications Act of 1996 refers to advanced communications capability as “high-speed, switched broadband communications capability that enables users to originate and receive high-quality voice, data, graphics, and video communications using any technology (U.S. Department of Commerce 2002).” The FCC states that a particular communication technology is considered “advanced” if it provides a minimum of 200 Kbps from subscriber to provider one way (Grubesic and Murray 2004). The Computer Science and Telecommunications Board of the National Research Council provides a two-fold definition of broadband: an access link at the user level that meets or exceeds 1 Mbps’ worth of data for current Web content and provides sufficient performance and penetration of services to encourage development of new applications (National Research Council 2002). All of these
definitions still reflect the vexing problem of standardizing a definition for such a diverse technology. Establishing a benchmark value for bandwidth would be easier if we knew how much each economic sector is using for their daily operations.

**Who Is the Rural User?**

In 2002, the U.S. Department of Commerce released “A Nation Online: How Americans are Expanding Their Use of the Internet.” The title of the report indicates the population studied (Americans) but the body of the report does not distinguish who the user is. For example, within the executive summary, the report is described as demonstrating the growing use of information technologies across all demographic groups and geographic regions. This aggregated data is a very wide spectrum from which to infer the rural user’s experience (U.S. Department of Commerce 2002). Further, within the section on rural users, the report does not utilize a concrete definition of “rural” to warrant the claim that rural community usage of the Internet is increasing. Considering that the report was constructed from the U.S. Census Bureau’s September 2001 Current Population Survey results, we might deduce that the definition used for “rural” is the same as defined by the U.S. Census Bureau as “any territory, population or housing unit not classified as urban (Bureau 2008).” This definition does not frame the rural experience as far as the type of economy, the spatial distance
from the nearest urban locality, and the accessibility to advanced communications infrastructure.

For the report to assert that Internet use in rural households has increased at a rate of 24 percent to match usage to the national average leaves the skeptical observer to wonder, by what means is this possible? The communities used to provide examples of rural communication successes have so many technological and metropolitan advantages that it would be odd if they were not functioning with the latest advanced communication platform. For example, Wilson profiles Kearney, Nebraska as an innovative rural community, yet Kearney has 24,000 residents, a hospital, three firms with up to 650 employees each, and is the location of Kearney State College (Wilson 1992). A more detailed and nuanced definition of the rural user is pertinent to discussing the growth of Internet users in rural America.

Defining the rural user provides guidance in addressing business-class broadband and rural community and economic development issues. What has to be discerned for the purpose of this research is the perspective from which the rural user responds to the research question. In popular press and political discussion the emphasis is on the service providers and the policymakers involved in distributing broadband. This research explores the user’s experience with advanced communication technologies; namely, the regular consumers of business-class broadband within rural communities and institutions who rely on advanced communication technologies to offer services. How do consumers and institutions desire to use the technology? What services do they want to take
advantage of? How are the users framing broadband within the context of their sector experiences? These questions and more will be addressed through this research. Rural business and institutional experiences with advanced communication technology are the foci of this thesis.

**Business-Class Broadband and Rural Economic Development**

**Impact of ICT on Central Place Theory**

Central place theory explains the positioning of a given good or service in a community based on location and opportunity for profit (Larson 2006). Potential providers of goods or services consider a location within a market that generates at least a normal profit. Such providers are at a better profit advantage if they locate centrally amongst a majority of the population. A given community member living further from the good or service experiences negative externalities such as transportation, time, and personal welfare (Larson 2006) in order to access such goods and services. As the market becomes saturated with other institutions, the surrounding community is absorbed into the central place. Members of these established central places experience decreased external costs and increased conveniences. Rural communities spatially located on the fringes of established central places absorb negative externalities, impacting their local expendable income (Larson 2006). This theory explains the development of
towns and cities from villages and hamlets and the significance of these hierarchies.

Changes in population density, consumer income, transportation, and the economies of providing goods and services shift central place hierarchies (Larson 2006). The 19th century saw much migration from rural to urban areas, chiefly for work opportunities and access to new technologies (Kline 2000; Poverty 1993; Rogers 1995). Central place theory suggests that the more distant a location is from the urban core, the more economically disadvantaged it is. This assumes that information related to jobs and economic opportunities has to be gained by migrating from the disadvantaged region (Poverty 1993). Advanced communications technology puts a spin on central place theory by providing a means to bring information and economic opportunities to spatially-isolated regions via high-speed Internet connectivity. When job or other economic opportunities can be satisfied using this type of communication technology, the need to migrate to larger central places from rural communities becomes unnecessary. Per capita income and expendable income has the potential to increase per rural dweller.

The gradual dispersion of advanced communications in these localities has softened the external costs of gaining desired resources, performing exchanges, and supplying the local community with needed resources. As online commerce sites become more accessible, transportation costs on the part of the consumer significantly decrease. These online stores offer a range of goods and services, capable of providing such at a lower cost than physical competitors and increase
the market area they intend to impact (Larson 2006). The Joyners, owners of Sheri’s Book Treasures, operate a bookstore in Soldier, Iowa; a rural community located an hour from Sioux City. The Joyners created a website to promote their store on the main strip of town and to sell books from their vast collection. Although they are in a rural location, they are able to cater to customers all over the nation because of the increasingly reliable high-speed Internet service (Kilen 2006).

Granted, there are goods and services which cannot be virtually provided yet are required in rural communities. Accessibility to the Internet assures an economic advantage for rural-based businesses and institutions without disrupting the consumer’s sense of well-being in these locations. Mid-Columbia Medical Center in Oregon was able to connect its twelve satellite offices and clinics to the main hospital complex by taking advantage of the available fiber optic network in the Columbia River Gorge region. The hospital was able to create new jobs and provide more reliable services to residents of this rural area (Spellman 2005). This example is significant; with an increasingly aging population in Pennsylvania, healthcare and emergency services are pivotal to sustaining rural communities. ICT assures the rural consumer of goods and services that life-saving options are available in their area.

The stories provided above as well as other examples provided in popular media and academic articles clearly suggest that central place theory no longer applies to these regions of America now that advanced communication technology is available to residents, businesses, and institutions that thrive in
these types of communities. In fact, central places become redefined because of ICT. Rural communities that are extremely isolated from established central places become their own central place, removing the reliance on cities and larger towns for community well-being. Instead of concentrating on the differences between urban and rural communities in respect to technological opportunities, energy should be directed towards discussing how broadband technology can impact rural economic sectors and rural culture.

**Impact of ICT on Public Good Theory**

As actors in the social, economic, and political realms differ on what particulars of the broadband problem should be prioritized, another issue is how to go about creating policy to correct the broadband-related problems. Policy makers react to figures provided by national reports (Commission 2007; U.S. Congress 2007; U.S. Department of Commerce 2002), but social scientists assert that revisions to existing policy or development of new national policy has to be developed from granular data collected at the community level (National Research Council 2002; Grubesic and Murray 2004; U.S. Congress 2007). The suggestions provided by private ISPs, public agencies, small business owners, rural residents, and entrepreneurs all are valid and measurable. However, the population sample used in these reports might not reflect rural community users. An objective, robust, and practical broadband-related policy can come from reports using data that are reflective of all American communities.
The crux of the business-class broadband argument is that we are not cognizant of who in rural America does have and does not have access to the Internet, how businesses or institutions are using it, how much is it costing them to have it, how the users would like to capitalize upon it if it was business-class broadband or better, and what community attributes promote techno-economic growth. This research is designed to provide metadata needed for policy makers to take a more informed approach towards revising existing telecommunications policy. Including the views of the rural user is essential to the formulation of a national broadband strategy.

**Public Good Theory Revisited**

What a national broadband strategy implies is the recognition of broadband technology as a public good. The delivery of business-class broadband as a public good would be a public service similar to public schools, wastewater collection, and street lighting (Shaffer 2004). In theory, a public good is free from exclusion and rivalry. The benefits received from a public good outweigh its cost, thus allowing for community-wide consumption of the good as long as the chosen infrastructure can support the population (Shaffer 2004). This also suggests that local government, not private markets, would be the purveyor of the public good. Local government has to consider the delivery of the infrastructure in a manner that is not only cost-conscious for the local consumer,
but can also meet local capacity. However, the existence of the infrastructure does not guarantee growth or development (Shaffer 2004).

Shaffer mentioned that Charles M. Tiebout, in his argument on revealing the consumer's true preferences for local public goods, would rely on migration tendencies of consumers to determine whether or not a public good is worth offering (Shaffer 2004). This theory is plausible towards traditional infrastructures such as electricity or water distribution. Business-class broadband is a unique public good, in that it can be delivered in various ways; the preferred delivery model being reflective of the particular community's values. When considering business-class broadband as a public good, not only should developers and public agents consider the footloose nature of today's society, but also what type of delivery model to adopt in order to attract people, businesses, and institutions to a given community. Essentially, developers should take Tiebout’s argument a step further and consider what existing delivery models would encourage footloose migrants to settle in a particular rural community.

Instead of relying on private companies to design and implement a community advanced communication infrastructure, policy makers should consider alternatives, such as community-centric models already in place in various communities. A public, community-centric delivery model achieves a social welfare optimum, satisfying desired resources, technology, and social preferences in rural America (Shaffer 2004). Business-class broadband delivered in a community-centric infrastructure contributes to community well-being. Business-class broadband is a public good. Policy related to broadband
technology should support its provision. The provision of public goods and services is an economic means to render an optimal living environment.

The Potential for Social, Economic and Technological Exclusion

The phenomenon of business-class broadband introduces the potential for exclusion in terms of social impact, economic investment, and technological opportunity. Economically speaking, exclusion is caused primarily through pricing mechanisms which effectively remove consumers from the market for a given good or service (Shaffer 2004). The multiplicity of exchanges and reciprocity inherent in a local market system has now expanded to a global market system, thanks to the World Wide Web. A rural community without advanced communications technology is at a local and global economic disadvantage if accessibility to the technology is restricted or denied. Information about markets and prices pertinent to rural community businesses is available when strong market relations are apparent (Reimer 2004). The utility of online search engines and databases eases the complexity of researching pertinent information and greatly reduces the time frame in which such information can be reviewed (Cart 1999). Thus, a business owner in rural America can be at a competitive advantage with his urban or global counterparts as long as the technology is available at equal or greater bandwidth.

The introduction of ICT to rural communities poses several sociological challenges. The most obvious is the shift in social relations from personal
networking to online networking. As ICTs become more of the status quo, means of communicating shift from verbal, face-to-face transactions to digital, impersonal transactions (Huysman 2004). This can be especially challenging for an aging population accustomed to certain methods of community networking. While the idea is to integrate contemporary technology in rural communities in order to compete economically with other types of community, community developers and members alike struggle with the shift from face-to-face to virtual means of building community (Huysman 2004; Putnam 2000).

Maintaining local social organizations is a component of a community and economic developer’s work that is both challenged and supported by ICT. Communal and associative relations are based on shared interests formulating into a given identity for the community member (Reimer 2004). Interest in common goals and concerns are given structure using focused objectives and informal structures, leading to social organizations or groups. Member contribution and information exchange are important measures to dissuade social exclusion (Reimer 2004). Involvement in a national organization, like a particular dog breeder’s club for example, invites many at the local level to interact with each other. Having access to the national organization’s website would optimize the local dog breeder club experience by having resources, contacts, and means to communicate shared interests with fellow club members miles away (Huysman 2004). Using broadband to connect with like-minded organizations in other communities presents an opportunity to support the local organization via the Internet. Communal relations are largely maintained by
custom, assuming a high level of trust and loyalty in order to be affiliated with a
given community (Reimer 2004). ICT offers the opportunity to enhance these
relationships as new commitments can develop with the mobility and real-time
nature of ICT. Social exclusion can occur if trust and loyalty are compromised,
and ICT can be manipulated to do so.

All of the previously discussed issues lead back to the concept of freedom. Freedom is a desired state of mind. It is the progenitor of communitarian values. Restricted, it is a deterrent of human activity. Freedom restricted leads to inequity, disenfranchisement, and disillusionment within American communities (Sen 1999). Recognizing broadband technology as a public good and enacting broadband-related policies that reduce the potential for exclusion will develop newfound freedoms, especially in rural communities.

**Research Question and Objectives**

Existing research suggests that high-speed Internet access is increasingly available in rural America (Commission 2007; Kelley 2004; Schafft et al. 2006; U.S. Department of Commerce 2002; Walzer and Colavito 2005; Wilson 1992). The figures cited are from aggregated samples, using non-metropolitan areas to represent rural communities. Non-metropolitan areas are those that are relatively close to an urban center, but are not close enough and do not have the same population density per square mile to be considered metropolitan. Rural communities exist in both metropolitan and non-metropolitan areas (Alter et al.
Strengthening rural Pennsylvania: an integrated approach to a prosperous commonwealth 2007).

Existing research on the rural broadband experience tends to focus on communities in metropolitan and non-metropolitan areas with the following techno-economic attributes:

1) Existence of fiber-optic networks
2) Access to major transportation systems (i.e. interstate highways)
3) Existence of a local higher education institution
4) Existence of a major business park
5) Population size greater than 3,000 per central place (i.e. town or borough)
6) Relative closeness to a thriving metropolitan area

These communities, because of their integration of ICT into local community and economic development, can be considered globally connected. These attributes ensure that these areas are able to compete in the global economy.

The intention of this research is to focus on communities that are non-urban, non-metropolitan, and spatially isolated from major central places. By doing so, the rural broadband experience can be observed apart from globally connected communities. It is unclear where these rural communities stand relative to ICT diffusion and adoption when they are clustered in with globally connected communities in non-metropolitan or metropolitan communities. It is also unclear whether these spatially-isolated communities are just as globally connected as their counterparts when they have few or none of these attributes.
The assumption is that the more robust in metropolitan context and attributes, the more likely a spatially isolated rural community has access to business-class broadband services and thus can compete with its globally connected counterparts (Crandall 2003; Malecki 2003; Muniwireless 2004; Sullivan 2002).

**Question**

As ideal as these metropolitan attributes seem, many rural locations do not reflect these attributes nor have the existing infrastructure to provide business-class broadband. The question is to what extent do rural communities without these metropolitan attributes utilize advanced communication technology in the form of business-class broadband?

For the purpose of this research, spatially-isolated, as opposed to globally-connected, rural communities are defined in terms of the following attributes:

1) Existence of advanced communications infrastructure

2) Significant distance from a major interstate highway

3) Significant physical distance from a higher education institution

4) No business park development

5) A local population less than 3,000 people, and

6) Significant physical distance from a metropolitan area.

For this study, communities under consideration are closely aligned with the U.S. Department of Agriculture’s definition of “rural” as non-urban, non-metropolitan
communities not adjacent to a metropolitan area with less than 2,500 persons residing within its political boundaries (USDA 2006). Thus, these rural communities are moderately populated central places not located in metropolitan areas that have few or none of the metropolitan attributes discussed above.

With respect to the communities selected for research, this thesis will explore the issues of the availability, accessibility and utility (including costs) of advanced communications technology in spatially-isolated rural communities without metropolitan attributes.

**Objectives**

The specific objectives of this research are:

Objective 1: Identify the advanced communications platform in existence within the research communities and how much the system costs to install and use.

Objective 2: Identify how users in these rural communities are incorporating the existing advanced communications platform to motivate economic success within their given sector.

Objective 3: Identify how rural community ICT users envision using advanced communications in comparison to others in their sector and business partners in order to support their business.
Plan and Organization

In order to satisfy the research objectives and subsequently answer the research question, a concrete research plan is needed. The following section describes the qualitative method, introduces the way the data is presented, and presents the format of data collection that is used for this research.

Key Informant Interviews

To better understand the technological climate, economic condition and social attitudes in rural communities, key informants are interviewed, and the resulting data will be analyzed using content analysis. Using key informants as opposed to other types of informants is a reliable means of gathering information, as these individuals tend to be particularly knowledgeable of their community (Gilchrist 1999). The key informants identified for this project are valuable resources because they have pertinent leadership roles in their respective communities and they are extremely knowledgeable of the sector they represent. Finally, the varying levels of business-class broadband availability and accessibility, as well as the varying types of advanced communication technology delivery models described by these key informants, suggest opportunities for future research using this data.

The interviews were used specifically to gain an appreciation for the availability of advanced communications technology in rural communities and to understand how the informants use the existing service. The interviews reveal
the cost-effectiveness of accessing and maintaining Internet service in the region. As well, the key informants are asked to reveal how they would envision using advanced communications technology if it was locally delivered at similar or greater speed and capacity as provided in densely populated communities.

**Phenomenon Matrix**

The data collected from the interviews will be organized in a matrix. The organization of the data in this format allows us to identify patterns within and across the communities and amongst the members of each sector, if any, that explains the phenomenon of business-class broadband in rural communities (Creswell 2007). The matrix introduces different perspectives on the impact of business-class broadband in rural communities, as well as introduces different means of interpreting the data depending on the reviewer. The summary of findings will be presented in Chapter 4.

**The Interview Script**

An interview script was designed to reflect the objectives for this research. The actual question from the script is italicized below, with the rationale of the question design following for each question. Introducing this information here reflects the organization of the research process.

1. *How do you connect to the Internet in this office and how do you use it? If you don’t connect to the Internet, why?*
a. *How important do you feel the Internet is for this organization and this community? Please explain.*

These interviews are conducted in a phenomenological format. The questions are formatted so that regardless of the key informant’s current accessibility to high-speed Internet, he or she can still respond with details related to the experience of the broadband technology phenomenon. For this question, if the key informant’s high-speed Internet connection is at the business-class broadband definition or better, then the experiences they share are likely to be framed around business-class broadband. If the Internet connection the key informant uses is below what is considered business-class broadband, then the experiences they share are likely to be framed around their current accessibility to the Internet.

The potential and real experiences of the user will be revealed with these types of questions. This question satisfies all three research objectives. The technical specifications of the platform satisfy Objective 1. The description of usage in the workplace is applicable to Objective 2. The importance of the Internet to the organization and community relates to Objective 3. Even if the user does not use the Internet, the rationale for not using business-class broadband and the importance of the Internet still apply to Objective 3.

2. *Do you have a choice of providers in this community? Who are they?*

   a. *What Internet service provider does this office use?*

   b. *How much did it cost to receive the service?*
c. Did your organization receive any type of incentives to cover the costs of service?

During the second panel discussion of the U.S. Senate Small Business and Entrepreneur Committee’s September 2007 hearing on the impact of the Internet on small businesses, it was decided that a key portion of developing a national broadband strategy was to consider broadband “mapping” under the purview of the FCC. The suggestion was to take all accessed points, meaning every user that physically invokes the Internet through broadband technology, per community, and spatially present such data so that underserved and bypassed communities could be easily identified (U.S. Congress 2007). Question 2 satisfies Objective 1 of this research. The responses provided from this question could be used towards the national broadband mapping task if pursued for future research.

3. How has the Internet changed how you interact with other individuals and business partners that affect the service you provide?

   a. Within your business or organization?
   
   b. Within this community?
   
   c. How important are those connections to your daily operations?

What this question attempts to achieve is to draw the key informant to share experiences related to technological change within the workplace, and, indirectly, how the use or non-use of business-class broadband has impacted their business’ economic standing locally, regionally, and globally. The interactions between the
user and his or her coworkers, the user and the organizational culture, and the business and the community are each significant experiences that hopefully will be revealed through Question 3. Question 3 satisfies Objective 2 and sets up information relevant to Objective 3.

4. Are you aware of other related businesses or organizations using the Internet in [sector] in ways that you’re not?
   a. Are there applications or specific programs that require the Internet, that others in [sector] are using, that you would like to use? If yes, what are they? If no, why not? Are there specific barriers?

5. How do you envision business use of high-speed Internet in this community in the future?
   a. What kind of applications or programs which require the Internet do you think would positively impact local businesses and residents within this community?

The availability of the technology is one significant factor. The adoption and infusion of the technology into daily operations is another significant factor. Broadband technology has been recognized as a motivator for socio-economic success in all communities as long as local capacity for the technology is established (Association 2003; National Research Council 2002; Grubesic and Murray 2004). To do so, community and economic developers and contributors within rural communities have to build some sort of strategic initiative to incorporate broadband technology into the local economy. Questions 4 and 5
satisfy Objectives 2 and 3, respectively. The questions are designed to draw out the visioning and opportunistic experiences of the key informant. Indirectly, it may draw the user to consider what the local strategy is and how they as experts within their sector can contribute to the community’s economic plan.

These types of questions reflect the recommendations of the Computer Science and Telecommunications Board, specifically Recommendation 5, in their “Broadband: Bringing Home the Bits” report. The recommendation is to increase local capacity to promote broadband deployment, with sub-recommendations to encourage this action (National Research Council 2002). In the opening paragraph of this chapter, the community developer was described as one challenged to use her skills to merge the phenomenon of business-class broadband with the existing economic structure of the given community they service under the guidance of existing laws. To do so involves community member cooperation and technological opportunity. Question 5 may reveal the level of technological opportunity and change agency inherent in the key informant.

What to Expect

This research is unique in many aspects. One, the methodology requires primary data, simply because the data on rural user experiences with broadband technology does not exist. Two, the type of communities selected for research are strictly non-urban, non-metropolitan, and not adjacent to a metropolitan area,
thus unlikely to be categorized with their urban counterparts. This focus balances existing literature on broadband adoption in communities which reference data from urban areas. Finally, the experiences of the rural user are summarized using a phenomenon matrix that emphasizes the user experience with broadband technology. The users’ experiences will be described in themes as opposed to weighted values.

Broadband technology is often described as “ubiquitous” (Crandall 2003; Grubesic and Murray 2004; Scott 2005), but the ubiquity is in the eyes of the author. The assumption of ubiquity in existing literature encourages further exploration of this phenomenon. It is crucial for community and economic developers to understand the means by which advanced communications technology, in the form of business-class broadband, can impact rural community sustainability. Further, the delivery of such technology seems inevitable, as more focus is projected on revising existing telecommunications policy at the regional and national level.

The justification of this research will be explored in Chapter 2. Parallels to previous national deployment of communication technology in the form of the telephone will be provided to show how current broadband deployment seems to mimic the social, economic, technological, and political arguments related to telephone deployment. Policy implications will be explored in Chapter 2 as well. Finally, the relationship between information and communication technology and the community and economic developer will be explored.
The methodology of this research is qualitative and relevant to answering the research question presented. Using a phenomenological approach to data collection is an ideal means to understand the user’s experience with business-class broadband within rural businesses and institutions. The phases of this type of methodology will be further described in Chapter 3. Phenomenology is valued for its concentration on describing the essence of a phenomenon - for this research, business-class broadband - from the perspectives of the key informants (Creswell 2007). Chapter 3 will also provide a detailed socio-economic profile with technological references of each community to be visited for data collection. The criteria used to select these communities came from existing literature related to broadband adoption and successes in rural communities. Using the definition of rural ascribed to for this research, the communities selected represent the least likely to have options in advanced communications technology. These communities are individually unique; yet do have the commonality of a natural resource history, a European ancestry, and significant spatial isolation relative to existing urban counties in Pennsylvania. How the key informants were selected will be described as well, for the type of informant impacts the type of data to be collected (Creswell 2007). Finally, the justification for the design of the interview script is provided in Chapter 3 to support the methodology chosen for this research.

Chapter 4 will present the findings of this research. A qualitative analysis of the rural user’s experience will be provided. The data provided from key informants by sector, by community is set in a phenomenon matrix to
demonstrate tendencies, commonalities and deviations presented from each sector, each community. Structuring the data analysis in this format gives an overall glimpse into the rural user’s experience with broadband technology in the user’s own words and with no weight assigned to each theme provided. This granular data contributes to current discussions on rural community sustainability, technological opportunity, and developing a national broadband strategy.

Chapter 5, the conclusion, will provide inferences based on research findings. Implications related to community development, economic sustainability, technological opportunity and political debate will also be generalized here, based on the structure of the phenomenon matrix presented in Chapter 4. The answer to our research question will be clearly stated in Chapter 5, complemented by suggestions for future research. Questions that developed from the research experience will also be presented for consideration.

**POTS and PANS**

In order to understand why this technology is of such significance in Rural America, we have to look into past experiences with technological innovation. As well, we have to consider how communities, their governments, and the federal government collaborated on (or argued about) communication technology deployment. No one technology parallels today’s experience with broadband technology more than the telephone. Delivering the Plain Old Telephone System
(POTS) to rural America was a territorial challenge, a societal phenomenon and an economic profit-turner (Kline 2000). America is now facing the challenges of delivering PANS* (Pretty Awesome New Stuff) now that the POTS are nationally available.

* Acronym described by witness in September 2007 Senate SB&E hearing
Chapter 2

512 Kbps is Not Enough

It is because of the lack of information from rural communities that we are motivated to address the research question, to explore the answer via the designed objectives, and consider the implications of our findings to the overarching question of, “what is going on with broadband in Rural America?” What does the institutional user’s experience with broadband technology mean for the Commonwealth of Pennsylvania and the rest of the nation? Does the current definition of broadband by FCC standards satisfy the ICT criteria needed by existing economic sectors in rural communities? What do “quality”, “always-on”, “redundancy” and “affordability” mean? How, by asking about a user’s vision for the technology, are we certain that the person has fully grasped the dynamics of this technology? Without community-level data to reference, answers to these questions are difficult to offer.

The Social Construction of ICT

Historical Relevance: The Telephone

Rural America has always been on the receiving end of technological innovation. The urban center, then as is now, served as the locale for research, development, and invention as all the necessary facilities and resources were
located there (Kline 2000). As an innovation grew in urban popularity (and arguably, financial profitability), the phenomena would be diffused into exurban areas and slowly introduced into isolated, rural areas (Rogers Chapter 2: A history of diffusion research - rural sociology 1995). Even then, the only members of rural communities that took advantage of the technological phenomenon were able to afford the thing as a luxury item. The telephone is such an example.

During the initial delivery of telephone lines to rural America, a socio-economic divide developed between the providers of telephony and members of the rural community that desired having access to the telephone system (Kline 2000). Because the technology’s popularity was market-driven, the private companies that provided telephony were able to charge exorbitant prices and service fees. Although the technology was useful, it was not affordable, causing rural community members to opt for lower quality structures.

Rural communities saw enough value in the technology beyond costs to want to domesticate it. Domestication is a term often correlated with wild animals. Elements of the same procession from an unbridled to harnessed state is applicable to ICT. In this sense, the technology is converted to complement the needs of the people or groups who sustain it, resulting in predictable, reliable service (Green Chapter 3: Domestication of technologies 2001). Rural dwellers were creative in their efforts to domesticate telephone technology, with two significant outcomes. One was collaborative investment in telephone lines with other local farmers, stringing their own lines along pasture fences and connecting
each farm in the community without private intervention. The other was the party line, developed from a single phone line purchased from a private company by one rural family ingeniously spliced to allow the rest of the community to share the same telephone line for one price (Kline 2000).

Only when the telephone was adopted and customized for the rural environment did private companies reconsider their approach. The customization of the telephone into a community-oriented tool sparked federal government interest. The technology had morphed from a market-driven luxury to a socially-driven public good. Once the technology was identified as a public good, government found a means to universally deliver the telephone to those that had been disenfranchised, be it by establishing de facto monopolies or offering subsidies to disadvantaged regions (Ingebretsen 2001). The Rural Utility Service under the Rural Electrification Act of 1936 and the Universal Service Fund under the Communications Act of 1934 were two government programs developed in recognition of the national socio-economic impact of communication technology due to the tenacity of rural community dwellers (Kline 2000).

**Present Day Parallels to the Telephone**

The business-class broadband technology experience in rural America closely parallels the adoption of the telephone in rural America decades before, specifically in terms of socialization, political viewpoints, and economic
consequences. Creative means to domesticate the technology for rural region usage are evident with the gorge-spanning lines of The Dalles, Oregon (Spellman 2005) or the wireless satellite network of Coffman Cove, Alaska (PRNewswire-FirstCall 2003). Both the FCC and the USDA have developed programs that cater to rural communities seeking broadband connectivity (Commission 2007). Yet, the overarching policy for business-class broadband in rural communities, the Telecommunications Act of 1996, prioritizes the duopoly of private telephone and cable providers over community-centric distribution models and provides subsidies for schools, libraries and health care providers only. Although the FCC recognizes the socio-economic impact of broadband technology (U.S. Congress 2007), the penetration and socio-economic importance of the advanced communication technology is not apparent enough to have it deemed a public good.

Lack of broadband accessibility in rural regions is attributed to high per capita costs, low return on investment (Malecki 2003), limited capabilities on the part of telecommunications or Internet service providers (ISPs), and a perceived disinterest on the part of rural residents in modernization (Schafft 2006; Wood 2000). These same resources reveal that the lack of accessibility in rural regions has much to do with socio-economic advantages and disadvantages that become apparent when new communication technologies are introduced in these regions. Universal access to broadband technology was proposed to be completed in 2007 according to the Bush Administration, but progress has halted in rural communities (U.S. Congress 2007). Other imperatives were focused on, reducing
universal broadband from a priority to just a goal. Valuable funds originally dedicated to the universal broadband imperative were allocated elsewhere.

**ICT in Rural Areas**

Individuals and entities within communities adopt ICT based on their interpretation of the usefulness of the technology. The adoption of advanced communications technology nationwide is increasingly socially oriented (Horrigan 2007), which challenges the structural capacity of existing communication systems. By socially oriented, it means that ICT has become relied upon more as a communications and collaboration tool. ICT can be delivered in many formats, but the fundamental requirements for ICT infrastructure are electrical power, disposable income, and a dry environment (Green Chapter 6. The public interest and the information divide 2001). These fundamental requirements, along with the social orientation toward the technology, can be found in rural communities. They merely need to be employed in the fashion necessary for high-speed Internet.

The report, “On Hold: Telecommunications in Rural America” claimed that rural communities have certain economic structures which dissuade technological innovation. Communities that have dial-up connections should be considered advanced, and “even slightly dated capabilities are better than none at all (Wood 2000).” Statements like these suggest an investment in rural broadband connectivity would not be economically feasible.
ICT Enhances Community Diversity

As citizens continue to create innovative ways to compete in the global economy, discussions about technological opportunities with business-class broadband in rural communities should increase. The question asked is not “is there a value to broadband?” because a value has already been determined by its existence; we would not have this advanced communication technology otherwise. The discussion, therefore, is more how this technology allows individuals in underserved regions of America to maximize community capacity, with communication options, and to sustain a culturally defined great quality of life with or without its presence. Broadband can unite communities and help them to flourish; citizens can get involved with local government, students can consider education programs of interest, and businesses can create jobs within the context of their preferences (Bennett 2003). These preferences are a reflection of the culture of the given community taking advantage of business-class broadband.

Cultural preferences may also encourage communities to not adopt communication technology. The Old Order Amish are an example of an American community that purposely refrains from conforming to technological change (Kline 2000). Even with members of society preferring not to engage with this technology, there are enough members that do. Individuals and institutions that do value the technology and do want the opportunity to exploit it should be invited to join in on the social construction of ICT.
The Economic Construction of ICT

Regulations are in place that give cable and phone companies absolute advantage in the distribution and levels of service available to rural communities. They allow a natural duopoly in spatially-isolated regions, restricting options in Internet service providers and the services requested by rural inhabitants. Without reasonably priced services, guaranteed delivery on the part of the service provider, synchronous data delivery (in the technical community referred to as “redundancy”), and options in providers that encourage competition, rural residents and institutions are disenfranchised from the technological opportunity that is broadband technology. In asking, “what is going on with broadband in Rural America?” the answer seems to be the lack of interest in the communication tool. This is a blatant attempt to dissuade rural residents from a communication tool that is proven to foster socio-economic well-being (Scott 2005; Wood 2000).

Seeking the Vision of Rural Users

Broadband technology is the lynchpin that binds old methods of production to global means of building economy. The overall economic benefits of ICT are less severe economic downturns, more jobs, faster productivity growth and innovative products and services (Atkinson 2007). For rural users, the usage of broadband technology to deliver products and services in the local community has resulted in a boost in the local economy (Franell 2007; Malone 2006;
Muniwireless 2004). These particular communities are interesting, specifically for the means in which they have garnered such success. It is evident that the existence of broadband technology alone is not the purveyor of rural economic wealth; other factors have to be considered. Any visioning or planning which includes ICT in a given rural community is worth implementing for the sake of economic stability.

The impact of broadband technology on rural local institutions is of interest for this research. Without institutions such as schools, banks, and emergency services in rural communities, there may not be enough of a population to sustain the community field. Likewise, without such institutions there is little validation towards a sense of community, as the basis of “community” is a connection in some form with others than oneself.

The Technological Construction of ICT

There are technical limitations in the technology that do make rural deployment onerous. The following platforms are capable of delivering business-class broadband.

Asymmetric digital subscriber lines, or ADSL, operate on existing telephone lines and thus are the most popular platform to deliver advanced communications to rural areas. The restraint in delivery is distance; the central office can only provide service within 18,000 feet of its location (Grubesic and Murray 2004).
Coaxial wire reserved for cable TV systems is now shared with high-speed Internet to allow for digital data delivery along with cable and telephone. Cable companies ease their infrastructure costs by delivering a shared network to subscribers in condensed geographical subsets. Many rural areas are not condensed enough to provide for an optimal digital cable platform (Grubesic and Murray 2004).

The least cumbersome in terms of delivery of popular platforms is fixed wireless. A transmission station connected to a local area network would have to be established in the region and receivers would need to be mounted on subscriber dwellings. It does not have to rely on existing cable or telephone infrastructure, but it does rely on an Internet service provider. In most rural communities the ISP is the local telephone or cable company (Grubesic and Murray 2004).

Rural communities deserve redundant, reliable, and reasonably priced broadband connections. If the only advanced communication technology in the area relies on the existing telephony or cable infrastructure, then rural residents and businesses are going to lose out socio-economically.

**Existing Definitions Do Not Compute**

According to the FCC, 200 Kbps is enough bandwidth to provide access to Internet essentials, such as graphic intensive Web pages, streaming audio, video files, and video conferencing. Seeing that ISDN connections, at 144 Kbps,
somehow meet the U.S. Telecommunications Act’s 200 Kbps benchmark, wire connections already existing in urban and rural America merely need a network upgrade so that data communication can occur along the telephone infrastructure (Grubesic and Murray 2004). This is an advantage for telephone companies, in that they can remain the sole provider of all communication services within their area of distribution without having to invest in a high-grade infrastructure. In this sense, existing providers can interpret a definition a priori and say they are complying with the FCC’s objective to distribute advanced communications to all U.S. residents in a timely and reasonable manner.

Two points have to be taken into consideration. One point is that the FCC’s determination of Internet essentials does not take into account the cumulative Web experience per user. Accessing a given site may not take but a few kilobytes during the initial load, but can increase in size as the site is explored. For example, accessing Google search engine will “cost” the user 2.29 Kbps in bandwidth, but clicking on the link for Google Earth and moving into the satellite image-intensive site will tack on about 5 Mbps for an initial map load (Darryl Baker, October 2007).

The Internet medium with the most dynamic type of site also has increased in visitation as it has been deemed more reliable than its printed counterpart: electronic news sites. According to a survey conducted by Georgia Tech University in 1998, 56.4% of surveyed Web users access an electronic news site daily (GVU Center 1997). These sites are inundated with Flash players, Java scripts, streaming video and audio, and even real-time satellite imagery for
weather-related news. The interactivity of these sites allows people to react to news stories, share details with associates, or post comments to discussion boards. This interaction taxes bandwidth as well.

A DSL connection may be satisfactory in the sense of U.S. Telecommunications Act of 1996 requirements, but it is insufficient in terms of what the average American user deems as essential for daily usage. Several interest groups, organizations and academic institutions propose that the benchmark value of 200 Kbps be increased to 512 Kbps. Even with updating the minimum value from 200 Kbps to 512 Kbps, it still is not enough to support the average user’s Internet experience. Files, video clips, music, pictures, and HTML-enabled typed dialogue delivered to a Web site all expect a significant amount of kilobytes to be available. The data exchange may be continuous, as in an instant messaging application embedded in a work-related intranet site or Web-based training videos for continuous education credit. These types of exchanges are contingent upon reliable bandwidth to carry discourse. In terms of businesses and institutions, the amount of bandwidth available in a given connection influences the types of applications and programs rural businesses and institutions invest in (National Research Council 2002). The more quickly data can be exchanged between providers of services and requestors of such services, the more likely a requestor of such services can be accommodated for, can interpret the service as reliable, and will continue a relationship with the given business or institution.
The other point to take into consideration is that timely and reasonable distribution of broadband technology is held paramount by the FCC without a specific timetable of when the technology must be provided to all citizens. In reports issued by the National Communications and Information Administration and the Rural Utilities Service in 2000, broadband deployment was widely available in urban areas. A nationwide survey found that less than five percent of towns with a population below 10,000 had broadband access (U.S. Department of Commerce 2002). The ambiguous definition of advanced communications narrows the scope of most distributors’ preferences of advanced services platforms to within profit margins or dense populations. Deployment measures are calculated similarly to platforms, in that the urgency of the technology is measured by what makes the deployment most profitable for the largest sector of the population, which tends to be the urban region of the U.S. (Grubesic and Murray 2004).

The aforementioned argument describes the conflict between the social construction of ICT and the economic construction of ICT. If left to the general public to decide the delivery model, the infrastructure, and the accessibility of ICT, the technology would be completely different from what is available via the telecommunications companies. The reality of the conflict is apparent when considering the technological limitations of ICT.
Getting Older and (Technologically) Wiser

The U.S. Census estimates the population of PA at 12,440,621 persons. Of that number, 2,242,369 PA residents are 62 years of age and over (Bureau 2008). Tioga County, Elk County, and Cambria County reflect 19%, 20%, and 22% of this demographic group respectively. The aging members of rural communities are not done living. An NIH report on the U.S. aging population points out that today’s older population is living longer, having lower rates of disability, and are more educated (Bergman 2006). Many of these individuals are still active and working, contributing to various sectors in rural communities. Although the health of these community members is improving compared to their predecessors, many are disabled and suffering from chronic conditions (Bergman 2006). The healthcare and emergency service sectors are two sectors of particular interest in this research because of the large aging population in PA.

Healthcare and ICT

The healthcare sector is already challenged with finding physicians, nurses, and treatment facilities that can service rural communities. Having 1 out of every 5 Commonwealth residents over the age of 62 compounds this difficult endeavor in Pennsylvania. The ability to provide x-rays, diagnoses, and treatment instructions from the main healthcare system to its satellite office in rural communities relies heavily on a significant amount of bandwidth. Continuous education and training for healthcare professionals in rural America
can be provided online to reduce travel time and replacement expenses, especially for in-home caregivers. The means to provide optimal healthcare services to rural areas relies on the strengths of the healthcare workforce and the area’s broadband connection.

**Emergency Services and ICT**

Emergency services to rural places primarily impacts the elderly, as mobility and time are limitations in a moment of need. The PA Comprehensive Highway Safety Program developed a brochure for rural dwellers to consider when making a call to EMS. Amongst the tips are for rural dwellers to write down the directions to their home from the nearest widely recognized street intersection, to send someone with a vehicle to meet the ambulance to guide them to the emergency caller, and to know who the nearest neighbors are (Program 2008). Having advanced communication technology in the form of a GPS-enabled Web site would make these procedures less arduous on both the service providers and the emergency service requestor. Mapping a given service area allows responders to know a considerable amount of information and access that information from the moment of alert to the end of the response.

**Public Policy and the Public Good**

The current broadband delivery standard is a private Internet service provider that owns and manages the service connection (cable, DSL, dial-up) and
the services (voice-over-IP, web servers, email) that businesses and institutions alike desire. This delivery structure encourages monopolies, discourages rural adoption of communication technology, and threatens the capacity to sustain a rural quality of life without the benefits of Internet accessibility.

Local rural economic development starts by integrating advanced communications technology with existing economic sectors to generate income and employment. Such development can at least maintain the local economic condition and at most advance the community into conditions where options rather than restrictions become the norm. Overlying policies in existence and up for debate related to the management of advanced communications systems are beyond the control of community developers and their served citizenship. These two community actors are challenged to find alternate means of interpreting advanced communications technologies to be more relevant to their existing economic conditions and be applicable to their desired usage of the technology (Gattone 2006).

The desired usage of advanced communications technology in rural populations has to be interpreted by the users in terms of potential and actual roles in local economic development. The features of the technology offer limitless possibilities, restricted only by the level of imagination of the given planner. The reasons for using information and communication technologies in a given rural community should not be limited to just economic advantage. The growth of knowledge economies and the decline of manufacturing economies forces rural communities to take into consideration what could become of
information and communication technology if incorporated into current economic outlets (Alter et al. 2007; Pigg 2005).

**Coal Towns Need the Internet Too**

Natural resource-based communities are susceptible to experiencing economic disparity if local resources are exhausted. These communities should consider the potential of ICT to diversify their area. A group in Oregon known for its natural resource extraction introduced broadband to the forestry community in order to entice non-natural resource sectors to start their businesses and services in this region. In doing so, they attracted Google Corporation and have an opportunity to attract other non-natural, resource-based companies to diversify their economy (Spellman 2005).

Pennsylvania is dotted with communities which have based their economic survival on coal mining. As these communities exhaust their local natural resources - if they have not already coming into the 21st century - they are compelled to seek other means of sustainability. At this point, we can only speculate that broadband technology is being incorporated into strategic planning for these areas.

**A Community-centric Delivery Model**

Ideally, business-class broadband should be provided in the form of an open access network. An open access system, which is an ICT delivery system
decoupled from entities that provide ICT services, not only allows for both increased utility and reliability without restrictions in accessibility, but also encourages technological opportunity and market competition at the rural community level (Alter et al. 2007). Emergency services in rural areas can offer assistance to remotely located individuals by taking advantage of real-time video streams and e-911. Educators can commit to the continued education of students and staff by offering Web-based courses. Governments can monitor online resources to keep abreast of changes in policies and ordinances at the many tiers of government that impact community residents. Small businesses benefit by casting a world-wide net that encourages buying local and growing global. Regional banks can offer services beyond brick walls and lobby hours with 24-hour online account transactions.

The establishment of an open access network, identified as a universal infrastructure, would provide the best means to achieve adequate delivery of synchronous broadband service in rural America. In order to allow for local provider competition, technical compatibility with urban counterparts, and the highest level of social welfare given such resources, policy makers need to reconsider existing preferences towards duopolistic delivery models. Rural communities not connected to synchronous broadband networks have the unfortunate opportunity to experience the same economic fate as the ghost towns created a century before by the bypass of telephone lines, the railroad, or Interstate highways (Parker 2000).
Existing Policies Do Not Compute

The U.S. Telecommunications Act of 1996 limits community developers and the communities they are advocating for by providing exclusive delivery rights to cable and phone companies. These companies are concentrating their delivery to metropolitan areas, where population density and monopoly control of the provider's infrastructure allows for the “best bang for the buck.” Along with non-guaranteed return on investment and expensive overhead costs for “first mile” construction, lack of product demand is a rationale for private companies, governments and agencies to resist expansion of business-class broadband to rural communities (Ingebretsen 2001). These entities influence policy makers by advocating fervently for open competition and natural monopoly conditions within the context of the market, not of the community (Parker 2000). Local and state policies are also siding with private companies and are implementing regulations so that public utilities, municipalities, community networks, and local citizenry are restricted from developing their own broadband infrastructure (Freepress.net 2007; Russell 2006).

For rural communities that do have advanced communications technology (in the FCC sense of the definition), priorities are still made to certain actors within the community field. Rural schools, hospitals, and state government local branches are given access priority to business-class broadband which is guaranteed by the regional Internet service provider (Alter et al. 2007). Rural communities have enough challenges in this century to resolve; added complications by disenfranchising certain groups and promoting the digital
divide at the community level only exacerbates the fragile state of the rural economy.

Attempts to Close the Digital Divide

The Clinton Administration launched programs in 1992 in an effort towards overcoming the technological isolation of rural areas by giving rural residents and businesses an economic advantage via the global network. The administration provided funds to extend advanced communications infrastructure to rural areas, akin to rural electrification efforts of the Roosevelt era. The idea was for the federal projects to “build on-ramps to the information highway”, with the private sector responsible for maintaining sections of the highway (Effland 2002). This effort was ambitious, yet shortsighted.

Treating business-class broadband as a static infrastructure alone is not enough; it has to be incorporated into the local culture and absorbed as a component of the local way of life. The rural community is a complex environment; intangible conditions such as lack of innovation on the part of local industries, a laxity in developing a rural entrepreneurial culture, and power struggles between advocates of central place and municipal borders make it difficult to implement a rural economic development strategy involving information technology (Wilson 1992). Secondary data on economic conditions are valuable in discerning these particulars, and they are often within the realm
of the Internet (Zimmerman 2005). Information and management techniques are essential for deploying ICTs into rural communities.

Senator John Kerry, in preparation for the 2007 SB&E hearing on improving Internet access to help small businesses compete in the global economy stated, “President Bush has promised national broadband by 2007, and we are inexcusably, tremendously, scandalously short of that goal. Previous generations put a toaster in every home and a car in every driveway as signs of economic progress. To stay competitive, we should strive to do the same with nationwide broadband. Our economy, our businesses and our families are counting on us to deliver (U.S. Congress 2007).”

Commonwealth legislators attempt to meet this objective by amending existing laws to encourage universal broadband delivery within Pennsylvania. Major telephone and cable companies see this as an advantage to fortify their position in a given community. Title 66 of the Pennsylvania Consolidated Statutes still leaves the power of advanced communication technology distribution in private companies’ hands. By contributing their services at a discount to local schools as a condition of broadband investment, or declining to invoke their right of first refusal to provide local business-class broadband services, universal broadband efforts merely encourage duopolies, instead of choice and competition (Assembly 2008).
The Role of the Community and Economic Developer

ICT is pervasive. Its utility spans all industries and all sectors. It is a unique technology in that its application to a given node of the socio-economic network encourages growth in that node (Atkinson 2007). The normative context of this research is the desire for the same advanced communication successes for rural socio-economic networks that have already been witnessed in larger urban networks. An example of practitioners incorporating ICT in rural community and economic development is the Connecting Rural Communities site, www.connectingcommunities.info. This site was designed specifically to promote the use and adoption of information and communication technology tools and infrastructure in rural communities (Southern Rural Development Center 2006).

The role of ICT in community and economic development is defined within the concepts of adoption and diffusion. This is where practitioners identify the community change agents and leaders and their propensity for adopting new technologies (Laudeman 2005). Thus, the technological opportunists in rural communities are sought after. These are the individuals that are innately curious about ICT, especially as the growth of the existing advanced communications infrastructure becomes more evident in their region. Leaders who understand and use ICT can validate its effectiveness on regional production (Laudeman 2005). Community actors that embrace the pervasiveness of ICT and incorporate the technology into their daily living will pass on this knowledge to their neighbors (Rogers Chapter 6: Attributes of
innovations and their rate of adoption (1995; Williams 2005). Developers can essentially take advantage of the traits of rural locales, specifically the tight-knit relationships, the reliance on word-of-mouth validation for innovations, and cultural trends that encourage community (Rogers Chapter 2: A history of diffusion research - rural sociology 1995) in growing the demand for advanced communications technology in these communities.

Finally, ICTs work in community socio-economic development efforts if the pervasiveness of the technology is exploited. Any development program that requires collaboration, innovation, flexibility, specialization or reflexivity merit the usage of ICT (Laudeman 2005). The integration of ICT and community-level interaction builds community capacity. The outcome of exploiting the pervasiveness of ICT in community and economic development is an enhanced sense of community (Pigg 2004).

American history has shown time and time again the power of a collective spirit. Rural Americans will organize at the local level in recognition of the shared desires of the members of the given community field (Summers 1986). Rural community dwellers will seek a means to deliver a public good if governing bodies or private companies are not willing to intervene for the sake of their region’s economic survival. Community and economic developers are in the position of advocacy as citizens collect, educate within, and consider options together. Community and economic development is a qualitative field of social interaction with the capacity to influence and shape community well-being. It is
also a field that serves as an agent for change, knowledge exchange, and social empowerment (Summers 1986).

The role of the community and economic developer is akin to the bridge that connects two shores. Technology lays in one direction, in the form of business-class broadband, and rural communities lay in the other. Social science is integral to bringing these seemingly opposite worlds together, bridging the old and the new with a legitimate rationale.

**Building the Bridge**

This chapter presented several reasons for pursuing this research. In order to witness the extent of strategic community and economic development incorporating business-class broadband in rural communities, we have to step out of the doors of academia and into rural America. The three communities selected to research serve as windows into the rural Pennsylvania experience with ICT. In Chapter 3, the methodology of the research is detailed. The phenomenon is best described by the informant’s framing of the broadband experience. This approach makes bridge building so much more exciting.
Chapter 3
The Phenomenological Approach to Research

The Phenomenological Method

This research intends to present the experiences a select set of communities have with business-class broadband technology. Six key informants representing banking, education, emergency services, government, small business, and healthcare within three communities offered information based on how they frame the broadband technology experience. Given the time and sample restraints of this research, an ethnographic submersion into the given community would be ineffective. A question has already been derived for this research so grounded theory has to be revoked as a method. A historical profile has been developed for each community to provide a character and cultural reference, but will not be used heuristically in this research.

Performing phenomenological research is preferable, in that its defining characteristic is the focus on describing the essence of a phenomenon (business-class broadband) from the perspectives of those who experience it (key informants) (Moustakas 1994). This is why in the sample selection process the number of existing ISPs serves as a criterion. If no broadband technology is available in a given community, there is no phenomenon in which to focus on. Members of communities without Internet services are limited to speculation.
Speculation is a valid way of experiencing the phenomenon. Since this research seeks specifics on existing infrastructure, we limit our criterion to those communities that have at least one ISP in their community. No objective inferences can come from speculative data.

**First Phase**

A phenomenological interview is the primary method of data collection in phenomenological research. The investigator seeks to uncover the essence of the meaning of the broadband technology experience (Moustakas 1994). Relations developed implicitly in the description of the broadband experience by the interviewee produce phenomenological knowledge for the observer. This knowledge contributes to the present interpretation of the relevance of information and communication technology in rural communities by different actors (Moustakas 1994).

We purposely engage multiple key informants from three different communities to provide not only an inferable sample of data but also draw out themes or reoccurrences in expressions during the interview session. The interview script is designed in such a way to neither cajole nor force responses, but rather allow for spontaneity in responses within the guidelines of the given question. In doing so, we complete the first stage of phenomenological study which is to provide a description in relation to the phenomenon of interest (Moustakas 1994): What is the broadband technology experience like for rural
institutions? Before we can paint a portrait of the accessibility and availability of broadband technology in rural America, we have to answer the phenomenological question first. Accessibility and availability of business-class broadband is the basis of the thesis question; the essence of the thesis question is found in the phenomenological experiences of these users.

**Second Phase**

Once the essence of the phenomenon is ascertained and described per informant, the data collected will then be horizontalized. Using this method of organizing deters premature predictions and assumptions. Giving each response equal value is a display of objectivity in this research. The power of this method is its way of self-revealing similarities, patterns and themes amongst the data with no interference from the observer (Moustakas 1994). The experiences seem to suspend themselves much like multiple liquids in one container with varying densities.

A phenomenon matrix is used to display each rural user’s experience, serving as a template to develop answers to the broadband problem based on the actor’s perspective on the problem. Other questions may come from the phenomenon matrix as well. The data is organized by the horizons that appear in the key informant’s responses. The horizon, the revelation of a reaction to the phenomenon, is noted as an invariant constituent. The invariant constituents are listed to reveal themes or labels that can be attributed to the key informant’s
framing of the broadband experience. The themes that arise from the rural users’ experiences are summarized in a thematic portrayal in Chapter 4.

A Heideggerian Approach to Technological Concerns

The philosopher Martin Heidegger is known for his deep insight on the incorporation of technology into science, the arts and society. Heidegger particularly questioned technology in a metaphysical context, asking how one could frame a given innovation as a societal benefit or burden (Kroker 2004). Heidegger’s works are relevant in this century, in that scholars still seek to comprehend how society has interpreted various communication technologies as beneficial or harmful. Receiving key informant responses regarding the business-class broadband experience is similar to what Heidegger described as the “challenging-forth of the standing-reserve” (Heidegger 1977). What Heidegger means by the “standing-reserve” is the particular technology that causes societal concern merely by its existence. Broadband technology is an example of the standing-reserve in that in its delivered form, it impacts an individual’s sense of comfort to a degree reflective of the individual’s interpretation of the technology. When Heidegger identifies the stage of “challenging-forth”, he is describing the moment in time when a potential user essentially comes to terms with the technology merging with her way of life. For the business or institutional user, this would be the moment in time when the technology merges with daily operations.
Heidegger suggests that the enframement of the standing-reserve proves to reveal the technology as a destiny or a danger. Particularly, the enframing is the way in which the “real” – the experiences of the informant - reveals it as standing-reserve (Heidegger 1977). The experience with business-class broadband technology becomes real for businesses and institutions once the technology is incorporated into the workplace. The “enframing” is the utility of broadband technology for a given business or institution. If a rural business or institutional user enframes business-class broadband technology within the context of her work, then she has identified business-class broadband as the standing-reserve.

Heidegger notes that it is at this moment, when the real reveals the standing-reserve, when a user interprets the technology as a destiny or a danger. Does it help or hinder productivity? Does it bring results or worry to the workplace? Is business-class broadband helping or hurting the rural user? High-speed Internet services such as VoIP, email, video conferencing, and real-time file exchange are all components of business-class broadband. If the user frames these components as relevant for the broadband experience, then it is a destining of the standing-reserve to be challenged forth. If these same components are enframed as nonessential or distractive for the user’s business operations, then it is a danger of the standing-reserve to be challenged forth (Heidegger 1977).

Heidegger was one to use phenomenology to interpret the purpose of technology. Even though scholars interpret his argument as an opponent of technology, he is adamant that we question the phenomenon lest society becomes
determined by technology (Heidegger 1977). With the revelations from the user's experience, we can anticipate a delight in the means in which the user enframes the standing-reserve.

**Interpretation**

There is one portion of the phenomenological approach that will be adapted from its fundamental form. Traditionally, interpretation of the data involves imaginative variation, which requires examining the data from divergent perspectives and varying frames of reference (Moustakas 1994). This process is beyond the scope of this thesis, but would be essential for continuing research in this area. Instead, interpretation of the data will be provided by sector, across communities with the phenomenon matrix as a point of reference. This structural description of the phenomenon will be provided in Chapter 4.

**Establishing Epoche Before the Interview**

Unlike other research methods, a phenomenological approach requires what Edmund Husserl referred to as epoche, the freedom from suppositions, which removes assumptions from the speculative question (Moustakas 1994). This is not a rejection of scientific facts. Value-free statements related to business-class broadband have been expressed in Chapters 1 and 2 to present the scientific, technological, and societal approaches to the research question. It was feared that the key informant would react differently to each question if the same
value-free statements were expressed at the time of the interview. Epoche was established for the interview sessions to allow for spontaneity, free expression of values, and control on the key informant’s end. The “knowing of things” is reintroduced in interpretation of the data and reflection on the research experience. As described by Moustakas, “the challenge of the epoche is to be transparent to ourselves, to allow whatever is before us in consciousness to disclose itself so that we may see with new eyes in a naïve and completely open manner” (Moustakas 1994, 86). Establishing epoche before each interview session allowed an objective means of delivering the interview script and full engagement on the observer’s part. By establishing epoche, the essence of the phenomenon revealed by the informant was honestly received.

**Research Components**

The way this approach is designed keeps the research process organized. The selection of communities is reflective of the criteria that were identified in the literature review. Each selected community will be profiled to provide an idea of the demographic, historical, economic and technological construction of each place. In doing so, the qualification of each community becomes evident. Justification for the types of key informants will be provided. Finally, the rationale for the interview script will be revisited from Chapter 1, describing the logic of the questions in connection to the research question.
Selection of Research Candidates

In Chapter 1, the literature review explained how “rural” communities were successful in incorporating business-class broadband into the local economy. The argument was that the communities referenced were not reflective of true rural communities, based on the USDA’s definition of “rural”. As well, the argument was made that national reports reflecting a growth in broadband use in rural places based their results on aggregated data. The reports did not distinguish the rural user’s experience outside of urban data. In designing the research question, the particulars of the existing reports’ samples were scrutinized. What advantages do the “rural” communities in the studies have that promote socio-economic success? The particular qualifiers defined in Chapter 1 are:

1) Existence of advanced communications infrastructure
2) Significant distance from a major interstate highway
3) Significant physical distance from a higher education institution
4) No business park development
5) A local population less than 3,000 people, and
6) Significant physical distance from a metropolitan area.

To determine the research candidates, the qualifiers listed above were compared against a listing of all Commonwealth boroughs. Many communities were disqualified as each qualifier was measured against the list. Eventually a short list of rural communities that met at least five of six qualifiers was developed.
This process revealed Pennsylvania communities that are reflective of the research definition of rural.

Ideal candidates for research are rural boroughs in Pennsylvania that do not have the following: direct access to existing fiber optic networks, close proximity to an airport or interstate highway by ten miles or less, a four-year college or Penn State University branch within the borough, developed or developing a Keystone Opportunity Zone (KOZ) within the borough (NewPA.com 2007), a population within the borough of more than 3,000 people, or close proximity to a city by at least 50 miles. The criteria selected extract the research candidates from all recognized communities in PA so that the rural experience can be fully witnessed as opposed to being assumed.

The rural communities selected should have at minimum one ISP providing some form of advanced communications technology. The Federal Communication Commission’s Form 477 is a form which is required of any facilities-based firm, identified as “holding companies”, providing high-speed service lines or wireless channels (Grubesic and Murray 2004). Information on the number of holding companies reporting high-speed subscribers is listed in the “Zip Codes by Number of High-Speed Service Providers” data table on the FCC’s website (Commission 2007). If any of the desired communities’ zip codes are not listed in this data table, then there are no holding companies providing service in those communities, and thus cannot be included into this study. In accordance with the phenomenological method, a phenomenon cannot be experienced if it does not exist.
Community Profiles

After peeling away the layers of urban attributes described in Chapter 1, and considering the social, economic, political and technological constraints of rural America in Chapter 2, three Pennsylvania communities horizoned themselves as ideal candidates for this research: the boroughs of Johnsonburg, Nanty-Glo, and Wellsboro, PA. These communities are located in Elk County, Cambria County, and Tioga County, respectively. Identifying one community per rural county allots for variety in key informants and encourages results that are unique to the given region.

Demography

Key demographic variables for each borough are presented in Table 3-1 below. The data are from the 2000 Census. Although the communities lie in differing sections of the Commonwealth, they are similar as far as size, median age, education, and income.

Table 3-1: Demographic Values For Research Communities

<table>
<thead>
<tr>
<th>Value</th>
<th>Johnsonburg</th>
<th>Nanty-Glo</th>
<th>Wellsboro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>3,003</td>
<td>3,054</td>
<td>3,328</td>
</tr>
<tr>
<td>Median Age</td>
<td>38.7</td>
<td>42.0</td>
<td>44.2</td>
</tr>
<tr>
<td>High School Diploma</td>
<td>80.7%</td>
<td>75%</td>
<td>83.1%</td>
</tr>
<tr>
<td>In Labor Force</td>
<td>57%</td>
<td>55.4%</td>
<td>53.7%</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>$27,924</td>
<td>$25,500</td>
<td>$30,169</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>$15,631</td>
<td>$14,184</td>
<td>$18,096</td>
</tr>
</tbody>
</table>
History

Each community’s history is detailed below. Their histories show how the abundance of natural resources in the area encouraged the development of the communities. These histories also reflect the character of the land and the cultural influences in the communities.

*Johnsonburg*

Johnsonburg borough, indigenously known as Quay, was founded in 1810 and incorporated in 1891 (Society 2008). The borough established its first tannery, boasted as one of “the greatest leather manufacturing industries in the world”, with Samuel Lowry as superintendent in 1882 (Project 2007). The Henry, Bayard & Co. planing mill was situated nearby. The Clarion Pulp and Paper Company was incorporated November 26, 1888, for the purpose of manufacturing paper at Johnsonburg, and was responsible for identifying Johnsonburg chiefly with paper production (Project 2007).

Johnsonburg is also known for its mountainous topography. A correspondent for the Erie Observer noted in 1887:

“Perhaps the finest mountain scenery in the State, and certainly the least known to tourists, is found in the Elk mountain region near Johnsonburg. To see the grandest part of the Elk mountains, one should take a carriage or horse from the Johnsonburg hotel and follow the excellent driveway to Rolfe, one mile, and continue to Wilcox, six miles distant. Striking peaks, sharp and glittering as the Matterhorn, surround one on all sides. Crystal streams flow through every valley, and the fair Clarion river supplies immense water-power for innumerable manufacturing plants. No lover of the
grand or beautiful in nature should fail to take a drive through and around Johnsonburg” (Project 2007).

_Nanty-Glo_

The borough of Nanty Glo started as Glen Glade in the 1890’s. According to oral history, Glen Glade was changed to Nant-y-glo in February 1901 by Mrs. Montell Davis, the Glen Glade postmaster’s wife. Nant-y-glo is a Welsh phrase meaning “vale” or “valley of coal” (Nedrich and Martin 2002). Nanty Glo was incorporated as a borough in 1918. It was formed from taking parts of Blacklick Township on the northerly side and Jackson Township on the southerly side of Blacklick creek (Nedrich and Martin 2002). The spelling of the borough’s name as Nanty Glo or Nant-y-glo is interchanged still today.

Logging was the area’s main industry until 1899, when additional settlers came to mine the large coal deposits of the region (Nedrich and Martin 2002). That same year, Pennsylvania Railroad installed a line through the community, initiating commercial mining of Nanty-Glo’s coal in 1896. A total of fifteen coal mines were established and mined. The Nanty-Glo Home Page mentions, “In addition to coal mining, Nanty Glo had at one time a chemical works, soda bottling factory, plastic factory, and a dress manufacturing firm. At the present time, all of these industries except Jo-Mar Plastics, have ceased operation” (Nedrich 2002).
Wellsboro

Wellsboro was named for Mrs. Mary Wells Morris, wife of Benjamin W. Morris, one of the original settlers (Tice 2007). The early settlers were New Englanders; this section of Pennsylvania was part of the Connecticut Grant. Much of the original development is reflective of the large houses and expansive lawns of the New England area. Wellsboro is located in what is referred to as “the Grand Canyon of Pennsylvania” (Network 2008), a natural and scenic area abundant in streams and lakes.

Pine forests, coal mines, and glass sandrock were in abundance in this area as well. Businessmen and lumbermen established Wellsboro as a trade and manufacturing center, encouraging community development from 1835 to 1850 (Tice 2007). The Pine Creek Land Company was able to get Wellsboro designated as the Tioga county seat in March 1806. In 1830, Wellsboro was the first town to be incorporated as a borough in Tioga County (Tice 2007).

Economic Analyses

The three communities are similar in that they are all natural-resource based economies. Other industries came to fruition as the effects of trade and immigration impacted the regions. In Figure 3-1, each community is represented with each relevant economic industry based on 2000 census figures (Bureau 2008). The growth of natural resource extraction encouraged other industries to develop in these communities. To reiterate from Chapter 2, of all possible rural
communities in Pennsylvania, those that have subsisted on natural resource extraction as their primary economy are vulnerable to the effects of the digital divide. Diversifying the economic base of these places ensures community sustainability.

Figure 3-1: Labor per Community by Industry, 2000

The Regional Economic Information System was also resourced to procure information at the county level on total employment by NAICS industry. This data reflects county values as of 2005 (Analysis 2007). The codes for government, manufacturing, wholesale trade, retail trade, and transportation and warehousing are displayed in Figure 3-2. These codes were selected to reflect the prominent industries of these particular counties.
Figure 3-2: Percent of Labor Force in Industry by County, 2005

The following are examples of prominent employers for each community. They are located in or near the borough.

**Domtar Paper Mill, Johnsonburg**

Owners varied since the late 1800s, but the mill still exists as the primary resource for employment for Johnsonburg residents. According to the company’s Web site, Domtar is the largest manufacturer of uncoated freesheet in North America based on production capacity (Domtar 2008). The abundance of timber
in the area has sustained the paper mill and the local economy since the founding of Johnsonburg.

**Patterson Lumber Company, Wellsboro**

The hardwood lumber manufacturer has been in existence in Tioga County since 1921. Patterson puts into practice the latest technological advancements in manufacturing to ensure lumber quality (Lumber 2008). The company prides itself on its land management practices, incorporating forest renewal practices to ensure continuous harvesting and lumber production for the years to come.

**Conemaugh Health Systems, Cambria County**

Conemaugh Health Systems provides services to 11 counties in west Pennsylvania, including Cambria County. Conemaugh has the largest home health and outpatient services in the region, including a satellite office in Nanty-Glo. A majority of the healthcare providers for Conemaugh work in the community they service, which is a major convenience to rural community members (System 2007).

**ICT Profiles**

Each community’s zip code was matched against the information provided on the FCC’s Form 477. As of the June 2006 FCC assessment, Johnsonburg has
one to three Internet service providers, Nanty-Glo boasts five, and Wellsboro shows four Internet service providers. Thus, each community meets the requirement of being served by at least one Internet service provider.

The Pennsylvania Department of Community Economic Development uses a GIS-based web tool, IMapData, to display a PA Technology Investment map. Data was requested from this site to identify existing fiber optic networks across the Commonwealth. In Chapter 1, it was presented that most of the successful rural communities studied had access to a fiber optic infrastructure. Data from IMapData was used to see if the candidates for research had the same technological advantage. Per the website, Johnsonburg has no fiber optic network in or near it. Several Verizon lines run south of Nant-y-Glo, but nowhere within. Wellsboro shows a Penteledata digital fiber line near it, but it is unclear whether it provides business-class broadband services to the community (Development 2007). This information refines our community selection, as well as demonstrates the robustness of existing ICT in the area.

**Summary of Community Qualifications**

Based upon the selection criteria and supplemented by each community’s demographic, historical, economic, and technological profiles, these three communities are ideal communities for this research. Compared against the selection criteria, we find the following:
1) Johnsonburg qualifies because the nearest interstate highway to the community is I-80, which is 27 miles south of Johnsonburg. There are no higher education institutions in this area. There are no existing or scheduled Keystone Opportunity Zones in the county. The community is 85 miles away from Erie, PA and 100 miles from Pittsburgh, PA. According to the 477 form, there are Internet service providers in the area. The borough population is 3,003.

2) Nanty-Glo qualifies because it lies 60 miles east of Pittsburgh, 104 miles west of Harrisburg, and about 200 miles from Philadelphia. The closest KOZ is 7 miles from Nanty-Glo. There are three private colleges at least a half hour distance away. It lies 50 miles north of I-70, 70 miles south of I-80, 56 miles east of I-76 and 25 miles west of I-99. The 477 form reports Internet service providers in the area. The borough population is 3,054.

3) Wellsboro qualifies because it sits about 50 miles north of I-80. The community is 12 miles from Mansfield University of Pennsylvania. There are no KOZs in the county. The community is 105 miles away from Harrisburg and 145 miles from Erie. The borough population is 3,328. The 477 form indicated ISPs in the area.
Identifying Key Informants

Community and economic development scholars are exposed to various economic theories and fundamental attributes of community practitioners. Certain community attributes appear as common denominators of various theories, regardless of which author presents the information. For a given community of place, urban or otherwise, the commonalities are a local government, an education system, health services, existing businesses, and public services. To provide the boundaries in which this research is conducted, specific community and economic attributes were organized by sector. These sectors can be identified within each rural community studied. The standard was to ensure that each defined economic sector would be found in each of the three communities, at minimum within the borough proper and at maximum within the county. This extension is made because some community entities - for example, the local healthcare system - may be physically located in another part of the county but is the primary resource for all boroughs.

Key informants from the selected study communities were identified within the following sectors:

- Local Government
- Healthcare
- Banking
- Small Business
- Education
- Emergency response
One person per sector per community was identified as a key informant. All efforts were made to contact an individual in a position of leadership within the given organization. Three informants per sector across communities provided data specific to their sector. Altogether, 18 interviews were conducted to capture the rural user’s experience with business-class broadband. The data provided from these informants can be interpreted in many ways, based on how the data is viewed. For this research, the data is provided in a phenomenon matrix to represent each informant’s response to the interview question. Analysis will be conducted by question per sector, across communities in Chapter 4.

The time and resources allotted for this research limits the number of interviews that can be conducted. The number of interviews thus constrains our inferences. Justification comes by recognizing this as exploratory research of business-class broadband in spatially-isolated rural communities, since existing research does not focus on these particular locales.

**Interview Script Design**

The interview process was managed in consideration of the key informants’ time and scheduling constraints. Interviews were conducted in a face-to-face format, with audio taping to ensure data integrity. Each interview took approximately 25 minutes to conduct. The interview protocol is presented in its entirety under Appendix B, Interview Script for Key Informants.
The design of the questions was pivotal to triggering useful responses and insight into a subject that may have not been scientifically explored within the region. In designing and planning the script, possible adverse reactions were considered. In conducting face-to-face interviews, reactions may include loss of motivation on the parts of the participants, difficulty in proving the study’s worth to the community, and difficulty in collecting both internal and external responses in relation to the informant’s personal experience with local advanced communications technology (Weiss 1994). Recognizing possible adverse effects at this point in research design helps reduce negative results in the data collection experience. Maintaining an objective perspective on this research is paramount to the contributions from our research participants. This study provides an opportunity to understand what broadband means to rural communities by observing their own words.

The interview script questions helped identify what advanced communications platform is being utilized by that sector within the community. The 477 form, although it does provide information on what provider is in the area and how many subscribers they are serving, does not break down further what the platform is. Therefore, we may have visited a community that has ISDN, or broadband DSL, or both. Distinguishing the platform will answer for us how applicable the features of the given platform are to the business or institution’s daily operations.

Costs incurred in accessing the advanced communications structure are of interest to gauge the financial investment in the technology. Specifically, we
desire to learn if the quality of service, the maximum bandwidth delivered and overall satisfaction with the broadband service merit the charges imposed by the local ISP. If there are choices in ISPs within the community studied, we want to be able to grasp how local competition and demand stimulate the provider rate.

Discovering how the existing infrastructure is being utilized in these specific sectors will be beneficial towards identifying technological limitations that impede socio-economic growth. Since the informants are leaders or decision-makers within the given sector they are being interviewed about, they should be able to reveal how a leader’s attitude towards advanced communications impacts the organization’s usage of the technology.

Asking questions of how a community actor would use advanced communications if it was more sophisticated than the current platform will provide insight on technological opportunity. The tacit knowledge of the actor can be gauged along with the supplemented information he or she acquired because of the Internet. The visionary in the key informant may present himself at this point. How the user incorporates ICT in their community if he or she was afforded the best, fastest, most reliable form of advanced communications in this community may be a simple statement or a compelling argument for business-class broadband in rural America.
Looking Into Windows

Popular conviction on broadband technology assumes that the technology is universally desired. Malecki details the opportunities that can be met by using the Internet in rural communities but merely speculates on such experiences (Malecki 2003). One national resource that attempts to delve into interpreting the user’s experience is the Pew Internet and American Life Project, where actions and attitudes related to personal experience with the technology are described (Horrigan 2007). The summary provided in this particular report is focused on experiences with broadband technology in the home as opposed to institutional usage. What particular experiences merit the generalization that rural communities need broadband technology? Since no absolute description is available, we seek it out on our own.

For this paper, a phenomenological approach is used to describe, reduce, and interpret the data. Candidates for the study are determined by criteria based on the objectives of this research. An interview script has been designed to organize the data according to the thesis objectives and question.

This much focused research design prepared us to travel the rural roads during a Pennsylvania winter and come face to face with the six representatives of each community. Their framing of the broadband experience is an invitation to witness the pervasiveness of the technology for ourselves. After several weeks’ worth of data collection, the results are in. The windows to Rural America were wide open.
Chapter 4

Results from Rural Pennsylvania

The phenomenon of business-class broadband in rural communities was made apparent through carefully selected key informants from six economic sectors. Using the phenomenological approach, preparation for data collection was conducted by establishing epoche. Before each interview, the interviewer’s mind was cleared of any prejudices, biases, or assumptions associated with business-class broadband. Walking into the workplace of each key informant in this fashion allotted the user’s experience to be openly received. The delivery of the interview questions was such that the framing of the broadband experience was left entirely in the hands of the rural user being interviewed. Along with a fresh reception of the data, there was a delight in observing the means in which the user framed his or her broadband experience.

There is a plentitude of data to summarize. To keep the chapter organized, a summary of the findings will be provided first. The summary parallels the beginning of Chapter 1, relating the rural users’ experiences to the topics that were presented prior to the introduction of the research question.

Following the summary is a presentation of the research objectives via the interview question responses. The phenomenon matrix is provided in Appendix A organized by interview question. There are several ways to interpret this data and neither way is an incorrect approach. For this chapter, the data will be
summarized by sector, across communities to indicate the conciliation of the research objectives.

Finally, a thematic portrayal of the data is provided. Verbatim responses from the interview transcripts are provided to emphasize the different ways that the key informants framed the broadband experience. From this thematic portrayal, the answer to the research question of, to what extent do rural communities deprived of these metropolitan attributes utilize advanced communication technology in the form of business-class broadband, is explained.

Phase one of the phenomenological approach requires the observer to provide a description in relation to the phenomenon of interest. The business-class broadband experience was recognized as a significant phenomenon for all key informants across all communities. In other words, there was not a single member of the sample that had no concept of the information and communication technology or could not reflect on its applicability to the local community.

In the initial selection of key informants, a pattern developed where all the key informants for small business were service-oriented like their five counterparts. Thus, the broadband experience for the rural user relayed from each sector offers a picture of the impact within the business or institution and how the services provided impact the community at large.

After the key informants were selected by sector, another sector was added at the last minute as a curiosity. Members of the area chambers of commerce were also interviewed to collect their experience with the phenomenon. The
Wellsboro Chamber of Commerce declined to participate. Overall, twenty interviews were conducted.

During the interview session, the key informant was provided a definition of business-class broadband as a popular advanced communication technology also known as high-speed Internet that delivers 512 kilobytes or greater when data is uploaded or downloaded. Business-class broadband is always on and it offers redundancy to prevent connection failure. The key informant was made aware that the definition of high-speed Internet provided may differ from what they conceptualize as high-speed Internet, and that was permissible.

**Summary of the User Experience**

**What Business-Class Broadband Is**

Rural users have expansive knowledge of advanced communications technology in the form of business-class broadband. Existing business-class broadband platforms ranged from cable DSL to OC12 dedicated fiber depending on the key informant. More than one user indicated that the existing platform they use does not satisfy the overall needs of the business or institution. Not only is 512 kbps not enough, but 6Mbps can be a delimiter of services as well. Users indicated that sector needs drive the type of ICT invested in for the workplace.
Who the Rural User is

Every key informant held a managerial or executive position. The time of experience in their sector role ranged from two months to 58 years. A majority of rural users have a positive experience with business-class broadband. These users are invested in their communities and do want to use ICT towards rural community and economic development. The availability of the technology limits how many of their desires can be realized. These users can demonstrate how useful the technology is and what the ramifications are when it is not available. Those that showed a weaker competency for information and communication technology utilization are still able to incorporate it into their daily operations. In visioning for the organization, these users would do more with it if they had resources to learn how.

ICT Creates New Central Places

Users shared how the technology has fostered a stronger sense of community, provided options in community development, and triggered economic growth opportunities that were not existent before. For current community dwellers, users contended that ICT keeps residents from leaving. Points were made where having the Internet allows rural dwellers to “get out” of the region without ever physically leaving. Working from home was a universal benefit because of the availability and accessibility of the sector’s broadband network. This concept is heavily supported and is more in practice than realized.
They recognized knowledge opportunities offered through web sites that will help keep them in business in their community. Many examples of strategic collaboration to promote rural community and economic development were provided.

**ICT is a Public Good**

The six sectors’ reliable connection ensures constant serviceability to the community, thus making ICT a supporter of the greater good. A laxity of Internet service providers is attributable to some key informants’ inability to fully utilize ICT in their workplace. Most users are limited in Internet service provider options in their area. For some of the users, competition and price influence the decision of which ISP to go with. Users insist that having an Internet connection in rural places is not enough; getting resources to those who require them keeps services available in these remote areas. The rural user recognizes the investment in ICT as smart government practice, which reflects the user incorporating the concept of ICT as a public good.

**The Potential for Social, Economic and Technological Exclusion Exists**

Rural users recognize that the technology is only as effective as the person who manipulates it. Rural users state that the “old way of doing things” may be the comfort level of older generations, but newer generations want the new ways
of doing things in their community. The argument on exclusion presented in
Chapter 1 focused on urban economic sector representatives excluding rural
communities from taking advantage of ICT. The data revealed that sectors within
rural communities exclude each other from technological advantages. Given the
role of the rural user, their broadband experience is framed around the needs of
the sector’s workforce over the impact of the technology on the community at
large. More than one user emphasized the need for resources to explain the
benefits of ICT. They recognize that lack of knowledge causes lack of adoption.
The availability of broadband-related resources clearly impacts the serviceability
of the sector in the rural community.

Conciliation of the Research Objectives

In Chapter 1, the interview script questions were provided to demonstrate
which questions are directly correlated with a given objective. Every question
contributed to at least one, and some, to all three objectives. For every objective,
highlights from each sector follow.
Objective 1: Identify the advanced communications platform in existence within the research communities and how much the system costs to install and use.

**QUESTION 1**

Question 1 of the interview script asked the user to describe how they connect to the Internet emphasizing technical specifications in their responses. The healthcare sector had strong, redundant connections to support sector-related applications. For example, one health system has dedicated fiber with reliable connectivity at 6 Mbps and is looking into upgrading to 10 Mbps capability.

Every education facility has dedicated fiber that guarantees connectivity at 100 Mbps at minimum. Small businesses across communities are exploiting their connectivity to promote and retain business in their respective communities. One business, a hotel, provides Wi-Fi connectivity for the hotel guests. One small business is not currently using the Internet, but is planning to invest in a DSL connection for their business this year.

The government sector relies primarily on cable DSL to connect. Banks across communities have decent connectivity, using DSL or fiber to push up to 6 Mbps both ways. One bank has fortified its infrastructure by bundling 6 T1 lines.

Emergency services have moved from microwave connectivity to fiber, save for one community. Microwave bandwidth is what is typically used for radio information relay and emergency dispatch. Now that digital means of relaying voice are more commonplace, there is no need to maintain analog radio channels.
**QUESTION 2**

Question 2 asked the user to list the ISPs available to them. Each community had different options; no one ISP exists across communities regardless of sector. Each sector responded with two to three provider names. Interestingly enough, the small business sector can list several providers across communities. This implies that of all sectors, small business owners are particular as to who provides their connection and cognizant as to whom the competition is. Eleven separate ISPs are detailed by small business in the phenomenon matrix.

**QUESTION 2A**

Question 2A asks for the Internet service provider they currently use. Each sector has choices in providers. Healthcare uses whichever local ISP can guarantee redundancy. Education seems to be limited by whomever the Intermediate Unit (IU) is in agreement with. Although E-rate implies that Verizon be the provider of Internet services in order to take advantage of the incentive (Assembly 2008), only one representative of the education sector maintains their connectivity via Verizon. Small business is more influenced by what the clients call for. Emergency services decided on their ISP based on who offers T1 lines.
**QUESTION 2B**

This question asks the user how much it cost them to receive service. The word “receive” was interpreted as either initial setup or current maintenance costs, depending on how the user framed his response. Healthcare contributes a considerable amount of money to maintain their existing infrastructure, spending up to $50,000 a year for the entire health system.

Education varied depending on which incentives they took advantage of. Members of the small business sector approach ICT with a spare-no-expense mentality. Each small business informant mentioned their connection was part of a telecommunication bundle, where they can receive Internet, phone, and cable services from one provider.

Government is frugal in their maintenance costs for their connection. Banking is also investing a nominal amount to maintain service, one bank paying $41 a month for their DSL cable connection. Emergency services pay a considerable amount, but each informant indicated the expense of the connection was due to the nature of their work.

**QUESTION 2C**

Question 2C asks the rural user if they received any incentives to cover the costs of service. Healthcare had nothing to report. Education was at the greatest advantage with incentives. State grants, E-rate, and even free equipment were offered in order to connect to their ISP. Other sectors, such as small business and
banking, were offered free installation to curb initial costs of service. One member of the emergency services sector was able to take advantage of grants and an agreement with their ISP to cut costs.

**Objective 2: Identify how users in these rural communities are incorporating the existing advanced communications platform to motivate economic success within their given sector.**

**QUESTIONS 3, 3A, AND 3B**

Questions 3 through 3B asked the user to describe how the Internet has changed how they interact with individuals and business partners within the organization and the community. Healthcare has taken advantage of Web-enabled applications to maintain interactivity between offices, patients, and doctors located in different areas. They praise how the Internet has reduced travel time between hospitals, but also share concern that latency is affecting their ability to interact with sector entities. One healthcare informant noted how the speed of data transfer from the main office to one of the satellite offices is much faster than the return of data to the main office from the satellite office. He attributes that to the low bandwidth capacity of the local ISP for the satellite office.

Education has taken advantage of their infrastructure by increasing collaboration amongst school districts, with parents, and amongst school
teachers. Since each school district has their own Web site, interaction and information sharing with the community has increased, and residents with school children are signing up for Internet service from the home to keep up with the education sector.

Small business is taking advantage of the information-laden resources on the Internet to keep their business booming. They have moved from interfacing with vendors at certain times of the year to instantaneous orders and inventory replenishment. Printing and mailing expenses have reduced significantly for the informants, since they can use the Internet to market their services. Having the Internet available to clientele makes the business more appealing to visitors.

Government is using the Internet to find resources for the local community. Instead of printing out information, they can simply post details to the local government web site or email the required forms to the resident.

Banking notes the customer movement from lobby visits to Web site visits. Online banking has become more preferable, so the sector ensures their Web sites stay current. The key informants noted that other banks are in the area, so if someone is considering opening a new account, having the Internet as a resource makes them more attractive.

Emergency services across all communities use speed as a measurement of meeting objectives. The faster the information can be disseminated, the quicker the sector can move into preparation stage and deploy emergency assistance. The Internet allows for real-time interaction with customers. The tool is effective and reliable.
All sectors across all communities indicated how having the Internet has changed how they communicate internally and externally. Responses are instantaneous. Requests are satisfied within hours, not days. The users observed increased productivity within the same amount of time because of ICT. Email has become the communication norm in all sectors.

**QUESTION 4**

This question probes the user to think of ways others in their sector are using business-class broadband in ways they are not. Healthcare comes off as the most ambitious of sectors across communities. They have a robust infrastructure, and they maximize the capacity of the network, but they want to utilize it more. Some informants mentioned how other hospitals have more Web interaction with their patients, especially with billing and scheduling appointments. Latency and security are the two main deterrents as to why the healthcare sector in these communities is not exploiting their infrastructure to the fullest.

Education maximizes the capacity of their infrastructure and takes advantage of incentives to continuously upgrade what they are using. Web casting is one means of utilizing the Internet that each community would like to do more with. Overall, the education sector across communities is functioning at the latest and greatest that ICT has to offer.
The small business sector recognizes how other small businesses are using the Internet. One small business is considering moving their retail store online to increase their customer base. The business preparing to incorporate ICT in the workplace is looking forward to cutting out the middle man in their daily operations, having direct access to the information and supplies they need via the Web.

Government in each community is aware of the advantages that larger government entities have with the Internet. One government body does not have a local government website; they attempted to create one for the community but did not know how to keep the site updated. Others have websites but are not certain how to make them more interactive. The resources and the manpower required to keep up with interactive websites are not available to small governments. Each informant indicated a need for ICT resources to enhance their experience with business-class broadband.

Banking is content with their technological advantage across communities. One bank indicated they are a frontrunner in broadband technology, not only within the community but in comparison to their sector counterparts in urban areas.

Emergency services have the latest technology to support their 911 centers and emergency management office. They are aware of what other sectors are doing with ICT.
This question extends from the awareness of other sectors’ usage of the Internet to specific applications or programs others in their sector use. Lack of solid connectivity between offices restricts the healthcare sector from investing in certain applications or programs. Examples of programs were remote monitoring of intensive care units via the Internet and providing online education services for remote caregivers. Online applications or programs available to remote sites results in decreased windshield time. Decreased windshield time was expressed as a huge advantage for all rural economic sectors interviewed.

Education likes the thought of more video interactivity. This would allow for online professional development and alternate campuses for students. The informants across communities are attuned to the latest applications and programs that they can take advantage of because of their robust infrastructure.

Small business wants to consider taking advantage of video seminars, or Webinars, as a means to provide information to clients in remote areas. The more interactive their website can be, the more clientele they can attract. Windshield time is a particular concern, as traveling to clients incurs costs such as fuel, food, and overnight accommodations depending on where the businesses travel to.

Government envisions applications and programs that can help them provide more services to the community. Each government informant explained the size of their sector is so small that interactivity on the Web would alleviate
daily operations and increase response time. One informant indicated that it is more an issue of manpower and time than the availability of the programs or applications to keep government in business in the community.

Banking is moving from computers to mobile phones, considering mobile banking as the new application to take advantage of. This is interesting to note in that our focus has been interaction with ICT in the form of business-class broadband powering the Internet on computers. Mobile bandwidth has to be just as robust in order to make the mobile banking experience enjoyable for customers.

Emergency services want to extend their robust infrastructure to a wireless format, providing real-time data to emergency response vehicles all over the county. Having high-speed wireless would reduce the emergency responder’s need to return to the main office to enter and collect data. One emergency service provider wants to make high-speed Internet free for every emergency responder in the county.

**Objective 3: Identify how rural community ICT users envision using advanced communications in comparison to their neighbors, others in their sector, and business partners in order to support their business.**

**QUESTION 1A**

When each sector informant was asked how important they felt the Internet was, everyone responded positively. Healthcare finds the Internet vitally
important for their organization and the community they serve. One member of the education sector indicated that business-class broadband “broadens the ability to get a better education.” Small business feels lost without the tool. Government, banking and emergency services informants used “critical” to describe the relevance of high-speed Internet to their operations and to the community.

**QUESTION 3C**

Internet-based interaction, be it amongst members of the informants’ organization or their business partners, is important to daily operations. Healthcare informants noted the savings in time, effort and costs because of Web-based applications. Education finds the Internet to be an invaluable resource to the sector. Small business responded with degrees of appreciation. One small business representative appreciates the time saved by having the Internet available for business. Another small business representative did not note an impact to his daily operations, but did note that having the Internet increases clientele. Government varied in their responses as well. One community noted a minor impact, while another indicated a very important impact to their daily operations. Banking noted an importance but not significance to the informant’s daily operations. Emergency services, however, recognize that Internet-based interaction is essential to daily operations across communities.
**QUESTION 5**

The key informants were asked to envision business use of high-speed Internet in the community in the future. The visionaries of each community emerged within each sector. Healthcare envisions leverage in connectivity to increase serviceability in the area. With a fortified connection between offices, more Web-based interactive applications can be invested in.

Education recognizes that the Internet is the lifeblood of the community. Small businesses across communities see a potential for increased usage of ICT in the community, but the “Mom and Pop” establishments may be slow to jump on the bandwagon. Government envisions the same impact. Local businesses and farmers they support do not realize the benefit of ICT in the context of their profit margin.

Banking wants more variety in ISPs for their area to encourage competition. One banking informant indicated how people are relocating to the area because business-class broadband is available.

Emergency services envision a county-wide network that all emergency responders can take advantage of. One emergency service provider is moving forward by developing a county-wide delivery model called Cambria Connect. This is detailed further in the section on thematic portrayal of the business-class broadband experience.
QUESTION 5A

This question builds from the envisioning initiated by Question 4 and 5 to find out what particular applications or programs the key informants want for their community. One healthcare representative touched on different opportunities within the community. In particular, she described work from home capability with remote access to the main building, online pharmacy order filling, setting up web cameras in the local day care facilities for working parents, and remote access for doctors to diagnose patients.

Education across communities wants high speed Internet access to be affordable for the entire community. Small business mentioned ideas such as community-wide Wi-Fi, small business grants and funding for Internet-related projects. Government wants to see programs or entities that could assist local institutions and businesses with information technology. They want to increase broadband availability across the county with a minimal amount of government interference.

Banking informants are experiencing an increase in customers living in various areas of the county that they would like to provide Web-based services to. Emergency services informants like the thought of downloading county maps and other parcel information from websites. The informants mentioned computer aided dispatch and e-911 services as resources that could positively benefit the community.
Summary of Conciliation

The precise construction of the interview questions ensured that each research objective would be satisfied via the responses from each key informant. Rural users have robust ICT infrastructures and they pay primarily out of pocket to install and maintain it. Rural users have domesticated ICT to become part of normal business practices. Communication is faster and results are met in shorter timeframes in comparison to operations before the introduction of the Internet. Rural business-class broadband users envision various ways to use ICT in the community in the future. The primary delimiters of ICT’s potential for the future are the costs and the reliability of the connection.

Thematic Portrayal of the Business-Class Broadband Experience

Certain themes were observed from the organization of horizontal expressions. Again, the presentation of the data here does not assume a preference of one theme over another as each datum is equally observed. Some themes presented themselves more frequently within the transcripts. The often experienced themes are described below.

Experiences with the Phenomenon are Communitarian in Nature

Rural users enjoy the benefits of ICT, but go beyond the walls of their given sector in consideration of the community-at-large. They consider how the
technology not only helps them do their job, but it helps them keep community members informed, active, and involved in the local economy.

HEALTHCARE: We’re like a TiVo for the [local healthcare TV channel] and they can watch segments of all the archive sections off of our website provided that they have Internet service. Now we try to be considerate to folks who have dialup so we actually put it out there two ways; we have dialup quality and then we have broadband quality.

EDUCATION: Some students would like to take statistics to prepare for college. I would have to hire another math teacher, which is a financial burden in a small school district, but now students can get online and take a statistics course which includes the teacher…it’s paid through grant money. So it’s no cost to the parents. No cost to the school district. It’s a win, win, win for everybody, you know, and we probably have maybe 15 online courses for students in a given year taking micro, macroeconomics, statistics, biology, etc.

BANKING: The other thing that I see in this community is that Wellsboro is kind of a unique little town. There’s not a huge manufacturing base here, but one of the areas that we’re seeing expand are people who can work from their home and it doesn’t make any difference where they work in the country if they have access to an airport that is an hour or so away they certainly don’t have to worry about traffic if they do ultimately have to travel for a job it will, a lot of what they do can be done from home, and we’re getting people who want to raise their family in [a] good little community with good schools, and they can work from home. So that’s kind of a little niche there we’re seeing more and more of...

Visioning questions did not require any coaching on the observer’s part.

For some users, the opportunity to share their vision for the community indicated how greatly invested they are in the local community.

GOVERNMENT: People are, humans are, very, very much adapted and attuned to patterns and to be able to look at a map in color of say, the land use of Tioga County, it’s pretty apparent where our forests and where our farmland is just looking at that map, and so the opportunity to convey information quickly and concisely and in a manner that gets the message that you’re trying to get across is and would be, I mean those are some things that, Rob and I were commiserating on over the weekend that it would be really helpful
and really useful for the public to have access to that kind of information...

HEALTHCARE: I guess for me, I know there’s a lot of individuals that don’t utilize [the] Internet yet in this area. I don’t think the education is out there that should be. You know a lot of people in this area seem to be old school I guess, and I think there’s a lot to be learned. A lot of opportunities [for] the younger generation. Possibly more work from home which would be wonderful. Another thing that would be pretty neat is like the local supermarkets or to be able to, you know, say an elderly person couldn’t get out of their home, send their list via the Internet of what they want and have them...disburse things that way. I think that would be neat. The same with pharmacies and stuff. I know we do have an older community around here. Another thing being a mom like in daycares using the webcams...Maybe I should set that up...What else do we need? And there’s another thing too within the hospital here is having more advanced care doctors in different areas to be able to assess patients, critical patients here. That would be neat.

EDUCATION: We want to move more towards professional development for teachers online or through video, outstanding students picking up some college courses, some credits, or maybe computer aided drafting you know things again that we used to do with a real person in the room now kids can do it from home, maybe even have an alternate campus. It could also help us with students that don’t like to come to school for whatever reasons, prevent them from going to private, charter schools if we have our own school within a school, cyber school...

The Technologically Astute Like ICT Very Much

These types of users experience business-class broadband with an above average understanding of how the technology works. Users that experience broadband technology as an appreciator of the phenomena tend to have a robust ICT infrastructure.
EMERGENCY SERVICES: ...went to a T1 and that’s currently what we have, and we are actually maxed at that, and we are currently looking at upgrading that to even a higher speed or multiple T1’s...

HEALTHCARE: We connect to the Internet through our primary network here with a dedicated circuit, 6 Mbps Internet connection. We do have facilities that connect to the Internet using cable or DSL high speed Internet, and we also use some connections to the Internet that are not high speed with Verizon Wireless connections. It really depends on the facility and location what mode we use. We’re actually in the process of looking at upgrading that to 10...

By engaging the informant in conversation about the usage of the technology in the workplace, the informants were able to detail the utility of the technology down to specific workgroups.

HEALTHCARE: For all the entities that are members of the...health system which includes three hospitals, forty some doctors’ offices, diagnostic facilities and locations throughout the entire community ... they all connect to the Internet via the initially described connection... AT&T...We conduct an increasing percentage of our business over the Internet with business partners. We employ it for telecommuting services. We have roughly 30-35 employees telecommuting over the Internet ... to do transcription, coding, medical coding, and abstracting services. We also use it to transmit radiology images overseas during off hours to support patient care in our, principally our emergency department. And beyond that we, we use it extensively for EDI and other types of business services. Electronic claims payment, EFT and other things...

These users are content with their current infrastructure but mentioned more sophisticated infrastructure, programs and applications in their visioning. When describing such opportunities, they changed their facial expressions and tones, indicating a level of excitement associated with ICT.

EMERGENCY SERVICES: The big one in our world is remote CAD, computer aided dispatch, remote records management. A big part there is and I’ll use the police as our example; right now for police to do their paperwork which is a majority of their time, they have to sit in the station and do that work. One of our goals to work with their departments is to be able to allow them to do their paperwork
while they’re sitting on a street corner or somewhere so they can be out in the public eye and still do their paperwork as necessary rather than being behind the closed doors having to do it...

EMERGENCY SERVICES: You know if somebody needs certain maps or parcels or whichever right now you travel to the courthouse to get that information. Down the road it would be nice for them to be able to purchase it and just download it to them.

Rural users are technologically astute. They can easily relate to ICT because it is a component of their job duties. The user shares details on job responsibilities and knows that what she is responsible for impacts the entire organization. The user is comfortable with the technology because she knows how it works.

**The User is Focused on the Sector’s Needs over Community Benefit**

Rural users experience broadband technology in their workplaces. They tend to have more sophisticated technology at work than at home. Users are genuinely concerned about and support the affairs of their particular sector, but are not open to the thought of sharing resources or collaborating with other sectors in the community. When tasked to envision the impact of ICT on their community as a community member, they hesitated in responding. Some even found the question too difficult to answer. They can only frame the broadband experience in terms of their workplace.

HEALTHCARE: We can define the community in different ways. If we consider our physician community...
BANKING:

I: How do you envision business use of high speed Internet in this community in the future?

P: Boy that’s a tough question.

I: Why is it?

P: That’s a tough question because I don’t know what the future of Atlantic Broadband is.

Some users feel constrained by the advantages they have with ICT over other sectors. They are communitarian in nature but ultimately are restricted by sector needs.

EDUCATION: We aren’t doing enough of [community outreach] and it goes back to a previous question that you brought up about where the community is at with high speed Internet access, I think we need to explore that more, we use a district webpage certainly the community has access to that webpage. But as far as the school district reaching out to all members of the community, we have not done enough of that. Part of that is again because we recognize the fact that it’s not available to everybody.

EMERGENCY SERVICES: We are looking at putting in a mesh network in this community and in Mansfield that would be tied to wireless Internet. That would not actually be for the community that would be a closed network that would be used for emergency services but available to fire emergency, ambulance, fire and police. So we would be using that same spectrum both regular 2.4 gig and also a 5.8 license to pump data out of here that’s all IP based and can also be easily tied to the Internet as well for those, those people that are out in the field.

**Business-Class Broadband is a Critical Phenomenon but the User is not Personally Invested in it**

When framing the broadband experience, this user is able to detail the experience from the viewpoint of his clientele or the objectives of the business’
service. They do not have a personal investment in the technology, phrasing the technology as a separate entity from the job role.

**CHAMBER OF COMMERCE:** What should be in place already is. Our school is as Internet savvy and Internet using as any school...I saw my first exposure to the whiteboard where you do all this (pointing in different directions in the air)...with the finger, and that's fine. I wouldn't be without that. That is terrific stuff. I don't know if schools were on your list of interviews, but they are doing a terrific job using your high speed Internet.

**GOVERNMENT:** We have the DSL so that when we come in in the morning and turn on our computers we're automatically turned onto it.

These users respect the technology and understand how it is used within the sector, but are content with not incorporating it in their daily affairs.

**SMALL BUSINESS:** Personally it doesn't affect me at all. We do get a lot of reservation requests from tourists who want to come into the area and businessmen, and we do communicate back and forth as far as reservation needs and rooming needs...People seem to answer more quickly by email over the Internet as opposed to picking up the phone and calling. So that's why I usually use it more for the vendors...

**CHAMBER OF COMMERCE:** I probably personally don't use the Internet as much as other people in our office, but I can tell you that everybody in this office is way younger than I am, and I don't know how they survived without it. I mean there are constant communications going between committee people, people in the community, people seeking information; it happens all day long here. You know I, I am the one to still pick up the phone occasionally and talk to people.

Only one key informant from the sample, when visioning broadband technology’s role in the community’s future, directly stated it was of no use.

**CHAMBER OF COMMERCE:** No I think there's absolutely no need for it...we don't kick a winning horse in the ass, and since I worked for nothing we got the job done. If I get into all sorts of elaborate computerized stuff, somebody is going to have to draw a nice big salary, somebody is going to have to have a bigger office, a paid
staff, and it would not be sensible because we don’t need those great big things. We like them. We like the long range connection with [the Internet], but to actually [use] them, no. I’ll still use an ax to cut down a tree if I have to. I don’t need to be moving huge trees with chainsaws.

A Direct Answer to the Research Question

During the key informant selection phase, there was no intentional generation of names that could relay the business-class broadband experience in direct correlation to the research question. Unknowingly, we had identified the developer of Cambria Connect as a key informant.

This is an example of an individual that was confronted with a problem that directly impacted his sector. He sought to resolve the issue but, as a visionary, considered what the resolution would mean for the community.

The key informant’s primary focus as a member of the emergency services sector was to upgrade the existing communication technology with something more robust and less reliant on microwave bands, since the current ones had since been reallocated to other services by the FCC. The OC12 he intends to introduce to the county opens up an opportunity for the county to function as an ISP for local businesses and institutions needing Internet-based resources.

Seeking more knowledge related to this concept, he traveled to Allegheny County, Maryland and learned about the structure, capacity and serviceability of AllCoNet, a municipally managed network with private partnership. While AllCoNet satisfies Maryland’s particular interest in education and economic
development, the key informant’s model, officially known as Cambria Connection, primarily serves public safety for Cambria and neighboring counties.

The strength of the pipeline he plans to deliver ensures serviceability to businesses and institutions already in existence, provides an option to residents seeking a more robust Internet connection at home, and entices businesses and institutions to invest in this public service. The funds from subscribers generate revenue back to the county ISP, which is, in turn, invested back to Cambria County. Current private vendors will have to lease off his existing towers in order to continue or initiate service in areas of the county they would like to service.

Current businesses will find the price for the product enticing. Businesses considering development in this region will be sold on the fortified redundancy of the system, because it is primarily a public safety system.

The creator of Cambria Connect took a problem and expanded the solution to encompass education, healthcare, emergency services, small business, large business, and other sectors benefitting from ICT.

Putting all the hats that I’ve had on in the past I’m saying, why don’t we have firefighters? Because they’ve all left for jobs in other places they couldn’t get here. But then I’ve got industry looking for people that they don’t have jobs to fill, and I’ve got education saying that we don’t have the capabilities to train them if they were here. So I put the circle together. Well if I can find the jobs, I’ll have firefighters, but in order to get them I have to link education to them. And the stuff that I learned in Cumberland all came together. I can put up one system that will be smart economic practice, we can draw in business, provide educational opportunities and one will work hand in hand with the other for further development in my area. And if I can have jobs and have people here, I have economic development, It’s sort of a never ending circle; one party working with the next.
Summary of Thematic Portrayal

The research question asks to what extent is the business-class broadband experience being realized in rural communities deprived of metropolitan amenities. Six economic sector representatives from three communities framed their business-class broadband experience in different ways, but unanimously offer a view of the pervasiveness of the technology in their business or institution. The degrees of ICT utility vary depending on how technologically astute the key informant is. The degree of technological opportunity horizoned from the user’s description of their broadband experience was made apparent during the visioning portion of the interview script. ICT is part of existing businesses and institutional operations and is part of future planning for the community across sectors.

What Does It All Mean?

There is no argument that the data presented in the phenomenon matrix and described above is substantial. Now that each cell is filled in, the next step is to discuss the relevance of these responses. In Chapter 5, the research findings will be discussed. Inferences from the data will be provided. Policy implications from the data will also be discussed. Implications for future research will be detailed as well. The chapter will conclude with a challenge to community and economic developers. What does all this data mean to the rural user and for community and economic developers?
Chapter 5

Resolving the Rural Broadband Problem

Economists, sociologists, and community and economic developers are charged with interpreting the broadband problem within the context of their respective disciplines. By presenting the rural users’ responses in Chapter 4, it is realized that rural users are living the business-class broadband problem. Once again, theory and practice are not intersecting. The data collected to answer this research question invites opportunities to interpret it, to consider the ramifications of such knowledge, and to determine how knowing this information can help better the rural community experience. The phenomenon matrix is a mere glimpse into rural America. Each cell in each grid is a living, breathing definition of business-class broadband.

To conclude the research, inferences from the data are provided. The responses from the key informants are windows into the rural Pennsylvania experience. Suggestions for consideration are based on the responses from the key informants, but are applicable to the general population.

Particulars from the phenomenon matrix influenced ideas for policy, particularly the relevance of the data to the current debate on the digital divide in America. Implications for public policy are offered for the Commonwealth and towards developing a national broadband policy.
The beauty of exploratory research is that it sets the stage for various ways to interpret the data. Ideas for further research related to business-class broadband are offered. The phenomenon matrix is an invitation to manipulate the data set, to expand on it, and to analyze the data set.

The chapter is concluded with a challenge to community and economic developers, explaining their role in encouraging the pervasiveness of ICT in rural areas. The phenomenological research approach calls for a reflection on the research experience. Since the reflection portion of the thesis deviates from the scientific presentation of the research, it is provided in Appendix D, Reflections on the Research Experience.

**Discussion of Findings**

**If 512Kbps is not Enough, Then What Is?**

Deciding on a minimum value for advanced communication technology should be considered respective to the economic sector’s basic operations. The research shows that rural businesses and institutions are using ICT to the best of their ability based on the accessibility and affordability of it and their familiarity with it. It is impressive to observe robust networks providing speedy transfer of data over the FCC standard for advanced communications technology. To witness a key informant describe how 6 Mbps hinders productivity makes the observer wonder if defining a benchmark speed is futile. Each sector
demonstrated how much they incorporate ICT in their daily operations. Each economic sector has unique technical requirements for organizational operations and serviceability to rural residents. Interest groups and organizations proposing a federal increase from 200 Kbps to 512 Kbps should shoot higher.

**Economic Sector Collaboration**

Rural users in Pennsylvania average 2-3 Internet service providers in their community. Every sector interviewed, save for education, had to come out of pocket to pay for a basic infrastructure. Only those that can afford dedicated fiber can take advantage of such a robust connection. Reliable, redundant networks are what keep rural economic sectors connected to their business partners, sector employees and the community members they provide for. Demand for ICT is clearly expressed in the research sample. ISPs in the area have an opportunity to provide faster, more reliable services to the community at an affordable cost. For example, if it means that Frontier Communications and Verizon have to compete against each other for exclusive provision of dedicated fiber for local small businesses in Wellsboro, then the competition should be encouraged. The encouragement for competition can come from the community. The power of collaboration can be used to aggregate demand and entice private ISPs to sophisticate their service products.

Perhaps the other economic sectors besides education should collaborate similarly to the intermediate units created amongst school districts in
Pennsylvania, organizing in an inclusive fashion, sharing ICT resources, and distributing costs so that the business-class broadband experience can be evenly enjoyed. Since each sector across communities share commonalities as far as organizational design and service objectives, they can better collude on the technological needs for their sector.

Developers Can Build Bridges in Rural Pennsylvania

Community and economic developers, infused with ICT knowledge, can relate the convenience of the technology to the culture of the community. Information and communication technology is pervasive across every sector and every community observed in rural Pennsylvania. The degree of technological opportunity amongst sectors varies by how technologically astute the rural user is. The government and small business sectors interviewed for this research demonstrated a will to incorporate and domesticate the technology in order to continue business, but they are not sure how. These two sectors in particular can go into many details about how others in their sector are incorporating the Internet in ways that they cannot. They have a vision for the technology, but the vision is blurred by lack of education. Government and small business are two entities of extreme importance to rural communities. This is where community and economic developers can help.

Local resources such as the Chamber of Commerce or County Cooperative Extension should be revamped to include technology educators, technology
coordinators, and other experts with strong ICT competencies. Rural community and economic developers have a strong sense of community, understand the rural way of life, and are cognizant of the value of collaboration in solving regional issues. Developers have to come to terms with what they are not cognizant of or are hesitant to learn about in regards to ICT. The technology has presented itself as the proverbial pink elephant in the room; it exists and has a function but developers as change agents are not incorporating ICT into their community responsibilities.

**Encourage Knowledge and Information Economies in Rural PA**

Traditionally, manufacturing and wholesale trade have been contributors to the local economic base, but it would not hurt to fortify the local economy with information and knowledge-based sectors. Rural users experience decreased external costs and increased conveniences because of business-class broadband in rural PA. Users provided examples of shifts in population density, transportation, and provision of goods and services. Thus, ICT presents the opportunity for rural communities to become self-sustaining central places. In that regard, rural communities in Pennsylvania can do more with what technological assets they have. This is significant especially for the communities that were showcased here, each with a natural resource extraction history. Marketing the business-class broadband infrastructure to information-based industries is one way to promote economic growth in these spatially isolated
regions. Collaboration amongst local businesses and institutions to promote a diverse economic base can result in blanket benefits for the entire community.

**Implications for Public Policy**

Now that granular data has been collected at the community level, the next step is to commence discussion on the existing data’s relevance to current telecommunications policy. Thanks to twenty key informants we have a better understanding of who in rural Pennsylvania does and does not have access to the Internet, how rural Americans are using it in businesses or institutions, how much it costs to have it, how would they use it if they could get their hands on particular applications or programs, and what community attributes promote techno-economic growth.

**Decide on a Community-centric Delivery Model**

Reiterated here from Chapter 1, a rural community without advanced communications technology is at a local and global economic disadvantage if accessibility to the technology is restricted or denied. In the same chapter, we introduced the concept of recognizing broadband technology as a public good. The suggestion was that the preferred delivery model should be reflective of the given community’s values. Whatever delivery model is agreed upon, it should be designed so that it attracts people, businesses and institutions to the given community. An example of a public, community-centric delivery model was
revealed by Cambria County Emergency Services. Hints towards a community-centric model were suggested for Tioga and Elk Counties as well. It is exciting to observe this discussion. Visionaries within each community will be the catalysts for such a model. This is not to say that private companies should be excluded in the development of community-centric delivery models. There is room at the table to discuss partnerships in delivering a community-centric model that encourages competition and promotes community well-being.

Business and institutional users are content with their existing connections, but latency in bandwidth determines whether or not services can be delivered beyond the main office. Sectors with satellite offices are particularly concerned in that their serviceability - to other communities and their own staff - is challenged by non-existent ISPs or ISPs providing lower bandwidth than necessary. Certain sectors have measures to regulate latency that other sectors find difficult to afford. Rural businesses and institutions are well in the race, but need stronger bandwidth to keep up in the global economy. In developing a community-centric delivery model, reliability and redundancy needs to be guaranteed.

**Revise Existing Policy to Promote Fair Competition**

Rural businesses and institutions in Pennsylvania are keeping up with the Joneses, or, e-Joneses in the sense of the technology. Institutions are delivering sector-specific services in a more efficient and quick manner to their
communities. Having ICT available and accessible allows for collaboration opportunities amongst community members, leaders, and service providers. Rural communities are incorporating advanced communication technology to motivate economic success with a vengeance.

Broadband allows for extra resources and tools never imagined for rural communities. In this sense, advanced communication technology motivates economic success and fortifies a sense of community. Rural users are invested in their community and want to maintain local values and norms by including the Internet.

Rural relationships have been enhanced, not removed, with the introduction of business-class broadband in rural America. To better serve Pennsylvania, Commonwealth legislation should be reconsidered so that all economic sectors, not just education, benefit from broadband incentives that assist with first mile investment and infrastructure upgrades. These same policies need to break from encouraging the cable and phone company duopoly and allow local municipalities, eager entrepreneurs, and public-private partnerships to compete in providing Internet services and broadband infrastructure in rural communities. Competition encourages creativity and innovation on the provider’s end and provides options and flexible prices on the consumer end.
Revisit Plans for a National Broadband Strategy

Any policy related to business-class broadband should affirm what needs to be technologically, socially and economically accomplished instead of who should be accommodated. Formulating a national broadband strategy requires input from the rural user. These users want a delivery system that is reliable, affordable, convenient, and non-exclusive. Broadband technology is the new public infrastructure and merits universal access across the Commonwealth as well as the nation. Even the current presidential candidates are infusing their rally speeches with implications of broadband as a public infrastructure. Senator Barack Obama, during his visit to Penn State University Main Campus on March 30, 2008, indicated that investment in America includes constructing public infrastructures such as roads, bridges, and broadband lines.

The Computer Science and Telecommunications Board of the National Research Council indicated that formulating a national broadband strategy starts with collecting data at the community level. This research is a jump on that imperative. The rural user has significant clout in the argument for revising existing telecommunications policy. Just like the days of the telephone, rural users are going to incorporate their self-reliance, independence and pride to ensure the availability of ICT in their communities with the assistance of the federal government or otherwise.
Implications for Further Research

The phenomenon matrix is rich with data to build from. From here, one could increase the sample size, change the research approach, or create another data array and provide inferences from there. Several ideas were developed during the course of the research and after reviewing the contents of the phenomenon matrix. The top three suggestions are described below.

Perform Data Analysis Using a Different Approach

The six sectors identified per community scraped the surface of what is happening within sectors across communities. The phenomenon matrix is data in raw form, which can be interpreted qualitatively or quantitatively. The sample size could be increased using the same criteria as was used in this research. Now that the type of ICT platforms used in rural communities have been specified, the platform type can be used as a qualifier. A suggestion would be to increase the sample size by sector. A study about telecommunications availability for education in Pennsylvania was referenced in the literature review. Focusing on one sector across communities could help provide information on how ICT impacts sector operations.

Another way to look at the data is from the perspective of the Internet service provider. Rural users in Pennsylvania described the limitations and benefits that come from the local Internet service providers. Using the phenomenological approach to witness the Internet service provider’s experience
with providing business-class broadband to rural communities would be a valuable perspective, especially when considering existing policy. There are two sides to every argument.

Quantitative researchers may seek to model the research data. Described in Chapter 3, variances in particular attributes described by the key informants can be converted to quantifiable values. This is especially significant to consider for those wanting to design an economic model of the business-class broadband experience. Another thought was to model the relation of ICT bandwidth to sector profitability. A hypothesis was developed during analysis of the data, considering that increased bandwidth yields increased profit for a given sector.

**Spatial Representation of Data**

The government representative from Tioga County noted how people naturally respond to visual representations of data. He was referencing GIS as an application to develop maps and local data for customers. More than one key informant connected GIS with the Internet as a means to deliver pertinent information to those they serve. In Chapter 1, the concept of broadband mapping was introduced. The suggestion came from the National Research Council to take all accessed points per community and spatially present such data so that underserved and bypassed communities could be easily identified. Converting the existing data into spatial data presented in GIS layers would make for an interesting representation of the broadband experience in rural Pennsylvania.
Explore Existing Community-centric Models

Delivery models that complement the social, economic and technological culture of rural communities do exist. Initially, when the research question was being developed, an exploration of an open access delivery model and its applicability to rural Pennsylvania was considered as a topic. Open access is lightly mentioned in Chapter 1 as an example. This data reveals components of each sector and each community that supports a community-centric delivery model. Other types mentioned are public-private delivery models, municipally-owned models such as Cambria Connect, and local entrepreneurial designs. The relevance of local technological opportunists should be a factor in suggesting a delivery model that compliments the rural community. The community-centric delivery models should encourage a diverse economic base, avoiding putting one sector at an advantage over others.

The Challenge to Community and Economic Developers

The community and economic developer functions as a bridge builder, as a collaborator, and as a change agent for the communities they serve. These basic attributes are not lost in the introduction of ICT to rural communities. Community and economic developers are challenged to embrace broadband technology as another societal change that has to be introduced, explained and incorporated into rural communities. Not every developer is comfortable with information and communication technology.
The challenge then, is for the community and economic developer to become a technological opportunist, an ICT cheerleader of sorts, regardless of her personal confidence in the technology. This innovation is no different than the tractor, the railroad, or the telephone. The community and economic developer is responsible for ensuring that everyone in her given community has the same opportunities with this technology as they do any other technology afforded them. If the developer does not know how to start this conversation, they should seek out those that do and push for technological change. Doing so ensures rural community sustainability and validates the purpose of the rural community and economic developer.

**Further Questions and Conclusion**

The results from the data roused further questions that should be considered as the broadband experience continues to be discussed and researched:

- Are community and economic developers capable of bridging ICT and the community they service together? Current training and development may not reflect the diffusion of ICT into rural communities and thus may not adequately prepare a developer for this growing community concern.

- How much would it financially cost Pennsylvania to design a statewide broadband infrastructure available to all citizens and
organizations? The data shows clear cost disparities experienced in all six economic sectors in terms of broadband investment.

- What are the policy strategies to implement a broadband infrastructure available to all citizens and organizations, and what are the comparative costs and benefits of each strategy? Again, with so many different actors framing the broadband experience there probably are several policy solutions.

- What is the social, economic, and political opportunity cost (measured in terms of benefits foregone) of not building a robust rural broadband infrastructure? Pennsylvania’s rural communities are teetering between being at an advantage and being excluded from the advantages of business-class broadband.

- What are the implications of a widely available, easily accessible broadband infrastructure developed for collaboration among businesses and institutions within and across sectors and, consequently, for improving economic efficiency and performance?

In closing, the rural business and institutional user’s experience with business-class broadband in rural Pennsylvania was examined in this exploratory research. The rural community experience has been enhanced by yet another technological innovation. The challenge is for community and economic developers to ensure this technology is experienced at its fullest potential for all members of the community they serve. Moving forward, the fields of regional
planning, community and economic development, public policy, and advanced communications technology all have significant considerations to make in incorporating ICT into rural America.
References


Center, GVU. 1997. GVU's 10th www user survey.  

Center, Southern Rural Development. Connecting rural communities.  


Development, PA Department of Community and Economic. Imapdata.  


Appendix A

Phenomenon Matrix

The proceeding charts are the summarized experiences of the rural user in America. For every community and every sector, the answers to the interview questions were inserted in a cell. The actual question from the interview script will be listed before each matrix as a reference. The entire script can be referenced in Appendix B.

“How do you connect to the Internet in this office and how do you use it? If you don’t connect to the Internet, why?” “What Internet service provider does this office use?”

<table>
<thead>
<tr>
<th>Question 1 &amp; 2A</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>T3 connection with AT&amp;T. 25 mbps up and down with scalability of 40mbps.</td>
<td>DSL wireless provided by North Central with backup DSL connection provided by Wind Stream.</td>
<td>Dedicated circuit provided by Frontier pushing 6mb up and down. Other facilities have DSL and wireless as their connection.</td>
</tr>
<tr>
<td>Education</td>
<td>Dedicated fiber with wireless distribution provided by IU pushing 4mb up and down with 1 gb scalability.</td>
<td>Dedicated fiber with LAN connection thru Sting Communication</td>
<td>Wide area network provided by Verizon. Pushes 100mb up and down.</td>
</tr>
<tr>
<td>Small Business</td>
<td>Cable modem DSL connection through Comcast. The bandwidth was No Internet connection.</td>
<td></td>
<td>DSL Wi-Fi connection provided by Pathcom. Pushes</td>
</tr>
</tbody>
</table>
undeterminable |  
| Government | Cable modem DSL connection provided by Comcast. It pushes 50 mb up and 100mb down. | DSL connection provided by North Central. | T1 provided by Frontier. Pushes 1.5mb up and down.  
| Banking | wide area network managed from the main office in Altoona using DSL cable. pushes 384kbps up and 3 mb down | Cable modem DSL connection provided by Atlantic Broadband. Pushes 1mb up and 2 mb down. | 6 T1s bundled and provided by Frontier. Pushes 6mb up and down.  
| Emergency Services | T1 line provided by Verizon. | Microwave wireless connection provided by North Central. Pushes 54mb up and down. | T1 line provided by Frontier. Pushes 760kb up and 1.5mb down.  

“How important do you feel the Internet is for this organization and this community? Please explain.”

<table>
<thead>
<tr>
<th>Question 1A</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>Vitally important</td>
<td>Extremely</td>
<td>It’s actually becoming more important every day</td>
</tr>
<tr>
<td>Education</td>
<td>Absolutely critical</td>
<td>Broadens ability to get a better education</td>
<td>Lots</td>
</tr>
<tr>
<td>Small Business</td>
<td>Lost without it</td>
<td>No experience/feel it would be very important</td>
<td>Extremely important</td>
</tr>
<tr>
<td>Government</td>
<td>Critically important</td>
<td>very important</td>
<td>The distinct advantage of having high speed Internet is it’s like having the Library of Congress on your desktop.</td>
</tr>
<tr>
<td>Banking</td>
<td>integral</td>
<td>critical</td>
<td>Not something that really impacts day to day</td>
</tr>
</tbody>
</table>
Emergency Services | Very | invaluable | Critical

“Do you have a choice of providers in this community? Who are they?”

<table>
<thead>
<tr>
<th>Question 2</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>AT&amp;T, Verizon, Atlantic Broadband</td>
<td>North Central Pennsylvania Regional Planning and Development Commission, Windstream</td>
<td>Frontier, Penteledata</td>
</tr>
<tr>
<td>Education</td>
<td>Comcast, Verizon</td>
<td>North Central Pennsylvania Regional Planning and Development Commission, Windstream</td>
<td>Penteledata, Verizon</td>
</tr>
<tr>
<td>Government</td>
<td>Comcast, Atlantic Broadband, Verizon</td>
<td>North Central Pennsylvania Regional Planning and Development Commission, Windstream, Verizon</td>
<td>Frontier, ChiliTech</td>
</tr>
<tr>
<td>Banking</td>
<td>Comcast, Atlantic Broadband</td>
<td>Verizon, Atlantic Broadband, Verizon Wireless, Direct TV</td>
<td>Not really sure what they are</td>
</tr>
<tr>
<td>Emergency Services</td>
<td>Comcast, Atlantic Broadband, Verizon</td>
<td>North Central Pennsylvania Regional Planning and Development Commission, Windstream</td>
<td>Frontier, Blue Ridge Cable</td>
</tr>
</tbody>
</table>

“How much did it cost to receive the service?”

| Question 2B | Nanty-Glo (Cambria County) | Johnsonburg (Elk County) | Wellsboro (Tioga County) |


<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
<th>Incentives</th>
<th>Other Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>$50,000</td>
<td>N/A</td>
<td>$1000</td>
</tr>
<tr>
<td>Education</td>
<td>$50,000</td>
<td>Free</td>
<td>N/A</td>
</tr>
<tr>
<td>Small Business</td>
<td>$130</td>
<td>No Internet</td>
<td>$12,000</td>
</tr>
<tr>
<td>Government</td>
<td>$69.95</td>
<td>$120</td>
<td>$400</td>
</tr>
<tr>
<td>Banking</td>
<td>$41</td>
<td>Approx. $100</td>
<td>Free</td>
</tr>
<tr>
<td>Emergency Services</td>
<td>$735</td>
<td>N/A</td>
<td>$1500</td>
</tr>
</tbody>
</table>

“Did your organization receive any type of incentives to cover the costs of service?”

<table>
<thead>
<tr>
<th>Question 2C</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Education</td>
<td>State grant, E-rate, Classroom of the Future Grant</td>
<td>E-rate, state grant, free videoconferencing equipment</td>
<td>State grant, E-rate</td>
</tr>
<tr>
<td>Small Business</td>
<td>None</td>
<td>$4.99 installation and no rewiring</td>
<td>None</td>
</tr>
<tr>
<td>Government</td>
<td>None</td>
<td>None</td>
<td>N/A</td>
</tr>
<tr>
<td>Banking</td>
<td>None</td>
<td>None</td>
<td>Free installation</td>
</tr>
<tr>
<td>Emergency Services</td>
<td>None</td>
<td>Grants, agreement with ISP</td>
<td>None</td>
</tr>
</tbody>
</table>

“How has the Internet changed how you interact with other individuals and business partners that affect the service you provide? Within your business or organization? Within this community?”

<table>
<thead>
<tr>
<th>Question 3-3B</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>Is an administrative tool; file sharing and talking over the Internet to other entities; rarely receive a fax;</td>
<td>Vendors, doctors home health nurses use remote access to access the health system; they can import and export</td>
<td>A lot more interactive, no only email but doing online depositions and online claims submissions and</td>
</tr>
</tbody>
</table>
business learning using video conferencing via the Internet; desktop sharing use extensively for training and product demonstrations; cut down the need for organizations to travel here or us to them

patient data via the web

writing, postings and things of that nature that are tied to the Internet; interact with them a lot more; treat email similar to an instant message type of solution; makes the interaction with local businesses a little quicker, a little less formal, but a little bit easier to take feedback more frequently

Education

Unlocked the door and opened the door of communication to extents we could never imagine; internal communication or professional development information takes literally days using old traditional mail boxes and hand delivering; technology has changed that so almost instantaneous using email; share resources and communicate will other schools and vocational schools; don’t think we are doing enough with community; community has access to webpage

Communication is more spontaneous and available; can take a whole group of kids on a virtual field trip; facilitates communication between schools and other superintendents; a time and cost saver (long distance calls)

District forums on website so claims, requests, orders all done on the Internet; become basically paperless; payroll is done electronically; every employee in this district has direct deposit; teachers use streaming video in instructional process; post all event information on website; use a messaging service so if we close school because of weather use the Internet to send message within 15 minutes

Small

Always researching

Change to online

Personally doesn’t
<p>| Business | new and better ideas to market business; help find areas that people need help in; keep in contact internally via email; can work from home if sick, real bad snow days, have kids at home or taking care of an elderly parent: connect with churches and organizations and email instead of physical mail information; send advertising via email; saved quite a bit of revenue | catalogs for purchasing supplies; interaction with local newspaper will be digital; change how they will conduct research; don’t think it would really impact community | affect; tourists and businessman communicate back and as far as reservation needs and rooming needs; use the Internet to contact food vendors and equipment providers; people seem to answer more quickly by email over the Internet as opposed to picking up the phone and calling; communicate with the Chamber, the Visitors Bureau and other establishments when have questions amongst each other; don’t think Wi-Fi has really sunk in to the community |
| Government | Not greatly; doing some purchasing online | Keep up on changes and news going on in the world; email back and forth with other departments; customers with questions can get answers and can keep in touch via email | Normal day to day contacts most communication is by email; transfer files and information; has a scanner so can scan documents; does a lot of copying of information to folks and keep them informed, included in communication loops; distribution lists set up for various volunteer organizations and committees; turn computer on Monday morning, and don’t shut it off until |</p>
<table>
<thead>
<tr>
<th><strong>Banking</strong></th>
<th>With website employees know the face we project to the outside world; products are all publicized; Internet banking enables customers to look up information they normally would call for; have access to their accounts when physical offices are not available; working sector of client base are learning to do more online</th>
<th>Email communication is a really critical function; use vendor websites to buy supplies; use websites to purchase bonds for customers</th>
<th>Not really; all the information I need access to is provided through our internal software systems; website is something that the younger generation needs and requires; make sure we have an upgraded website for them to be able to formulate some opinions about us</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emergency Services</strong></td>
<td>The faster you get the information, the faster you can disseminate and prepare; more users on county system slowed the process</td>
<td>New ICT gives true connectivity to remote offices and agencies; able to transfer data and maintain records; information for customers is real-time and effective</td>
<td>Communications between office and state emergency operations center share homeland security information, time sensitive data on an hourly basis; use an encrypted chat room that allows to log incidents and do emergency management issues over it; weather instruments gather local weather and pushing that to the Internet; National Weather Service, news organizations, weather services use this data; remote access to server; website has information for</td>
</tr>
</tbody>
</table>
department and entire courthouse; community get in contact with, send emails, find information, ask question through website

**How important are those connections to your daily operations?**

<table>
<thead>
<tr>
<th>Question 3C</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>Saves a lot of time, effort and costs</td>
<td>Definitely extremely, extremely important</td>
<td>Considered critical</td>
</tr>
<tr>
<td>Education</td>
<td>Wouldn’t be anywhere near as effective</td>
<td>Very important</td>
<td>Invaluable</td>
</tr>
<tr>
<td>Small Business</td>
<td>It just is time saving</td>
<td>N/A</td>
<td>It doesn’t</td>
</tr>
<tr>
<td>Government</td>
<td>Minor impact</td>
<td>Very important</td>
<td>If we didn’t have the communication tools we’d be back in the dark ages</td>
</tr>
<tr>
<td>Banking</td>
<td>Very important</td>
<td>A non-critical service</td>
<td>Don’t think makes any significant difference</td>
</tr>
<tr>
<td>Emergency Services</td>
<td>They do and don’t affect operations</td>
<td>Can’t do without them</td>
<td>Essential</td>
</tr>
</tbody>
</table>
“Are you aware of other related businesses or organizations using the Internet in [sector] in ways that you’re not?”

<table>
<thead>
<tr>
<th>Question 4</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Healthcare</strong></td>
<td>Other organizations have a way for patients to directly have access to their own healthcare to do self scheduling and pay their bills online; have web-based board of directors interaction</td>
<td>No; utilize everything pretty much to the max</td>
<td>Patients go online and scheduling their own office visits, having them go online and checking their clinical results; more software applications are web based; limited in that with the rural environment</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>Other schools offer online courses, have video using high speed Internet</td>
<td>Most of other schools are doing the same kinds of thing that we’re doing; some schools are doing web casting</td>
<td>Others use a higher degree of blendedschools.net</td>
</tr>
<tr>
<td><strong>Small Business</strong></td>
<td>Others use websites for sales</td>
<td>Others have e-newsletters, bank of information for research, data related to Funeral Directors Association</td>
<td>Using it in the same fashion as far as communicating</td>
</tr>
<tr>
<td><strong>Government</strong></td>
<td>There are some that will allow taxpayers to pay their taxes online</td>
<td>Others have their own website</td>
<td>Websites that allow people to download GIS maps; small county governments don’t have the resources and the manpower to keep up with that advancing technology</td>
</tr>
<tr>
<td><strong>Banking</strong></td>
<td>No</td>
<td>No; very technologically astute and a frontrunner in technology</td>
<td>Don’t think so</td>
</tr>
<tr>
<td>Emergency Services</td>
<td>Right now we’re kind of the norm of what goes on with emergency services at the county level for operating 911 and emergency management</td>
<td>Hospitals use high speed data to send records to other hospitals and higher critical care hospitals</td>
<td>No</td>
</tr>
</tbody>
</table>

“Are there applications or specific programs that require the Internet, that others in [sector] are using, that you would like to use? If yes, what are they? If no, why not? Are there specific barriers?”

<table>
<thead>
<tr>
<th>Question 4A</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>Remote monitoring of ICUs; online education services for caregivers and patients</td>
<td>No</td>
<td>As the speeds get better, video conferencing would be an area; we have locations 30 or 40 miles away meeting would be nice there to be able to do video conferencing than to travel; some of that is to have reliable connectivity and getting the resources improved in some areas; we don’t do [home health care] because it’s just not a good solid connectivity where the nurses would be traveling to; those kind of things would be greatly improved as Internet access improves</td>
</tr>
<tr>
<td>Education</td>
<td>If I heard them I’d probably say yes we’d be interested in that</td>
<td>Online professional development, alternate campus like</td>
<td>Fully interactive video conferences</td>
</tr>
<tr>
<td>PSU World Campus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Business</td>
<td>Webinars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business website</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>Customer access to past accounts, water account, sewer accounts, in a central file; incorporate GIS borough wide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Online grant applications, look up sample ordinances</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I don’t think it’s an issue of software and application programs as much as it is time to just getting online and getting going; because the department is small his time is diverted to other projects and other things, and that slows down the development of those kind of things</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banking</td>
<td>Internet banking by phone; opening accounts online</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile banking</td>
<td>Leave to Marketing and MIS departments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Services</td>
<td>Mobile data in every county emergency vehicle; free high speed Internet service to every police department, fire department and ambulance service in the county</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High speed wireless for emergency response vehicles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computer aided dispatch, closed mesh network for emergency services</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“How do you envision business use of high-speed Internet in this community in the future?”

<table>
<thead>
<tr>
<th>Question 5</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>Leverage of Internet connectivity to interconnect facilities</td>
<td>Everyday use</td>
<td>More and more software vendors offering Internet based applications as an option versus buying your own servers; to look at</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Benefits</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Don’t see any really major advantages</td>
<td>Life blood for our community; feel it would be very effective</td>
<td></td>
</tr>
<tr>
<td>Small Business</td>
<td>Going to really help the area, bring the businesses in</td>
<td>Sure that most businesses in town use it quite a bit</td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>Local businesses with websites, online ordering from local restaurants</td>
<td>Most people will have it if they don’t already</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video arraignments/video conferencing</td>
<td></td>
</tr>
<tr>
<td>Life blood for our community; feel it would be very effective</td>
<td></td>
</tr>
<tr>
<td>Sure that most businesses in town use it quite a bit</td>
<td></td>
</tr>
<tr>
<td>Don’t think the Mom and Pops kind of institutions or businesses will get on</td>
<td></td>
</tr>
<tr>
<td>the bandwagon</td>
<td></td>
</tr>
<tr>
<td>Going to really help the area, bring the businesses in</td>
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<tr>
<td>Local businesses with websites, online ordering from local restaurants</td>
<td></td>
</tr>
<tr>
<td>Most people will have it if they don’t already</td>
<td></td>
</tr>
<tr>
<td>folks want to buy local here. They want to support their local businesses;</td>
<td></td>
</tr>
<tr>
<td>they’ve seen the loss of business diversity in their communities as a</td>
<td></td>
</tr>
<tr>
<td>result, and so they would like to buy local, but the convenience piece</td>
<td></td>
</tr>
<tr>
<td>enters into that equation often times and then you can get on the</td>
<td></td>
</tr>
<tr>
<td>Internet, find what you’re looking for, and use plastic and have it</td>
<td></td>
</tr>
<tr>
<td>delivered to your door. There’s no reason why a local business couldn’t do</td>
<td></td>
</tr>
<tr>
<td>the same thing; [farmers are] rapidly going to find out that if they had</td>
<td></td>
</tr>
<tr>
<td>that ability they could increase their market share and grow their</td>
<td></td>
</tr>
<tr>
<td>business without a lot of extra marketing hassles; being able to provide</td>
<td></td>
</tr>
<tr>
<td>the information we have here in the courthouse online is going to be</td>
<td></td>
</tr>
<tr>
<td>very helpful for the public as well</td>
<td></td>
</tr>
<tr>
<td>Banking</td>
<td>It will increase</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Emergency Services</td>
<td>Cambria Connect available to everyone</td>
</tr>
</tbody>
</table>

**“What kind of applications or programs which require the Internet do you think would positively impact local businesses and residents within this community?”**

<table>
<thead>
<tr>
<th>Question 5A</th>
<th>Nanty-Glo (Cambria County)</th>
<th>Johnsonburg (Elk County)</th>
<th>Wellsboro (Tioga County)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>Resolve coverage issues</td>
<td>Work from home; supermarkets and pharmacies taking online orders; webcams in daycare; advanced care doctors in different areas able to assess patients remotely</td>
<td>The ability for patients to view results or physician notes online; having more access or reliable access in the rural areas is going to be an issue; the only other area of Internet concern would be security and it’s still a never ending ordeal with patient information and I’m sure with other businesses it’s the same. The security is still a big concern</td>
</tr>
<tr>
<td>Education</td>
<td>Get high speed Internet access at an affordable price for</td>
<td>Access PA; local retail businesses with websites</td>
<td>Lower start up costs for business</td>
</tr>
<tr>
<td></td>
<td>residents of the community</td>
<td>Grants and funding for projects</td>
<td>City council start thinking about going anywhere in any store or any business and have accessibility to the Wi-Fi</td>
</tr>
</tbody>
</table>
|--------------------------------|-----------------------------|--------------------------------|-------------------------------------------------------------------------------------------------
| **Small Business**             | Don’t know                  | Put all our email addresses out there | One of the goals in our comprehensive plan is to increase broadband availability and to facilitate the availability of Internet service across the county, but in a lot of respects that facilitation is assisting local governments in having conversation with business with the private sector to actually develop that kind of infrastructure; I’m not in a position to go out and run cable or T1 lines to all the people that could use it or need it, and so my job is to set the stage so that can happen with the minimal amount of government interference |
| **Government**                 | PayPal as a form of payment; programs or entities that could assist businesses with information technology; help with business web page design |                                |                                                                                                  |
| **Banking**                    | Email; online banking; emergency alert systems; tourism; advertising; medical applications | Towers where customers are      | No                                                                                               |
| **Emergency Services**         | Cambria Connect             | Computer aided dispatch; purchase and download state and county maps or parcels | No                                                                                               |
Appendix B

Interview Script for Key Informants

Community: ____________________________________________________________
Date: ________________________________________________________________
Time: _________________________________________________________________
Place: ________________________________________________________________
Name: _________________________________________________________________
Title: _________________________________________________________________
Length of time held this position: ________________________________
Opening Statement

Thank you for sparing time to visit with me. Today we're going to discuss your experiences with advanced communication technology in this workplace and as a representative of the [banking/education/emergency services/local government/healthcare/small business] sector. A popular advanced communication technology used by businesses and institutions is business-class broadband. Business-class broadband is also known as “high-speed Internet”. Business-class broadband delivers 512 kbps or greater when you upload and download data; it is always on, and it offers redundancy to prevent connection failure. This interview is going to explore the use of or potential for business-class broadband in rural communities.

Your definition of high-speed Internet may differ from ours. Regardless of the Internet connection you are using, we still are interested in hearing about your experiences with the advanced communication technology that provides Internet services to your workplace. If you are not using business-class broadband, then the information provided will provide insight as to why not and, if you could, how. The information you provide me today will contribute to identifying how businesses and institutions in rural Pennsylvania connect to the Internet, how these users conduct their businesses using advanced communication technology, and how Internet users in your sector envision using high-speed Internet to keep this sector in business here in this community. Our research focus is on your high-speed Internet experience as a member of this sector and as a member of this physical community. Do you consent to participate in this interview? (use his name, wait for response) Do you have any questions before we begin? (use name, wait for response)
We will now discuss your experience with the Internet

The User Experience

Question 1: How do you connect to the Internet in this office and how do you use it? If you don’t connect to the Internet, why?

(you want to get at barriers to provision and access.)

Make sure to:

(probe for technical specifications whether they do or do not use the Internet; need to know what platform does exist)

(specify time at work if they do connect to the Internet; home experience not relevant)

(probe for the terms “high speed Internet” or “business-class broadband” within the response)

a. How important do you feel the Internet is for this organization and this community? Please explain.
Now we’ll focus on the organization’s experience with broadband

Institutional Experience

Question 2: Do you have a choice of providers in this community? Who are they?

(probe for exact names)

a. What Internet service provider does this office use?

b. How much did it cost to receive the service? (ask to be as exact as possible)

c. Did your organization receive any type of incentives to cover the costs of service?

Question 3: How has the Internet changed how you interact with other individuals and business partners that affect the service you provide?

a. ...within your business or organization?

b. ...within this community?

c. How important are those connections to your daily operations? (do not have to ask if it is made clear thru a & b, otherwise probe)
And finally, we’ll ask about your ideas for this business related to broadband Visioning and Opportunities

Question 4: Are you aware of other related businesses or organizations using the Internet in [sector] in ways that you’re not?

a. Are there applications or specific programs that require the Internet, that others in [sector] are using, that you would like to use? If yes, what are they? If no, why not? Are there specific barriers?

(if no, probe if they have heard of anything “up and coming” for their industry and a name if so)

Question 5: How do you envision business use of high-speed Internet in this community in the future?

a. What kind of applications or programs which require the Internet do you think would positively impact local businesses and residents within this community?
This marks the end of our interview session. Before I stop the tape, do you have any questions or clarifications you have related to the questions we just discussed? (wait for answer) Is there any additional information you have to offer in regards to your workplace experience with this technology? (wait for answer) Thank you for your time. (end taping)
Appendix C

Pictures from Rural Pennsylvania

While visiting my research communities, I took photos of the areas that I felt were useful in describing the rural broadband experience. Considering where my key informants live, particularly the terrain and the distance from major highways, finding communities using robust advanced communications infrastructure in their daily operations was amazing.

I had no idea, absolutely no idea, what I was going to experience as a traveler to these communities. It is difficult to describe to my family and friends where I have been during this thesis experience without having these pictures to supplement my words. There are more, but the favorites are attached below.
Johnsonburg, PA

View of houses along 219 from the Copper Kettle Restaurant
My car has officially seen it all! Texas tornadoes and hailstorms, Florida rainy seasons and hurricanes, and now, Pennsylvania mountain snow and 4 degree Fahrenheit temperature. God Bless her...
Domtar Paper Mill off of 219
Frozen lake in Tioga State Park. That pier won’t move for a few more weeks.
Main Street Wellsboro on a winter day
Nanty-Glo, PA

The sign says it does, but they don’t! But the Niner Diner does have GREAT meatloaf...
First and Chestnut, Nanty-Glo
View of Nanty Glo from on high
Appendix D

Reflections on the Research Experience

My first set of interviews was conducted on February 19, 2008 in Wellsboro. I was not nervous about meeting new people, but I was nervous that I would not do a good job of delivering the research questions. I was successful in establishing epoche once I got on the road to Wellsboro, but not so much in shaking my worry. The execution of the interview questions was almost flawless. Everything I learned from Dr. Findeis’ CEDEV 575 – Methods and Techniques was employed by the book. The responses I received were so appreciated. I was amazed that the questions I delivered specific to addressing my research question were truly being answered. And the substance that came from the data; I was in disbelief at points.

After my first few interviews I felt thankful for choosing the phenomenological approach to data collection. I was reacting to their responses as if I had no knowledge of broadband technology or business management or the organization’s background or the history of the community. The best way I can describe my receptivity to the data is like watching a multitude of tropical fish swim in a large tank. You want to pay attention to an individual fish, but then a cluster of fish present themselves, and then another fascinating one, and so on. You get caught up in all that’s happening in the fish tank that, when it’s time to walk away, you yearn for more.
The level of will and enthusiasm received from the participants was encouraging. Not only did they want to talk, but were adamant that they wanted to share what’s going on in their community. One informant, in regards to my recruitment letter, responded with, “I share a lot of the feelings that you address in your e-mail and I think you will be surprised at what we are doing here...”

There were two exceptions to the positive recruitment process. One potential informant shared her broadband experience while speaking on the phone. There was no hesitance in the delivery of her viewpoints. I stated to her with much enthusiasm that what she just shared is directly applicable to my research and completed the statement by asking, “can we set up an interview for next week?” Her demeanor shifted from confident to hesitant, and she immediately declined to participate in the study. I gathered that the idea of being audio taped did not sit with her well.

Another potential informant, an esteemed member of the community, was difficult to contact. Once I obtained his office number I called and his assistant responded. She was curt when she asked me the reason for my call. I used my customer service phone skills and provided a summary of my intentions in a bubbly, perky manner in hopes of shifting her demeanor. I recall her asking me to hold and hearing a muffled conversation in the background. She returned to the line and barked, “He’s not interested in talking to you.” I politely thanked her for her time. I seriously doubt someone in a position of importance in Wellsboro would refuse to speak to a graduate student, especially if it was an opportunity to showcase his opinions on a technology that helps him do his job. I attribute the
failure of securing an interview with him on the way my intentions were translated by the very nice lady that answered his phone.

Two of my informants fell ill at the time of our scheduled interview. Fortunately for me, they were gracious enough to find a suitable replacement to meet with me in their stead. This exemplifies the level of support my key informants had for my research.

Several informants made the comment after the interview session that the questions I asked were “vague.” Of course they have to be vague, for two reasons. The primary one is that there is no existing data to build questions from for further insight on the user’s experience. Second, the more specific the questions were the less likely the user’s framing of the broadband experience would be spontaneous. Especially with the visioning questions, I encouraged the participant to run with their imaginations so that they did not feel constrained by the realities of their present ICT delivery model. If my key informants only knew how many revisions my interview script went through before I had the opportunity to ask such questions! They call it vague, I call it calculated.

**How ICT Impacts the Research Experience**

**Define Irony**

The irony in establishing key informants for this research is that almost every recruitment email I sent went directly into their Bulk folder or was filtered
to Trash. I thought it was because I initially used my Yahoo! account as opposed to my PSU account to deliver the messages. Our Webmail system, at least in my experience, is not reliable. However, sending the emails from my psu.edu account did not change where my email ended up on the receiver’s side. Many emails had to be resent or routed to alternate email accounts. It is great that security measures are in place for email systems, but random emails from valid accounts still fall victim to the subroutine. This presents another argument related to security measures. If the security tools used on the email server are too high, valid emails from potential patrons and vendors may get sent to Bulk or Trash. How much security is too much security?

**ICT Moves (Cars Through) Mountains**

ICT contributes to the rural experience as well as the research experience. Since all the key informants live a significant distance from major highways, many farm-to-market, rural, and even dirt roads were traversed in order to collect the data. Advanced communication technology was utilized in the combination of Internet data accessed by my wireless-enabled notebook and GPS-enabled navigation via VZ Navigator on my Samsung FlipShot phone.

Addresses for participant’s locations were procured through websites. The day of travel, I entered the address of the first key informant. The navigator recognized my physical coordinates, be it my apartment or the gas station, and routed me by voice and turn-by-turn thru the mountains of Pennsylvania.
When I entered the borough of Wellsboro, I needed to locate a store for supplies. I realized I had no audio tapes to record on! From the Wellsboro Diner I entered “Radio Shack” and “pharmacy” as options in my local search tool provided on my phone. The navigator provided a route based the location of the diner to the applicable store with audio tapes. Mind you, I’m conducting all of this in the Northern Tier.

**ICT Makes For a Pleasant Dining Experience**

Once I was ready to have lunch, I asked my informants where they recommend I go. This is a good traveler’s tip that I adhere to: go to where the locals go, not where the tourists go. I entered the name of the restaurant into the local search tool, and I was on my way to the local hotspot. Once I arrived, I would immediately recover my laptop from my briefcase, start it up and see if it recognizes any wireless networks. The Native Bagel in Wellsboro has Wi-Fi connectivity for just $5. In Johnsonburg, there are no wireless networks available at the Copper Kettle. Interestingly enough, on the side of Piedmont Pub was a sign displaying, “High-speed Internet here”. Next time I’m in Johnsonburg, I’ll dine there.

The Niner Diner in Nanty-Glo had a sign stating that the Internet could be accessed at the restaurant. I went in, sat in a booth, and started up my laptop. Realizing the computer did not locate a wireless signal, I walked up to the counter to let the waitress know I couldn’t connect. She explained to me that the
manager took down the service because the local school children were spending their time after school in the diner accessing the Internet. I told her it was unfortunate because that was the sole reason I stopped in. The food is great at the diner; the dining experience would have been better for me had a connection been available.

**High-Speed Internet is an Attention-Getter**

In regards to signage, signs on buildings and along rural roads indicating high-speed Internet availability were abundant. Placemats with local advertisers imprinted on them are typically used in restaurants to boost the local economy. You can observe the increased power of advertising with email addresses and websites listed along with typical ad fodder. For the roads I traveled, I observed at least one large off-road sign offering high-speed Internet.

**Research Allows For Sightseeing**

To me, phenomenology is complimented with a touristy approach to an unfamiliar area. Before this research experience, I hadn’t visited communities outside of central PA other than Pittsburgh, Harrisburg, Philadelphia, and of course, Punxsutawney to visit Phil. Prepping for travel with information relative to the area’s history and sights to see and capturing the scenery with a camera makes the phenomenological approach to data collection much more enjoyable. The interview experience became fun for me. The sense of awe and anxiety that
comes from visiting a new place for the first time is similar to the sense of awe and anxiousness experienced during the phenomenological interview. I imagine a person who does not enjoy traveling or driving for long periods of time or is uncomfortable in unfamiliar surroundings would make for a poor primary data collector.

**High-Speed Internet in Laid-Back Towns**

In reflecting on the research experience, particularly looking at the constraints in rural places, I couldn’t help but sense that information and communication technology is increasingly detached from the human experience overall. This technology moves too fast; it shifts quicker than the average user can understand it. By the time the learning curve has been completed, another means of delivering the ICT tool has been developed. It takes over the human experience, forcing us to try to catch up to it.

Only a select few can keep up in the marathon that is broadband, while the average user is left gasping for air. My observation is that it is an elitist means of controlling who can and who cannot take advantage of ICT. And I can make this statement as a “reformed” tech elitist, a former software engineer for IBM that once reveled in the customer’s lack of knowledge of the product I supported. So who’s there to look out for the non-marathoners? The technologically astute aren’t taking the time to explain the workings of the beast to their human counterparts. The tech experts need to recognize that their innovations are only
as great as their ability to relay its utility to the common user. Otherwise, it’s just another marathon that no one is signing up for.

This is why I assert that ICT adoption and diffusion needs to be a cooperative affair; bringing the technical experts, the developers, the leaders and the common user to the planning table. As long as these worlds do not intersect, we become increasingly determined by this technology. We see this with organizations that pay more for servers than they do for quality employees. Or, with financial officers making budget revisions to reduce training and development and increase hardware upgrades. To avoid that, let’s actively use collaboration to shift from technological determinism to a more complementary, appreciated technological advantage for all involved.

**Thesis Conclusion**

I don’t consider this research as “work”. It is and ultimately this is merely data collection. But for me, this thesis is insight to the rural way of life, the culture of PA and an overall validation that I’m doing my part to positively contribute to a rural dweller’s well-being.

I kept a thesis journal the entire time at Penn State University. When it came time to prepare this reflection, I sat and read all my entries. It was humorous and insightful and depressing all at the same time. I found the entry that described this idea about communication technology and its impact on society. To read it now after the research experience is humbling. Where my
mind was at then and where my mind is now is the same, except now I can run my mouth and use science to back it up! I close this thesis with the actual journal entry:

May 20, 2007: Discovery. I haven’t really accomplished a damn thing in the realm of this MS other than realizing how frightened I am of people that are genuinely smarter than me. As much as I avoid competition I find that it’s essential in order to get things done around here.

I’ve whined and moped enough. Feigned interest and appreciation enough. There’s plenty of people leaving this institution that truly deserve the degrees they are awarded. I, on the other hand, am sitting here waiting for the other shoe to drop.

Let’s face it: the two things you are good at is 1) telling people what to do and 2) running your mouth as if you know what you’re talking about. How transparent do you want to continue to be?

What do I like? I like the way I was raised; amongst different groups of people within a very isolated community. I like to interface with people, and I seek out those that have something strikingly different about them. I like to fix things and situations because I tend to be the one in the room least likely to panic. I want to help. I always want to help, to the point where I sacrifice my efforts for the greater good.

I’m a fan of technology related to communication. The Internet, cell phones, GPS, GIS; it’s all useful. I don’t care to know how it works; not anymore anyways. But I have this notion that of all technological advancements afforded to us, communication technology has helped a good majority of us to connect with one another.

So can communication technology bring communities together? I think of how I grew up on base and had to correspond via letters and anxiously wait for a response. I listened to local radio stations and we watched European and AFN channels on TV. Now, with the advancements in technology, the means of communicating have garnered a quicker response time and have brought separated lives much more closer [sic], even if in all dimensions except physical.

I figure that I’ve learned more about rural communities to respect them and to certify that these areas are enriched by many aspects. I
think by investing in rural communities, by making communication technology more assessable, community and economic growth can occur.

But of course, what is most cherished about these neighborhoods is that there is low reliance on mechanisms that speed processes along. Even in that one reading where the guy had to invest in another phone line since his ordering system was upgraded by his distributor, people are really ambivalent of investing in anything that changes their way of life. So how do you “sell” communication technology in a tradition-heavy, low maintenance community? Will the investments benefit a few? How will local government and businesses assist in this investment? What would it do to a community’s culture?

I feel that collaboration has proved in many dimensions the capability of people to change for the greater good. I think people that dwell in rural areas are afraid of what they do not know, and naturally shy away from strange technology. We also are experiencing a population aging and thus contributing to the local economy by lesser and lesser means.

Communities that have similar issues but are only limited by distance can develop a grass-roots e-organization with the ability to talk to each other on how to manage similar problems. I think about the distances that female Australian farmers travel just so they can carry dialogue and not feel so alone in the world given their regional isolation. We need to know that we aren’t alone in this big world. We can shatter barriers by promoting dialogue across shoulders without the stigmas of physical features. And I think when people are given an opportunity to learn from one another without working thru a middle man (like extension offices or government agencies) we feel a sense of empowerment and capability. And from there, anything seems possible. And communication tools like the Internet can help.

That sounds about right. –IMES