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AMERICAN POLICY AND THE EVOLVING BROADBAND INTERNET NETWORK

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Broadband Internet technologies are the latest in several waves of communication and information technological change to enter rural America. Like previous technologies, it promises to have a profound impact on the social and economic fabric. Arguably, the Internet has already had a more profound effect on agricultural and rural economies than earlier communication technology introductions. The Bureau of Census annual wholesale and retail trade survey reports online retail sales nationally increased from $31 billion in 2001 to $107 billion in 2007. Also according to U.S. census statistics, online wholesale trade in 2006 was an estimated $613 billion, or approximately 16% of all sales. Online wholesale trade in farm products was an estimated $5 billion or 4% of all wholesale farm product sales in 2006. This article provides a brief history of modern information services and the policies that are shaping their spread and use across rural America.

Rural Communication Services over Time

Communication and information technological changes have come in four basic waves in the United States, each profoundly affecting rural-urban economic and social relationships (Stenberg, 2006). The first was set in motion in 1843 with a $30,000 grant from Congress to Samuel Morse. The grant funded the building of an experimental electric telegraph line between Baltimore, Md. and Washington, D.C. The ensuing rollout of the telegraph—with the railroad's critical contribution—ushered in the original agricultural e-commerce activity 150 years ago. The telegraph made it possible for farm and household goods to be easily ordered from great distances and led to the formation of such 20th century retail giants as Montgomery Ward and Sears, Roebuck, and Co.

The second wave came around 1900 with the onset of the first rural telephone systems. The most notable impact from the first telephone systems was the decline in the need to make day trips from farmstead to towns. Farmers could address some of their farm and household needs with respect to farm inputs, household goods, veterinary and medical services, information, and other services without leaving the farmstead.

During this period, though, telephones were considered a luxury and not available to a high percentage of farms. Later, roughly from the period spanning World War I to World War II, improving technology allowed shared communication lines, thus driving down costs for service to individual farms and households. The diffusion in rural areas during this period was faster than it was in large urban centers though connecting to the national network for long distance service was impeded by the Bell Telephone System's market dominance and the regulatory environment at the time. Telephone systems became much more integrated within their local economies and contributed to the building of rural communities. The era was dominated by local and regional-based economic activity.

The third wave appeared in the middle of the 20th century following regulatory change and the enactment of the Communications Act of 1934. Long-distance communication service improved greatly and declined in price. The era was marked with increasing vertical economic integration into the national economy of regions and corporations and other business enterprises, including increasing farm consolidation. Markets for goods

and services became more national, rather than local, in focus.

The fourth wave began in the late 20th century with new information technology, such as the fax, personal computer, and Internet. This has meant instant access to many parts of the world and is the current era, the Information Age. The Information Age, however, has been built on communication and information technology from all four eras. Farmers still call their local cooperative or other business affiliate. Agricultural businesses still make long distance calls to complete or start business deals. The latest era offers new, and alters some existing, business channels of communication.

Internet and Federal Government Policy

Federal government policy has historically been influential in the development and diffusion of communication and information services in the United States. Federal level rural telecommunications policy has followed three legislative paths: the Communications Act of 1934, periodic farm bills, and occasional nonrecurring legislation, such as the American Recovery and Reinvestment Act of 2009 (ARRA). The Communications Act of 1934, as last amended by the Telecommunications Act of 1996, has not required support for Internet into households, though it allows for regulatory action to mandate it. The Federal Communications Commission (FCC) was given the authority by the Act to include Internet services as part of the Universal Service Program, which partially subsidizes rural and poor household telephone service, but has not yet taken the step. However, the last two farm bills—Farm Security and Rural Investment Act of 2002 and Food, Conservation, and Energy Act of 2008—have led to an increased rollout of broadband technologies into rural communities. The 2002 and 2008 Acts provided grants and mandated a loan program for rural broadband providers and are administered by the Rural Utility Service (RUS), U.S. Department of Agriculture (USDA), with a budget determined by Congress annually.

The Food, Conservation, and Energy Act of 2008 has three provisions and principles to encourage the investment in broadband technologies for rural areas. First, it authorizes $25 million annually in grants, loans, and loan guarantees for the purpose of improving access to broadband telecommunication services in rural areas. Second, these grants and loans are mandated to be for construction, improvement, and purchase of equipment and facilities for rural broadband service in eligible communities. Third, the definition of what constitutes broadband service would be reviewed regularly to take into account changes in technology.

In addition to enhancing technology deployment, the 2002 and 2008 farm bills directly support the development of e-commerce. The 2002 Act brought about the establishment of a rural electronic commerce extension program, the National e-Commerce Extension Initiative, in 2003. The program's goal is to expand and enhance e-commerce practices and technology to be used by rural small businesses and enterprises. The Southern Rural Development Center, in partnership with National Institute of Food and Agriculture, USDA, administers the program. The program addresses factors that dictate the adoption and diffusion of e-commerce innovations in rural areas: whether rural areas have the necessary technology to embrace e-commerce undertakings, how and whether these businesses can benefit from e-commerce activities, and whether extension departments have the resources to provide adequate and appropriate support to small businesses and enterprises.

The farm bills also support the development and use of the Internet in rural schools and health facilities, also administered by the RUS-USDA. RUS's Distance Learning and Telemedicine Program (DLT) is intended to improve education and health care delivery in rural America through loans, grants, and loan/grant combinations for advanced telecommunications technologies. Entities awarded the grants and loans provide education and medical care via telecommunications and include corporations or partnerships, Indian tribes or tribal organizations, state or local units of government, consortia, and private for-profit or not-for-profit corporations.

Since 2002 more than $166 million has been awarded by the DLT program to 3,796 rural educational facilities and 2,226 health care institutions. Funds have been used for the acquisition of capital assets, instructional programming, acquisition of technical assistance and instruction for using equipment, site development and alteration of buildings, land and building purchases, building construction, and acquisition of telecommunications transmission.

The Telecommunication Act of 1996, though not mandating the universal service program to cover Internet service to the household, did provide a program for education and library systems: the E-Rate program. The

E-Rate program, established by the Telecommunications Act with an annual fund of $2.25 billion raised from a fee imposed on all telephone users, subsidizes Internet service for schools and public libraries, gives schools more options for faster Internet service, allows for community Internet service, and helped begin pilot programs for digital textbooks. The program allows schools and libraries to use federal funds to lease unused local communication lines—known as dark fiber—to connect to the Internet, a potentially faster and lower-cost connection than offered through some local telecommunications companies. The E-Rate program, though, came under fire from Congress in 2004 for wasteful spending. Changes in accounting regulations and program rules led to a temporary suspension of new grants that year.

The FCC noted in its National Broadband Plan released in March 2010, that some schools still do not have broadband connections. The company that administers E-Rate received at least 200 requests in the 2009 fiscal year for money to pay for dial-up Internet connections. The program mostly serves schools in poor and rural communities. The FCC is also considering allowing schools to open up their E-Rate funded Internet resources for local community use during after school hours and when schools are not in session. Only school use is currently allowed under E-Rate regulations.

The FCC's National Broadband Plan was mandated as part of the broadband Internet provisions in the ARRA. The ARRA also provided $7.2 billion in grants to the profit and non-profit private sector for the provision of broadband services in rural and urban communities. Of the $7.2 billion, $2.5 billion specifically targeted rural areas and is administered by RUS-USDA. The rest of the outlay, $4.7 billion, went to both urban and rural areas, and is administered by U.S. Department of Commerce's National Telecommunication and Information Agency. The grants have been awarded and the systems they funded are currently under construction.

RUS-USDA had authorization to use the ARRA funds as grants, loans, and grant/loan combinations. By Sept. 30, 2010 there were 320 awards obligated for a total $3.5 billion in grants and loans made in 45 states and one territory. Among these awards were 285 last-mile projects that totaled over $3 billion, 12 middle-mile awards for $172.6 million, four satellite awards for $100 million, and 19 technical assistance awards for over $3.4 million. Last-mile line is the connection from communication lines going directly to a household or business from the communication network, a middle-mile line is the connection from a national communication line to towns and villages. The awards are expected to provide broadband Internet access for 2.8 million households, 364,000 businesses, and 32,000 anchor institutions across more than 300,000 square miles. The projects partly cover 31 tribal lands and 125 persistent poverty counties.

The federal regulatory environment continues to be a major element shaping the broadband Internet market in rural areas. While many regulatory issues exist, two highly contentious regulatory issues are considered seminal in the rural Internet's advancement: open access rules and net neutrality. Open access are the rules by which incumbent providers must open their physical systems to other providers of broadband Internet service. Net neutrality refers to the rules by which information is treated by service providers as it moves across the Internet. Both set of rules impact the cost to businesses and consumers of using the Internet and the profitability of service providers, often with direct, but not necessarily one-to-one, tradeoff in costs between user and provider.

Internet and State and Local Government Policy

The federal government is not the sole generator of policy initiatives. State and local governments also play a major role in the future of broadband Internet access, though their role is constrained by the federal government. If federal law and state and local legislative actions conflict, federal law takes precedence. Federal limits became even more a fact of life after the enactment of the Telecommunications Act of 1996. Nevertheless, state and local governments have had a great deal of latitude. State and local policy initiatives fall into three basic categories: (1) demand enhancement, (2) rule, regulation, and tax, and (3) finance and infrastructure policies.

Demand Enhancement Policies

Limited local broadband availability may be a result of real or perceived lack of demand. The lack of demand, as a consequence of either low level or fragmented demand, discourages private investment. If demand is low or fragmented, local governments may step in. The source of demand insufficiency leads to different sets of policy prescriptions. When low demand has been the case, demand has often been stimulated through

extension programs, often business training in the use of information and communication technologies. Increasing business acumen in these technologies, it is argued, leads to increased use by businesses.

When fragmented demand is the perceived problem, local governments have often adopted programs that will aggregate demand. Local government, in this case, acts as a monopsonist—single seller—and governments follow one of two policy prescriptions. They act either as an anchor tenant or a group pricing facilitator. When local governments act as an anchor tenant they negotiate with a provider to get the service. The provider then may offer the service to others. When local governments act as an agent for a group of potential users to obtain the service, they may either directly negotiate or assist in the development of a group to negotiate with a service provider.

Rule, Regulation, and Tax Policies

Reform of rules, regulations, and tax policies has been another mechanism for encouraging investment in local broadband services. Governments, in this case, adopt reforms that reduce the cost or shorten the period to gain positive returns from an investment. The two most common reforms affect access to local facilities or are industry specific regulations. Access reforms address such issues as zoning and right-of-ways. Industry specific regulations include franchising and licensing.

Overlaying the rules and regulations are taxes and fees designed for telecommunication companies and levied by local governments. They include:

- Franchise taxes
- Telecommunication taxes
- License fees
- Utility taxes
- Local 911 tax
- Access line tax
- Telephone relay surcharge
- Public service taxes
- Infrastructure maintenance fees
- Right-of-way charges

Taxes and fees may be adjusted to affect household and business access rates to local facilities.

Finance and Infrastructure Policies

State and local government use finance policy to encourage private investment. Finance policy includes grant and loan programs, tax incentives to providers, equipment and services to users, and planning grants, training, and nonprofit deployments to community groups.

Infrastructure policy involves governments making their own investments in infrastructure by establishing government run companies. Direct local government investment, however, has been quite controversial in the United States. On one hand, local government sponsored broadband deployment may diminish competition by crowding out private investment. On the other hand, local government provided infrastructure may be the only way to provide competition, or in some cases the only recourse, where unfavorable economics discourage private investment.

Concluding Comments

Four major waves of communication and information technology advancements have taken place over the last 150 years. In the fourth wave, broadband technologies have increasingly become available and used in the rural and farm economies. Old communication channels, however, remain open and continue to be used by rural and farm businesses in their everyday activities. Communication and information technology continues to change and improve in capability while costs decline.

Federal policy has tried to encourage the development and diffusion of communication and information technology into rural communities through loan and grant programs while attempting to adjust the regulatory environment appropriately. Unfortunately, not all regulatory issues have a clear cut win-win solution and will continue to be contentious. State and local governments have a multitude of policies that must be carefully considered as the policies both support as well as add costs to broadband service rollouts and operations.

For More Information

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