

The Killer App for Local Fiber Networks

For a community fiber network, economic development may be the killer app – the application that validates the use of the platform.

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Nearly every U.S. community that has developed a fiber optic broadband network or partnered with the private sector to acquire one has put economic development at the top of its list of reasons for doing so. Communities increasingly recognize that fiber networks also provide critical benefits for education, public safety, health care, transportation, energy, environmental protection, urban revitalization, government service and much more. But only in revitalizing and modernizing local economies and creating meaningful, well-paying jobs do community leaders, businesses, institutions and residents consistently find common ground. In short, economic development and job creation can fairly be called the “killer app” for local fiber networks.

Despite the central role of economic development and job creation in any discussion of fiber networks, there is still much to learn about the relationship between them.

WHAT IS ECONOMIC DEVELOPMENT?

Let's begin with definitions. According to the U.S. Economic Development Administration,

Economic Development creates the conditions for economic growth and improved quality of life by expanding the capacity of individuals, firms, and communities to maximize the use of their



talents and skills to support innovation, lower transaction costs, and responsibly produce and trade valuable goods and services. Economic Development requires effective, collaborative institutions focused on advancing mutual gain for the public and the private sector. *Economic Development is essential to ensuring our economic future.*¹

Similarly, the World Bank defines economic development as follows:

The purpose of local economic development is to build up the economic capacity of a local area to improve its economic future and the quality of life for all. It is a process by which public, business and nongovernmental sector partners work collectively to create better

conditions for economic growth and employment generation.²

Many economic development strategies and options are available to communities. They can focus on increasing the profitability of local businesses, increasing the *number* of local jobs, increasing the *quality* of local jobs or striking a balance among these goals.³ They can seek to attract or retain a relatively small number of large companies, a larger number of small to medium-sized businesses or a combination of both.

Communities can concentrate on their local economies, cooperate with neighboring communities or involve themselves in larger regional initiatives. They can attempt to support the growth of all local industries or target particular industries – high-tech, health care, data centers and so forth – with the best prospects.

Once communities decide what they want to do, they typically have a wide choice of development tools available. They can offer tax incentives or loans and other financial enticements. They can establish improvement districts, enterprise zones, and other kinds of development areas. They can improve roads, sewers, water facilities and other infrastructure. They can offer favorable terms and accelerate approval of franchises, permits and other necessary authorizations.⁴ They can support workforce development and training. They can use local government purchasing power to increase a targeted company's sales, thereby reducing its risks. They can help aggregate demand within the community. They can also seek grants, loans, and other support from federal and state agencies, foundations, and other organizations.

One development tool is to improve broadband infrastructure, and even here, communities usually have multiple options. They can work with willing incumbents, enter into public-private partnerships with new entrants, establish advanced communications networks of their own or develop other innovative approaches that work for them.

Making advanced broadband available is only one of many economic development tools, but studies show that broadband appears to have a positive effect on a range of economic indicators.

THE LINK BETWEEN BROADBAND AND ECONOMIC DEVELOPMENT

Although the availability of advanced broadband networks is only one among many tools for economic development and only one of several factors an entity takes into account in deciding whether to move to or remain in a particular community,⁵ several formal studies have been done on the relationship between broadband and economic development.⁶ The first wave of these studies, which focused on first-generation, low-capacity broadband networks, suggests that there is at least an association and probably even a causal relationship between broadband and economic development.

Other studies indicate that “the Internet plays an integral role in helping small businesses achieve their strategic goals, improve competitiveness and efficiency, and interact with customers and vendors.”⁷ Studies also confirm that broadband expansion can dramatically increase state GDP and tax receipts.⁸ Site selectors report that locations are now routinely eliminated because of inadequate telecommunications infrastructure.⁹

For example, in a 2005 study, George S. Ford and Thomas M. Koutsy concluded that “broadband infrastructure can be a significant contributor to economic growth ... [and] efforts to restrict municipal broadband investment could deny communities an important tool in promoting economic development.” The study “quantif[ie]d the effect on economic development resulting from a community's investment in a broadband network” by looking at

Lake County, Fla., which developed a municipal broadband network in 2001 and provided access to the network to private businesses.

In comparing Lake County with similar communities in Florida that did not have municipal broadband networks, Ford and Koutsy found that Lake County had “experienced 100 percent – a doubling – in economic growth relative to its Florida peer counties” since the deployment of the municipal network. The study points out that this doubling occurred despite the fact that these other counties “no doubt” had private broadband networks during the evaluation period.

In another 2005 study, analyzing data from 1998–2002, Sharon Gillett, William Lehr, Carlos Osorio, and Marvin Sirbu found that communities in which mass-market broadband became available by December 1999 “experienced more rapid growth in employment, number of businesses overall and businesses in IT-intensive sectors.”¹⁰ Likewise, in a 2007 study, Robert Crandall, William Lehr and Robert Litan concluded that broadband not only increased nongovernmental employment by 0.2 to 0.3 percent but also had a positive impact on GDP.¹¹

In 2010, Jed Kolko found a “positive relationship” – one that “leans in the direction of a causal relationship, though not definitively” – between broadband expansion and local economic growth. Kolko's study revealed that almost all industries showed a positive relationship between broadband expansion and local economic growth, particularly in industries that rely on information technology, such as utilities, information, finance and insurance,

technical services, management of companies and enterprises, and administrative and business support services.¹²

In their 2013 study, Brian Whitacre, Roberto Gallardo and Sharon Strover focused on the impact of broadband on the economic health of rural areas. They found that “high levels of broadband adoption in rural areas do causally (and positively) impact income growth ... as well as (negatively) influence poverty and unemployment growth. Similarly, low levels of broadband adoption in rural areas lead to declines in the number of firms and total employment numbers in the county.”¹³

FIBER NETWORKS AND THE ECONOMY

Given the relatively recent emergence of fiber networks, there is not yet a large enough database to support statistically rigorous statements about the relationship between high-bandwidth broadband connectivity and economic development. It is clear, however, that fiber networks enable hundreds of thousands of individuals to work from home, adding tens of billions of dollars annually to the U.S. economy.¹⁴ In addition, fiber connectivity adds between \$5,000 and \$6,000 to the value of a \$300,000 home in the United States.¹⁵

A series of studies conducted at the Chalmers University of Technology in Gothenburg, Sweden, specifically addressed the effects of broadband speed. In their first report, published in 2011, the researchers concluded that increases in broadband speeds contributed significantly to economic growth.¹⁶ In a report published in 2013, the same researchers concluded that, in developed countries, the threshold level for broadband to have any impact on household income was 2 Mbps; gaining 4 Mbps of broadband increased household income by \$2,100 per year.¹⁷ Given that fiber networks are capable of nearly unlimited speed, it appears that their potential economic impact is higher than that for lower-capacity broadband.

A recent study commissioned by the Fiber to the Home Council Americas compared economic activity in 14 metropolitan statistical areas (MSAs) in which gigabit-speed connectivity was widely available (to more than 50 percent of the households) with economic activity in 41 similarly sized MSAs in the same states in which gigabit speeds were not available. According to the study’s investigators, “our model suggests that for the MSAs with widely available gigabit services, the per capita GDP is approximately 1.1 percent higher than in MSAs with little or no availability of gigabit services. These results suggest that the 14 gigabit broadband communities in our study enjoyed approximately \$1.4 billion in additional GDP when gigabit broadband became widely available.”¹⁸ Although this study focuses on “early evidence” and is far from conclusive, it is consistent with the field experience of many communities.

What formal studies do not yet reveal is how many units of economic development a community can expect from a specific dollar investment in a fiber network under the unique conditions present in that community. Neither the data nor the analytical tools to do this will be available in the foreseeable future.

As Graham Richard, former mayor of Fort Wayne, Ind., observed, “From the point of view of retaining and gaining jobs, I can give you example after example [of the impact of broadband]. ... What I don’t have is a long term, double-blind study that says it was just broadband.” But, “as a leader, sometimes you go with your gut.”¹⁹

THE VIEW FROM THE TRENCHES

A huge and rapidly growing body of evidence confirms that, at least in some localities, advanced broadband networks can indeed spur economic development and create jobs. The communities cited here have taken differing approaches based on their individual resources and economic development needs. Some make fiber available to businesses; others

serve households as well. Some are more concerned with increasing the availability of broadband, and others focus on reducing its price. Some try to retain existing large employers, and others aim to attract new startups.

The common thread is that economic development officials are working closely with existing and potential employers to identify, understand and meet their needs for advanced communications capabilities.

- **Cedar Falls, Iowa:** In the 1990s, Cedar Falls Utilities built a citywide municipal hybrid fiber-coaxial network and provided fiber connections to commercial and industrial customers in both the city and the industrial park.²⁰ Over the years, Cedar Falls watched businesses from neighboring towns relocate to the area, in part because of the need for more bandwidth and greater Internet capabilities.²¹ Cedar Falls has now made the transition to all fiber and became the state’s first gigabit city in 2014. Jim Krieg, general manager of Cedar Falls Utilities, noted the growth fiber optics had generated: “Twenty years ago, [Cedar Falls] had 27 businesses and \$5 million in taxable valuation; today, there are 160 businesses and \$270 million in valuation.”²²
- **Chattanooga, Tenn.:** With its fiber-to-the-home network offering gigabit speeds throughout the city, Chattanooga has attracted several major companies, including Volkswagen, which has already spent more than \$1 billion building factories in the area and created 12,000 new jobs, as well as Homeserve USA and Amazon.²³ Chattanooga’s innovative, high-speed fiber network has also created an entrepreneurial boom in the city.²⁴
- **Cumberland, Md.:** Cumberland, Alleghany County and the county board of education have partnered for 15 years on an innovative wireless infrastructure program that delivers high-quality services to government users and makes available both middle-mile and

last-mile wireless capabilities for private ISPs that serve residential, business and health care customers. The availability of these services, particularly in the most rural parts of the county, distinguish the county from other rural areas. It has enabled the development of home-based businesses and attracted second-home buyers who otherwise would not have chosen to locate in the county.

- **The Dalles, Ore.:** The Dalles, a city of 11,873 residents in the picturesque Columbia River Gorge, operates a 17-mile municipal fiber optic network. In 2005, as a direct result of The Dalles's municipal networking capabilities, Google decided to purchase an industrial site there for \$1.87 million to house high-tech equipment that would be connected to the rest of the company's network. According

to the man who coordinated the deal with Google, "It was visionary – this little town with no tax revenues had figured out that if you want to transform an economy from manufacturing to information, you've got to pull fiber."²⁵ The project was expected to create "between 50 and 100 jobs over a matter of time, earning an estimated average of \$60,000 annually in wages and benefits."²⁶ The Dalles succeeded so well that it recently paid off its network debt well ahead of schedule.²⁷

- **Danville, Va.:** In contrast to The Dalles, Danville did not have a fiber network when AOL came looking for a site. As a result, AOL struck Danville off its list of potential sites for a new data center and located the center in Prince William County, Va.²⁸ After this setback, Danville developed a fiber network of its own.

Now known as the "Comeback City," Danville used its fiber network to revitalize its economy, once the worst in the state with a 19 percent unemployment rate, and made the city a site of robust economic development, attracting Microsoft, IKEA and many other new, high-tech businesses.²⁹

- **Kendall County, Texas:** A cooperative telephone company, GVTC, began building out FTTH in the Texas Hill Country in 2004. It works closely with the Kendall County Economic Development Corporation to promote the network to businesses. As a result, the region's growth has outpaced the rest of Texas by 4 percentage points. Corporate site selection committees no longer reject sites in the county. An economic development official said, "If I don't have fiber, I'm eliminated – not just

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Lafayette, La., is becoming a technology hub, with many companies relocating to the area because of its excellent, affordable Internet connectivity.

fiber to the business, because the executives are commuting to San Antonio and want to work from home because of gas prices. Fiber allows throughput and security.” Software companies, medical companies and aerospace companies have relocated to or stayed in the area because of the fiber network. Even Hill Country wineries, which constitute a small but tenacious local industry dating back to early German settlers, are now putting towns such as Fredericksburg and Boerne on vintners’ maps.

- **Lafayette, La.:** “When NuComm International needed to locate a new call center – one that would add 1,000 jobs ... to the local economy – it chose Lafayette, La., because the city is building a massive fiber network to connect everyone.”³⁰ Lafayette has garnered attention in the tech sector, with many companies relocating to the area because of Internet connectivity. In one example, “Scott Eric Olivier moved his tech startup firm, Skyscraper Holding, from Los Angeles to Lafayette when he heard of the speeds and service offered by LUS Fiber.”³¹ Olivier says the same 100 Mbps connectivity that costs him \$200 per month in Lafayette, enabling him to move large files across the Web, would cost him several thousand dollars a month anywhere else. In the past few months, Lafayette attracted three new employers that will bring 1,300 jobs into the city.³²
- **Martinsville, Va.:** Martinsville’s fiber network enabled it to attract major businesses, such as defense contractor SPARTA Inc.’s research

center, Mehler Technologies, American Distribution and Warehousing and ICF International (500+ jobs).³³

- **Mesa, Ariz.:** In the early 2000s, Mesa started placing conduit in its rights-of-way during capital construction projects and any other time a road was open. The city built a critical mass of conduit and fiber over a decade and a half, and it partners actively with private entities seeking access to conduit and fiber. Apple located a silicon research lab in Mesa, and the city credits the direct fiber connection to that facility as a significant part of the inducement for Apple and other entities to locate in Mesa.
- **Montgomery County, Md.:** In the mid-1990s, Montgomery County developed a sophisticated revitalization plan for downtown Silver Spring, which had seen steady economic deterioration and high retail and office vacancy rates. Important to the revitalization was attracting Discovery Communications and the American Film Institute (AFI) to locate as anchors; a key to attracting those anchors was that the county provided dark fiber resources to the locations where they committed to build. This revitalization has been enormously successful, and Discovery and the AFI Silver Theatre and Cultural Center have proved essential to the redevelopment of Silver Spring.
- **Powell, Wyo.:** In anticipation of the construction of a fiber-to-the-home system in rural Powell, a South Korean venture capital firm agreed to pay up to \$5.5

million to engage 150 certified teachers, working from their homes, to teach English to students in South Korea using high-speed videoconferencing.³⁴ The FTTH system has been so successful that the city was able to buy out its investors 18 years ahead of schedule.³⁵

- **Princeton, Ill.:** Princeton built a fiber network to retain Ingersoll-Rand as a major local employer; it now has more than 75 commercial customers, and most banks in town are connected with fiber. The broadband utility is regarded as attractive for potential employers.³⁶
- **Pulaski, Tenn.:** Local economic development leadership has begun marketing Pulaski Electric System’s services to nearby Huntsville, Ala., home to a large number of defense and space industries. Before PES built its network, the community had never attempted to approach the defense or aerospace companies because it had little to offer that met their special needs. The FTTH network has allowed several existing industries to receive superior service at much lower prices than they paid previously. The system has become a focus of community pride and an example of the community’s willingness to invest in the future.³⁷
- **Reedsburg, Wis.:** Reedsburg’s FTTH system “has allowed Lands’ End to develop a kind of virtual call center, with many of its customer service representatives working out of their homes.”³⁸
- **San Leandro, Calif.:** San Leandro, located in the San Francisco Bay area, competes with such tech giants as Silicon Valley for local businesses. In 2012, with the goal of attracting modern, technology-based industries to San Leandro, the city established a partnership with a local business owner to create an ultra-high-speed fiber broadband network. The network, Lit San Leandro, is largely privately funded but utilizes the city’s conduits to run the underground fiber network. After only two years, Lit San Leandro is

already attracting businesses to the area. For example, a 3D printing firm moved from San Francisco to a factory in San Leandro after considering more than 50 other locations. Similarly, a Kaiser hospital was built on the site of a former grocery distribution center, and the Westlake/OSIsoft Technology Complex, which includes three six-story, 300,000-square-foot tech offices, located in a former Del Monte cannery.³⁹

- **Santa Monica, Calif.:** Santa Monica's Information Systems Department mapped out a plan for the creation and expansion of its broadband network in 1998. Since then, the city has been slowly and methodically implementing its plan, saving city government \$700,000 a year in communications costs as well as making advanced communications capabilities available to private entities. In 2014, the city upgraded its fiber optic network speed to 100 Gbps.⁴⁰ According to the city's chief information officer, Jory Wolf, the network has already contributed significantly to the city's economic growth, and he expects the business sector to leverage the upgraded network for service models, content distribution and telemedicine initiatives.⁴¹
- **South Bend, Ind.:** In the early 2000s, South Bend began researching how to improve its telecommunications networks.⁴² South Bend had fiber networks in place, but it was not in a position to develop and operate the networks itself. Because no existing providers were interested in establishing vendor-neutral fiber services through the city's infrastructure, South Bend worked with local partners to establish Metronet, a nonprofit dark fiber network that serves government, educational and other nonprofit entities. Its for-profit subsidiary, St. Joe Valley Metronet (SJVM), provides fiber access to banks, manufacturers and

other businesses. The profits from SJVM are paid to Metronet through dividends and help subsidize Metronet's continued operations and expansion. SJVM has helped draw technology businesses to South Bend, from the GramTel data center in 2009 to the 2013 launch of a new coworking and meeting/conference space in the downtown area.

These are a small handful of the many projects across the country that use advanced communications capabilities to support economic development and at the same time use the benefits of economic development to fund their networks and make them sustainable.

NEXT STEPS

More information about the economic benefits of advanced broadband will continue to come to light. For one thing, the federal broadband stimulus programs invested billions of dollars in hundreds of middle-mile and last-mile projects across the United States. Most of these projects were completed only recently, and once they have a few years of operating experience under their belts, they will produce a wealth of information about what worked well and what did not in stimulating economic development.

The growing interest in gigabit networks is also likely to increase the understanding of how widespread availability of gigabit speeds affects economic development. Google Fiber's entry into the market, the gigabit projects of numerous community networks, and recent gigabit announcements by such private players as AT&T, C Spire Fiber, CenturyLink, Cox Communications and others have made "gigabit" a household word. In many communities, organizations such as the Mayors' Bistate Innovation Team (formed by the mayors of Kansas City, Kan., and Kansas City, Mo.) are emerging to analyze and stimulate economic development and other uses for the new gigabit connectivity.

Useful analytical approaches and devices are emerging to help communities reap the economic

benefits of advanced broadband. For example, Strategic Networks Group has developed tools to measure and analyze broadband utilization and benefits to businesses, organizations and households.⁴³ These tools, backed by a growing database that currently covers more than 16,000 businesses and 12,000 households, can provide detailed analyses of the economic impacts of broadband utilization and enable businesses and organizations to compare themselves with other entities of comparable size and other characteristics. As the databases grow, they will become increasingly valuable.

In addition, communities that have advanced communications capabilities are increasingly talking to one another, sharing resources and lessons learned, and collaborating when possible.

BROADBAND COMMUNITIES has sought to facilitate such exchanges by hosting a series of national and regional economic development conferences.

Over time, the path from broadband investments to economic development should be faster, more efficient and less costly to navigate. In short, as Graham Richard suggests, we should have ample information to let our instincts lead us to sound decisions. ♦

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 The endnotes to this article will appear in the digital edition, online at www.bbcmag.com.

ENDNOTES

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