From Passenger to Pilot:

The Use of Broadband in Navigating the New Economy River

Rural counties can and must implement broadband on a county-wide basis to gain control over the adverse effects of our accelerating New Economy.

by

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Abstract

As a boat out of control plummeting down a raging river, so are our rural counties in this New Economy.

Four factors of rural economies are isolated: control over commerce, industries, jobs and taxes.

New Economy industries have taken this control away from rural counties, unstabilizing their tax base and lowering their quality of life.

Broadband is found as a catalyst which accelerates the New Economy by facilitating high-speed, real-time data transfer. The facilitation of IT integration by broadband is the major source of New Economy industry effects on rural counties.

IT tools and processes of current industry leaders such as Wal-Mart, Dell and UPS are isolated. As well, communities which have implemented their own broadband solutions to the above adverse effects are examined for ideas to bring rural counties back the ability to control these four factors.

Finally, a plan to level the playing field and restore control based on what we've learned is outlined in broad strokes. Such a plan can give rural counties a chance to learn about guiding their own course on this New Economy river.

Introduction

The riverboat had begun rocking more and more violently during the trip as it picked up speed. Water began lapping over the sides as the waves increased in size. The direction of the boat had become more and more erratic, the deck so unstable that most passengers had found seats, if only on the damp and wave-washed deck. Finally, one of the most upset passengers made his unsteady way up to the pilot house to complain. Moments later he stumbled back down the ladder, ashen-faced. He breathlessly exclaimed to his fellow passengers, "There's no one piloting this boat!".

Rural counties today are in the position of those riverboat passengers. The economy is speeding up and the passage is becoming rougher to travel, but there is apparently no one guiding their trip down this river. The premise of this paper is that these rural county passengers need to learn how to pilot their own boat – or just as quickly learn how to swim.

David J. Peters, from the Missouri Department of Economics, sums up the situation:

> *"Mark Twain once said that a Mississippi riverboat pilot had to "learn more than any one man ought to be allowed to know" and that he must "learn it all over again in a different way every 24 hours." His words seem appropriate to the Missouri of today, with an economy increasingly driven by new information and the ever more sophisticated technologies that carry it."*

In this paper, I will review the four key factors in rural economies that we must learn about:

A. Cities and their commerce,
B. Rural Industries,
C. Jobs and their wages, and
D. Viable tax bases.

We will come to see how IT and high-speed data transfer (broadband) affects rural economies and discuss the pro's and con's of their use by both industries and rural communities.

The subject county here is Audrain county in Missouri, though data collected points to similar situations in rural counties across Missouri and other states in our nation.

Let's begin with the current situation.

Section I: Rural Counties – Passengers with no pilot

The current situation in rural Missouri counties is a bit desperate. While demand for Audrain county services such as roads, hospitals and schools has increased, the revenues to keep up with these expenses have barely kept up. Since rural counties are forbidden by law to spend more than they take in, the only solution in cases of insufficient revenue is to cut back on services, affecting the quality of rural county living (Scott et al.).

While currently just under a quarter of the Audrain county jobs in 2000 were manufacturing (US Census Bureau), between Oct 2000 and Sept 2001, this county lost over 11 percent of those jobs. Missouri overall only lost 6.2% of its manufacturing jobs during that same period (MERIC). This continued a national trend of losing manufacturing jobs. While the U.S. Lost 9 percent of its manufacturing jobs between 1967 and 2001, the Midwest and Northeast lost more than 40 percent. As lower paying service jobs absorb the unemployed, the community quality of living is affected and the difference of income levels is increased (Doyle).

Approximately 1 in 10 midwest workers actually work two jobs to pay bills and make ends meet (Wilkinson). Added to this is the factor of out-commuters (those commuting to jobs outside the county) rising above the amount of in-commuters (Scott et al.) and the resulting creation of "bedroom communities" where people live in an area but commute for work and pleasure, leaving little time to contribute to the community's social, cultural, economic and political life (Johnson and Scott). There is another factor – critical mass. A rural town, village or city can fall below the needed participation to keep it viable as a governing unit. The community would then go into an irreversible decline, with the cost of providing services becoming too expensive. (Jorde). Around Audrain County you can see such towns where they exist by name only – such as Skinner, which only exists as a sign on a back road. (See Appendix A.)

Meanwhile, the bright ideas to provide solutions to this have left with the educated youth to metropolitan areas, continuing a long history of outmigration to metropolitan labor markets, which have more diverse and lucrative jobs that offer a greater chance of advancement. This leaves a larger share of older, less-educated workers (Gibbs and Cromartie 18). Additionally, equity for investment in these rural areas can be hard to find (Jorde). This accelerating economic change has left the rural counties further and further behind their urban counterparts as they have disproportionately fewer resources to handle their own scene (Johnson and Scott).

Let's look at the underlying reasons to learn how these economic problems got started.

Section II: IT Runs Through the River

IT (Information Technologies) have been the underlying causation to the bulk of these accelerating changes. These changes started with mainframe computers and then accelerated with the creation of the Internet and personal computers.

Prior to the 1970's rural economic scenarios ran on just a few stable principles:

- Cities, towns and villages depended on commerce and were formed at commercial trade points, especially transfer points from one transportation mode to another. If you look at a map of Audrain County, you will find that the city size depends on how many different routes enter and leave the city, town or village. The majority of these cities, villages and towns were established within a few years of each other, mostly with the advent of the railroad.(See Appendix A.)
- Industries located near their raw material supplies to save cost of transportation. This made them sources of stable jobs and lifetime careers, at least as long as the raw materials held out. (Stories of the mining ghost towns can be found right here in Missouri as well as out west.)
- Since the Great Depression, cities and states had settled into the simple action of providing jobs as the one solution to economic stability and growth (Highfill).
- Taxes have evolved into the simple means to provide funding for common services that could not be simply charged for according to individual use, such as roads, bridges, schools, hospitals, etc. (Mankiw 237).

Since the creation of the Internet and the advent of personal computers, these economic principals have become less stable and less dependable in their results.

A. Cities and their commerce

Cities are no longer the necessary centers of commerce. The railroads have stopped servicing many of these smaller towns and villages. Enhanced logistics and distribution have enabled super-retailing companies such as Wal-Mart and its imitators to settle on the fringe of larger rural cities and communities, taking aways sales from local businesses. A third factor the Internet superhighway stops at every residence with as little as a dial-up line. Online shopping has increased every year, an exponential increase. Last year some "e-tailers" experienced as high as a 219% increase, while the industry leader, Amazon.com, had a 49% increase – its total sales surpassing the next 7 leading e-tailers combined (Pastore). The total U.S. Internet economy more than doubled between 1996 and 1997, going from$15.5 billion to $38.8 billion (Adkinson and Court). While this 1998 report predicted U.S. Internet sales to top at over $350 billion, the world-wide Internet sales for 2001 were reported as more than $600 billion (Pastore). Meanwhile, Congress and the President just extended the tax moratorium on Internet sales, making state and local sales taxes all but impossible to collect. With an Internet connection and UPS delivery, there is now increasingly little use for "going downtown" to do your shopping. With Wal-Mart and their competitors like Dollar General, there is little reason to go nearer than the city limits.

B. Rural Industries

Industries no longer have to physically locate near their markets to service them. These "footloose" industries have increased the search for not just markets to sell goods in, but for the jobs and finances these industries can bring. (Johnson and Fluharty). Businesses now get cities to compete against each other in order to acquire the most favorable deal in tax breaks, guaranteed loans, etc. Industries are no longer bound by sources of raw materials and can be built and closed within years, owing to exisgencies and fluctuations of their Information Age markets.

As an example of the "Old Economy" being trumped by "New Economy" effects, Mexico, Missouri (the county seat of Audrain County) was fortunate to have rich clay deposits. In 1917, a young engineer named A.P. Green founded and developed, from these clay deposits, what came to be the world's largest international brick refractory. Through its union, the workers could rely on steady, highly-paid work for their lifetime. Senior and middle management were all located in Mexico, so there were plenty of participation and financial returns to the community. Many local businesses depended on the wages and salaries paid to A.P. Greens' employees, since these same employees would purchase goods from the local businessmen. While this company lasted through two world wars and the Depression, ultimately the loss of steel industries (which used its firebrick to line their steel furnaces) to overseas competition, plus the increasing costs of asbestos litigation doomed this company and similar firebrick plants throughout the county. While other manufacturers were brought to Mexico in an attempt to replace these lost jobs, their average wage level remains a third or less of the scale of A.P. Greens. Most are not unionized and turnover is high. These other manufacturers did not bring their central offices with them, so the losses of income-multipliers (where wages paid create several additional jobs in return) were never replaced.

C. Jobs and their wages

The speed at which industries can relocate in today's economic clime, as well as the mutual effort by area employers to keep wage costs low, work against the effort of the city to continue the earlier successful "one skill, one job, one lifetime" pattern that had lasted for over 8 decades in this county. Sticking to "Old Economy" strategies, many industries perpetuate low-cost, untrained workers and so low taxes and underfunded schools (McGranaham) Manufacturing jobs can pay less well in rural, low-wage areas reflecting lower productivity and the relative lack of competition among employers (Gibbs and Cromartie 23). This leads the educated and skilled workers to out-migrate, as covered above.

An example of the effect of footloose industries is in the recent decision by Wal-Mart to locate a new distribution center (warehouse) in an adjacent county rather than Audrain. It was revealed that the demographics of the Audrain county area didn't support the amount of needed workers to man this warehouse sufficiently. So the warehouse was built in an adjacent county with higher unemployment. It is interesting to note that this warehouse starts its workers at nearly 150 percent of what local warehouses and factories pay. This is due to their use of sophisticated computerized distribution equipment and requisite training, compared to local warehouses using older systems that only require low-level manual skills. These increased wages had many of the experienced Audrain county warehouse and factory workers applying for the limited number of jobs there, though it meant a longer commute daily. And many of these local workers did get hired on.

Job training can significantly raise productivity and wage level. A study in Los Angeles showed that training and education can result in a 16 percent raise in personal income after 3 years and a 39 percent increase after 5 years. Such training is usually instigated by government agencies, as businesses are not inclined to invest in advanced training only to lose that employee over to its competition. Due to economic stresses on businesses, a person can expect to change jobs seven to ten times over one's career (Tesreau and Gielazauskas). Clearly job training is a community and county priority to maintain stable and valuable employment

D. Viable Tax Bases

The apparent reasoning for maintaining tax base stability has revolved around simply getting more jobs. Local cities compete for workers from the counties surrounding them. Commuting in rural counties is more and more common. So rural city managers and economic directors may have false security in the idea that "if we get more industries, we get more jobs and so people will pay more taxes." This is partially true, since sales taxes are the second highest revenue producing source in the state, second only to income tax (Kovalyoya and Johnson). The sales tax return idea is faulty, since these commuting workers simply take their paychecks and spend it closer to home (or at the local Wal-Mart, which is commonly located outside the city's taxable area.) One of the principal strategies cities employ is giving tax breaks along with guaranteed low-cost loans to lure industries (with their additional jobs) to the area, which directly cuts into affording the health, education and other services that their workers require.

A recent example of this illustrates the error in this strategy. In Clarksville, Missouri (from Pike County, which neighbors Audrain) a cement firm had its tax bill lowered 78 percent. According to the school district superintendent, this one company represented one-half of the local school district tax base. The amount of tax money for this district would be trimmed from $648,000 down to $146, 000. The local hospital could expect a $40,000 to $50,000 cut in their annual $160,000 county appropriations. Meanwhile, another nearby county had offered the company a $97 million property tax abatement as an "economic development incentive" to build a complex in their county, replacing the current operation. While the neighboring county (inside the metropolitan St. Louis area) could afford to do so, Pike county could not (AP).

A Section Summary -

I've covered here the dire situations that rural counties find themselves in:

- Traditionally, cities have built and financed themselves around commerce by collecting taxes from sales, property and use taxes. With the rise of the Internet, e-commerce has begun rapidly replacing cities as commerce centers. Wal-Mart and its competitors have drastically eroded existing rural merchant's traffic volume (Welles).
- While industries were formerly fixed, they have recently become able to locate independent of raw materials and even their markets. They can choose the county they will locate in according to tax incentives, which forces counties and cities to vie with each other, cutting their own tax bases to get more jobs, which they can only hope will replace what they had to give up in paid taxes to achieve.
- Taxes have become pawns to lure industry and so unpredictable as a tax base to provide common services. Rural cities and counties are then in a Catch -22 economically. None of the industries and residents need buy their goods locally and pay taxes to do so, meanwhile continuing to utilize services that are paid for from a declining tax base. So counties are closer and closer to insolvancy.

- Job competition and tacit agreements between local rural industries keep wages low, forcing daily commutes outside the county to better paying jobs, while frequently having to hold more than one job in order to make ends meet. This added time of commuting takes away from community contribution, creating "bedroom communities" and places smaller towns and villages at risk of dying off as they fall below critical mass. The outmigration of educated youth continues, which further drains the county of talent needed to turn the scene around.

I've touched on the fact of Information Technologies being at the base of these changes, as well as the starting date of these changes being coincident with the development of Internet communications and the personal computer. Let's examine these data and as well the underlying culprit and also potential hero of this complicated scene – broadband.

Section III: Broadband – a catalyst that speeds the economic current

Broadband is all about data transfer, particularly Internet use. Broadband as in sattelite links or DSL can be seen as a 12-inch water main compared to a dial-up connection's garden hose. The Internet made international communication and data transfer possible. Broadband accelerated the effects of this breakthrough. Where originally, it was only possible to get some small text files transmitted across the US, now video, audio and large data transfers of entire databases are possible across the globe. Any effect that can be created with the average connection is immensely amplified by connecting it with true broadband.

So broadband can be our worst nightmare or our best tool. It is conceiveable that rural areas, with an investment in infrastructure, intensive use of skilled labor and information technology, plus a global marketing plan could reverse their fortunes. Metropolitan areas have had the advantages of broadband for years. While these services tend to "trickle down" to rural areas, rural telecommunications have always tended to be one or more generations behind (Johnson and Fluharty). Added to this is the failure of the telecommunications industry giants to adequately service rural areas as they do urban ones. The problem has been that in the sparsely settled rural areas, any return on investment (ROI) is years away, so commercial broadband carriers have stuck to metropolitan areas where the ROI is faster (Adaptive). Rural areas have been increasing use and facility with the Internet. However, this is in terms of dial-up access (NTIA). Without readily accessible broadband, they cannot recieve the benefits their urban cousins have without significant personal or business investment.

Broadband is capable of these effects as it increases the amount of data transfer that can occur. While Internet was formed originally to share information, the initial data was small text files. When large capacity "pipes" of broadband are installed between senders and recievers, additional services can be built far above simple transmission of email (Atkinson and Court). With high-capacity broadband in place, industries can expand their transfer capabilities into teleconferencing and real-time management of data as well as networked interactive access to databases regardless of their physical location. This use of real-time data has crowned new industry leaders, such as UPS, Wal-Mart and others. It is currently revolutionizing manufacturing as now companies can see their supply-chain in all its parts and so keep expensive inventories pared. Federal Reserve Chairman Alan Greenspan explained this recently:

> *"New technologies for supply-chain management and flexible manufacturing imply that businesses can perceive imbalances in inventories at a very early stage – virtually in real time – and can cut production promptly in response to the developing signs of unintended inventory building"* (qtd. in Bartholomew).

An example of this is seen in GM, which has pared its design time for new production models from 6 years down to 18 months by integrating and streamlining their production through information technologies. As well, they increased quality at the same time, jumping to number three internationally (Konicki). Companies that have taken advantage of integrating IT into their production lines have found that they are able to manage over vast distances with virtually no added time. Data that was collected, summarized, typed and mailed to the central office on a quarterly or annual basis can now be done on a daily or more frequent basis. Wal-Mart continually monitors its stores' point-of-sales transactions and shares this data with their suppliers. Suppliers can use this data to identify customer shopping patterns at the store display level by state, county or even city; this enables them to operate more efficiently, keep less stock in warehouses and find trends that predict sales – not just year-to-year or season-to-season, but day-to-day and even hourly (Palace).

From these few data, all of the above adverse effects can be explained:

- Cities can't protect their commerce routes from the giant merchandizers such as Wal-Mart, which uses massive data information collected and transmitted near instantaneously via broadband. This company uses a computerized system to track its sales and deliveries through a massive satellite-linked network of stores and warehouses.
- Due to supply-chain integration, Industries with high-speed Internet access can locate remote plants according to cheapest operating costs, since now coordinate their traffic regardless of location. Management doesn't have to be local to see exactly what any given plant is producing even up to the hour. So many of these industries are absentee-owned. Profits go outstate and few managers are local; the plants consist mostly of hourly employees. Tacit agreements on wages with other local industries keep wage and salary costs low. Income multipliers are few (Johnson, Scott).
- More jobs are no real solutions to rural towns and cities, since the above low-wage scene means that both parents of a family have to work, one at two jobs. Since their combined income is just above poverty, little is paid to taxes. Property, if owned, is of little value to add to the tax base.
- Through the above, taxes are avoided by industries and residents; this makes it hard to collect to support social services, road repair, schools, and other county services. Counties are going effect of broadband-enabled industries and broadband-challenged rural communities.

OK, so we know how these economic effects are created. The next question is: Is there something we can do about it?

Section IV: Building and Steering a Big Boat

We've seen how the the adverse effects on rural counties and their villages, towns and cities can be traced to broadband use. However, broadband can be likened to a paddle. A paddle is a simple tool that has two ends: one to move the water and one to control its use. Grab the wrong one and you don't move very fast anywhere, if at all. With any tool, it's not what tool you have, it's knowing how to use it. Let's examine some of these New Economy industry leaders to more closely nail down exactly how they use broadband to their advantage: What tool do they use? This will give us clues how to wield this broadband paddle ourselves.

Retailing – Wal-Mart.

Wal-Mart, as many industry leaders, didn't get its advantages by simply throwing some satellite connections, computers and bar-code readers in. How they advanced was by management innovation and integrating IT into these advances. Management had to integrate computers and broadband into their day to day operation, not just start using word processors instead of typewriters, spreadsheet programs instead of neatly tallied ledgers (Lewis, et al). Wal-Mart innovated with IT and integrated these technologies into their day-to-day operations. Currently their computerized distribution centers run 24 hours a day, with truck loaded according to tickets made up based on the sales of the stores – all computer-tracked with and coordinated so that they never run out of supplies. Suppliers are notified similarly of warehouse stocks (Ortega).

TOOL: IT integration of distribution and sales with management innovation and alignment.

Service and Sales – Dell Computers

Dell revolutionized the computer and computer-service industries through use of IT to reduce inventories and create direct on-line sales. The biggest problem with computer manufacturing is inventory. Due to the nature of technical advances, any item in stock devalues daily. A computer manufactured today could be worth half its value in 6 months. Dell, through integration of its various production systems was able to reduce its inventory on the factory floor to zero, which further enabled their suppliers to lower their costs via inventory reductions (Intel). They have a remarkable production line which only starts when the order is placed, taking 3 minutes to build per PC and requiring an internal lead time of only 5 hours (two of which is testing). They keep only 6 days of component inventory, which is owned by suppliers (Forslund). Dell is known as a "hypergrowth" company, which is defined as growth in earnings of better than 10 percent annually. In fact, while in just a few years the company has grown from its origin in Michael Dell's car trunk to the international leader in computer sales and service, in the last three years alone it has grown 50 percent each year. This is a total of 337 percent growth over that period (Dell). It utilizes a direct Internet sales model with a negative working cash flow model and IT investment into processes and strategies that support this (Marks).

TOOL: Direct Internet sales with integrated production.

Logistics – United Parcel Service (UPS)

While UPS was started in 1907, they started adopting and integrating IT into their production lines around 1991. They are today the leader in logistics internationally. Their key advantage is being able to enable the customer to track their package using UPS's software on the computer of their choice, from mainframes to PDA's. They achieved their advantage by integrating real-time data availability into readily accessible formats for their customers (Bartholomew). FedEx slipped behind due to ignoring ground delivery in favor of more expensive air-shipping. Management hubris in the 1980's during a hypergrowth period is blamed for the short-sighted Fed-Ex decision (Haddad and Ewing). UPS has become synonymous with Internet e-tailer delivery and returns by creating alliances and partnerships with various major e-tailers like E-bay. For returns, they've created a program that can print labels directly from their servers using the purchasers browser (Morrow).

TOOL: Integrated customer interaction with real-time data access.

Manufacturing – Foriegn Auto Manufacturers in the American South

Foriegn auto-making concerns such as Honda, Toyota, Mercedes, BMW, Hyundai and others have been moving into the vacuum created by the departure of many textile factories. They've created about 50,000 jobs in the South, raising wage, skill and education standards there. They match wage scales of the UAW Detroit plants while remaining non-union. At Honda's Alabama plant, workers start at $14 an hour and in two years work up to $21 an hour, while Ford, Chrysler and GM pay $25 an hour for union labor. A good deal of this higher pay is due to the higher skills required for these jobs, such as robotics knowledge. Additionally, for each job created by these factories, an additional 5.5 jobs are created in supplier factories or elsewhere in the community. These factories farm out subassembly work to their suppliers, which makes their final assembly faster and higher quality. These factories are integrally related with their suppliers as well. A supplier of dashboard panels, Delphi, recieves a signal every 2 ½ minutes from the Mercedes factory telling them precisely what color dashboards to make next and what extras (CD player, navigation system, etc.) to include (Muller et al.).

TOOL: Integrated manufacturing with suppliers, higher job skills pay higher wages.

INDUSTRY TOOLS SUMMARY: We see here that broadband and IT use enables industry leaders to create alliances with their suppliers, provide real-time data access about company products even to their buying public, make sales an integral part of manufacturing, slash costs by making factories able to create on demand and not have to keep warehouses of materials waiting to be sold. Workers are expected to know more and are paid for those earned skills. Buyers can use the Internet for purchasing or checking on their shipping. Meanwhile, higher tech industries create more jobs in the areas through their suppliers or other required service jobs.

Now that we know how industry leaders have become that way and how, let's look to see if any examples exist of smaller-scale application — something we can possibly use ourselves.

Section V: Small Boats Navigating a Big River

We've covered how broadband has been successfully used to make new industry leaders and revolutionize their respective industries. Let's see how some communities have implemented broadband to start steering their own course down this New Economy river.

Decatur, Alabama – Agricultural applications

Don Glenn has made a $24,000 investment in some of the latest technology that enables him to know exactly how and where to spread fertilizer and seed, track yields by the yard and compare last year's harvest from satellite imagery. Daily and hourly he can chech the weatherand get the latest grain prices from his satellite connection. With improved profit margins, he figures he's broken even already and has already saved $5,000 in supplies so far this year (Thomas).

Missoula, Montana – Leapfrogging urban technologies

The nation's first 3G wireless broadband was rolled out in Missoula Montana, giving this city and its rural residents facilities that larger metropolitan areas don't yet possess. They have a wide variety of services including email, travel reservations, instant messaging and more, all possible from a pocket sized modem that doesn't require line of sight connection. (IPWireless) What they have done here is leapfrog large metropolitan areas which are still trying to retrofit existing antenna towers and relays to enable 3G devices. This is possible in Missoula as nothing existed before, so the installation could take advantage of the latest developments.

Evanston, Illinois – "Broadband and Main"

In order to stave off becoming a "bedroom community" for Chicago, this city of 75,000 formed a non-profit organization to get broadband available for use by the residents of their city, regardless of income range. They have approximately 15 percent of their city using broadband now. The idea was to build a communications infrastructure to attract tech companies. By aligning themselves with a cable company, AT&T, they were able to roll out a system that paid for itself through other services that could then be sold on that improved cable system, such as digital TV and phone service. The investment is paying off – a meeting of local business owners started a website called shop-evanston.com. With their own affordable broadband links (about $50 per month) they can link up to the town's site and sell to customers across the world (Crockett).

Haiku, Maui, Hawaii – An international network by the beach

Chelsea Hill runs an international translations agency from the remote city of Haiku on the island Maui in Hawaiii. While there are 5 others with her in this venture, they routinely meet with professionals from their offices in Seattle, Victoria, British Columbia, and Bristol England – all via broadband connections. This type of business became possible when the shate offered powerful incentives for high-tech small businesses to relocate their R&D operations to the state. Hawaii is now one of the three most networked states in the Union (Overholt).

Athens, Georgia – Networking a city

Athens is currently building a network covering 24 blocks that can be accessed by a laptop, PDA or a Pocket PC. Mostly an outdoor network, any resident or visitor can log on from a park bench or outdoor restaurant table to find out information or just surf the Internet. This network is part of an educational experiment to educate the residents about wireless and see what business potential can be achieved. The city is providing access to 10 power poles, plus the power to the equipment. Students from Georgia's School of Journalism will be interviewing local merchants to come up with ideas that use wireless capabilities to bring in business (Walton).

Big Island, Hawaii – Networked education

An entire island has been networked with wireless broadband, providing low-cost or free broadband connections in order to upgrade the education on this island. While the Internet access points themselves have been donated, the base stations that turn make this access useful to hundreds of subscribers can cost as little as $1,000 each. A bus has been outfitted with antennas and amplifiers so that it can act as a mobile base station in its own right. Across the island, various applications for this have been found, from nature research and reports by students to a remote camera the Fish and Wildlife Department uses to keep an eye on a feeding station of an endangered species. The various medical clinics are being hooked up so that doctors can have video conferences about patient care (Schonfeld).

Maryville, ND – Building new jobs and industries

A web services firm started by two local professors and a student in 1995 now employs over 19 and has a ½ million dollar annual payroll, utilizing local students as interns and hiring many after they graduate. Students are highly technically trained at the local university and this is considered a resource. Last report has a defense contractor wanting to locate part of his business there, an increase of 70 jobs. This was due to the community gettting IT training going at the university as well as for the residents and installing a broadband base to back it up (NTIA).

Morrisberg, ONT – Tele-networked expansion

A local businessman tired of the expense and inefficiency of having to run his 5 businesses separately due to the 100 miles of area he covered. He joined them into one with a wireless network mounted on local water towers. As a result of his success, two local cities have asked him to help them expand their telecommunications systems and so attract IT jobs from nearby Ottawa (Careless).

It is possible for a community to organize and implement broadband technology solutions to positive advantage and so place themselves back at cause over the New Economy. The above examples point out:

- improved efficiencies and cost savings in agriculture,
- the ability to "leapfrog" into next generation capabilities,
- enable local businesses to compete on an global level,
- bring about businesses that can take advanage of rural scenery and quality of life while working for an international firm,
- improve education opportunities,
- improve health care facilities,
- provide new jobs and industries while making existing ones more efficient, and
- being able to do this networking on a wide area basis cheaply.

Most importantly than these above, another factors emerges: Broadband has the capability of creating a level playing field where rural communities can effectively compete alongside giants such as Dell and Wal-Mart. While the productivity of rural communities and its traditional work-ethic values have never been in question, getting adequately paid for that production has been. One possible strategy that has worked is producing and supplying to niche market demands that the industrial-sized stores and companies can't meet (Welles). Combined with the low cost of Internet marketing and e-commerce, this couild put rural-branded products out on the front display shelf with the globalized ones – for purchase internationally by anyone who has a browser, exchangeable currency and an address UPS can ship to. Let's see what other steps might need to be taken to start piloting our own boat.

Section VI: Rural Counties: Piloting their Future

What would it then take locally to utilize broadband and begin to reverse the above effects? Four factors would have to be handled:

- Cities must take control over their commerce.
- Industries must begin contributing to the community as active participants, not tenants.
- Real, livable wages must be paid; workers will need to be trained to earn these.
- Taxes must be realistically earned through servicing the community, not given away for no actual gain.

To these we add the the necessary paddle to guide our economic boat:

- Readily available broadband must be created on a county-wide basis to implement these changes and get these rural counties back at real cause over their economies.

A simple view of this:

A. Commerce:

- Get existing stores and businesses operating via e-commerce in addition to local and regional sales. This revenue will come back to the city as they spend or invest it. Cities can actually set up central e-commerce sites to assist these businesses; they would then collect service revenues from these sales. (Mexico, Mo. owns it's own ISP; it would be a simple extension of current capacity to enable e-commerce for its downtown and county-wide businesses.)
- As well, these websites can bring physical business to town as well, by promoting various local activities and tourism.
- Discover and promote products which serve niche markets that the larger industries can't or won't reach. Level the playing field with e-commerce and e-marketing.

B. Industry:

- Encourage and assist local businesses to integrate Information Technologies into their production to improve efficiencies and increase their bottom line. This may take guaranteed low-rate loans to purchase the needed equipment and pay for training (which can be done via the local vocational-technical school or college.)
- The industrial parks need to be turned into "fiber parks" to enable acquisition of already IT-enabled industries.
- Meanwhile, foster start-ups with incubator programs and also "virtual incubators" where businesses could be run from home or the farm utilizing broadband connections to get their sales and delivery started. The Extension Office could assist in this area, as they already have been doing.
- Cities can foster technical competitions, such as web-site design and e-commerce programming which can be awarded with scholarships, paid internships as well as cash prizes and donated awards. IT industries, such as programming and software companies can pay well to retain highly-trained staff, yet need little in the way of physical premises. IT businesses on the average produce 5.5 more jobs for each one they directly create (Peters). It would cost a rural city little to become a local technological center specializing in e-commerce, for instance.

C. Jobs:

- Simply, get the jobs you have better paid and better trained to earn that higher pay. Henry Ford proved it on his own production lines in the 20's – if you pay workers more, they will spend more. If they don't have to work two jobs, then they will have more time to contribute to the community via its various churches, clubs and groups.
- Locally owned industries above will create income-multipliers, which will in turn create more jobs in the community. As well, form strong alliances between those businesses, local colleges and schools in order to produce graduates that are able to directly assist the local economic growth and quality of life.
- Students and interns can work on web-sites and e-commerce as well as assist with solving production situations. Summer interns gain valuable work experience which enables them to apply what they have learned. Completed successful e-commerce and web sites can be proudly included on resumes to assist in their ultimate job hunting, if the interning company doesn't get these interns first.
- Executives who retire from urban jobs into a rural community often will start part-time businesses to supplement any pension they have. Such could be experienced consultants to up-and-coming local businesses. The idea would be to create locally owned hypergrowth companies.

D. Taxes:

- Review the agreements that have been made to acquire industries or keep them. Without fettering production, any destructive agreements should be renegotiated so that county and local services are fairly paid for. Industries should be part of the community, not just low-rent tenants.
- Get county-wide planning approved by voting residents. This would resolve tax vacuums like trailer parks. As well, review how to enable home-owning by residents currently in low-cost housing so that they can own their own home or rural residence. With higher wages above, they can afford a better quality of life, which returns to the community indirectly through their property taxes.

E. Broadband:

- Among all of this, there is the undeniable need for readily accessible broadband. Suggested is a county-wide network consisting of both fiber-optic cable where it exists and fixed wireless antenna connections where it doesn't yet reach. Fixed wireless has been found to be the best economical solution to spanning rural areas (Bright).
- This will enable more businesses to become efficient by utilizing tools currently only available in urban areas. The number of high-paying jobs can rocket, quite in addition to such benefits as Homeland Security, e-government activities, remote education and health, plus various other amenities such as improved phone service, video teleconferencing for businesses, entertainment such as movie rentals, etc.
- Such an investment could pay for its initial costs within one to two years, enabling further expansion with the community it serves.

So there we have it. We can move our counties from passive passengers to active pilots on this New Economy river. The passage can smooth out into a comfortable ride, no matter how fast we end up going. What remains is whether we, in our rural counties, will learn from our history and do something about it, or invest in swimming lessons.

Summary

As a boat out of control plummeting down a raging river, so are our rural counties in this New Economy.

Four factors of rural economies have been isolated: control over commerce, industries, jobs and taxes. New Economy industries have inadvertantly taken this control away from rural counties, unstabilizing their tax base and lowering their quality of life.

Broadband is a catalyst which accelerates the New Economy by facilitating high-speed, real-time data transfer. The facilitation of IT integration by broadband is the major source of New Economy industries' adverse effects on rural counties.

IT tools and processes of current industry leaders such as Wal-Mart, Dell and UPS were compared with those communities which have implemented their own broadband solutions.

Key strategies and tools were isolated to enable them to start effectively competing with these industry leaders, utilizing the county's own resources.

Finally, a plan to level the playing field and restore control based on what we've learned was outlined in broad strokes. This plan can give rural counties a chance to learn to start guiding their own course in this New Economy river.

Conclusion

A river flows inexorably to the sea. No means known to Humankind can stop or reverse its flow effectively or for very long. Rural counties are each their own boat on the New Economy river. As they learn to pilot their own craft, they can direct their own course, speed and comfort in travelling this broad river. Broadband is the paddle which can be used to help guide their boat. It is up to these rural counties to learn how to use this tool effectively – or learn how to swim. The river doesn't care which.

Robert C. Worstell
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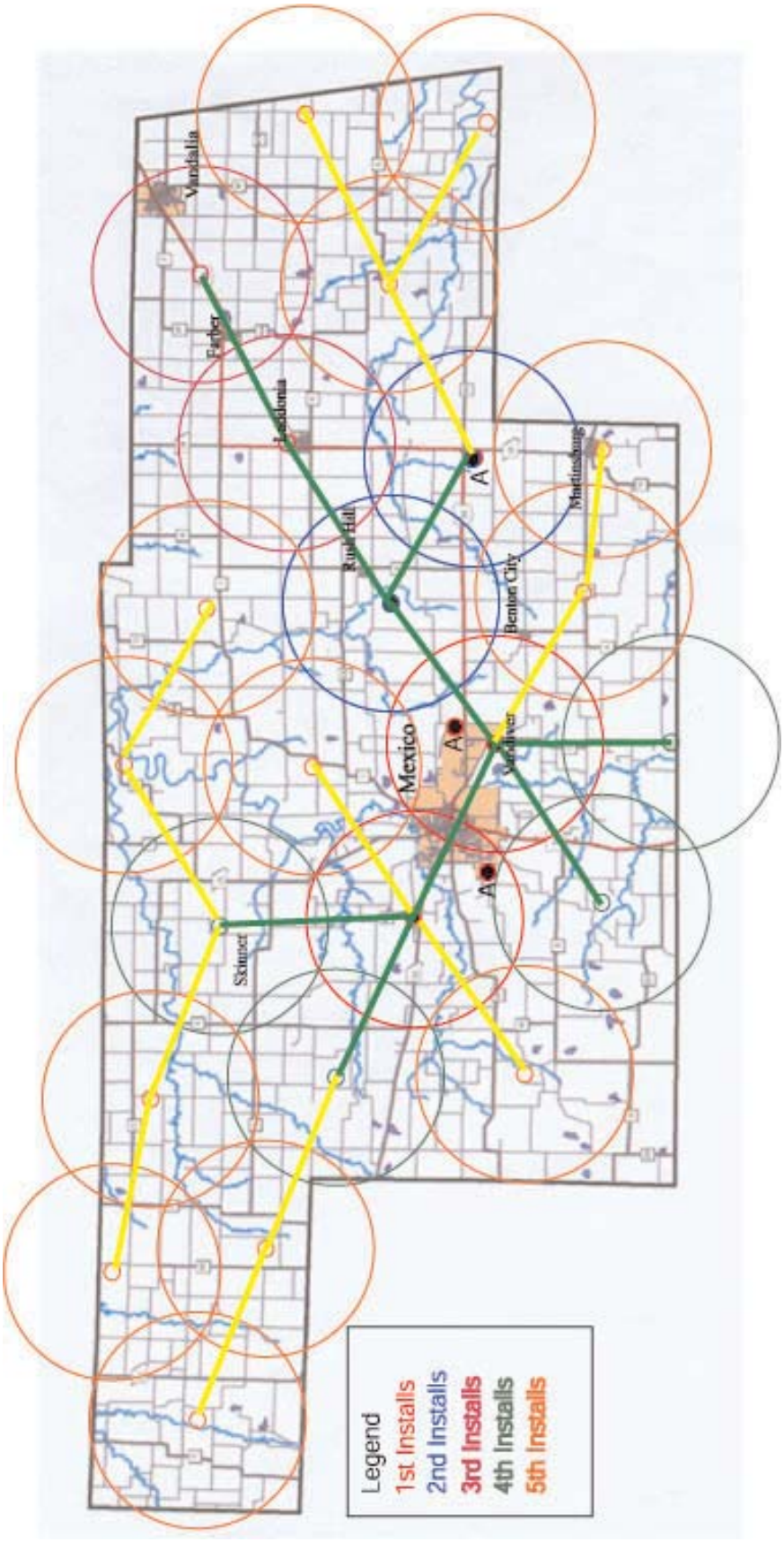
Appendix

A. Audrain County Map with principal towns and cities.

Appendix

B. A proposed county-wide broadband plan for Audrain County.



Notes