The Perceived Economic Resultant Impact of Broadband Internet on Three Small Kentucky Cities

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Abstract: The purpose of this research study was to investigate the perceived economic viability that technology, in the form of broadband Internet has made on three small Kentucky cities. The economic viability of each Eastern, Central, and Western Kentucky City was found to be based on technological perceptions and not actual economic indicators.

This study examined the perceptions of the association of broadband Internet to economic growth through a single-case, case study approach. Data were collected through several, semi-structured interviews with each city's municipal utility provider, one cable Internet provider and one Digital Subscriber Line (DSL) provider.

One common theme that appeared throughout the small cities in Kentucky was optimum collaboration between the different broadband Internet providers but minimum collaboration between the municipal provider and the for-profit providers. Closely associated with this theme was a lack of recognition of broadband Internet opportunities for the broadband providers in different cities. Finally, both the cable Internet provider and DSL provider claimed the Internet's main purpose was entertainment while the city municipal broadband Internet providers claimed that economic development was the resultant of broadband Internet.

Recommendations include the development of a partnership between the municipal utility and private broadband Internet carriers, a relationship between the municipal utility and the rural cooperative utility, and establishing a technology committee.

Introduction

Ford (2005), espouses that Broadband Internet plays an integral role in the economic growth of a rural community. Several communities across the nation have embraced technology that benefits its citizenry through the Internet provided by their Public Municipality (Florida Municipal Electric Association, 2005; Ford, 2005; Ford & Koutsky, 2005), through cable, or through digital subscriber line (DSL). The Internet, accessed through cable television companies, telephone companies, or through municipal utilities, creates a significant impact on the economic growth of communities within Kentucky (Atkinson, 2007; ConnectKentucky, 2006). Including the Internet in plans for economic growth has influenced not only *how* adults learn, but also *where* they learn and how they use what they learn (Fisher, 1992; Atkinson, 2007). This research study of three Kentucky cities, investigates the economic growth in each Kentucky City after broadband Internet was introduced by a public utility municipality, a cable Internet provider and a Digital Subscriber Line (DSL) provider.

Background of the Problem

The Commonwealth of Kentucky ranks 36th in land area and 26th in population among the 50 states. Its mean density is 103 persons per square mile (ranging from 21 persons per square mile to over 1,800 persons per square mile), which is almost 75% higher than the other states in the U.S.

(United States Census Bureau, 2009). In the nation, Kentucky is ranked 46th in both high school graduation rates and the number of college graduates (United States Census Bureau, 2009) when compared to the other states. Since 2005, this number has increased from 37th for high school graduation and from 44th in college graduates (United States Census Bureau, 2005). According to studies conducted in the last five years, Kentucky suffers an illiteracy rate of 25% in the western part of the Commonwealth and 52% in eastern Kentucky. According to Gibbs (2005), this illiteracy rate is a primary determinant that directly affects economic growth and jobs in communities across America.

In Kentucky, Internet access is provided to the end-user through for-profit utilities such as BellSouth Telephone Company, Adelphia Cable Company, or through non-profit public municipalities like Kentucky Central Municipal Utilities, Kentucky West Electric System, or Kentucky East Utilities. These non-profit utilities were part of a consortium known as the Municipal Electric Providers Association of Kentucky (MEPAK, 2006), now called Kentucky Municipal Utilities Association (KMUA) whose function is to provide collaboration between the municipal water and electric utilities across Kentucky.

Purpose of the Study

The purpose of this study was to investigate the perceived economic implications that technology, in the form of broadband Internet, has made

on three small Kentucky cities. While there are many definitions of *economic implications*, this study defines it as *sustained economic growth*. Ford and Koutsky (2005, p. 1) define economic growth as "1) growth and development in adult and community education and 2) good schools, adequate roads and transportation, access to affordable health care, and 3) quality of life factors such as parks and cultural venues." Swearingen (2009), concurs with this but adds that "technology innovations are well-recognized drivers of economic development" (p. 5). Additionally, Swearingen proposes that close to half of the economic growth in the U.S. can be attributed to technology associated with research and development.

Research Question

In this *single-case* case study, the research question was, "When broadband Internet is available to small cities in Kentucky, what is the perceived effect to the communities and the economy as seen through the eyes the broadband providers?"

The methodology of the previous (pilot) study was to triangulate the empirical data with the interview findings to answer the research question, "What economic impact does broadband Internet have on a small Kentucky city?" While the data for the pilot study was accurate and assisted in answering the research question, the subsequent data sets for this study, conducted in three different cities were not reliable. As will be discussed in the data collection section, the empirical data was ambiguous within two of the three cities.

Research Sites and Participants Selection

The location of the study includes three small cities in Kentucky, each in a geographical sector of eastern, western, and central Kentucky. These sites and participants were chosen based on purposive sampling because this sampling technique provides participants and sites that can provide "pertinent information about the intended research topic and setting" (Gay & Airasian, 2003, p. 195). In order to keep the findings confidential, pseudonyms have been provided to the three cities: Kentucky East, Kentucky West and Kentucky Central. Similarly, pseudonyms have been provided to all of the participants to preserve their confidentiality.

Literature Review

A review of the literature revealed a few specific case studies (e.g. Florida Municipal Electric Association, 2005) that address the economic viability of broadband Internet but a common operationalized theme appeared to be missing that may identify why broadband Internet would affect the economic development of a community. Therefore, this literature review includes multiple, functional areas of broadband telecommunications and economic growth as the broad scope is necessary to allow the reader to generate a mental road map of economic uncertainty in any environment, especially a rural environment. Although there was an abundance of literature on global

economic growth that includes rural America, it appears that there has been little research conducted on broadband Internet development and its influence on economic growth in the Commonwealth of Kentucky. This literature review indicates that except for a minimal number of articles on economic development implicated by broadband Internet, the majority of literature published is conceptual. Additionally, the operationalized literature that was reviewed was dated. Atkinson (2007) posited that *current*, technology-based innovations will improve economic development in the United States. This literature review illuminates the rationale for the existence of broadband Internet as perceived by the broadband Internet providers. The perceptions of these participants are important because according to Chew-Graham, Alexander and Rogers (2005), perception on the use of the Internet is a major concern for management. The concerns were the benefits and obstacles related to using the Internet in health care. The study concluded that the benefits were the vast amount of information that can be obtained by using the Internet, while the obstacles were education and training on how to take advantage of this information.

Additionally, Kuhfus (1999), suggested that the perceptions of the Internet are the future of the Internet. He went on to say that we must consider the "long term" effects of the Internet and the perceptions of industry and its relationship with government and economic development. Kuhfus posits that a collaborative partnership between the government and industry

may be the answer. The public municipalities fall into the government category as they are provided oversight by a committee nominated by the mayor and/or judge executive (rural mayor).

There has been minimal research, both conceptual and operational, in the area of perceived economic implications caused by broadband Internet. Chew-Graham, Alexander and Rogers (2005), suggested that this may be because perceptions can be based on self-efficacy, time constraints, and uncertainties, resulting in a lack of empirical evidence to be studied. Additionally, Leino (2006), implied that perceptions can be unreliable and untruthful if the researcher is not familiar with the subject area.

Methodology

Research Design

The research design chosen for this study is an interpretative, qualitative, *single-case* case study. The case study approach was chosen because of a desire to understand one person or entity (Gay & Airasian, 2003). Additionally, a single-case study was chosen, because according to Yin (2003), "a single-case study can be likened to a single experiment, and many of the conditions that justify a single experiment also justify a single-case study" (P. 39). Although an argument could be made that there were multiple contexts because of the three different cities (therefore requiring a multiple-case study approach), the context that was

assumed for the research was similar enough to be considered the same, thereby resulting in a single-case study. Yin suggested that a single-case study was one of "representative or typical study" (Yin, 2003, p. 41).

The study centers on three cities in three different geographical regions of Kentucky, providing similar contexts of rural environments to explore. Three cities were chosen (instead of a single city), so that a better representation of the small cities in the Commonwealth could be gained. If a single city had been chosen, then there would be a possibility that the reader may draw inference on a unique characteristic of a single city as being representative of all small cities in Kentucky. This generalization might influence the reader's perception of the study.

This is a single-case case study with one case written in this chapter for all cities; Kentucky East, Kentucky West and Kentucky Central. The data obtained were examined in support of the research questions and has not been used for comparison or contrasting each city. Representatives from three broadband providers (municipal, digital subscriber line, and cable Internet) answered multiple questions about economic growth within Kentucky's context.

Participants

Purposive sampling, as supported by Gay & Airasian (2003), was employed by selecting participants based on their position and their ability to provide the necessary information for this study. The general managers of each public municipality identified

participants from the utilities based on their telecommunications knowledge and their willingness to become involved in this research project.

In order to better understand the economic impact of broadband Internet and its relationship to a small city, a cable Internet provider and a Digital Subscriber Line Internet provider were also interviewed. These service providers were selected at random from a different Kentucky city than any investigated in this study. This was done to prevent any bias or suspicion with each entity.

Data Collection

Data were collected through personal interviews with each participant in their own settings. Prior to the personal interviews, each potential participant was sent a list of interview questions for them to consider and research ahead of time. The interview questions (listed in Appendix 1) served as a guide in each interview; however, additional questions that probed deeper into the participant responses were added during the interviews. Freebody (2003) suggested that semi-structured interviews begin with a set of pre-determined questions, but additional follow-up questions may be necessary depending on the interviewee's responses. Yin (2003), implies that the researcher should seek to make the respondent his or her *informant*. Not only should the open-ended questions motivate the informants to give their opinions, but they should also give their insights and corroboratory or contrary evidence.

The initial data were collected through semi-structured interviews and conducted in a quiet, private, one-on-one format, and lasted approximately one hour each. The interviews were voice-recorded in a digital format that would facilitate transcription via electronic methods on a home computer. The data were transcribed into a spreadsheet so that the categories and emerging themes could be easily identified.

Other data that attempts were made to collect, included economic growth data that consisted of new business, sustained business (businesses that remained because of broadband Internet), and sales receipts for the previous 3 years before and after the introduction of broadband Internet. The purpose of collecting this empirical data was to triangulate the results with the economic perceptions of the interviewees. After several visits to different offices in search of these data, it was discovered that all of the cities under investigation did not collect and maintain these documents or the data were not reliable when corroborated with different intra-city agencies.

Data Analysis

Approximately two weeks after the interviews, the data were transcribed to hard copy and coded. The transcription process included using Dragon Naturally Speaking Voice Recognition software. The interviews were transcribed by playing the interviewee voice into a computer microphone and allowing Dragon Naturally Speaking to interpret and print out the results. While a few words were misinterpreted; they were later corrected by validating the written results with the interview recording.

By doing the transcription process this way it allowed the emotions and nuances to be captured which later proved to be valuable in the coding process. The data were then copied into a spreadsheet so that the coding process could begin.

The coding process included extracting themes, patterns, ways of thinking, and events as they repeat and stand out. Recognizing these areas is the first level of coding and should be annotated (Bogdan & Bilken, 1998). This was accomplished by critical listening and accurate transcription of the recorder to paper.

Additionally, field notes and memos were kept, and the data updated accordingly. These data allowed the proper context to be developed as each person was interviewed, including interruptions caused by interviewee co-workers, phones ringing, and interviewee facial responses to certain questions.

Limitations

Because of the sheer size of the study, much the individual city transcribed data was combined in the discussion section of this study if it was deemed that it was similar enough to provide a consistent theme. Additionally, multiple comments from the participants that supported the themes contained in Table 1 were omitted in this study for brevity.

Categorizing and Coding

After the data were collected and transcribed, coding took place. The data were coded with the following categories, as listed in Bogdan and Biklen (1998):

a. Definition of the situation code – codes on which the subjects define particular topics (e.g., economic growth);
b. Perspectives held by subjects – codes that depict how the subjects feel about orientations and perspectives toward the subject area (e.g., technology and broadband perspectives);
c. Subjects' ways of thinking about people codes – how the subjects perceive the other participants including outsiders (e.g., governor's policies, technology);
d. Activity codes – codes that list regular behavior (e.g., addressing issues that cause system downtime); and
e. Strategy codes – methods, techniques, ploys, and other conscious ways that the participants accomplish tasks (e.g., how technology has been used to the participants' advantage).

The actual coding involved printing out the transcripts from each participant. Because the same questions were asked to each participant, the printed response documents were placed side-by-side so as to develop themes and patterns. As the repetition (frequency) of phrases, words, and ideas increased, the themes began to emerge.

Afterwards, dialog that was not germane to this research study (the perceived economic effects to the communities when broadband Internet is available) was discarded for lack of pertinence to the research question. The data were then evaluated for common categories and themes and annotated in Table 1 in Findings.

While there was some disparity between the ways each city approached the subject of broadband Internet influencing economic development, the data obtained were similar enough to be inserted into the same categories for this study.

Findings

Coding Categories and Themes

Table 1 lists the first level of coding categories and themes separated by the cities that were investigated as well as the cable Internet and DSL providers. An "X" annotates if the theme was present in the findings. The themes are defined as:

The Internet is a necessity – The Internet is essential to the economic well-being of the city.

Definition of economic growth – How each participant described his or her perception of economic growth.

Examples of new growth – Relevant illustrations of economic growth since broadband Internet was introduced.

Online training and education – The participant's feelings towards online training and education.

Broadband Internet concerns – The participant's anxiety about broadband Internet.

Broadband   Internet opportunities – The participant's positive outlook on broadband Internet.

Tracking economic growth – Any documented evidence that indicated that someone in the city was trending economic development.

Conservation   of   natural resources - Using broadband Internet to protect or conserve fuel, electricity, or other.

Bogden   and   Bilken   (1998), defined the following code definitions and assumptions as: 1) Definition of the situation   code   –   codes   on   which subjects define particular topics (e.g., economic   development);   2)   Subject Perspectives – codes that depict how the subjects feel about orientations and perspectives toward the subject area; 3) Subjects ways of thinking about people and objects codes – how the subjects perceive the other participants including outsiders; 4) Activity codes – codes that list regular behavior and 5) Strategy codes – methods, techniques, ploys, and other   conscious   ways   that   the participants accomplish tasks. An "X" indicates that the theme was present in the city data.

Discussion, Recommendations, and Conclusion

Discussion

The utility manager for Kentucky Central implied that they were wasting resources   and   were   not   using technology [broadband Internet] to conserve resources. Best and MaClay (2002), argue that community Internet access   in   rural   areas   will   provide economic   sustainability.   The   utility manager continued by saying that they will use [spend] $3.00 of gas to make a bank deposit or get cash, instead of using the Internet and/or any online services. Most banks now offer online banking where one can write a check, pay bills, and transfer money between accounts with a secure system in just a few keystrokes. The Internet, especially broadband Internet, has allowed this to occur.

"No media has broader impact on American society in the last few years   than   the   Internet"   (McBride, 2001,   p.   16).   McBride   continued   to describe   the   Internet   as   the   great *equalizer*. Actually, anyone with a basic software   package   (Web   creation package)   and   a   computer   that   has access to the Internet can create a Web site and then promote it around the region.   However,   there   were   few businesses that were taking advantage of this. It would appear to be logical that businesses that are less frequented by the people, would consider Web sites that would provide a web *presence*. This presence could offer the same products and   possible   sales   that   a   traditional brick 'n mortar storefront would offer in a more populated area.

Table 1 – Coding Categories and Themes

Code Category	Theme	Broadband Provider				
		Kentucky East	Kentucky West	Kentucky Central	Cable Provider	DSL provider
Definition of the Situation	1) The Internet is a Necessity	X	X	X	X	X
	2)Definition of Economic Growth	X		X		
Subject's Perspectives	3) New Growth Examples	X		X		
	4) Online Training and Education	X	X	X		
Subject's Ways of Thinking	5) Broadband Internet Concerns	X	X	X		
	6) Broadband Internet Opportunities	X		X		
Strategy	8) Tracking Economic Growth		X		X	
	9) Conservation of Natural Resources			X		

One of the staggering concepts that was discovered in rural Kentucky is that farmers are not using the Internet to obtain weather information to include forecasting, trending, or storm warnings. Farmers can obtain regular information about rainfall, weather information, and even a selection of strategies that will help them cope with natural conservation of resources (Anonymous, 2002). Distance is no longer a factor (Jones & Kovac, 2003); therefore, farmers can use wireless to assist in locating and plotting fields

through satellite communications. Additional uses could be e-commerce that includes buying/selling online. It does not appear that farmers are taking advantage of technology found on Web sites that could positively affect economic growth (Kolzow & Pinero, 2001; Monette, 2005).

Of the few web sites that were identified in rural communities, almost none were current. This was discovered by comparing the web site with the actual business for items such as price, availability, and ordering information. When the business was asked to explain the disparity, several admitted that the person that developed the website was no longer employed there. Anderson (2005) reported that many organizations do not monitor Web sites closely (or at all) but are operating under the assumption that "presence is more important than service, access or content" (p. 27). Conserving resources include not only natural resources but also people resources. Anderson (2005) implied that people resources include visitor resources. He said many Web sites suffer from trying to say too much instead of keeping their Web sites simple with only a few essential links that clearly annotates a marked path for visitors to return to any section or page. Incidentally, there were not any *local* (Kentucky community) Web sites that addressed economic growth although all three cities as well as the cable Internet and DSL providers expressed that broadband Internet was directed connected to economic growth.

Foster (the cable Internet provider) posited that they *mainly* use their Internet for entertainment purposes. The communities could consider an online education/training interactive Web site on *what* the Internet can be used for, *how* it can be used, *why* it should be used, *where* it can be used, and specifically, *who* can and should use the Internet (Compton, Davis & Correia, 2010). All communities within Kentucky are located within a maximum of one hour's drive time from a municipal utility. Also 100% of the public municipal utilities that offer broadband Internet also belong to a telecommunications association that is a subcommittee of MEPAK. This committee could create (or provide oversight) of an educational consortium that would be responsible for creating materials that could be used to satisfy the what, how, why, where, and who questions above.

Although public municipalities are non-profit, the general manager from Kentucky Central commented on profitability in that "we should all strive to continually improve our operations and reduce unemployment and not necessarily concern ourselves with profitability" as he defined economic growth. Kentucky Central's general manager defined it as "continually improving our operations as keeping our employees skill level current with today's technological changes." Atkinson (2007) defined economic growth is based on "positive-sum strategies such as investing more in science and technology, building infrastructure and boosting education" (p. 70). Note that Atkinson does not mention profitability as either causing or sustaining economic growth.

All of the participants stated that they had experienced *some* economic growth but were not sure how much.

When asked if this was caused by broadband Internet, Kentucky East's public municipal general manager said, "Absolutely." He said that his city attracted two call centers that provided over 300 jobs. Daviess County, located in central Kentucky is proposing to install wireless Internet county-wide and offer it as an economic incentive to either relocate to Daviess County or remain there (Mayse, 2005). However, this project has not accomplished what it set out to do and has since been sold to another broadband provider.

Kentucky East and Kentucky West's municipal broadband providers in Kentucky admitted that their primary goal for providing broadband Internet was to provide a service to their communities. The cable provider said that his impetus for providing broadband Internet is that his community asked for it. Additionally, he said "In a rural state it was important to continually extend one's network into new subdivisions and recently populated areas." He further stated that he wouldn't "extend into rural areas though…the expense is too high". Best and Maclay (2002) suggested that to sustain economic growth and to avoid business development failures, the Internet should be extended to rural areas.

Miles, the DSL provider, said that his utility installed the Internet because it is a necessity and everyone needed it. While all of the other broadband Internet providers made a similar statement, Miles, like Foster, the cable provider said that the Internet's main function was entertainment.

Kentucky Central's municipal utility looked at the Internet in a different fashion. The general manager stated that they installed and maintained the Internet because it is a way to conserve natural resources. He further proposed, "Workers can work from home, people can bank online, and we can make fewer trips to the gas station." Conservation of natural resources is vital to sustaining our economic growth (Johnston, 2005; Robinson, 2004).

Recommendations

Public entities (municipal utilities) can and should collaborate with private firms (cable Internet and DSL providers)

In all three cities, it was found that there was a huge disparity in the relationship between the private Internet provider (DSL and Cable) and the municipal utility. The disparity, though, did not appear to have fostered from any past business relationships but simply from each company profile. Based on interviews with each entity, it appears that both public and private firms have the same goal in mind; they desire to serve each customer at an affordable, competitive rate. However, there are tax issues that would cause each company to form a third company and each would need to supply the necessary workforce and equipment (O'Neill & Kellar, 2008).

Many public municipalities/utility districts actually began hanging [installing] fiber and providing telecommunications for their own purposes (Gavin, 2000). They do this to keep their own communications

infrastructure updated, provide an order wire (communications line) that allows them to correspond with each substructure, or communicate with sister companies (Gavin, 2000). The excess that is not used internally is generally leased to the public (via fiber-optic, hybrid fiber coaxial, or wireless) for purposes of providing broadband Internet, cable TV, telephone, and security systems to help pay for the system (Florida Electric Municipal Association, 2005; Ford, 2005; Grant, 2000). The additional amount could easily be leased to private telecommunications firms. However, Paducah Power Systems PowerNet (2010), decided not to get into the telecommunications business, and instead, leases bandwidth only to telecommunications firms instead of end user services.

In telecommunications, specifically Internet access, there is a logical reason for public and private farms to work together. John Unger, a state senator from West Virginia has introduced a legislative deal that aims to address both supply and demand by creating public-private partnerships to increase broadband access throughout the rural portions of the state (Breen, 2007). "It's a chicken and egg thing," said Unger. He continued with, "If you don't have the service you can't have demand and they won't provide the service unless there is a demand" (Breen, 2007, p. 6). In addition to providing the partnerships, West Virginia also seeks to increase demand by teaming with early childhood education programs to introduce young children and their families to the Internet. The idea is that once families

see the benefits of broadband Internet, they will have ideas on how they can use the Internet in their homes. In 2003, about 60% of households in Kentucky had access to the broadband Internet. In August of 2008, over 95% of Kentuckians had access to broadband Internet (ConnectKentucky, 2008).

Another benefit of public municipalities/public institutions working with private enterprise/companies is better service for the end-user. Luff and Norberg (2003) present a convincing argument that service, performance, and other factors are better when these two institutions work together. They say that by reducing problem isolation time, repair time is less. This phenomenon called *mean time to repair* (MTTR) is one measure of Quality of Service (QoS) (Luff & Norberg, 2003). Additional benefits include reduced cost of operational support, less finger-pointing of where the fault is located, and who is responsible. They speculate that this reduces and even sometimes eliminates the need for service technicians to resolve problems. Even working together, they would be able to provide an IP demarcation point that would delineate the actual service location for each; this is much like the demarcation point of the electric meter at the user's residence (Luff & Norberg, 2003).

Develop a relationship between the rural cooperative and the city municipality

One area that could possibly help all of the research cities as well as all other cities in Kentucky is the concept of telecommunications

regionalization (similar to the cable company supplying telephone service). The regionalization process would appear to work well when the city municipality, along with the rural cooperative, form partnerships. However, after talking to the municipalities, they speculated that this concept might not work. Earl (Kentucky Central's Municipal General Manager) said that this has been previously attempted with little to no success. Kentucky West's municipal manager was more vocal. He stated that any partnership or regionalization effort will not work as this stems from a land-lock electrical provider law of the state of Kentucky. He did, however say that regionalization works well during storm recovery or any other natural disaster that they have encountered in Kentucky West. Both sides are willing to come to the table and have discussions to restore service to either city or county customers but that's as far as it goes. For this to happen; however, that it is only natural for the city to provide a Network Operations Center (NOC) thus forming the hub and then connect the county radial communications elements to the NOC. Furthermore, city/county could connect their network across the state and provide cable TV, Internet, security centers, etc. Kentucky East said that this was being talked about but only connecting city municipalities together with a dedicated fiber optic line across the state Kentucky. He implied that regionalization developed between a co-op and municipality is a long way off.

The ratepayers from both the municipality and the rural cooperative appear to trust the services that each

utility is providing. This probably stems from having open public meetings, access to the general manager, and dialogue with the personnel directly providing the services (the lineman, water distribution personnel, and equipment operators). Additionally, the majority of the records that are provided by the utility to include any documentation sent between offices or departments are open to the public and can be acquired by simply making a written request to the general manager of each company. This appears to promote trust, conveys a perception of integrity, and a willingness to serve.

Interviews with the municipality indicate that there is a state law in the Commonwealth of Kentucky that prevents extending utility services beyond the boundaries that have been set forth by state laws. However, this law does not currently apply to telecommunications. In other words, telecommunications could be extended via wireless to the county or even to multiple counties. Before one public municipality recently sold their telecommunications business, this was taking place between the city and the county by the city providing services in a small rural town. This relationship could become a working model for other rural communities in Kentucky to use.

Implement a Technology Committee

One of the quasi-government entities, such as the Chamber of Commerce, could sponsor a technology committee that would include all broadband Internet providers, an Economic Development representative,

a Workforce Development Representative, a city government representative (Councilperson, Assemblyman, Alderman, etc.), a county government representative (Magistrate, County Commissioner, etc.), and a local small business representative. Prices, components of a contract, or any other cost data would be off-limits for discussion. New technologies, models for collaboration, and any other discussions that could benefit the community with additional technologies and variable modes of access would be the vision of this committee.

With profit being the primary motivation for existence and competition being a close second, both profitable broadband Internet providers and non-profit public municipalities were satisfied with the local infrastructure *within their control*. The public municipalities each have a hybrid-fiber coax (HFC) system that is connected to a network operations center (NOC), co-located with their utility operations on one end and the customer premise equipment (converts the analog signal to digital) on the other end. The NOC is elaborate with routers, firewalls, servers, and other circuit conditioning equipment such as large uninterruptable power supplies. The equipment's purpose is to provide routable, secure Internet traffic for the customer. Each Public Municipality functions as an Internet Service Provider (ISP) that routes Internet traffic bi-directionally to a larger ISP.

The cable Internet provider and the Digital Subscriber Line (DSL) have similar systems except the DSL provider carries the Internet traffic, bi-directionally, via the telephone line

instead of an HFC network. The cable Internet provider in this study is located in one county; however, it is a national system. The DSL provider is located in more than one Kentucky County. Each was respectful of the other's existence and commented favorably about each other's technology and status in the community. This mutual respect implies that both entities might find favor for a partnership.

Conclusion

The Commonwealth of Kentucky is a rural state with cities ranging in size from the largest at just over 500,000 citizens to the smallest incorporated city that has less than 100 citizens. The cities that were chosen for this research study are typical of Kentucky in both technology and economic growth. The one common thread that appeared throughout small cities in Kentucky was the superb teamwork between the different entities within each city that will be described in a future study. However, there was a lack of *any* collaboration between the Public Municipality and the private Internet providers. This lack of teamwork can be dismissed as a competitive advantage or professional envy; although, it appears to have evolved over years of being on opposite sides of issues. Additionally, continued study should be pursued to expand on the disparity in Table 1 between the for-profit Internet providers (Cable and DSL) and the non-profit (both municipality and rural co-operatives) utilities for all of the categories.

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Appendix 1

Are you from this area? What makes your city unique and special?

Tell me a little about your interest in working for a municipal utility.

How long have your worked here?

When did your utility first offer broadband Internet? Why do you all offer it?

How do you define economic growth?

How do you measure economic growth?

Has your utility experienced growth in the last 5 years? Why. Is there a model in place to forecast growth for the next 5 years?

What factors stand in the way of growth?

How do you use technology to your advantage?

Is technology "in the way"? Does your faculty/staff take advantage of it? Do your customers take advantage of it?

What are your thoughts on the current local Internet infrastructure? What are your thoughts on the state infrastructure?

What are your thoughts on Gov. Fletcher's plan to have broadband Internet available to 100% of Commonwealth citizens by the end of next year? Will that make a "difference"?

What facilities or skills are needed in your community? Why? What is your utility doing to make this a better community?