Cooperatives:

A Workable Business Model for Rural Broadband Implementation

A study in how venture capital funded business models have failed to span America's Digital Divide and how broadband can and is being successfully implemented in these rural areas.

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Abstract

The attempts by large national and venture capital funded business models to span the metropolitan/rural digital divide have failed, with any apparent success due to the larger corporations sticking to the metro areas where there is more immediate return on investments (ROI). Large scale nation-wide rollouts and even venture capital funded regional efforts have often led to bankruptcy reorganizations. This is the wrong model applied to rural areas.

Where there has been any success in implementing rural broadband, it has been primarily co-ops and some locally-owned fixed wireless providers.

A basic paradigm shift is seen occurring with the integration of Information Technologies into the current societal structures. IT integration results in more jobs and improved quality of life, plus increased base and community health. More demand for Internet access has resulted with increased use of computers and dial-up access; rural area residents and businesses have become more aware of its value. This has reflected in an increased demand for broadband access for rural areas.

While there are some risks involved in seeking to raft these broadband deployment rapids, the benefits to rural communities and residents far out-weigh the risks, providing a successful and proven business model is used.

Introduction

This paper is the result of studies and research which kept bumping into the Digital Divide. For all the papers and articles on broadband, you could count on one hand how many were about getting it implemented successfully in rural America. And there was the “dot-com bust” where many slick-named broadband providers went belly-up, with more since. Working over the given PR numbers about how profitable it was showed some interesting math errors. Regional providers were researched to find out how they did it, only to find that they were burning through venture capital at mad rates and factually had been or were currently in bankruptcy proceedings.

Yet the fact that broadband is simply not getting installed in any volume in rural areas still held consistent throughout this research. It seemed obvious that the American Free Enterprise system should be able to span this divide and enable all rural residents the same opportunities as metropolitan residents. But this hasn’t turned out to be the case.

You’ll see here an examination of the usual business model applied to current broadband rollouts and how this doesn’t make the grade in rural areas. But organizations who have consistently and continually survived out there had to have something that worked. Electricity, Telephones and Water had to get there somehow. You can find the examination of that alternative business model and as well the risks facing such a model being applied to broadband.

We start with the examination of the nascent status of broadband and how this affects the rural economic scene.

The Rising Demand of Broadband

The existing scene from a 1998 Survey showed a wide divergence in rural access to computers and Internet in rural areas, especially for the rural poor, who were half as likely to have Internet access as urban poor (NRECA).

Broadband use is increasing per reports issued in 2002. In January this year, high-speed access out-paced dial-up for the first time (Reuters).

These facts showed up in a recent government study:

- America's use of the Internet has increased to 54% of the nation, an increase of 26 million in 13 months.
- Ninety percent of children between 5 and 17 now use computers.
- The Internet usage gap between rich and poor has been narrowing since 1998, with the poor income families increasing by 25 percent and among the richest classes only increasing 11 percent.
- Since 1998, the use of Internet in rural communities (53 percent) has grown to match national average (54 percent).
- Between August 2000 and September 2001, use of high-speed broadband has doubled from 5 percent to 11 percent (NTIA).

Additionally, the FCC reported in February 2002 that high-speed Internet usage in sparsely populated zip codes have nearly doubled (19.9 percent to 36.8 percent); it's noted that this increase may have come from new industries in these rural areas which have use of more broadband (FCC 02-33: 18, 19). Further, the factors for building broadband infrastructure have been the rapidly rising demand for high-speed services by both residential and industrial areas (Ibid., 27).

While residential users have been making more of online shopping and entertainment, businesses have found that maintaining or increasing efficiency through improved use of computer technologies had required more high-speed access to get the real-time data they now routinely need (Fixmer).

Globalization and Localization

As businesses do more and more work on line and as transport and distribution systems improve, businesses have become more “footloose” and freed to operate in locations different or separate from both their raw materials and their clients (Johnson, Fluharty).

Even retailing is changing as more can be bought on-line or by mail order.

Agriculture is less directly related to the health of the nearby communities, especially with the industrialization of packing plants and other facets of of agriculture. While small farms seem put at a disadvantage due to small scale of operation and accessible markets, with a global marketing strategy and efficient use of information technologies, the playing field might still be leveled (Johnson, Scott).

A strong government or university presence, scenic landscapes and rural amenities, plus existing broadband infrastructure have been identified as the main factors in IT job expansion (Peters). In many rural areas served by colleges, only building the broadband infrastructure is left to attract or keep IT talent for their area.

By building and enabling this infrastructure in our area, we effectively begin leveling the playing field for our local businesses and farms, enabling an improved quality of living for our residents. Skilled labor brought in for IT jobs will contribute to the capital base and demand for improvements (Johnson, Scott). Because of the smaller "footprint" that IT industries have, requiring no expensive warehouses or manufacturing plants, these can afford to pay better and provide more extensive benefits to retain their higher-trained and experienced staffs.

By improving information flow and its infrastructure, this contributes to the economy of the area. Not only does it directly provide telecommunication jobs, but also enables peripheral jobs, the ability to telecommute (saving businesses expense in facilities) and incubation of new business ideas into successful community businesses (Dodt, Stein, Strack). As well, building a broadband infrastructure and promoting this factor of creating IT jobs enables local areas to train and keep local talent, which has been the bane of Missouri and other state government, since their state IT jobs have been used as stepping stones to higher-paying private sector jobs (Cunningham). Communities that have a college or vocational-technical school nearby can side-step this issue by training their own IT staff from local students and by re-training any existing workforce to meet job demands. Additionally, the success of this local training will promote such rural communities. Larger IT firms will find the lower cost of doing business attractive when backed with a ready work force. These firms will have more direct input into the local college and high school training, so streamlining the training and personnel procurement process.

How Not to Blow Through Your Venture Capital

One would think that with so many people needing broadband service across the country and with these needs increasing almost exponentially, enterprising Big Business would be able to profitably span this area. Unfortunately, this hasn't been the case.

The national concerns' attempts to bridge this metro/rural digital divide have not made appreciable dents in the subject. While Richochet's bankruptcy was a spectacular failure, many other firms' failures such as NorthPoint Communications, Winstar Communications and Global Crossing have contributed to creating an air that the telecomm industry has been receding (Martin). However, the fixed wireless industry itself has had a 158 percent growth during the last year. This has been the result of smaller concerns starting up across the country, who are locally originated to meet local concerns (Sanders).

While this seems a contradiction, it points out a misapplication of model by large industries to meet the demands of rural areas across the background of large open spaces and sparsely-inhabited communities. Most commercial broadband carriers have stuck to metropolitan areas where the return on investments into cable, DSL and fiber-optics have greater population density and so faster ROI (Adaptive).

Cable, DSL and fiber all require expensive trenching for cable runs to reach these rural customers. Most copper loops are too long to enable DSL upgrades, so require expensive planning and engineered retrofitting. With the return on investment having to come from customers miles apart, don't look to this being front-burner items for existing telco's. Even rural telco's are estimated at requiring nearly $11 billion to upgrade their lines to enable DSL (Shultz, Sukow).

With fixed wireless, the major carriers are in a wait-and-see position. Cost of necessary truck rolls and customer premises equipment (CPE) need to come down. What they are waiting for is a system where the customer could buy his equipment for less than $200 and then install it himself. Meanwhile, the technical problems with line of sight (LOS) must be resolved to make the installation friendly (Fusco). Currently CPE's haven't fallen below $500 and must be installed professionally.

Until this is solved, the wireless solution remains one of marginal profitability. For a one person outfit who lives in a lower cost-of-living rural area, one tower will produce enough to have a sufficient income after about two to three years. More towers add to this profit, but will also require added installers and make truck rolls more expensive as you cross counties to service and install new customers. New customers add extra overhead of CPE costs, which again brings overhead higher and profit margins slimmer. Rural towns with their higher population densities are where any wireless competition will be. The broad open rural areas are simply not profitable for regional or national concerns.

The ROI model of sticking to metro areas is exactly what has been keeping the "Digital Divide" in place. What we are dealing with in rural areas is 25 percent of the US population living in 75 percent of the land (NRECA). There's a lot of space out there to cover. What's needed here is a solution which will cover this area and deliver services to rural areas in the same manner as are provided to metro customers.

Analysis of broadband carrier types which have been successfully deployed in metropolitan areas shows that only one - fixed wireless - is able to effectively reach across the broad rural areas and remain profitable. Fixed wireless succeeds where others don't as in rural area it can be implemented in increments, one subscriber at a time So cost doesn't accrue until the actual subscriber goes online. This ensures profitability and the subscriber begins paying immediately after the install(Adaptive). So national and regional concerns, in an attempt to service metro and rural areas, built up networks of leased fixed wireless towers. But without having the subscriber base or the promise of one at the outset, they burned through their venture capital and wound up in bankruptcy fire sales.

While fixed wireless steps in as a technical solution, what then is the business case that will win?

Cooperatives and Their Success

Cooperatives have been a part of the American scene throughout it's history. Borrowing from the agricultural societies of the 16th to 18th centuries, cooperatives have been formal organizations following traditional values of many farmers banding together to get the job done, be it raising a barn or acquiring basic services for their areas. The general principles are that they are member-owned, member-controlled and member-benefitted. These have been highly successful. Electric Cooperatives still own and control approximately half of the power lines in the US (Bielik).

In 1940, Federal funds were made available to build and maintain rural telephone exchanges in the form of loans made through the electric cooperatives (Merlo). In some cases, the support and

demand from the community was such that farmers strung the initial line themselves, nailing it to fence posts to get it to their house; these became known as “range line telephones”.

These interests continue today as local demand for broadband services continue to mount. Small rural telco's have found themselves installing DSL to meet this broadband demand in rural towns (Wilson; Plostina; Merlo). Electric cooperatives such as Barton County Electric Cooperative have even founded their own Wireless Internet Service Provider to be able to provide the needed access for business applications as well as residential customers (BCE). These organizations succeed owing to their direct relation to their established customer base, plus the factor of being able to perform more incremental installs. Broadband is simply another service to provide from a related industry, either telephone or electrical.

Additional facility has been being installed by the electric cooperatives. Owing to the Federal government selling off wireless frequencies, many electric cooperatives have begun installing fiber-optic cable to replace the microwave towers they had been using to control their power systems (SMP). This has required leasing “dark fiber” (fiber-optic cable installed but not in dedicated use) access to local schools, city governments and hospitals to defray costs. In turn, this access has enabled modernization of facilities and services that schools especially can provide. Now a single teacher from a community college can teach to three or more locations at once, not requiring three teachers for a handful of students in each location. In Missouri, the Cooperatives’ Broadband Network has already connected about half the state with fiber optics and continues to expand (Ponelit). Several other states have similar implementation occurring. This has been attributed to the successful attraction of new industries which rely on broadband to link with their affiliates internationally. Fiber optic cable has been known as an important siting requirement for high-tech firms in metropolitan areas (SCAG).

Using such fiber links as a backbone, wireless implementation to rural residences and farms will be as so much mortar, filling the gaps between the existing bricks to build a seamless, contiguous broadband span across rural areas. As such seamless broadband becomes available, not only educational but other services can be layered in on such a network to bring in additional revenues. For example, local Police, Sheriff and Highway Patrol would be able to transmit large data, such as digital photos of the crime scene or even live video footage to headquarters for real-time analysis. Telemedicine becomes possible, with rural residents able to have access to metropolitan specialists without the time, expense and discomfort of long travel times. Businesses can take advantage of Virtual LANs to keep their data secure. Travelling executives would be able to access their corporate servers much as they would in an airport or metro hotel lobby, utilizing “Hot Spot” technology. Telecommuting and more efficient “e-government” becomes possible, saving individuals’ and tax payers’ dollars. (Irving; ITAA)

There are additional benefits to wireless use by cooperatives. Some electric cooperatives have announced plans to employ wireless technology in the form of automatic meter reading devices, providing more accurate and more efficient capture of data for their members.(Singer).

The chief advantage of wireless connection in pure agricultural applications is to enable information access and communication availability over long distance. While having an “always on” library at your side can answer many questions, the advent of GPS (Global Positioning Satellites) and GIS (Geographic Information Systems) enables the farmer to move up to precision agriculture to improve his yields, minimizing environmental impact while maximizing his profits (Ross; Farm Progress; Beckman). Wireless broadband also enables the farmer to immediately send his GIS data to the farm-house or farm-office central server or even to the Extension Office or distant Agricultural College Specialist for analysis. With Voice over IP (VOIP), the farmer can have a direct phone link to the house for emergencies, requests for supplies, forwarding messages or simply reminders for meals.

With this access to real-time data from reliable, high-speed broadband, farmers can make definite increases in profitability from existing tractors, implements and equipment; improving the bottom line without major additional purchases. Additionally, with the advent of electronic commerce, the individual farmer can begin to compete outside regional or even national boundaries to sell his crops and produce. Handling credit cards, faxes, remote video conferences with suppliers and customers all become possible. Advertising reaches further for the dollar invested. The individual farmer can conceivably market to and reach the same customers and prospects as multi-national corporations, which use large sales forces and marketing teams (Irving).

It's not that cooperatives will be the only one capable of providing broadband. It is that they are uniquely situated to do so. They already have an established base. There isn't the monopoly problem associated with a single vendor, since the customers own the same shop they give their patronage to. It is an extension of the original cooperative action where groups of individuals locally organize to get certain services provided to their community. Broadband is and perhaps always will be a patchwork consortium of various-sized groups, organizations, entities and individuals with more or less a common purpose of providing broadband service in some aspect to (paying) customers. There seems plenty of room for anyone who wishes to compete. Cooperatives, especially those who are participating in fiber-optic installations, seem in the driver's seat to take up fixed wireless to build a very useable network to span the rural areas with broadband.

This venture, however, has its potential drawbacks.

The Future — Risks and Rewards

No venture is without risks. The main scene to work with is the competition and upgrades in technology on all fronts. There is no fair comparison without evaluating a risk assessment along with the benefits.

All these technologies are expected to drop in price for equipment and installation. DSL is expected to be gotten out to rural copper loops once they split these down to less than 18000 feet. Cable isn't expected to get out to rural areas any time soon, since they depend on co-existing with the telco's existing poles and infrastructure. Fiber optic is expected to ultimately come down in price and ease of installation that it will be able to be installed directly to most homes and rural residences. Satellites will be upgrading to offer more services. Fixed wireless radios and antennas are also steadily decreasing in prices as the technology and competition continues.

So the future will bring more offerings for Internet access and then the possible layered services. Of these options, our best choices are still fiber-optics and fixed wireless. These two technologies complement each other nicely, since fiber optic gives you potentially more bandwidth than you can use, fixed wireless enables roaming connection at a good bandwidth and economically handles the "last mile" installations that fiber-optics can't yet reach. So getting a video conference at T1 speeds is possible from a tractor or pickup in the middle of a field. And transmission is possible from a battery-operated camera located at a rural high school football game.

There is another competitor, Third Generation (3G) wireless. This is expected to be able to get up to 384Kbps bandwidth in the upcoming few years, utilizing upgrades to the existing cel phone networks. They will also be going over to packet-based transmissions instead of current circuit based,

which will be more efficient to enable higher volume of traffic on the same frequencies (Shahani). The frank expectation is that these two lines of 3G and fixed wireless will marry, especially since they operate on the same frequencies. Meanwhile, proper choice of fixed wireless radios and antennas will minimize noise between these lines, although there is some concern that the bandwidth will get pretty congested shortly with this explosion of demand. This will add to the pressures of competition and give us better and cheaper equipment and services, providing guidance against future monopolies is continued by the Federal and State governments, as has been the case so far.

Within current data, these predict that we will have more and more services in rural areas being offered on more widely implemented 3G and fixed wireless platforms. Ultimately fiber catches up to install to every residence as the demand continues while broadband becomes cheaper in price with more services available due to competition. Satellite systems will probably cover more entertainment options (such as rentable movies, music and TV) than Internet, essentially due to their built-in latency which effectively inhibits streaming media or true real-time interaction. Wireless and Fiber are the only two above that can effectively carry live two-way, real-time video and interaction of any bandwidth (Adaptive). Broadband will more and more become services driven, not just entertainment with movies, music and gaming, but also education, telemedicine, and high-speed Internet access, which is, after all, just another service on broadband network lines (ITAA).

Competition of wireless providers will become more possible with the advent of lower cost CPE's and do-it-yourself installation kits (Fusco). These could enable this to be profitable enough that national concerns might get involved, perhaps on a "franchise" basis. These will use the same frequency and could cause random noise to interfere, but again, with correct selection of antennas and radios, these can be overcome with insignificant loss of signal and no affect on quality of service. The key solution here is the one already in place; get there first with an already-proven cooperative business model and provide the best service with the best equipment available.

There is no doubt that metro areas will be covered by national concerns as they do now with just about every possible service the market will carry. But the key datum remains that about half the electrical lines in the US are still cooperative owned (Bielik). This predicts that rural areas will continue to be served by rural cooperatives, owing to the cost/ROI ratio that only cooperatives can benefit from.

A final risk is that the FCC could cancel license or sell this spectrum too. This is unlikely, owing to the nature of the bands set aside, but must be honestly taken into consideration. Wireless lends security in this instance, since the equipment can be handily paid for within three years.

There is no guarantee that any or all fixed wireless installations will be successful. Most new businesses fail in the first few years. Fixed wireless has been proven profitable, if sometimes marginally. We have ample failures to look at in order to see how not to do it, on both corporate and individual bases. At the same time, it is not a question of "if", but "when". While we have the tools and the business model to apply to this scene, we do not have any plethora of time to execute it. Its estimated that within two to three years, we will be close to a worldwide wireless connection. It will take only about two years for wireless to reach climactic deployment (Geer). So the window for action in this area is short if we are to act for our communities. Time we save will bring our communities IT-related efficiencies that much sooner, freeing the savings to invest in other needed budget items and community services. Time we waste will require our communities that much more expense to catch up with their metropolitan cousins.

Summary

In this paper I have covered demands for increased broadband and probable means to supply this in rural areas. This has brought to view the observation of a basic paradigm shift occurring with the integration of Information Technologies into the current societal structures. IT integration results in more jobs and improved quality of life, plus increased base and community health. More demand for broadband has resulted with increased use of computers and dial-up access; rural area residents and businesses have become more aware of its value.

While attempts to use large national and venture capital funded business models to implement rural broadband have failed, any apparent success has been due to the larger corporations sticking to the metro areas where there is more immediate return on investments. These efforts do not serve rural areas, but metropolitan pocket linings. Large scale, nation-wide attempts at rural broadband rollouts have failed and even venture capital funded regional efforts have also led to bankruptcy reorganizations. This has been the wrong model applied to rural areas.

Where there has been any success in rural broadband, it has been primarily co-ops and some locally-owned wireless providers. Fixed wireless, in conjunction with existing fiber-optic networks currently being installed by rural electric and telephone cooperatives proves to be the needed combination to deploy across rural America.

While there are some risks involved in seeking to span this divide, the benefits to rural communities and residents far out-weigh the risks, providing the cooperative business model is used.

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