Progress on Broadband Adoption in Rural America

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Rural America needs access to broadband, or high speed Internet, to grow and prosper. Its schools, healthcare systems, and business environments would all benefit from increased adoption and use of broadband. Rural America's economy could benefit through the direct and indirect creation of jobs as well (International Telecommunications Union, 2012). But much would have to change. The entire broadband system would need to be improved, including networks, devices, content, applications, and educational training to understand the benefits of broadband adoption in rural America. Fortunately, the creation of a national plan to address this issue has been underway since 2009.

In 2009, Congress directed the Federal Communications Commission (FCC) to develop a National Broadband Plan (NBP). The main goal of the NBP was to ensure every American had access to broadband (FCC, 2012). Further, the 2009 American Recovery and Reinvestment Act (ARRA) funded the building of the national broadband system, including in rural areas. The ARRA provided $2.5 billion in funding to the U.S. Department of Agriculture's Broadband Initiatives Program (BIP) to improve infrastructure networks. In addition, the ARRA provided another $4.7 billion to the National Telecommunications Information Administration (NTIA) to establish the Broadband Technology Opportunities Program (BTOP). BTOP was to be used to increase access and adoption as well as stimulate demand for broadband through educational training. In concert, all of these developments bode well for increasing adoption and use of broadband in rural America.

To be sure, the passage of the ARRA and the allocation of more than $7 billion in resources to launch and implement the NBP have marked a significant economic development in U.S. history. Consider the size of this investment relative to the U.S. Interstate System. In 1956, President Dwight D. Eisenhower signed the Federal-Aid Highway Act ushering in what was called the "Greatest Public Works" project in U.S. history. As of 2012, the U.S. Interstate System extended 47,714 miles across the United States. For some perspective, consider that a trip around the globe extends almost 25,000 miles at the equator. Thus, the highway system now extends almost two trips around the globe. Under the BTOP, more than 74,000 miles of fiber should be built throughout the United States. That is almost three trips around the globe. It has taken over 50 years to build the U.S. Interstate System. The broadband build-out was planned to take place in only four years. The ARRA projects ended as of September 30, 2014.

Significant progress has been made on several fronts within the past four years. However, rural America can benefit from more experiential learning opportunities. Rural broadband adoption can be boosted when experiential learning is coupled with a supporting role by land-grant university faculty (Barnes, 2010).

Goals and Challenges

The FCC plan specifically recognizes the role of government and its influence within communities as it relates to broadband adoption (FCC, 2012). The FCC concluded government should focus on four short-term goals, including: (1) design policies to ensure robust competition; (2) efficient management of government assets within the

broadband system; (3) reformation of current universal service mechanisms to support deployment of broadband and voice in high-cost areas; and (4) reformation of policies, laws, standards, and incentives to maximize the use of broadband in education, health care, and government operations. The FCC established the following long-term goals: (1) at least 100 million homes should have affordable access to broadband; (2) the United States should lead the world in mobile innovation; (3) every American should have affordable access to robust broadband service, and the means and skills to subscribe; (4) every American community should have access to broadband for its anchor institutions such as schools, health care systems, and libraries; (5) to ensure safety in communities, first responders should have access to a fast, reliable, nationwide public safety network; and (6) every American should be able to track and manage their real-time energy consumption. With an ambitious plan in place, many of the key challenges preventing rural adoption of broadband could be removed. However, some challenges are both global and domestic.

U.S. consumers continue to face broadband speed and cost challenges. For example, in the United States, consumers typically pay more for broadband and its various speeds of data transfer than other countries. A 2013 report by the New America Foundation's Open Technology Institute brings into focus the global nature of the problem for the United States. Data collection included bundled services where phone, Internet, and TV were included as a bundled price point, or a triple-play bundle. Price points were compared across more than 100 cities. The first U.S. city to rank within the top 50 was Bristol, Va., (ranked 33rd) at a price point of $54.79 per month. Bristol offers six megabits download speed for Internet access using its fiber network. The next closest U.S.

cities were Lafayette, La., ($65.39, 44th); Washington, D.C., ($68.30, 45th); and Los Angeles and New York (tied at $69.99, 47th). The report concluded that consumers pay more for triple-play services and mobile broadband plans at slower speeds in the Unites States. These results were consistent with a report released prior to the implementation of the national initiatives (Turner, 2005).

Slower speeds and higher prices can inhibit broadband adoption, especially in rural America. A recent study by Whitacre, Gallardo, and Strover (2013) examined several aspects of rural broadband policy options for rural regions in the United States. One of the study's conclusions was that reform to broadband provider competition policies should be evaluated closely because competition was limited when municipal or public organizations or governments were not allowed to provide broadband to their communities. Tapia, Powell, and Ortiz (2009) noted that many states have made it illegal for a municipal or public-private organization to be a broadband provider to prevent competition for services among municipalities and private providers. Reese (2013) noted that 19 states have specific laws that create roadblocks for municipalities to provide broadband. In doing so, some states have limited access to broadband to those living in rural areas. Reforming these types of competition policies might not be popular with private provider incumbents, but rural citizens could benefit considerably.

Local government involvement can boost rural adoption of broadband. Hague and Prieger (2009) found that when local governments were involved in the supply of broadband services more knowledge of local barriers were identified and greater accountability for services provided existed. Further, Shuffstall et al. (2009) identified and summarized several practical models of
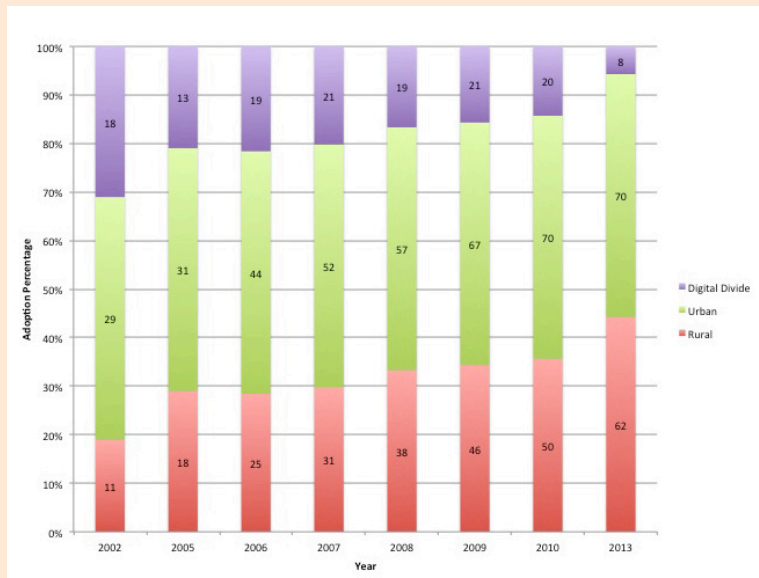
broadband delivery whereby public and private collaborations paved the way to greater access in rural America. They document the use of municipal-only delivery models as well as public-private models used to deliver broadband. Shufstall et al. (2009) noted that studies in Colorado and Oregon have documented some success in using alternative models of broadband delivery to rural areas. Reform to competition policies coupled with alternative models of delivery could bode well for rural broadband adoption.

Narrowing the Digital Divide

The "digital divide" represents the lower rural household broadband adoption rates compared to urban household adoption rates. Besides the lack of a robust competition policy, other factors have contributed to rural adoption lagging its urban counterpart. Whitacre, Gallardo, and Strover (2013) suggested two other factors that contributed to this lag: lack of infrastructure and broadband speed differences. Simply put, slow broadband speeds in rural areas reduce the incentive to adopt broadband. Without controlling for infrastructure differences such as broadband speed or the type of broadband networks available to consumers, previous studies may have overestimated the effects of income, age, and other adoption factors.
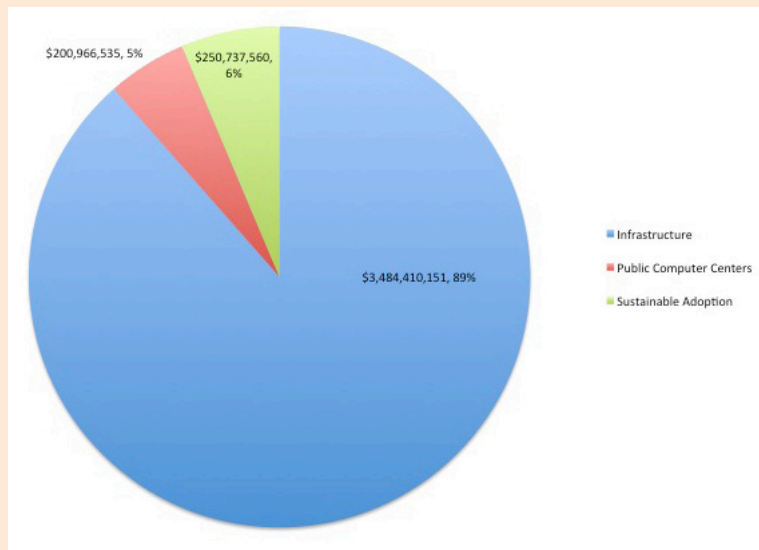
According to a series of surveys by the Pew Internet and American Family Life Project, the digital divide continues to close. In 2002, the gap was 18%; that is, rural lagged urban by 18% (Figure 1). However, recent survey data show a closing of the gap at only 8%; that is, rural adoption equaled 62% with urban being 70%. A notable change also occurred from 2009 to 2013, the period spanning the funding of the major national initiatives. During this period, rural adoption increased from 46% to 62% and the gap declined from 21%

Figure 1. Rural Broadband Adoption in the United States, 2002-2010

Source: Pew Internet and American Family Life Project, (2013)

Figure 2. Broadband Technology Opportunities Program Grant Awards, 2010

Source: National Telecommunications Information Administration (2010)

in size. Library systems received significant funding to expand access. The simple fact was that people needed greater access to computers to take advantage of having access to broadband. Libraries served as a central point of access in most communities. Finally, some of the investment focused on training to give people experience in using the Internet in general, and broadband, specifically. Educational training focused on helping people understand the possibilities of how access to broadband could improve their lives or their businesses. Educational training brought together access to broadband with learning designed to provide people with experiences that cement the benefits of adopting broadband.

Figure 2 shows the specific mix of BTOP grant awards soon after resource allocations were made in two different rounds of funding to applicants. The great majority of funding was allocated to infrastructure projects equal to $3.4 billion, or almost 90% of all funding. The other two subprograms within BTOP received far fewer investments. Establishing public computer centers, $201 million, and sustainable broadband adoption projects, $251 million, received 5% and 6% of total funding, respectively. According to NTIA (2010), $3.9 billion was committed in federal funds across 233 total projects. These infrastructure projects were to lay 74,469 miles of fiber with an additional 48,997 miles to be upgraded. More than 40 million households were also projected to benefit from increased access to new fiber and other infrastructure while an additional 4.3 million businesses were projected to benefit from increased access to broadband.

Some of these investments certainly benefit rural America, especially in states that allowed municipalities or local governments to provide broadband services. According to NTIA, 89 of the 233 awards

to 8%. In other words, the digital divide between rural and urban appears to be shrinking considerably.

Experiential Learning Projects in Rural Areas

When the United States embarked on the national broadband mission in 2009, funding was invested into three primary areas: fiber lines (infrastructure), computer access (public computer centers), and sustainable adoption (educational programs for people). The U.S. fiber network received money to connect communities to fiber grids; the hard infrastructure assets were sparsely connected across multiple firms leaving some communities without access to fiber. Next, the U.S. grid of publically available access points increased

were granted to local governments. For those states that allowed public ownership of broadband services, this came as a tremendous boost to the local, or even regional, economy.

The demands for new broadband infrastructure took the lion's share of resources in the BTOP. The sustainable adoption program received only $251 million for 44 projects which were to be implemented using innovative approaches to increase sustainable broadband adoption among vulnerable populations. Vulnerable populations refer to those who have historically faced significant barriers to broadband adoption. Many of these populations were located in rural

Experiential Learning in the "Bricks to Clicks" Program

In summer 2014, the Woodville/Wilkinson County Chamber of Commerce (Chamber) invited Mississippi State University Extension Service (MSU-ES) to conduct its pilot extension program, Bricks to Clicks. Woodville is a small community in southwest Mississippi with a population of approximately 1,000 people. Bricks to Clicks is an entrepreneurship program that provides business owners with significant technical assistance to launch their own web presence in the form of blogs, websites, or in combination with other social media platforms. The program in Woodville lasted approximately nine weeks with five businesses participating. Local business owners learned how to use iPads, productivity applications, and launched a variety of online presence options including new Facebook business pages. The process provided participants with an experience of how broadband can be used on a very practical level for business development.

The program focused the participant's experience on the use of social media and specific implementation of Facebook marketing strategies designed to help each business owner advertise and grow his or her businesses (Barnes, 2014). This entailed participants learning how to conduct do-it-yourself paid advertisements on their respective Facebook business pages. However, the greatest experiential learning took place after the program ended when the Chamber requested additional assistance to use paid Facebook advertisements to market its annual tourism event. In the case of Woodville, the Chamber chose to promote its annual Deer and Wildlife Festival (WDWF). Paid advertisements within Facebook were used to market the event to people living within a 150-mile radius of Woodville. The goal was to grow the page's number of likes and, in turn, increase attendance.

Only a few studies have addressed paid advertisement messages within Facebook (Barnes and Coatney, 2014). After evaluating the options, the Chamber chose to use Facebook's Start to Success Program. The program provides assistance with the development of advertisements and consultations to learn how to optimize paid advertisement investments. Optimization usually means adjusting advertisement messages or images in some way to gain more favorable viewing within Facebook's news feed.

The Chamber and MSU-ES worked closely with Facebook representatives to create various advertisement campaigns. The campaign focused heavily on the television program Duck Dynasty's John Godwin attending the event. Images of Godwin were used in some of the paid advertisement messages leading up to the event. Most of the messages contained images of Godwin. These messages and images were featured on both mobile and desktop news feeds.

At the beginning of the process, Facebook provided advice on the number of messages and their use on mobile and desktop platforms. Poor performing advertisements would be eliminated. As Facebook pushes each advertisement onto each platform, it tracks the number of daily impressions. Facebook paid advertisements have a life-cycle which is monitored and adjusted depending on daily impressions. Only the highest performing advertisement on each platform is selected for use during the period. This weekly process of evaluating advertisement message performance is one of the key learning aspects of the Bricks to Clicks program. MSU Extension specialists played the role of an educational liaison between the Chamber and those working with the Chamber at Facebook.

At the beginning of the campaign, the WDWF Facebook page had approximately 1,160 "likes." By the end of the 30-day campaign, page likes grew to slightly over 5,500. Overall, the results indicate that mobile outperformed all desktop campaigns across several measures. The average cost across advertising campaigns varied, with mobile having the lowest overall cost at $0.37 per "like" gained. This is because mobile users liked the page after seeing the advertisement an average of two times, whereas desktop users required more than twice as many impressions before liking the page. As a result, the average cost of a desktop "like" ranged between $0.47 and $0.62.

The Woodville festival attendance increased approximately 33% due, at least in part, to the Facebook marketing campaign. More importantly, the community believed it was a valuable marketing tool and an investment in their learning experience.

America. Often, awards were made to those applicants who coupled new computer centers with training about the benefits of adopting broadband in rural areas (NTIA, 2010). From a review of NTIA's grant summary of awards, multiple case studies reveal that experiential learning opportunities in rural areas did promote adoption of broadband in rural areas, especially among people with low incomes, seniors, minorities, the less-educated, and the unemployed. For example, in Oklahoma, Pine Telephone Company, largely serving rural Oklahomans, received funding to create a wireless technology solution to deliver affordable broadband service and education to rural, remote, and economically disadvantaged areas in southeast Oklahoma.

These sustainable adoption projects have provided many opportunities for rural communities to understand the benefits of adopting broadband. From a review of the BTOP awards, it was clear that experiential learning took center stage when non-infrastructure grants were awarded. Many of the public computer center awards also featured educational training in various ways to provide participants with experiential learning about broadband. And other rural community projects later showed that local or regional projects, led by land-grant university faculty, can encourage rural broadband adoption, even in high-poverty areas (Barnes, 2010; and Barnes and Coatney, 2014). Hague and Prieger (2009) found educational programs that show rural communities the value of adopting broadband technology—similar to BTOP's sustainable adoption—can go a long way in encouraging adoption and its efficient use.

Some of the BTOP funding awarded to Mississippi State University Extension Service (MSU-ES) for sustainable adoption efforts was used to implement a new entrepreneurship program, Bricks to Clicks, aimed at helping rural communities use social media to market tourism events. The community of Woodville, Miss., with a population of 1,000, participated in the pilot program and used Facebook marketing advertisements to promote its annual festival in 2013. Without access to broadband, Woodville would not have been able to use Facebook or any other digital marketing tools efficiently and the residents would not see the long-term economic value of having access to broadband. The lesson from the Woodville effort is that guided experiential learning encourages adoption of broadband as well as the efficient use of online tools to promote sustainable rural economic development.

Clear Signs of Progress

Progress has been made as rural America is experiencing the value of access to increased broadband and Internet services. The digital divide continues to decline. The more than $7 billion in ARRA funding has created thousands of miles of new fiber lines. Households and businesses have been connected more than ever. Schools, public safety, and other institutions in rural America have benefited. The NTIA's BTOP program and USDA's BIP have provided significant funding to reach vulnerable populations and connect these populations to broadband technology. Rural communities also have greater access to such platforms as Facebook, Twitter, and other social media outlets that can be used to boost rural economies through the attraction of new dollars into their communities. Farmers' markets can expand their reach using these same networks, too.

But learning how to use these networks will be fundamental to taking advantage of an updated broadband infrastructure in rural communities. Experiential projects, guided by land-grant university faculty, can play a key role in driving rural broadband adoption. If so, rural America would benefit greatly.

For More Information

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