The Influence of Digital Connectivity on Rural Georgia's Economies

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Abstract

While most communities in urban areas in the United States benefit from ready access to quality internet service, rural communities are often left behind because they lack the infrastructure to provide fast, reliable access required to support and nurture economic growth. Technological innovation in education, healthcare, business: all are constrained in rural America by an obvious digital divide. The disparity is well kno, Vol. wn at both national and local leadership levels. The concern is how effectively the growing gap will be addressed and resolved.

This research project examines the national issue before focusing on the obstacles that Georgia faces and analyzing the economic impact of an ineffective broadband system on the state. It highlights LaGrange, GA, as a city that has benefited more than other rural areas in the state, due to its sophistical digital connectivity. The profile offers a comparative economic profile of Troup and surrounding counties and suggests that LaGrange's fiber optic network is one factor in the county's consistent economic growth.

The project concludes that rural areas must have access to highly developed, reliable broadband networks to stimulate the growth that supports business interests and encourages rural participation in the global economic community.

Introduction

Digital connectivity has become a cornerstone of modern life. The ability to access and utilize fast, reliable, internet service is fundamental to the success and expansion of our world's economies, while also serving as a catalyst for the future of innovation in such fields as education, healthcare, and entertainment. The lives of so many people have already been forever altered through the introduction of technologies such as mobile communication networks, social media, and smartphones that allow for nearly instantaneous access to vast amounts of information (Kane, Borghei, Darr, Hild, Kaczmarek, & Lewellen 2017). The opportunities afforded to those who capitalize on this access to a seemingly ever-changing and constantly improving internet, will likely continue to expand, as our global economy continues to become more interdependent through its increasing reliance on it. Unfortunately, this trend has also highlighted a disparity that seems to be a recurring impediment to universal opportunity in the United States, and that is the growing urban/rural digital divide.

While the vast majority of the urban United States is benefiting from access to quality internet service, a significant portion of the country's rural population has been left behind. This has led to the formation of a chasm that is becoming more evident: the difference between those who have broadband and those who don't. This is a concern that has been voiced by a number of our country's leaders as well as by those who live and work in rural America, who believe that the rural United States is going to continue to be left behind with the advent of new technologies allowing for faster and more reliable internet that are, for the most part, only benefiting larger more densely populated regions of our country.

Through this report, I hope to expand upon the many innovative policies that the federal government, states, and localities have devised in order to alleviate the setbacks that the digital divide places on rural communities, while also examining the economic success of rural areas with strong broadband connections. I will also discuss the state of Georgia's obstacles in providing reliable broadband for all of its citizens, while highlighting the detrimental economic effects of this disparity in rural Georgia. However, rural Georgia has not been completely defined by economic stagnation and unreliable internet, as some rural communities have been successful in their installation of reliable broadband networks and they have reaped economic rewards because of it. I will highlight one such success story, while also detailing the need for a fast

and reliable broadband connection to support the diverse industries and global companies that drive rural Georgia's economy.

The Current State of Connectivity in the United States

The divide in internet accessibility is stark, and it has the potential to grow larger if left unchecked, particularly if faster networks are created that require the use of infrastructure that is not available in much of the rural United States. In recent reports published by *Politico* and The Brookings Institution respectively, the contrast between those who possess access to quality internet service and those who don't is eloquently portrayed. This excerpt, released by The Brookings Institution, from Dr. Turner-Lee's soon-to-be-published text *Digitally Invisible: How the Internet is creating the new underclass,* skillfully details how the digital divide is, and will continue to, disproportionately impact the United States' most disadvantaged and vulnerable citizens. She states "rural residents are at risk of being marginalized in an information-rich economy where digital transactions and commercial sharing services are becoming more relevant. Already facing diminished life chances, people with lower incomes, people of color, the elderly, and foreign-born migrants in rural areas run the risk of being on the wrong side of the digital divide that further exacerbates their economic, social, and political marginalization" (Turner-Lee, 2017).

The report focuses on the forgotten town of Staunton, Virginia located in the Shenandoah Valley in the northwestern part of the state. Local residents and business owners talk in detail about an internet service that is not capable of serving their needs, as it lacks the necessary speed and bandwidth, the maximum amount of data that can be transferred over an internet connection. This is a serious concern for local businesses, as they lack the capacity to efficiently digitize aspects of their business (Turner-Lee, 2017). For example, local business owners find it difficult to keep pace with the demand of online sales in the absence of faster broadband, an issue that can negatively impact their sales and profits, while also leaving them vulnerable to competitors in their markets (Turner-Lee, 2017). Mike Lund, a local business owner, underscores the broadband limitations that cling to anyone who wishes to start or expand a business in Staunton. Mike states, "I speak with our local broadband provider all the time and they are pretty open when they say how expensive it is to bring more service to Staunton… But, we need more broadband; we want to do more to showcase our local crops, our products, and services. Without high-speed internet, you can't do everything possible for the residents and businesses of Staunton" (Turner-Lee, 2017). However, this is far from the most severe impact of poor internet access in Staunton, as local business owners' fare far better than others in the community and those who live outside Staunton's city limits.

In a special report produced by *Politico* titled "The Digital Divide," the publication highlighted the hauntingly pervasive divide in internet access that impacts tribal populations on Indian reservations in ways most Americans cannot imagine. The Nez Perce tribe, located on a large swath of land in Idaho, lay claim to the unique title of being among the least connected people in the United States (McGill, 2018). According to the most recent Federal Communications Commission (FCC) report released in 2016, 35% of the United States' tribal populations living on Indian reservations lack access to adequate internet service (FCC, 2016). The FCC estimates regarding internet access for tribal populations in Idaho are far more grim, as it states that 83% of those who live on tribal lands likely do not have access to adequate internet (FCC, 2016).

The Nez Perce tribes serve as an unfortunate example of the limitations that prevent private internet providers, state and federal agencies, and municipal/local providers from being able to serve locations like the home of the Nez Perce. Oftentimes large internet providers are not willing to provide internet service to rural locations, as it cost far too much. It is also difficult to connect populations when it requires companies to traverse rugged landscapes that are riddled with obstacles such as steep mountains or vast rivers (McGill, 2018). State and federal agencies will incentivize private internet providers to connect sparsely populated areas by providing them with funding, but as the case of the Nez Perce tribe illustrates, it is oftentimes not enough to convince companies that they will not incur unnecessary costs by attempting to provide service to areas in harsh terrain (McGill, 2018). The Nez Perce also have attempted to construct their own internet platform through funding from the United States Department of Agriculture (USDA) and the state of Idaho, but it has not been successful in providing adequate broadband access to many people. The service is far too slow and many choose not to use it as they feel it is not worth the costs they will incur (McGill, 2018).

The struggle of the Nez Perce to attain reliable broadband in rural Idaho, while a somewhat extreme example, is reflective of the numerous obstacles much of the rural United States must overcome in order to achieve internet accessibility for everyone. Despite an intensified effort from departments such as the FCC, the

USDA, and the National Telecommunications and Information Administration (NTIA), to make broadband accessible for all Americans, they have so far failed to achieve the goal of universal broadband accessibility (see Figure 1, next page). In 2010, the FCC, at the behest of Congress, instituted the National Broadband Plan. The FCC defines the National Broadband Plan as a "roadmap for initiatives to stimulate economic growth, spur job creation and boost America's capabilities in education, health care, homeland security and more. The plan includes sections focusing on economic opportunity, education, health care, energy and the environment, government performance, civic engagement and public safety" (FCC, 2018). The plan established government standards pertaining to broadband speed and accessibility, formulated criteria for collecting broadband data, and played an instrumental role in creating a network of federal grant and aid programs for communities that currently lack access to fast internet.

In the years following the installment of the National Broadband Plan, the federal government has established a plethora of programs with the aim of providing universal broadband connectivity for all Americans. For instance, the Connect American Fund, which is a component of the FCC's Universal Service Fund, was established to aid the FCC in their goal of connecting everyone in the United States to fast and reliable internet by providing the funds and infrastructure necessary to assist rural communities in their pursuit of connectivity (Kane et al., 2017). Despite the federal government's efforts, the results of their programs have been mixed. The graph below serves as a snapshot of the glaring divide that still remains between those who have access to internet and those who do not.

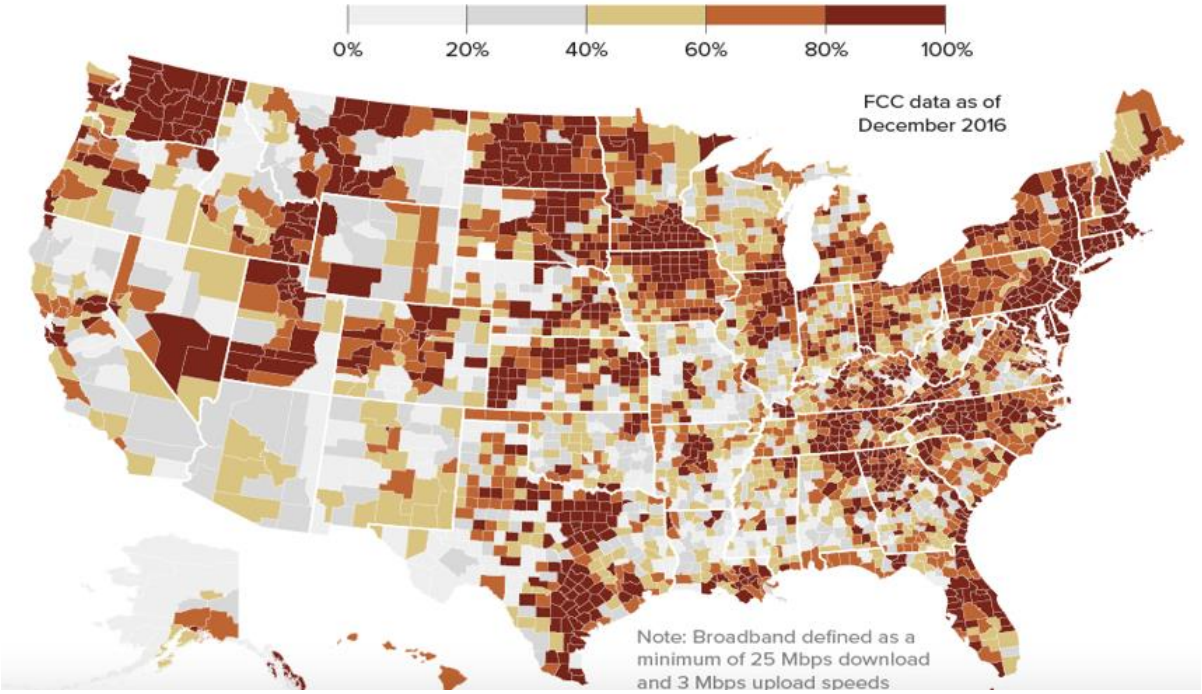


Figure 1: The map above details the number of U.S. residents that have access to broadband through an estimate of the amount of coverage in each U.S. county (FCC 2016).

The FCC has also recognized that the standard for acceptable internet speed is ever changing. In 2015, the FCC increased the minimum standard for download speed to 25 megabits per second (mbps) and increased the minimum upload speed to 3 mbps. Both of these changes represent a significant shift in federal regulations, but they also further highlight the inefficiencies of the many federal programs at meeting their own minimum standards. What's more, the FCC through their own admission has acknowledged that their maps likely overstate the amount of coverage to which much of the United States rural population has access (Hendel & Doherty, 2018). This is yet another striking example of a frustrating inefficiency in the FCC's approach, as it conceals the reality of internet coverage in the United States. In their efforts to map coverage, the FCC will mark an entire census block as served if just one household or business claims that they have adequate internet service (Hendel & Doherty, 2018). There are also contentions about the requirements for coverage, as some providers receiving federal

subsidies to extend broadband to rural areas only need to reach speeds of 10 Mbps, a number far below the government's own coverage standard (McGill, 2018).

According to the 2016 FCC report (Figure 2, following page), broadband access is largely defined as "the difference in the percentage of people living in urban and rural areas without access to high speed Internet" (National League of Cities, 2018). It is estimated that roughly 10% of Americans do not have access to an adequate broadband connection, with the overwhelming majority of that 10% of the population residing in rural locations (Chakrabarty, 2018). The divide is put in perspective by the gap between urban and rural connectivity, as it is estimated that some 39%, or roughly 23 million rural Americans, do not have access to an adequate broadband connection, while only 4% of the United States urban population lacks access to adequate broadband speeds and connectivity (Chakrabarty, 2018). In a society that is becoming more dependent upon the internet, this means that rural regions of the country are at risk of drastically limiting their residents' ability to succeed in the modern world (National League of Cities, 2018). Those living in rural areas will face difficulties in filling out online job applications, succeeding in online education, training, and employment opportunities, as well as struggle to utilize online resources for healthcare and government services (National League of Cities, 2018). Furthermore, rural communities will face disadvantages in growing both their economy and population, as it will be challenging to attract and retain businesses and residents without being able to provide an affordable high-speed internet service.

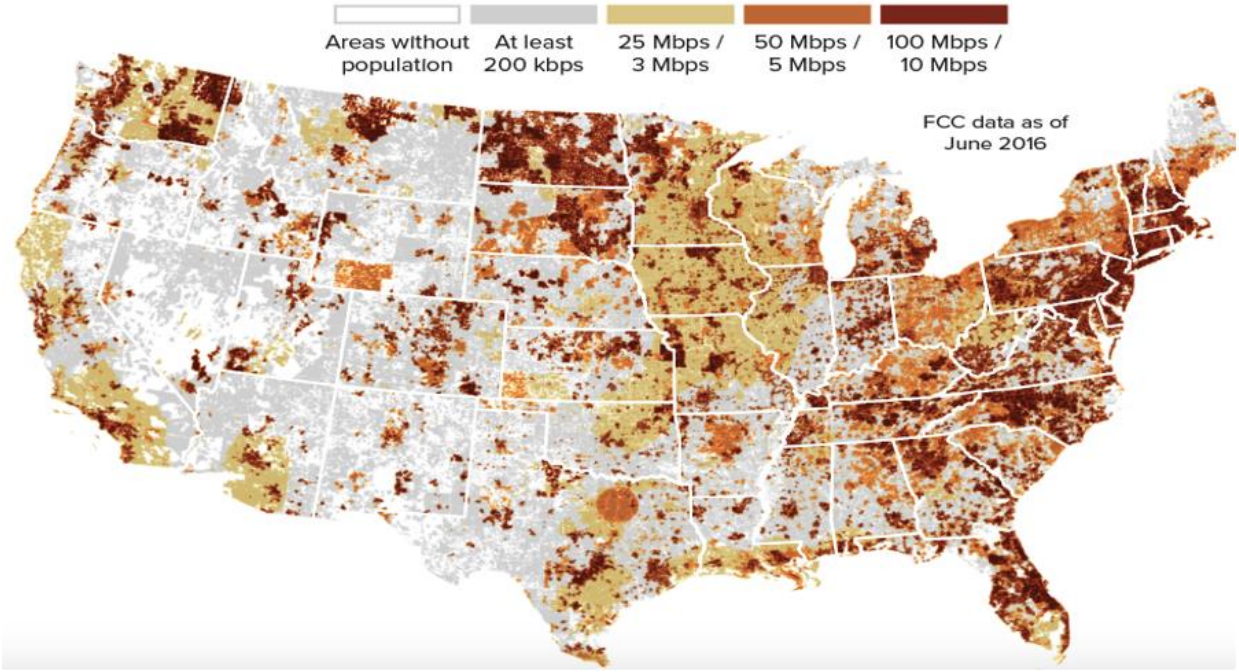
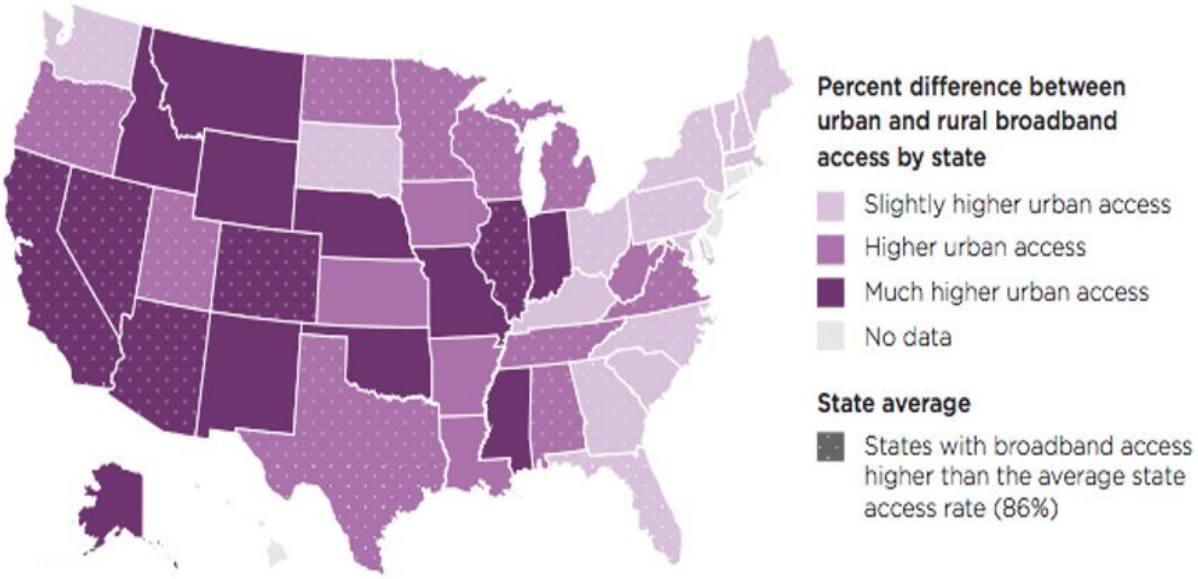


Figure 2: The map above details the internet speeds that are available to households and businesses in each U.S. county (FCC 2016).

Oddly enough, as the overall access of a state's broadband coverage increases, the divide in access between the urban and rural population increases as well, according to the 2018 National League of Cities (hereafter referred to as NLC) report. This is an issue that the federal and state governments are working to alleviate, but it is usually attributed to the inability of rural areas to attract private providers, as it is far too costly in comparison to urban areas that are seeking upgrades in their broadband connections.

In order to further highlight the significant divide in connectivity between the United States urban and rural population's, it should be noted that there are no states with rural residents that have more access to adequate broadband than urban residents, a point that is illustrated in Figure 3. In fact, there is not a state that is even particularly close to offering equal access to both its urban and rural residents, as Massachusetts is currently leading the pack with an 8% difference in connectivity between its urban and rural populations. However, that gap is expected to close through the incorporation of methods that other states have started to utilize, such as municipal broadband networks established through partnerships between local governments and private internet providers that largely receive funding through federal and state grants (NLC, 2018).



Source: Federal Communications Commission, 2016

Figure 3: This is an illustration of the vast difference in urban and rural connectivity (FCC 2016).

The State of Connectivity in Georgia

LaGrange, Ga Profile

The city of LaGrange, GA features one of the state's eight fiber networks, and due to the infrastructure that was developed in LaGrange, the city, along with the surrounding areas benefiting from its broadband supply have experienced a much more positive economic fate than other rural communities in Georgia. I have discussed at length the urban and rural divide in broadband connectivity as well as underscored the detrimental effects of this divide on specific communities and its residents. For the purpose of this assignment, I will focus not on a community that is struggling to cultivate economic growth because of inadequate broadband, but rather a community that has been successful at developing a sustainable broadband infrastructure that has allowed for consistent economic growth.

Census data is useful in gaining an understanding of a community and the makeup of its population. The following statistics are also useful for measuring the economic health of a community. LaGrange is the county seat of Troup County, which is situated along the Alabama border about 40 miles north of Columbus, GA. According to U.S. Census data, LaGrange has an estimated population of 30,472 people, with 54.6% of the population being female and 45.4% being male (2018). LaGrange features no racial majority, as 43.9% of the population is white, 48.6% is black, 5.5%, is Hispanic or Latino, while those of Asian descent represent 3.0% of the population (2018). The city contains 11,100 households with a median home value of $115,700 (2018). The median household income is listed at $33,501, and an estimated 29.4% of the population lives in poverty (2018). The median resident age is at 33.6, which is slightly younger than the median resident age for the entire state. LaGrange also boasts a high level of citizens who have at least a high school degree, as 80.1% of the population meets the mark, while 62.3% of the eligible working population makeup the workforce (2018).

Troup County, while considered rural, is not exceptionally small when compared to other rural Georgia counties, but its population according to census data is estimated to be at 69,786, with 51.8% of its residents being female and 48.2% being male (2018). Whites constitute a racial majority, as 59.8% of the county population is white, 36.1% is black, 3.9% is Hispanic or Latino, and 2.1% of the county population is Asian (2018). Troup County features 24,619 households with a median home value of owner-occupied homes estimated at $120,300. The median household income is estimated at $42,545, while 20.4% of the county population lives with an income that is at or below the poverty line (2018).

Education rates for the county population are also fairly high, as 83.6% of Troup County's residents have a high school degree or higher (2018). Troup County also boasts a labor force that features 61.5% of the eligible working population.

Three Rivers Region Business Profile

The Three Rivers Regional Commission provides economic data for an area of Georgia that encompasses 10 counties that include: Butts, Carroll, Coweta, Heard, Lamar, Pike, Meriwether, Spalding, Troup, and Upson (see Figure 6). The commission provides data that details the areas demographics, employment figures, and industry growth just to name a few. The three largest industries outside of government within the region are manufacturing, retail, and education and administrative positions (TRRC, 2017). Much of the growth in manufacturing occurred in LaGrange and Troup County after the decision of KIA Motors to locate in the area. This caused a spike in the amount of manufacturing jobs in Troup County, as the car company attracted nearly 30 suppliers that added thousands of more jobs to the county (TRRC, 2017). LaGrange and Troup County account for a significant portion of the jobs detailed in the graphs above, as there are 39,608 employed citizens in Troup County (TRRC, 2018). Troup County represents the second largest workforce in the region trailing only Carroll County. According to the LaGrange Economic Development Authority, LaGrange is home to 47 employers that are considered "major" by the department's standards. In fact, Troup County employs more Fortune 500 regional sites per capita than anywhere else in the United States (2018). These employers account for a significant percentage of the county's workforce.

Three Rivers Region - Industry Snapshot				
Description	2006 Jobs	2015 Jobs	2006 - 2015	2006 - 2015% Change
Crop and Animal Production	1,547	749	798	52%
Mining, Quarrying, and Oil and Gas	178	116	62	35%
Utilities	1,208	1,176	32	3%
Construction	13,310	9,191	4,119	31%
Manufacturing	29,905	29,094	811	3%
Wholesale Trade	5,225	5,417	192	4%
Retail Trade	20,662	22,006	1,344	7%
Transportation and Warehousing	3,607	4,015	408	11%
Information	3,144	2,600	544	17%
Finance and Insurance	4,481	3,456	1,025	23%
Real Estate and Rental and Leasing	1,967	1,600	367	19%
Professional, Scientific, and Technical	3,458	4,182	724	21%
Management of Companies and	886	1,371	485	55%
Administrative and Support and	10,550	16,003	5,453	52%
Educational Services	1,032	1,675	643	62%
Health Care and Social Assistance	16,097	21,253	5,156	32%
Arts, Entertainment, and	1,535	1,498	37	2%
Government	30,460	27,303	3,157	10%
TOTAL	167,249	173,379	6,130	4%

Source: Economic Modeling Specialists, Inc.

Figure 4: The chart represents the Three Rivers Region analysis of jobs and job change in the region from 2006 to 2015.

Broadband Connectivity in LaGrange

For the past 20 years, nearly every community that has set out to construct its own fiber optic broadband network has done so with the purpose of furthering its ability to cultivate economic development (Baller, Hovis, & Stelfox, 2016). The Coalition for Local Internet Choice captures and seeks to define this connection in a research paper published in 2016. The contributors state "the promise of economic development, including both attraction and retention of opportunities for meaningful and well-paying work, combined with the fear of falling behind other communities in the United States and around the world, unites local communities across political, economic, cultural, educational and other divides" (Baller et al., 2016). The city of LaGrange is no different, in an interview with the LaGrange/Troup County Director of Telecommunications and IT, Alan Slaughenhaupt explained that the central purpose for building a broadband network in the city was to cater to the needs of prospective businesses. He stated, "That is absolutely the reason we [City of LaGrange] got into this business" (personal communication, 2018).

In the late 1990s, local business leaders reached out to LaGrange to express their concerns regarding exorbitant internet costs. The city responded to the concerns of local businesses by attempting to outsource the

problem to private providers who had complete control of the broadband market in the LaGrange area at the time. The private providers were unwilling to lower their broadband prices, so the city embarked on building its own broadband network with the goal of offering reliable internet at a significantly reduced cost to companies. LaGrange has been successful in their mission, and their success has resulted in a far more diverse local economy that features an array of new jobs and companies, spanning multiple industries and countries of origin.

Slaughenhaupt, comparing broadband to other factors deemed crucial by companies considering LaGrange/Troup County as a destination, delivered this proclamation, "In today's environment, connectivity is king" (personal communication, fall 2018). There are other critical factors that companies must weigh such as water and energy costs, the availability and price of land, labor costs, taxes, and education and healthcare facilities just to name a few (Baller et al., 2016). In taking into account these other factors, it is difficult to define the impact of broadband availability on economic development. However, while the availability of broadband is just one of a litany of factors that companies must consider when deciding if they wish to move or remain in their current location, there are occasions in which it is the deciding factor. For instance, the capabilities of LaGrange's fiber optic infrastructure and the prices that the city offers served as one of the primary factors, if not the primary factor, in recruiting a number of call centers that were in search of affordable land and a broadband connection that could manage their large servers. LaGrange had the capabilities and was eventually the location they ultimately decided to select because their broadband network was better suited for their specific needs in comparison to their competition (Slaughenhaupt, personal communication, 2018). As he pointed out, that theme appeared again in the decision of a large entertainment company to build a resort along a LaGrange exit on I-85 (personal communication, 2018). The resort is expected to garner as much as $53.3 million dollars annually to Troup County while also creating around 650 jobs (Jones, 2016). The Troup County government can expect around $1.1 million dollars in average annual revenues as a result of this project (Jones, 2016). This company, and the subsequent revenue and jobs created by its decision to locate in LaGrange, would have never occurred if the fiber optic network created by the city did not have the capabilities to support its broadband needs.

LaGrange's broadband network is successful because of a strong core infrastructure that is able to adapt to the changing broadband needs of businesses. LaGrange is able to do this because their networkoperates through a fiber optic connection that is able to transmit internet at the fastest speeds currently available. The network is also adept at handling enormous swaths of information in areas with high internet traffic, such as downtown LaGrange, without slowing down. Slaughenhaupt stated that "LaGrange has state of the art technology" (personal communication, 2018) in reference to the city's broadband capabilities. LaGrange is making fiber available to businesses and prospective companies in order to cultivate economic growth, as local leaders like Slaughenhaupt work directly with companies to gain a better understanding of their broadband needs. Scott Malone of the LaGrange Economic Development Authority boasts that the city has more Fortune 500 companies per capita than any other city in the world (Evans, 2018). LaGrange, with the aid of assets such as its fiber optic network, is likely only going to add to its impressive base of companies that already features 24 international businesses (Evans, 2018). As discussed below, LaGrange's fiber optic network has made it an attractive destination for a new industry that has furthered the global reach of its local economy.

Although it is difficult to make a direct connection between economic growth and the presence and availability of broadband, it is fairly easy to identify the disadvantages of not having broadband. The contributors from the Coalition for Local Internet Choice underscore the challenges for communities lacking broadband to achieve economic growth when they write "site selectors report that communities that lack suitable broadband infrastructure are routinely eliminated from consideration as potential sites for location or relocation. In other words, although the presence of a robust broadband network may not itself be sufficient to persuade an organization to come to or stay in a community, the absence of such a network guarantees that potential employers will go elsewhere" (Baller et al. 2016). This pattern is evidenced in a comparison of the growth of the automotive sector in Troup County to the surrounding counties studied by the Three Rivers Regional Commission.

According to the LaGrange/Troup County Chamber of Commerce there are more than 3,000 car manufacturing jobs in Troup County, with an additional amount of automotive supplier jobs numbering in the thousands (2018). The Chamber also reports that there are around 15,000 jobs that have been created within the region because of the automotive sector (2018). These developments have contributed to a torrent of job talent that is now choosing to live and work in LaGrange and Troup County and are contributing to the local economy. This has also contributed to the growth of other sectors such as the healthcare, restaurant and entertainment industries, which have experienced growth in Troup County over this same period.

It is not accurate to suggest that the capabilities of the broadband network in LaGrange is solely responsible for, in essence the birth of the automotive sector in Troup County, as it was one of many factors that led to the creation of more than 15,000 automotive related jobs. However, Slaughenhaupt (personal communication, 2018) indicated that Troup County was chosen as the destination for Kia Motors Manufacturing Corporation for factors that include state of the art broadband infrastructure. That factor also influenced the seven key Kia Motors suppliers that relocated to the area. The broadband infrastructure that is able to expand to meet employers' needs, coupled with attractive factors including land availability at low prices and low utility costs, make Troup County an attractive location (Slaughenhaupt, personal communication, 18). These factors have also led to the decision of companies in the distribution, manufacturing, and healthcare industries to locate and expand their businesses in Troup County, as the county features thousands of more jobs produced by these industries (LTCC, 2018).

Other communities that have built their own broadband network have also experienced economic growth from events similar to those that have occurred in LaGrange. For example, the city of Cedar Falls, Iowa was one of the first cities to construct a citywide broadband network. In the years following its installation the number of businesses in the city increased six fold (Baller et al., 2016). The success of municipal broadband networks is happening nationwide, as cities from across the United States have a story to share regarding the positive impact of broadband networks on fostering economic growth. Martinsville, VA built a broadband network that has allowed it to attract large distribution and manufacturing companies. The city's broadband infrastructure has also provided it the resources necessary to convince SPARTA, a large defense contractor, to select the city as the site of their research center (Baller et al., 2016). The Dalles, Oregon, a city of roughly 11,000, is now the home of an industrial site for Google housing high-tech equipment "that will soon be connected to the rest of the company's network" (Baller et al., 2016). The success does not end with these examples. Communities of all sizes are realizing that they must develop state of the art broadband infrastructure in order to better foster economic growth. This is especially true in a global economy that is dependent upon the rapid production and exchange of goods and information.

The benefits of municipal broadband networks are bountiful for cities the likes of LaGrange. The presence of a reliable broadband network is critical for economic development, as companies are unwilling to settle in an area that will not allow them to modernize their operations and communicate with the world around them due to limited internet access. Economic growth is far from the only benefit of broadband networks, as more access to quality internet will vastly improve the standard of living for residents within a community. Residents will find it easier to access government resources, apply for jobs, and to complete school and work assignments from the comfort of their home (Turner-Lee, 2017). A municipal broadband network will afford cities the ability to enhance public education, healthcare facilities, transportation infrastructure, electrical grids, and integral government services, while also contributing to community revitalization projects necessary for recruiting businesses and a young and educated workforce (Turner-Lee, 2017). Despite the abundance of benefits that broadband networks offer to communities, there are detriments to developing broadband infrastructure that can hamper a community's ability to prosper. The benefits of developing a broadband network must be measured against the costs in order to garner a proper understanding of their potential impact on a community.

Slaughenhaupt attributes LaGrange's broadband success to one specific principle that governs the decisions made by the network. The principle is that the network must always be profitable. The telecommunications providers in LaGrange, like all utility services the city offers, must be profitable in order for the city to remain solvent, as LaGrange does not have a property tax. This limits the amount of revenue the city generates from area businesses and residents. The city's broadband network operates like a business, meaning they do not depend on government or taxpayer dollars; they do not employ more people than they need, and they limit the amount of expenditures to those that are necessary. Slaughenhaupt believes the difference between LaGrange and other cities that have been less successful at funding their broadband networks is the business model that the LaGrange network adheres to. As he states, "LaGrange did not follow the model of build it and hope businesses will come. LaGrange adhered to the mindset of we will build the network when businesses want it" (personal communication, 2018). In other words, LaGrange expands their network for paying customers only. This has allowed the city to avoid tapping into the funds of taxpayers or having to accept government grants or loans. Current indicators suggest that the LaGrange broadband network is thriving, as they serve 700 plus customers and gross nearly $1 million dollars in profit annually. This money assists in the funding of city expenditures that ultimately benefit the lives of the businesses and residents within the city.

The broadband network instituted in LaGrange stands as a template for communities to replicate. However, city leaders must be made aware of the common mistakes and potential pitfalls associated with unsuccessful municipal broadband projects. The University of Pennsylvania Law School's Center for Technology, Innovation, and Competition (CTIC), released a report reviewing the financial performance of municipal broadband networks in their respective communities. In the report the authors state "understanding how likely a project is to remain financially solvent is critical, because any shortfall would require a city either to inject additional taxpayer funds into the project or to default on its loan obligations. Either option would be costly and would hinder the municipality's ability to address other priorities" (Yoo & Pfenninger, 2017). Communities have failed to recover their investment into broadband infrastructure for a variety of reasons, but in most cases the primary issues are overbuilding and the inability to secure customers (Yoo & Pfenninger, 2017). LaGrange established its broadband network as a means for providing internet service to its businesses and citizens in an area that was underserved by private providers. In the absence of competition from private providers, LaGrange's broadband network was able to attract customers and expand its network with the money it received from them. Cities that have built broadband networks before securing customers for their service are participating in the practice of overbuilding. While some communities have experienced success through building a network and convincing companies to come after the fact, many more have been hampered by debt and overspending. This has forced communities to acquire revenue from their citizens in the form of additional taxes, while also having a detrimental impact on their ability to finance necessary government functions. Some cities have also shown that they are too overzealous in their pursuit of providing broadband to their citizens by not considering the financial impact of a local broadband market that is already saturated with private providers (Yoo & Pfenninger, 2017). Research suggests that customers are unlikely to switch internet providers when there is only a marginal difference between their services (Yoo & Pfenninger, 2017). Private providers are also willing to lower their prices when pressed with more competition in a given market, this does not bode well for cities that are seeking customers to help recover the cost of building the network (Yoo & Pfenninger, 2017). The University of Pennsylvania Law School identified 20 communities whose broadband networks are a financial burden on the city's resources. Through an analysis of those 20 communities, the researchers discovered that a majority of those cities had overlooked the factors detailed above during their decision making process. As a result, those communities' broadband networks will remain financial burdens for the foreseeable future, as they are unable to generate revenue (Yoo & Pfenninger, 2017).

Conclusion

The results of my research demonstrate that rural communities need not be solely dependent on private providers or government aid to develop broadband infrastructure that meets the needs of businesses and residents. LaGrange, GA has successfully built a fiber optic network that has afforded the city the opportunity to experience significant economic growth. However, the template for building a broadband network in LaGrange is not one that is universal. It is simply an example of one mean for achieving the end of providing broadband to the businesses and residents who depend on it. Other communities have taken different paths, but have accomplished the same goal. Despite the contrast in approaches for constructing broadband networks, communities would be wise to study the broadband network projects of other communities, regardless of their success, as there are lessons that can be gained. This will allow communities to refine their approach, which will vastly improve their chances of building a network that will serve as an asset for the area's residents and economy.

LaGrange also demonstrates that rural communities can have a global economic footprint if they possess the proper resources and leadership. The city's fiber optic network has played an instrumental role in the recruitment of large international companies to an area the average person likely perceives as just another small city in rural Georgia. Without the presence of the broadband network, LaGrange would find little success at convincing businesses to locate in the area, while also severely limiting opportunities for expansion for companies already present in the region. Companies operating in LaGrange would find it impossible to communicate with domestic and foreign customers, employees, and providers. Companies would also be limited in their ability to modernize critical functions such as online transactions, managing inventory, and customer and client communication outlets, thus jeopardizing their ability to compete with competitors in their field. For these reasons broadband is indispensable, as it is a fundamental element in a global economy that is becoming ever more dependent on instantaneous transactions, access to information, and advancements in communication technology.

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