

## Rural Communities and Broadband Internet Use

Broadband Internet availability has direct implications for the well-being of communities. Limited or nonexistent broadband restricts Internet use in rural communities and subsequently the benefits derived from its use. Research suggests that broadband use fosters community involvement, enhances the provision of services such as health and education, and expands household income prospects through such activities as telework.

### Community Interactions and the Internet

In the Internet's infancy some researchers warned that its use would weaken community ties, splinter common interests, and erode levels of voluntary or community participation, according to Stern et al. (2008). Local communities would be destroyed as people went online and found their own virtual communities of shared interest.

Sociological research over the past decade, however, has found this concern largely unjustified. In fact, Internet use has been shown to bolster community vitality through civic engagement and community participation (Stern and Dillman, 2006; Stern et al., 2008; Wellman et al., 1996). The concern has now evolved into fear that those with antiquated or no connections to the Internet are systematically being left out of community activities (Stern et al., 2008).

By use of a logistic regression model, Stern et al. showed that the use of the Internet is associated with higher degrees of community participation across a variety of groups and organizations. People use the Internet to receive information via e-mail from organizations or to search out information groups. Using broadband technologies corresponds positively with higher levels of passive and active community participation. Stern et al. concluded that the **quality** of Internet access is also important to a community's sociological well-being, regardless of factors such as income, age, education, and race.

Stern and others' data suggest that rural communities that rely most on volunteerism to function might be at a disadvantage as a consequence of either a lack of Internet access or an unwillingness to adopt broadband technologies. Furthermore, the lack of broadband service may in itself discourage the development of proficiencies in using the Internet. In other words, sluggish dial-up service may preclude individuals from growing efficient in daily Internet use, and thereby attenuate their contribution to their local communities.

Broadband Internet services, however, offer more definitive, or at least economically measurable, benefits to rural communities. These benefits covered during the 2008 ERS broadband workshop span medical, educational, and job services. One particular benefit is telemedicine.

## Telemedicine and Telehealth

Rural communities have long faced challenges in getting adequate local health care. Telemedicine and telehealth have been hailed as vital to health care provision in rural communities, whether simply improving the perception of locally provided health care quality or expanding the menu of medical services (Goetz and Debertin, 1996). More accessible health information, products, and services confer real economic benefits on rural communities and their residents: reducing transportation time and expenses, treating emergencies more effectively, reducing time missed at work, increasing local lab and pharmacy work, and providing savings to health facilities from outsourcing specialized medical procedures (Capalbo and Heggem, 1999; Whitacre, 2008).

These benefits have been recognized by Federal policy. The USDA administers a number of programs aimed at improving in-clinic medical technology and broadband Internet access to fully utilize medical technologies in rural clinics. The 2008 Farm Act (the Food, Conservation, and Energy Act of 2008) expands these programs.

Telemedicine studies have primarily been case studies on how hospitals have adapted to telemedicine or cost-benefit studies for hospitals adapting particular telemedicine applications. Whitacre (2008) examined the economic benefits from a community perspective. Rural hospital services affect a community directly in the health of its citizenry and financially since rural hospitals in the States studied are most often partially funded by local sales taxes. As a consequence, understanding the full economic potential of telemedicine is important in understanding the economic benefit of such programs for rural communities.

Whitacre visited hospitals in 24 rural communities across Arkansas, Kansas, Oklahoma, and Texas. Four telemedicine benefits were catalogued: (1) hospital savings resulting from outsourcing specific procedures, (2) transportation savings accruing to patients, (3) income savings resulting from reduction in missed work, and (4) increases in local lab and pharmacy work.

Whitacre found wide variation in the way rural hospitals use teleradiology, teleoncology, and telepsychiatry, the specific telemedicine services analyzed in the study. The biggest benefit noted by hospital staff was in improved turnaround for patients. Cost savings for the hospital were typically not great, though annual cost savings varied significantly. Transportation savings to patients also varied considerably. The estimated transportation cost savings for patients not having to go to a more distant hospital after the initial visit was estimated to range from \$2,000 to \$110,000 per year per hospital across the 24 hospitals.

Estimated savings to patients who would have missed additional work time had they gone beyond their local hospital ranged from \$3,000 to \$70,000 for the 24 rural hospitals. Additional pharmacy and lab work that was gained by rural hospitals or their local affiliates was estimated to range from \$31,000 to \$1.5 million per annum. The cost of not having telemedicine thus was estimated to average \$370,000 per annum for the 24 rural hospitals. Communities with larger hospitals (2,000 or more patient

encounters per month) would be forgoing over \$500,000 per year if telemedicine were not offered.

## **Distance Education**

Education has long been shown to contribute positively to individuals' economic well-being as well as to national economic growth (through labor productivity gains). Education, also a major factor in the well-being of rural America, has been undergoing a transformation because of broadband Internet, with promising economic consequences. The institutional changes taking place between students, parents, faculty, and education administrators are already evident.

School-to-school distance education systems have opened to other provider groups that reach beyond schools or learning centers (Poley, 2008). Learners include students in K-12 and higher education as well as new immigrants, continuing education students, and individuals taking courses for personal development. Providers of distance education include universities, community colleges, private companies, communities, professional organizations, primary and secondary schools, and individuals.

Learners "attend" anytime during the 24-hour day, at work sites, learning centers, and in the home (Poley). Elementary school learners can visit educational sites that were introduced in the classroom, complete research projects (often with the assistance of parents), and check up on assignments while home sick. Their parents also can interact with teachers more freely. Secondary school students can enroll in online Advance Placement courses and other college-prep and college-level courses.

Distance education for post-secondary institutions also saves resources—for schools by reducing overhead and for rural households by reducing travel costs. It enables motivated learners to complete a course of study that might otherwise be incompatible with their work schedules and parental responsibilities (Poley). The promise for rural residents is increased access to educational resources, at lower costs than without distance learning.

## **The Service Sector in the Internet Economy**

Most employment growth in the United States over the last several decades has been in the service sector, a sector especially conducive for broadband applications. Analysis of Bureau of Economic Analysis data shows services making up 50 percent of real private gross domestic product (GDP), 60 percent of personal consumption expenditures, 16 percent of private investment, and 25 percent of total trade in 2007.

As the sector has grown, information technology has increased the sector's productivity and globalized its marketplace. Information technology and the service sector are primary drivers of economic growth (Mann, 2008). As the global economy has grown, so have markets for information technology and services that process or trade through the Internet (Mann, 2006). Information technologies have allowed services to be fragmented between nontraded and tradable segments, such as back-office operations of financial firms, airline reservation offices, and software development for private business.

During the ERS-sponsored workshop on rural broadband in 2008, Mann identified four overarching effects of the Internet on the service sector:

- Greater international division of labor in services or standardization of services,
- Greater supply of intermediate services or fragmentation of services,
- Greater demand for intermediate services or fragmenting of services, and
- Globalization of both the supply and demand for services.

This has led to increasing private service sector exports and imports (table 13), with the United States exporting more services than it imports.

Not all service sector trade is uniformly distributed. Mann (2008) concluded that the trade in services has harmed low-wage service work like call centers and may continue to do so. Codification of work processes, such as in the software industry, also puts some high-wage work at risk of going overseas. Broadband allows rural areas to compete for low- and high-end service jobs, such as software development, but does not guarantee that rural communities will get them.

## Telework

Telework is one part of the service sector that could be greatly enhanced by broadband Internet. Might rural communities benefit? Do rural communities have people that would be interested in and able to work online? Are there firms that would be interested in rural sourcing rather than global sourcing some of their services? Morris and Goodridge (2008) addressed this during the ERS workshop. They surveyed businesses across the country and found that approximately 12 percent were engaged in global offshoring of some service support activity, mostly (52 percent) to India.

The major advantages with offshoring cited by businesses were reducing costs, freeing up management time, and offering “24/7” customer access. Disadvantages were increased incidences of customer dissatisfaction and morale problems among domestic employees. The businesses indicated that

Table 13

### Trade in private services, 1997-2006

	Exports			Imports		
	1997	2002	2006	1997	2002	2006
Private services (\$ million)	83,929	122,207	187,771	43,154	72,604	116,524
	<i>Percent of private services</i>					
Education services	10	10	8	3	4	4
Financial services	15	18	23	14	13	12
Insurance services	3	4	5	14	30	29
Telecommunications	5	3	3	19	6	4

Source: Mann, 2008.

57 percent of customers were dissatisfied with outsourced services and only 15 percent were satisfied. Around three-fourths of these businesses would be interested in bringing back some of the jobs if rural employees could be recruited. The most common reasons cited for bringing back service jobs were increased customer satisfaction (63 percent), favorable government tax incentives (53 percent), and ease of identifying skilled labor in rural America (51 percent).

Morris and Goodridge conducted three surveys in 2006 and 2007, with one drawing on individuals across the entire country. Of rural residents, 37 percent were very interested in working from home to earn additional income, 39 percent were moderately or somewhat interested, and 21 percent were not interested. Homemakers were least likely to be interested in working at home (40 percent), though 30 percent would be interested in working anywhere from 11 to 20 hours a week at home.

Fifty percent of retirees, however, were interested in returning to the workforce, citing flexible schedule, supplemental income, social interaction, and intellectual stimulation as inducements. Fifty-four percent of retirees nationwide stated that they had broadband Internet access; the rate for rural retirees is uncertain, but is likely much lower given our analysis of Current Population Survey data. The relative lack of broadband access in rural communities may inhibit rural telework opportunities for retirees and others.