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Indiana Rural Broadband Report 2015

Executive Summary

Since 2006, Indiana has benefited from proactive telecommunication reform legislation resulting in increased competition and eliminating unwarranted legacy regulations that inhibited outside capital investment. As a result of this open, pro-competition environment, coupled with the development of a robust, fiber optic backhaul network serving much of the state, and forward-thinking public/private partnerships offering last-mile broadband services, Indiana leads the Midwest in establishing a statewide broadband fiber optic infrastructure as a prerequisite to further investment in both wired and wireless broadband services. The major findings and recommendations of this paper are as follows:

- According to the FCC’s *Eighth Broadband Progress Report* (2012), only 1.788 percent of the population in urban and suburban areas lack access to broadband, as opposed to 12.4 percent of the population living in rural areas.
- Indiana is currently considered an “overachiever” due to the presence of pre-existing optical fiber networks, a prerequisite to the buildout of wired and wireless broadband services in rural areas.
- While the basic ingredients exist for broadband development in Indiana, future investment in rural areas will be technology agnostic, and will require a strategic plan to overcome Indiana’s inherent disadvantages, which include economies that depend less on technological advancements, terrain variations and vast rural areas. These “pre-conditions” will be different for each location, which suggests that broadband strategic plans must be customized for each rural area.
- Proposed legislation in Indiana matches up well against efforts in other states to promote effective outcomes in terms of rural broadband deployment.
- Indiana should develop programs to increase broadband adoption in rural areas and to include digital literacy education programs so as to educate Indiana residents regarding the benefits and uses of broadband Internet. Heightened digital literacy will increase consumer adoption rates and potential positive economic impact in areas of new wire and wireless broadband deployment.
- Upon review, Indiana should continue to promote broadband development and expansion with the funding of a new Rural Broadband Center which would work with county, municipal and economic development officials to assist in the ascertainment of local broadband demand, to review economic development opportunities, to identify potential partners, and to develop a customized broadband strategic plan for each rural area of the state.
Indiana Rural Broadband Report 2015

Introduction

This is the fifth in a series of independent reviews by the Digital Policy Institute (DPI) of the regulations that impact the provision of telecommunication services, competition and outside investment in broadband infrastructure in Indiana.

The first report -- in 2006\(^1\) -- provided members of the Indiana General Assembly with a necessary factual and policy foundation to support the most comprehensive reassessment of outdated telecommunication rules in over two decades. Included were recommendations for a “light” regulatory approach patterned after 1996, federal deregulation, plus predictions of the benefits of telecom reform on growth in capital investments and jobs in the state. Further, the report made the case for statewide franchising of multichannel video services. The resulting legislation, HEA 1279,\(^2\) was passed with strong bipartisan support and signed into law by the Indiana governor on March 14, 2006.

The second report -- in 2008\(^3\) -- took a look at the early measurable benefits of telecom deregulation in Indiana. That report highlighted Indiana’s leadership, as 20 other states subsequently passed similar telecom reform measures. After nearly two years, over $516 million in new capital investments were reported by Indiana’s telephone industry\(^4\) as it built out infrastructure to provide new and expanded services after relevant risk and uncertainty were eliminated in 2006, under HEA 1279. Most telephone carriers, both large and small, plus most

\(^1\) Digital Policy Institute, Ball State University, “The Economic Impact of Telecom Reform in Indiana: 2006,” (February 14, 2006). Available at: [www.digitalpolicyinstitute.org](http://www.digitalpolicyinstitute.org)


\(^3\) Digital Policy Institute, Ball State University, “An Interim Report on the Economic Impact of Telecommunications Reform in Indiana,” (February 15, 2008). Available at: [www.digitalpolicyinstitute.org](http://www.digitalpolicyinstitute.org)

\(^4\) Ibid.
incumbent cable firms, subsequently opted for statewide franchising of video services in Indiana. Similar patterns have been shown nationwide under Indiana-like statutory changes in those jurisdictions.

The third report -- in 2010\(^5\) -- was the presentation of an econometric model that evaluated the national impact of statewide franchising on broadband adoption. Evidence showed that statewide franchising had a significant effect on the adoption of broadband telecommunications, accounting for almost six percent of new subscriptions in those states where the market enjoyed long-time access for competing providers.

Finally, the fourth report -- in 2012\(^6\)-- evaluated the impact of telecom reform legislation in Indiana over the past five years, and examined the remaining administrative regulations of the Indiana Utility Regulatory Commission (IURC) that should be addressed in order to assure fairness and consistency with Indiana’s “light” regulatory approach. The net findings of DPI’s 2012, report were similar to the IURC’s earlier 2010, review. Both documents confirmed that new capital investments had occurred, that there were increased build-outs of infrastructure using fiber optics and other digital transmission technologies, and that consumer complaints since deregulation have been relatively non-existent.\(^7\)

As Table I indicates, Indiana has a strong legacy of incentivizing broadband infrastructure investments through adoption of a “light” regulatory touch and an array of

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5 Digital Policy Institute, Ball State University, “Telecommunication Deregulation: A Policy Progress Report,” (March 2010). Available at: www.digitalpolicyinstitute.org


**Table 1:**

**Indiana Relevant Telecommunications Laws**

<table>
<thead>
<tr>
<th>Law</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiana HEA 1279-2006</td>
<td>2006</td>
<td>Eliminated public utilities commission oversight of pricing and service quality for all retail offerings, except for basic local service, which remained regulated until June 30, 2009. Also allowed statewide franchising for new multichannel video entry.</td>
</tr>
<tr>
<td>Indiana HEA 1112-2012</td>
<td>2012</td>
<td>Allowed a telephone company to withdraw as a COLR if there are at least one other service providers using any technology. Eliminated COLR requirement as of June 30, 2014.</td>
</tr>
<tr>
<td>Indiana SB 0560-2013</td>
<td>2013</td>
<td>Allows utility-related infrastructure development investors, including broadband, to receive certain property tax exemptions</td>
</tr>
<tr>
<td>Indiana SB 0492-2013</td>
<td>2013</td>
<td>Eliminated the IURC's authority to order telecommunications carriers to report on service quality goals and performance data.</td>
</tr>
<tr>
<td>Indiana SB 396-2014</td>
<td>2014</td>
<td>Repeals the IURC’s ability to dictate the establishment of reasonable rates for telecommunication providers.</td>
</tr>
</tbody>
</table>

Legislative mechanisms. For example, Senate Enrolled Act 560, passed in 2013, allows utility-related infrastructure development investors, including those investing in broadband-related facilities, to receive certain property tax exemptions. According to the 2014, annual IURC Report, to qualify for the property tax exemptions, the development areas must be termed “Infrastructure Development Zones” by county executives. This significantly increases the

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8 Indiana HEA 1279- 2006. Available at: [http://www.in.gov/legislative/bills/2006/HB/HB1279.3.html](http://www.in.gov/legislative/bills/2006/HB/HB1279.3.html)
9 Indiana HEA 1112- 2012. Available at: [http://www.in.gov/legislative/bills/2012/HB/HB1112.1.html](http://www.in.gov/legislative/bills/2012/HB/HB1112.1.html)
10 Indiana SB 0560- 2013. Available at: [http://www.in.gov/legislative/bills/2013/SB/SB0560.2.html](http://www.in.gov/legislative/bills/2013/SB/SB0560.2.html)
11 Indiana SB 0492- 2013. Available at: [http://www.in.gov/legislative/bills/2013/SB/SB0492.2.html](http://www.in.gov/legislative/bills/2013/SB/SB0492.2.html)
14 Ibid (p.100)
incentive for telecommunications providers to build out broadband infrastructure in these tax-exempt zones. Other incentives are covered in more detail later in this report.

Now in 2014, with much of the regulatory underbrush cleared away, we present this fifth report in the series, again focusing on how Indiana can continue its national leadership role in establishing a viable digital telecommunications ecosystem, both wireline and wireless, that promotes and helps sustain broadband services to all areas of the Hoosier state.

Federal Regulatory Overview

The National Broadband Plan\textsuperscript{15} is a document which the FCC is using to plan for expanded broadband development in America. There is a four-part plan for government to further the development of broadband:

1. Design policies to ensure robust competition and, as a result, maximize consumer welfare, innovation and investment
2. Ensure efficient allocation and management of assets government controls or influences, such as spectrum, poles, and rights-of-way, to encourage network upgrades and competitive entry.
3. Reform current universal service mechanisms to support deployment of broadband and voice in high-cost areas; and ensure that low-income Americans can afford broadband; and, in addition, support efforts to boost adoption and utilization.

4. Reform laws, policies, standards and incentives to maximize the benefits of broadband in sectors government influences significantly, such as public education, healthcare and government operations.\textsuperscript{16}

In addition to these four parts, the FCC has laid out six long-term goals to reach in ten years from the 2010, publication of the National Broadband Plan. The first goal is for at least 100 million homes to have access to high-speed broadband (100Mbps downstream/ 50Mbps upstream). Goal two is for the United States to lead the world in mobile innovation, which would include having the fastest mobile network in the world. The third goal is for every American to have access to broadband services, which is generally considered to be an always on, 4Mbps downstream/ 1Mbps upstream connection. The fourth goal is for every American community to have access to a 1Gbps connection in libraries, schools, and other public facilities. The fifth goal is for all first responders to have access to a nationwide, wireless, public broadcast safety network. The final goal is to promote green initiatives by allowing all Americans to access information through broadband about their utility use.

Concerning the above-mentioned goals, Figure 1 sheds some light on the significant growth in broadband access and speed rates across the United States. Access and speed rate growth can be observed over the last 10 years; but the need for improvement remains in order to ensure affordable and reliable access to broadband. Internet implementation has made a seismic leap forward, as shown in Figure 1.

At one time, a standard dial-up connection remained the norm, with slower upload and download speeds. Fast forward to 2010 and beyond, the broadband landscape has expanded exponentially as dial-up connections have become nearly non-existent.

\textsuperscript{16} Ibid.
In particular, wireless broadband has shown rapid growth and increased availability for American populations. Wired broadband, which is in some cases more robust, continues to improve through FCC and the Commerce Department support. Strides still need to be made in order to tap into the emerging technologies market through the use of high speed broadband access. As stated in the *Four Years of Broadband Growth* report by the Office of Science and Technology Policy and the National Economic Council, the majority of technologies, including

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18 Ibid (p.6)
DSL, cable, and mobile wireless, are readily available at speeds of 25 Mbps; but not all of them are available at higher speeds.\(^{19}\)

**Figure 2:**

**Broadband Disparity between Urban and Rural Areas, 2012**

Source: Four Years of Broadband Growth

As shown in Figure 2, we see a significant disparity in broadband access speeds. It becomes of greater concern as the desired connection speeds increase; in that rural areas’ residents are not obtaining the same benefits as do residents in more urban areas. With greater population densities, the return of investment for ISPs is greater, resulting in access to all major metropolis areas. Rural areas do not reap the same benefits of broadband access. Although higher costs are required for broadband deployment to reach unserved areas, these rural citizens should not be prevented from seeking and accessing higher connection quality and speeds.\(^{20}\)

\(^{19}\) Ibid (p.11)
\(^{20}\) Ibid (p.12)
Broadband Background

The term broadband commonly refers to high-speed Internet access that is always on and faster than traditional dial-up access. \(^ {21}\) Broadband’s data rate allows more content to be carried through the transmission “pipeline” per unit of time. Another feature of broadband is that, unlike dial-up services, it does not block voice service and does not require reconnecting after logging off. Broadband provides reliable access to a wide range of robust Internet services, such as streaming media, Voice over Internet Protocol (‘VoIP’ or “Internet phone”), computer gaming and interactive services. Many of these current and newly-developing services require the transfer of large amounts of data – transfer that may not be technically feasible with dial-up service. Therefore, broadband service has become increasingly necessary to access the full range of services and opportunities that the Internet can offer. \(^ {22}\)

Broadband is defined by the FCC as “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.” \(^ {23}\) Access to broadband can be achieved through a variety of platforms, such as digital subscriber line (DSL), cable modem, fiber optics, wireless and satellite. The choice of platform affects not only the price, but also the speed of the given broadband service.

The FCC notes that broadband is defined as advanced telecommunications capability, having varying speeds depending on type of service. Speeds from a service provider can range


from 200 kilobits-per-second (kbps) up to 100 megabits-per-second (Mbps) or more.\textsuperscript{24} While broadband speeds can vary immensely depending on level of service, as of 2010 the FCC defined advanced telecommunications capability as 4 Mbps for download speeds, and 1 Mbps for upload speeds. That definition, however, is subject to change.

The FCC’s report from 2012, notes that many rural areas fall below this threshold for broadband speeds.\textsuperscript{25} The average household may require more than the defined minimum threshold when high-definition streaming video, coupled with other household uses such as e-mail and web browsing, demand increased speed.

In August 2014, the FCC released a Notice of Inquiry (NOI), as annually required under Section 706 of the Telecommunications Act, asking individuals to comment on whether the definition of broadband speeds should be increased from the current 4 Mbps download to be at least 10 Mbps down for rural areas and 25 Mbps for developed markets.\textsuperscript{26} In December 2014, the FCC ruled that Internet service providers that use government subsidies to build rural broadband networks must provide speeds of at least 10Mbps for downloads and 1Mbps for upload.\textsuperscript{27}

\begin{flushleft}
\textsuperscript{24} Ibid.
\textsuperscript{27} Brodkin, Jon, Arstechnica, “Ignoring AT&T and Verizon protests, FCC says “broadband” has to be 10Mbps,” (December 11, 2014). Available at: \url{http://arstechnica.com/business/2014/12/ignoring-att-and-verizon-protests-fcc-says-broadband-has-to-be-10mbps/}
\end{flushleft}
Types of Broadband

There are many options for deploying broadband infrastructure throughout an area. Some options are currently used more frequently than others. Broadband is the common term to describe high speed Internet; however, there are three basic ways to access the Internet; fixed wireline, fixed wireless, and mobile wireless. Fixed wireline broadband utilizes copper or fiber optic cable that runs high speed data transmissions directly to homes and businesses. Fixed wireline technology connections include DSL, cable modem, and fiber optic, whereas fixed wireless connections enable a devices to access the Internet without a wire connection. Fixed wireless broadband utilizes transmission towers that communicate between a base station tower and many subscribers (one-to-many). Fixed wireless services generally support between 1 and 10 Mbps of bandwidth. Mobile broadband wireless, on the other hand, is a type of high-speed Internet access that lets you use 4G LTE mobile Broadband data-only devices (i.e., tablets and notebooks) on a carrier’s LTE cellular network. Mobile broadband wireless service is ideal for a mobile workforce where roaming among multiple locations is commonplace. A few of the technologies that enable high-speed Internet connections are described in detail below.²⁸

Key Terms

* Cable modem service enables cable operators to provide broadband using the same coaxial cables that deliver pictures and sound to television. Most cable modems are external devices that have two connections: one to the cable wall outlet, the other to a computer. Subscribers can access their cable modem service by simply turning on their computers, without dialing up to an Internet Service Provider (ISP). Wireless routers add user flexibility by

providing “mobile” access within a home or business. Transmission speeds vary depending on the type of cable modem, cable network, and number of customers sending or receiving data.29

The next generation of cable modem service is the DOCSIS 3.0 which stands for “Data Over Cable Services Interface Specification”. DOCSIS 3.0 allows for up to 50 Mbps speed; this permits cable television operators to add high speed and telephony data to their current cable TV systems.30

*Digital subscriber line (DSL)* is a wireline transmission technology that transmits data over traditional copper telephone lines already installed to homes and businesses. The copper wires have sufficient bandwidth to deliver both voice and data. DSL-based broadband provides transmission speeds ranging from several hundred Kbps to millions of bits per second (Mbps). The availability and speed of DSL service typically depends on the distance from the connection point to the closest telephone company facility.31

*Fiber to the Premises (FTTP)* provides a high-speed, fiber-based alternative to traditional cable and copper wire telephone networks. Fiber-optic technology converts electrical signals carrying data to light and sends the light through transparent glass fibers about the diameter of a human hair. Despite the fact that fiber is thinner than copper wire, it provides a much higher data rate. Fiber transmits data at speeds that far exceed current DSL or cable modem speeds, typically by tens or even hundreds of Mbps. The actual speed varies, depending on a variety of factors, such as how close to the point of connection the service provider brings the fiber and how the service provider configures the service, including the amount of bandwidth used. The

fiber providing broadband simultaneously can deliver voice (VoIP) and video services, including video-on-demand. FTTP deployment is currently concentrated in urban and suburban communities because the cost of deployment is high in rural and less densely-populated areas.32

*Wireless broadband* connects a home or business to the Internet using a radio link between the customer’s location and the service provider’s facility. Wireless broadband can be mobile or fixed. Wireless technologies using longer-range directional equipment provide broadband service in remote or sparsely populated areas where DSL or cable modem service is not necessarily available and/or would be costly to provide.33

Otherwise known as *third generation wireless technology*, “3G” is mostly used with mobile phones and handsets. It serves as a means to connect the phone to the Internet or to other IP networks in order to make voice and video calls, to download and upload data, and to surf the net. Unlike Wi-Fi, which a consumer sometimes can access free-of-charge in “hotspots,” an Internet user needs to subscribe to a service provider in order to have 3G/4G mobile network connectivity.34

*Long Term Evolution (4G LTE)* is a wireless broadband technology designed to support roaming Internet access via cell phones and handheld devices. LTE offers significant improvements over older cellular communication standards; it, like predecessor technologies,
supports browsing websites, VoIP, and other IP based services.\textsuperscript{35} Download speeds in excess of 30 megabits per second, and upload rates exceeding 15 megabits per second are typical.

Figure 3 below shows the different types of broadband service and their typical capabilities. For example, DSL broadband service is limited to metropolitan and suburban areas.

\textbf{Figure 3:}

Broadband Availability Sphere\textsuperscript{36}

* Wireless Broadband is the only broadband service accessible to all three areas: Metropolitan, Suburban, and Rural.

\textsuperscript{35} Mitchell, Bradley, About Technology, “What Does LTE Stand For?” (n.d.). Available at: \url{http://compnetworking.about.com/od/cellularinternetaccess/g/lte-broadband.htm}

\textsuperscript{36} There are a decreasing number of broadband options the farther a consumer is located from a metropolitan area. Satellite access technologies for broadband have been left out from this analysis, as a result of their comparative unreliability and cost. Cable and fiber have “last-mile” cost considerations too high for telecommunications companies and consumers to afford in rural environments.
due to the distance from the subscriber to the closest telephone company central office switching facility. Cable modem and Fiber to the Premise (FTTP) broadband services also are limited in these two areas because of the low population density and significantly high infrastructure costs to provide these services to rural areas. Wireless broadband, however, provides a quality of service sustainable to all three geographic regions.

**Overview of National Broadband Ecosystem**

With the creation of so many new devices, applications, and content-delivery systems, broadband is playing an ever more important role in assuring our nation’s economic prosperity.\(^37\) Video consumption on both mobile and fixed devices increased dramatically through 2013, and this trend will continue, along with the steady rise of social media and video streaming websites like YouTube and Netflix.\(^38\) The mobile device market continues to change and expand rapidly while the rate at which these devices consume data will also continue to increase as well. With the advent of the “internet of things,” the number of devices connected to the internet will also increase exponentially and, as a result, the number of IP addresses has increased and will continue to increase, along with a heightened demand for spectrum.\(^39\)

More than 290 million Americans live in areas with access to fixed broadband infrastructure capable of actual download speeds of at least 4 Mbps; but more than 14 million people live where they do not have access to this level of speed.\(^40\) As of 2013, an FCC report showed that ISPs were delivering 97 percent of advertised download speeds (depicted in the

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38 Ibid (p.17)
39 Ibid (p.18)
40 Ibid (p.20)
chart, below) during the peak usage hours; and many exceeded their advertised speeds as of 2013.41

Figure 4:
Advertised Speed Comparison between Telecommunications Providers 42

In addition, both telephone and cable companies have continued to upgrade their network infrastructures rapidly in order to offer higher speeds. Figure 4 above illustrates a breakdown of the major telecommunications providers’ advertised speeds compared to their actual upload and download speeds. AT&T has continued to expand its fiber-to-the-node infrastructure,43 and recently announced a commitment to explore bringing fiber-to-the-home (FTTH) to 25 metro areas.44 Ft. Wayne, the 76th largest market, already has fiber-to-the-home

42 Ibid.
availability via Verizon’s original FiOS network serving Allen County. In 2009, Verizon sold their landline network in Indiana, and 13 other states, to Frontier Communications.  

**Figure 5:**

**Companies Still Actively Expanding Gigabit Broadband Services**

Cable companies have also continued to rapidly introduce to their networks DOCSIS 3.0 technology, which is capable of download speeds of up to 50 Mbps. Figure 5, above, shows some of the firms that are actively deploying gigabit broadband services in the United States as of August of 2014. There are multiple service providers working independently or with another

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ISP to activate gigabit-powered broadband service to major metropolitan areas. With AT&T being the leader for our region facilitating gigabit speeds in nearby metropolitan St. Louis and Chicago, and Google now in active negotiations with 34 additional metropolitan areas for ultra-high-speed fiber service, many insiders believe Indianapolis, the 12\textsuperscript{th} largest market, will soon be added to that list.

**Broadband Access and Deployment in Indiana**

Many significant events have occurred over the past 10 years that propel Indiana to the front of the broadband deployment line in the Midwest. Indiana has a long history of broadband telecommunications projects and initiatives, placing the state in a well-prepared position for enhancing broadband coverage.

Beginning in 2007, after the passage of HEA 1279-2006\textsuperscript{48}, Verizon added DSL capability to central offices in 69 rural communities serving 70,000 southern Indiana customers, while AT&T completed the upgrade of its remaining central offices to DSL capability in 33 rural communities across the state.

Over the past five years, NTIA’s Broadband Technology Opportunities Program (BTOP) and the Department of Commerce, through the American Recovery and Reinvestment Act, have invested $4 billion in innovative projects that expanded access to and adoption of high-speed Internet services across the country, primarily to unserved or under-served rural areas.

For Indiana, two significant, federally-funded projects come to mind. First, Zayo Bandwidth received a federal award of $25,140,315 to provide a 626-mile fiber optic network to provide 1 Gbps to 10 Gbps service among 23 Ivy Tech Community College sites and the 42

\textsuperscript{48} Indiana HE 1279 (2006)
Indiana colleges and universities already on the I-Light network. These connections enable online education and high speed network connectivity in areas that were previously underserved. These new connections have also enabled Zayo Bandwidth to connect other institutions to I-Light, such as Hanover College and Franklin College, giving them far better connections.

Second, Educations Networks of America, a service provider, received a federal award of $14,257,172 to deploy 560 miles of fiber optics to deliver broadband Internet service to 145 public schools and libraries around the state to enhance services to an estimated 290,000 students and library patrons. In addition, this open network project proposed to offer affordable broadband Internet service to 200,000 households, 30,000 businesses, and 630 community anchor institutions.

Another fiber-based broadband success story is Smithville Communications, parent firm to Smithville Telephone, an incumbent local exchange telephone company and Indiana’s largest independent communications firm, headquartered in Ellettsville, IN. Smithville has been a significant contributor in expanding broadband supportive infrastructure throughout Indiana. The company currently serves about 23,000 businesses and residences in southern and central Indiana. Communities such as Gosport, IN, will be considered an “all-fiber” gigabit community

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49 I-Light is collaboration among Indiana colleges and universities, state government, and private sector broadband providers. It is a high-speed fiber optic network that connects Indiana member sites to state, national and international research and education communities. Member sites connect to I-Light at speeds from one Gigabit to 10 Gigabits per second.

by the end of 2014, as a result of Smithville’s $90 million fiber-optic, system-wide fiber upgrade.\(^{51}\)

Smithville has recognized the investment opportunities available in rural communities. Using a $37,729,143 loan under the federal American Recovery and Reinvestment Act awarded in 2010, Smithville provides broadband services to 3,815 households, 209 businesses, and 12 community anchor institutions in rural Indiana. In addition, Smithville has expanded into other part of Indiana, such as the Bloomington area, Jasper, Seymour, Evansville, Lafayette, Fishers, Indianapolis, and Lizton.

Strategic use of broadband resources has also been an Indiana Higher Education Telecommunications System (IHETS) focus for many years. In 2006, Ball State University became one of the first universities in the United States to test WiMAX technology, specifically for rural broadband purposes.\(^{52}\) The University negotiated a public-private partnership with Cisco Systems to explore WiMAX systems’ broadband wireless potential.\(^{53}\) This project was the first to explore the potential of wireless broadband on a college campus in the U.S.

IHETS strategically has enhanced Indiana’s telecommunications infrastructure through assisting in connecting “K-12 schools, public libraries, state government, colleges and universities, and public broadcasting” since 1999.\(^{54}\)

Within Indiana, there is a considerable difference between the availability of broadband in suburban and urban areas, as compared to rural spaces. According to the 2012 Eighth


Broadband Progress Report released by the FCC, only 1.788% of the population inhabiting urban and suburban areas lack access to broadband, as opposed to 12.4% of the population living in rural areas.\textsuperscript{55} Nevertheless, it must be noted that Indiana exceeds the national average in matters concerning the increase of broadband access to rural areas within the state. Noted by BroadbandUSA, Education Networks of America, Inc. launched the Broadband Access and Equity for Indiana Community Anchor Institutions. The initiative, which is aimed at providing increased opportunities for education through broadband deployment, demonstrates the support broadband deployment is receiving in the state of Indiana.\textsuperscript{56}

According to the 2012, TechNet State of Broadband Index Report, Indiana is ranked at the 28th position, with a 93-index value rating, based on three measured index inputs, which

\begin{center}
\textbf{Figure 6:}
\end{center}

\begin{center}
\begin{tikzpicture}
\begin{axis}[
width=\textwidth,
height=0.4\textwidth,
axis y line*=left,
axis x line*=bottom,
axis line style={-},
]
\addplot+[ybar, bar width=10pt] coordinates {
(Indiana, 100)
(Michigan, 120)
(Ohio, 80)
(Kentucky, 60)
(Illinois, 140)
(Wisconsin, 100)
}
\addlegendentry{Adopt Total}
\addlegendentry{Network Total}
\addlegendentry{Econ Total}
\end{axis}
\end{tikzpicture}
\end{center}

\textit{State Broadband Index – Breakout of Inputs, 2012}

Source: TECHNET’S 2012: STATE BROADBAND INDEX\textsuperscript{57}


\textsuperscript{56} BroadbandUSA, “Education Networks of America, Inc.: Broadband Access and Equity for Indiana Community Anchor Institutions,” (July 2009). Available at: http://www2.ntia.doc.gov/files/grantees/IN_EducationNetworksofAmerica_FINAL.pdf

\textsuperscript{57} Ibid (p.9)
include network, adoption and economic values, as indicated in Figure 6 above. The network index input was based on average and peak network speeds within the state, in addition to measuring the percent of homes passed by fiber.\textsuperscript{58} The broadband adoption index was based on survey data collected by the National Telecommunications and Information Administration (NTIA), collecting information on households subscribed to broadband within the state.\textsuperscript{59}

Last, the “economic structure” index measured individual states’ information economy based on an evaluation of their “Information Communication Technology” sector; specifically reviewing businesses and ICT oriented jobs available in each state.\textsuperscript{60} TechNet’s State Index is held in high regard as a primary, trusted source of broadband survey data across the United States.

\textbf{Figure 7:}

\textbf{State Broadband Index- Network Total, 2012}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{state_broadband_index_network_total_2012.png}
\caption{State Broadband Index- Network Total, 2012}
\end{figure}

Source: TECHNET’S 2012: STATE BROADBAND INDEX\textsuperscript{61}


\textsuperscript{59} Ibid (p.4)

\textsuperscript{60} Ibid (p.4)

\textsuperscript{61} Ibid (p.9)
Despite being ranked below the national average index value of 100, Indiana is qualified as an “overachiever” within the Technet Report for demonstrating high network quality rates due to the presence of pre-existing optical fiber networks. Indiana’s index ranking is affected by the inherent disadvantages present in the state, which include economies that depend less on technological advancements, terrain variations, and vast rural areas as compared to other states.

To illustrate the three criteria that were used to calculate the index rankings of each state, the charts above use Technet Report data to provide a breakout of inputs comparison between Indiana and its regional competition. It is the higher network input value shown in

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62 Ibid (p.9)
63 Ibid (p.11)
64 Ibid (p.12)
Figure 7, i.e. the existence of the fiber optic infrastructure, which gives Indiana its unique advantage.

**Figure 9:**

Indiana Office of Technology Broadband Map of Indiana (Wireline & Wireless coverage with at least 6Mb down 1.5Mb up) as of September 29th 2014

Highlighted within a more recent study, the State of Broadband Index Report shows information concerning the share of homes in Indiana that are passed by fiber. As of 2014, this

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latest report shows 43.8% of homes in Indiana are passed by fiber, which is almost four times more than the closest competition in the region. For example, the Kentucky rate is 8.9%. Indiana’s advantage as compared to its regional peers and the national average is clear. The marginal gains in fiber deployment since these data were reflected in 2012 have been consistently maintained through 2014. The State of Broadband Index Report also depicted Indiana’s broadband adoption trends within the 2007-2010, time span from the NTIA surveys, which revealed an increasing trend in broadband adoption. Broadband adoption percentage rates in Indiana increased from 42% in 2007 to 56% 2009 and up to 59% in 2010. Figure 9, above, depicts the areas (shaded) within the state of Indiana that are currently served by a broadband provider.

**Indiana Broadband Initiatives**

Capital expenditure (CAPEX) requirements to build out broadband systems in rural areas often require incentives like pre-subscription of businesses customers to broadband service, loan guarantees, and/or establishing tax increment finance (TIF) districts. Over the past ten years, a number of Indiana economic development groups have established TIF districts for their areas to attract and help fund fiber-to-the-premise (FTTP) projects. As an example, Metronet, an Evansville-based company, has worked with a number of smaller Indiana communities to establish TIF districts and establish bonds, which the firm purchases, to assist with the construction of a fiber optic network directly to households for Internet, television and


69 IC 36-7-14 and IC 36-7-15.1
phone service. The revenue bonds are then retired, at no cost to the taxpayers, from property tax revenue generated from the project.

Metronet, which began operation in 2005, has grown to offer 100-percent fiber-optic service to 14 cities statewide, including Connersville, Huntington, Madison, New Castle, North Manchester, North Vernon, Seymour, Vincennes, Wabash, Lebanon, Franklin West Lafayette/Lafayette and Crawfordsville.

Another incentive example comes from Wabash County, where the construction of a 100-percent fiber optic network serving LaFontaine was funded in 2013, using $100,000 in county economic development income tax (CEDIT) revenue as seed money. According to Bill Konyha, president of the Economic Development Group of Wabash County, as a result of a partnership with Metronet and their investment CEDIT funds, “we are able to extend 21st century technology . . . to enhance the quality of life for residents in Wabash County.”

Some broadband projects get their start providing service to the business sector of a community, and then later expanding to offer fiber-based serves to residential customers. For example, AT&T recently announced “AT&T Business Fiber” in Indianapolis, a service that will initially offer between 25 and 300 megabits-per-second, with plans to support up to 1 gigabit-per-second in the future. Other projects are simply the natural expansion of broadband into rural areas using wireless technology. For example AT&T recently announced it is expanding its 4G LTE network in west central Indiana into the Owen County community of Spencer.

70 IC 6-3.5-7
In Blackford County, officials from Hartford City and Montpelier recently announced a project to install more than 20 miles of fiber optics to provide high-speed connections for businesses, non-profit, and municipal facilities in those communities. The project, a partnership with BG Networking, a Nashville (IN) private telecommunications firm, will be completed by April 2015 and be able to handle speeds of up to 1 gigabit-per-second.74

The expansion of broadband development in Indiana by third parties has enhanced the likelihood of future development of broadband by creation of an extensive fiber framework throughout the state. Additionally, the transition petitions of telecommunication providers requesting a service change from PSTN to IP within the state, also suggest a push toward increased access to broadband.75

As mentioned above, acceleration of infrastructure development within the telecommunications industry in Indiana began with House Enrolled Act 1279 passed in 2006, where provisions concerning the deregulation of rates and charges for telecommunication services, as well as the adoption of statewide franchising of multichannel video providers became effective.76 Senate Bill 1112, enacted in 2012, contributed to this acceleration by allowing telephone companies to withdraw as a carrier of last resort (COLR), where it could be shown that at least one other service provider was providing voice service. To date, the FCC has not imposed extensive regulation on internet service providers (ISPs) as ISPs are not classified as traditional telecommunications carriers.77

76 Ibid (p.103)
77 Ibid (p.117)
For Indiana, Senate Enrolled Act 396 limits the ability of Indiana’s IURC to enforce rate restrictions for telecommunication providers. Coupled with a deregulated environment, Indiana has also enacted statutes creating the Indiana Broadband Development Program, which aims to increase broadband access for Indiana residents.

**Regulatory Impediments to Rural Broadband**

DPI long has noted that firms in the telecommunications industry, as well as their regulators at the federal and state levels, continue to confront significant challenges. These challenges concern the capabilities and connections among service providers and consumers in urban, rural and non-rural underserved geographic areas. Regulatory change in the telecommunications landscape is continual. Many states have enacted creative legislation to foster their communications and economic environments. Much of Indiana’s telecommunications regulatory environment has already been reformed, although differences remain in comparison to the regulatory situation in states experiencing strong acceleration toward extensive rural broadband coverage. Historically, the principle of “universal service” was created to distribute ubiquitous telephone (voice) service across the nation in 1934. This same principle is applicable in 2014, through the Connect America Fund (CAF), an incentive program to accelerate broadband availability, economically benefiting both urban and rural

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78 Indiana SB 396 (2014)
consumers.\(^{82}\) A clear nationwide focus has developed for rural broadband access, but funding sources and policy mechanisms must be developed to accelerate deployment of infrastructure to consumers. Some states are becoming more proactive in promoting broadband deployment.

For example, in 2008 California created the California Advanced Services Fund (CASF) to support broadband network construction in unserved and underserved areas. Originally funded at a level of $100 million, it was expanded to $225 million in 2011, and runs through 2018. The CASF is funded through a small assessment on telephone and VoIP services.\(^{83}\)

Specific barriers to rural broadband acceleration have been identified across many states. The world is transitioning to an exclusive IP network, which is diminishing the need for, and relevance of, legacy Time Division Multiplexing (TDM)-based systems. These legacy systems require maintenance of older infrastructure and additional human capital, as opposed to funding allocation for new broadband technologies.

### Policies Affecting Rural Broadband Deployment

A review of regulatory changes among states implementing rural broadband reveals a pattern of community benefits to statewide stakeholders. States that foster a deregulated, competitive, telecommunications landscape, with consumer and stakeholder protection, have greater success in statewide broadband deployment. Consumer protections are tied to legislative and regulatory actions:

Georgia enacted \textit{HB 176}\(^{84}\), which contains similar revisions as Colorado’s \textit{HB 1327}\(^{85}\) — limiting permit fees for wireless antenna placement, in addition to removing zoning constraints for

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\(^{84}\) Georgia HB 176 (2014)

\(^{85}\) Colorado HB 1327 (2014)
wireless co-location on existing structures. Across Indiana, the construction permitting process is not consistent among governmental entities in fees, required documentation, inspection and return timelines for denial and affirmation of requests. These inconsistencies add time and cost to the process of providing terrestrial and wireless broadband infrastructure. Permits for telecommunications construction are valid for a very limited amount of time, requiring re-filing and additional fees if a delay occurs.

Michigan enacted HB 636\textsuperscript{86}, allowing providers to discontinue landline service by 2017, provided that specifically mandated procedures are followed in accordance with access to emergency 911 services. This removes older infrastructure responsibility while also promoting wireless signal coverage to new areas, as citizens must have access to at least one option for reliable emergency services.

New Hampshire introduced SB 258\textsuperscript{87} with a similar purpose. Maintaining a resilient consistent connection for emergency services is paramount in rural broadband deployments. This includes power infrastructure concerns such as long-term, battery-based redundancy throughout the network to the consumer site.

Missouri enacted HB 331\textsuperscript{88}, promoting rapid wireless infrastructure deployment (similar to Georgia’s HB 176), addressing telecommunications enterprises needing rights-of-way. They also opened collocation opportunities beyond public land, allowing “certified historic structures” also to be used (with passage of SB 650\textsuperscript{89}). Indiana has a large number of state-owned buildings and large amounts of public lands for potential antenna siting.\textsuperscript{90} Streamlining these provisions at the state level would allow coordinated efforts to accelerate deployment. Customizing tower and antenna proposals to meet individual community demands is a tedious undertaking impeding the acceleration of broadband deployment to rural areas. Uniform state policies and regulations would improve this situation in the Hoosier State.

Washington State enacted HB 2253\textsuperscript{91}, reducing the restrictions on obtaining work permits and certifications previously required for low voltage data cabling installation. Passing non-data voltage through network cabling (Power over Ethernet) is common, but some states have not updated their telecommunications installation laws to reflect this. Similar to Colorado’s HB 1327 (29-27-404), microcell installations have been granted accelerated permit procedures under HB 2175.\textsuperscript{92} Indiana has its own construction requirements impeding uniform deployment, as one county may require broadband cabling to be buried at a four

\textsuperscript{86} Michigan HB 636 (2014)
\textsuperscript{87} New Hampshire SB 258 (2014)
\textsuperscript{88} Missouri HB 331 (2013)
\textsuperscript{89} Missouri SB 650 (2014)
\textsuperscript{90} See Figure 10 in the appendix. Indiana has maps available to locate state owned lands and buildings that may be used to accelerate tower and antenna placement. Broadband access is in the public interest of consumers’, so the use of public lands and buildings has been permitted in many states legislation.
\textsuperscript{91} Washington HB 2253 (2014)
\textsuperscript{92} Washington HB14-2175 (2014)
foot level while another requires three feet. Inconsistencies in local construction code makes accelerated deployment difficult across county lines. Here too uniform state requirements are needed for Indiana.

Colorado’s Broadband Deployment Act (HB 1327) in section 29-27-403 limits the local government evaluative timeframe for processing telecommunication related permits to one hundred and fifty (150) days. Similar time limit or “shot-clock” rules were adopted by the FCC, and prevent local and state governments from unjustified delays in granting permits for construction of wireless infrastructure. The ability of the FCC to adopt and enforce those shot-clock rules has been affirmed by the Supreme Court. However, the enforcement of federal shot-clock ruling in Indiana may need to be supplemented by Indiana’s adoption of “technical foul” regulations to deal with situations where localities continue to stand in the way of broadband development.

Colorado’s permit-batching procedures for small cell network deployments are addressed in Section 29-27-404, which streamlines deployment of this coverage architecture for providers. Statewide priority is provided for telecommunications providers in Section 29-27-404, permitting open use of all public highways (and their rights-of-way). In Section 38-5.5-107, municipal entities are regulated on fees charged to carriers for local telecommunications activity in their jurisdiction. Section 38-5.5-109 addresses trenching considerations for roadway fiber projects in excess of one mile. Last, Section 39-26-129 addresses tax incentives for providers to expand into rural areas of the state.

Wisconsin enacted similar legislation, based on other states’ experiences, for accelerated broadband deployment: Statute 196.504 creates a Broadband Expansion Grant Program to fund underserved areas of the state. Act 22 within SB 13 addresses telecommunication utilities regulations, provider of last-resort (POLR) obligations, intrastate-switched access rates and VoIP deregulation. Statute 66.0404 accelerates cellular tower deployment through statewide uniformity of construction permitting (process and cost limits), reliance on the federal shot-clock (45 days) rules, opening co-location options, and an improved denial process that places the burden of proof on local municipalities to supply substantial

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93 Colorado HB14-1327 (2014)
94 Ibid (p.4)
95 In Re: Petition for Declaratory Ruling, 24 FCC Rcd. 13994 (2009)
97 Colorado HB14-1327 (2014)
98 Ibid (p.4)
99 Ibid (p.6)
100 Ibid (p.8)
101 Ibid (p.9)
102 Wisconsin S. 196.504 (2013)
103 Wisconsin SB 13 (2011)
104 Wisconsin S. 66.0404 (2013)
evidence of flawed engineering plans. Statute 66.0406 also restricts local municipalities’ reasons for denial to only public health or safety concerns.

Wisconsin and Colorado passed uniform legislation allowing telecommunication companies to accelerate broadband growth. Wisconsin’s and Colorado’s actions are outlined in Table 2 below.

Table 2:

Wisconsin & Colorado Broadband Acceleration Policies

<table>
<thead>
<tr>
<th></th>
<th>Wisconsin</th>
<th>Colorado</th>
</tr>
</thead>
<tbody>
<tr>
<td>§ 196.504</td>
<td>Reallocated Universal Service Fund (USF) money to create a “Broadband Expansion Grant Program” so data providers can receive reimbursement for expanding to underserved rural areas.</td>
<td>HB 14-1328 Created “grant-making from moneys allocated from the Colorado high cost support mechanism” and produced “connect Colorado to enhance economic development, telehealth, education, and safety act.”</td>
</tr>
<tr>
<td>Act 22 in SB 13</td>
<td>Deregulation of POLR, access rates, VoIP to promote rural broadband expansion.</td>
<td>HB 14-1329 &amp; HB 14-1331</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HB 14-1329-- “Connect Colorado to enhance economic development, telehealth, education, and safety act” (deregulation of VoIP services).</td>
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<tr>
<td></td>
<td></td>
<td>HB 14-1331 addresses “provider of last resort”, maximum price for basic service and provides a review for “re-regulation” four years out (in 2018)</td>
</tr>
<tr>
<td>§ 66.0404</td>
<td>Accelerates cellular tower deployment by statewide uniformity of construction, permitting process, cost limits, shot-clock (45 days), co-location options, and local municipalities permit denial restrictions.</td>
<td>HB 14-1327 Permitting changes and reiteration of FCC shot-clock rulings.</td>
</tr>
</tbody>
</table>

105 Wisconsin S. 66.0406 (2013)
106 These two aforementioned statutes are summarized well in a frequently asked questions guide. Available at: http://www.wicounties.org/uploads/legislative_documents/final.mobile-cell-tower-q-a.pdf
107 See Table 4 in the Appendix. A policy research matrix on additional states of interest was developed.
108 Colorado HB14-1328 (2014)
109 Colorado HB14-1329 (2014)
110 Colorado HB14-1331 (2014)
111 Colorado HB14-1327 (2014)
In Indiana, the passage of similar regulations could accelerate rural broadband deployments, especially with respect to wireless service methods. Statewide uniformity in the application process would accelerate the pole attachment approval process from that governed by the use of varying forms of filing at the local government level. Construction of broadband facilities to create a new telecommunications point-of-presence (which refers to local telecommunication operation) for rural areas is restricted by the Indiana Department of Transportation (INDOT) regulations on railroad, river crossing, highways and local roads as well.

Summary, Conclusions and Recommendations

Summary

The State of Indiana is poised to assess the state’s current broadband ecosystem and develop a strategic plan that will serve as a catalyst for providing broadband services to unserved and under-served areas of the state.

Competition drives results; and to stay among the nation’s top economic leaders in terms of education and business, Indiana must continue to remain competitive. States throughout the nation are now taking initiatives to expand broadband service throughout their jurisdictions. As such, it should be among Indiana’s top economic priorities to extend broadband from current metropolitan areas to rural areas as well. Lessons can be learned from the experiences in other states.

Having reviewed regulatory considerations addressed by other states, Indiana’s strategic broadband plan should have the goal of increasing opportunities by changing telecommunications companies’ regulatory environment. States such as Wisconsin have
produced “lessons earned” documents outlining the consumer benefits and reinforcements needed to increase statewide broadband access. Beyond the expanded commerce broadband brings to the table, Telehealth initiatives are included by successful legislators as well.

Statewide health information exchange (HIE) programs require rapid access to patient data, as well as the engagement of consumers with their own health data. Broadband access has a clear purpose and capacity in these areas. For example, Wisconsin produced a “Wisconsin’s Playbook for Broadband Progress” document in 2013, claiming eleven different “plays” or strategies for accelerated rural broadband deployment. Specifically, three larger themes were derived from local success stories across the state:

1. Leverage existing resources to incent private investment
2. Provide forums for public and private sector partnerships and collaborations to advance Wisconsin’s broadband communications.
3. Promote awareness of shared opportunities among consumers, government leaders and providers.

Wisconsin’s playbook emphasizes the role of Broadband Regional Planning Teams (BRPTs) across the state. This process is outlined in more detail across six strategies related by one or more of the three themes. A bottom-up approach is used in Wisconsin to educate communities on the benefits of broadband through local leaders they trust. Table 3 below outlines Wisconsin’s strategies.

Michigan has taken a similar approach through the creation of a Connected Nation subsidiary (Connected Michigan) which partners with the Michigan Public Service Commission.

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113 Ibid (p.8)
Michigan’s outlines are structured around economic and community development (ECD) projects that reflect many of the same philosophies of Wisconsin’s experience.

Three remaining barriers to broadband adoption among most rural populations were found in Michigan to be “a perceived lack of relevance, the cost, and the need for digital

Table 3:

Six Strategies from Wisconsin’s Playbook for Broadband Progress

| Partnerships and Collaboration | “Inclusive leadership that incorporates shared benefits, mutual goals and participation by citizens, business, government, private providers, education, health care and others.” |
| Leveraging                    | “Each successful example leverages existing resources ranging from water towers to local broadband providers to governmental advocacy connecting training opportunities to libraries.” |
| Awareness                     | “Broadband is a means, not an end. Success stories highlight what broadband can do. Awareness education plays a key role in bringing consumers, government leaders and private providers together around the unique opportunities in their local area.” |
| Actionable Ideas              | “Each success story illustrates an incremental approach that addresses a particular need (better coverage in rural areas, sharing of digital applications, expanded adoption for low-income residents, etc.). Each initiative is targeted, specific and achievable with resources that are available.” |
| Consensus                     | “Closely related to targeting actionable ideas is the pursuit of consensus. Wisconsin communities are able to make important advancements most effectively when leaders focus on points of agreement for future progress.” |
| Community                     | “Ability to engender and sustain support for efforts often hinges on leaders being mindful that “a rising tide lifts all boats.” Successful initiatives are designed and portrayed in terms of the community’s shared benefits.” |
literacy training.” On a national scale, NTIA has published its own “NTIA Broadband Adoption Toolkit” in 2013, for ECD. It included a detailed outline, from community awareness techniques to digital literacy curriculum design. But, even with a deregulated telecommunications environment, some citizens remain non-adopters (about 1/3 of the population). Correspondingly, the top barriers to adoption are access & availability, cost, perception, relevance and digital literacy skills.

Digital literacy programs through community anchor institutions (CAIs) have the potential to enhance public perception, relevance and skill related challenges. Institutions such as “libraries, workforce centers, nonprofit organizations, and community colleges” are already stepping up to this challenge. The regulatory environment greatly can affect individuals in terms of access, availability and cost of broadband; but the simultaneous awareness of broadband community value is required for proper telecommunication return on investment (ROI). Six grantees in Indiana were awarded over $148 million dollars of NITA funding, 69% of which was awarded for infrastructure based projects in the state. The remaining 31% of funding was granted to information communication technology (ICT) for ECD sustainable broadband adoption projects.

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116 Ibid (p.4)
117 Ibid.
118 Ibid (p.5)
119 Broadband USA: Connecting Americas Communities, “Indiana | BroadbandUSA,” (2014). Available at: http://www2.ntia.doc.gov/indiana
120 Ibid.
A variety of strategic planning resource lists have been published by individual states for broadband deployment. Colorado,\textsuperscript{121} Connecticut,\textsuperscript{122} Georgia,\textsuperscript{123} Michigan,\textsuperscript{124} Missouri,\textsuperscript{125} South Dakota,\textsuperscript{126} New Hampshire,\textsuperscript{127} New Jersey,\textsuperscript{128} have all released strategic broadband plans or “lessons learned” from their deployments.

The bullet list below represents the current pattern discovered in telecommunications policy that provides the most effective outcomes in terms of rural broadband deployment.

- Limit permitting fees for wireless antenna placement.\textsuperscript{129}
- Redefine basic service requirements.\textsuperscript{130}
- Update telecommunications definitions at the state level if federal legislation does not reflect recent innovations and expectations.\textsuperscript{131}
- Reduce valid timeframe for telecommunications construction permits.\textsuperscript{132}

\begin{itemize}
\item \textsuperscript{121} Colorado Broadband Data and Development Program, “Local Technology Planning Teams Lessons Learned,” (September 15, 2011). Available at: \url{http://www.mcedd.org/LTPT/documents/LocalTechnologyPlanningTeams-LessonsLearned-11-2011.pdf}
\item \textsuperscript{122} The Connecticut Academy of Science and Engineering, “Guidelines for the development of a strategic plan for accessibility to and adoption of broadband services in Connecticut,” (December 2011). Available at: \url{http://ct.gov/broadband/lib/broadband/I_GUIDELINES_FOR_DEVELOPMENT_OF_BROADBAND_STRATEGIC_PLAN-RELEASE_DATE_123011.pdf}
\item \textsuperscript{123} Georgia Technology Authority, (2014). Available at: \url{http://www2.ntia.doc.gov/grantee/georgia-technology-authority}
\item \textsuperscript{124} Connected Nation (Michigan), (2014). Available at: \url{http://www2.ntia.doc.gov/grantee/connected-nation-michigan}
\item \textsuperscript{125} Missouri Office of Administration, (2014). Available at: \url{http://www2.ntia.doc.gov/grantee/missouri-office-of-administration}
\item \textsuperscript{126} South Dakota Bureau of Information & Telecommunications, (2014). Available at: \url{http://www2.ntia.doc.gov/grantee/south-dakota-bureau-of-information-telecommunications}
\item \textsuperscript{128} New Jersey Office of Information Technology, (2014). Available at: \url{http://www2.ntia.doc.gov/grantee/new-jersey-office-of-information-technology}
\item \textsuperscript{129} Wisconsin S. 66.0406 (2013)
\item \textsuperscript{130} Colorado HB14-1331 (2014)
\item \textsuperscript{131} Michigan HB 4314 (2011)
\item \textsuperscript{132} Colorado HB 1327 (2014)
\end{itemize}
• Remove zoning constraints for wireless co-location and pole attachment on public land, state owned buildings and certified historic structures.133

• Consistent statewide construction permitting process in terms of fees, required documentation, inspection and return timelines for denial and affirmation of requests.134

• Statewide uniform policy on tower and antenna proposals' process.135

• Allowing the discontinuance of landline service by a future date, consistent with access to emergency 911 services through an equally reliable provider. Requirements long-term, battery-based redundancy throughout the network to the consumer site.136

• Statewide right-of-way regulation favoring telecommunications expansion and growth, permitting use of all public highways, railroads, bridges and river crossings.137

• Reduce restrictions on obtaining work permits and certifications if previously required for low voltage data cabling installation.138

• Streamline regulations to allow batching of permits for microcell or small cell network deployments, reflecting the differences in these deployments from standard cellular antenna.139

• Reduce inconsistencies in local construction code for telecommunications work, providing consistency with long-range construction across county lines.140

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133 Missouri SB 650 (2014)
134 Wisconsin S. 66.0404 (2013)
135 Wisconsin S. 66.0404 (2013)
136 Michigan HB 636 (2014)
137 Colorado HB 1327 (2014)
138 Washington HB 2253 (2014)
139 Washington HB14-2175 (2014)
140 Wisconsin S. 66.0404 (2013)
• Address restrictive trenching considerations for roadway fiber projects in excess of one mile.

• Use of FCC “shot-clocks” for municipal evaluation timeframe in processing of telecommunication related permits to forty-five (45) days for new antenna placement and for all other related applications.\textsuperscript{141}

• Impose additional state-wide standards for limiting the time for local permitting.

• Regulate municipal entities on fees charged (price ceilings) to carriers for local telecommunications activity in their jurisdiction.\textsuperscript{142}

• Provide tax incentives for providers to expand into rural areas of the state.\textsuperscript{143}

• Prevent state utilities commission from regulating voice over IP (VoIP) standards of service.\textsuperscript{144}

• Transfer revenue authority over prior telecommunications taxes for the use of subsidized rural deployment.\textsuperscript{145}

The largest factor in economic development is technology; and the broadband landscape in Indiana contains the necessary attributes to promote broadband expansion statewide. Among these attributes are Indiana’s high fiber-to-home passed rate, its mostly flat topography and the state’s growing economy, particularly in Indianapolis, which is listed among Forbes top ten most rapidly growing cities in the United States.\textsuperscript{146} In order to continue this growth, Indiana must adopt a broadband plan that will offer this valuable resource to every home in the state.

\textsuperscript{141} Comments of CTIA – The Wireless Association, WT Docket No 13-238 & 13-32 and WC Docket No 11-59 (2014)

\textsuperscript{142} Georgia HB 176 (2014)

\textsuperscript{143} Indiana SB 560 (2013)

\textsuperscript{144} Wisconsin SB 13 (2011)

\textsuperscript{145} Michigan HB 6022 (2012)

Conclusions

What broadband expansion would mean for Indiana rural residents is clear. Local businesses would be able to compete at the highest levels, reaching new customers and consumers across all markets. Farmers could reinvent their business practices through using technologies giving them access to more business-related information, including crop prices, targeted weather forecasts, and local/regional/national/international marketing opportunities.

Educational advancements also would be valuable outcomes, as students everywhere would have the opportunity to participate in online courses and to expand their classroom knowledge beyond the defined walls of their educational facilities. Along with content growing online, and more teachers assigning homework that requires Internet access, parents would be able to communicate more easily with teachers. Also, with expanded broadband – particularly in rural areas – local libraries would see increased participation as their community members would be provided access to information and resources inaccessible before.

There are myriad benefits to expanding broadband to current “non-users” in rural areas throughout the state. Improving the total economic and community development of surrounding areas produces positive externalities and information exchange efficiencies within healthcare, government and public utility services, among other business sectors. With health information exchanges, broadband allows for healthcare facilities to access electronic medical records independent of the patient location. Through “smart grid” technologies, broadband users would have access to real-time energy consumption and conservation data. Moreover, state government offices and state agencies would have the ability to offer more services online, enabling increases in efficiency and accessibility to residents.
The time has come for Indiana to elevate its status in the nationwide broadband ecosystem. It is essential not to be left behind in the broadband technology revolution while other states are enjoying accelerated deployment. To continue economic growth, Indiana needs expanded broadband to allow industries to advance through greater access to data and resources. Complementing economic development, education gains through more widespread and faster broadband access will help create a more advanced and educated workforce.

This analysis shows the state of Indiana in terms of the availability and potential for broadband deployment, along with its comparative rank among other states’ existing plans to implement and accelerate broadband expansion. The report concludes with a list of “lessons learned” compiled from other states’ experiences in broadband deployment. Finally, this report provides conclusions and recommendations for the state of Indiana as it formulates its plan for broadband expansion.

Indiana has a unique advantage over surrounding states, having begun the process of addressing broadband expansion a number of years ago. Within the most recent Technet report, Indiana is listed Indiana as an “overachiever” due to the network quality and extent of a widely available fiber backbone infrastructure. This is primarily attributed to a combination of public-private broadband initiatives including county level investments such as the FIOS fiber to the home deployments that were originally made by Verizon in Allen county.\footnote{Horrigan J. & Satterwhite E., TechNet, “TechNet’s 2012: State Broadband Index,” (2012). Available at: http://www.technet.org/wp-content/uploads/2012/12/TechNet_StateBroadband3a.pdf. Note FiOS service is now offered by Frontier Communications in Allen County, IN.}

A survey conducted by the National Telecommunications and Information Administration in October of 2010, indicated that Indiana, which ranked 15th in terms of population, had increased broadband adoption by seventeen percent between 2007 and
Many neighboring states rank lower on the TechNet index than Indiana; but they share a similar geography and rural topology. With help from stakeholders in community level leadership, and prior infrastructure investments, the state is now in a position where it can improve broadband network deployment and Indiana’s digital economy. Neighboring states have helped pave the way for crafting not only policies to encourage broadband deployment, but also have provided models for other states to follow. Through the implementation of similar broadband programs and regulatory changes, Indiana can enjoy full deployment of broadband and, thereby, again be a model for other states to follow.

Recommendations

The expansion of broadband into rural areas of Indiana should be of great interest to state leaders. In the modern technology economy, states must ensure they are developing policies that create welcoming environments to attract high-tech investment. This, in turn, will attract not only high-tech businesses, but also brick and mortar businesses and service industries that need modern technology to operate efficiently. Indiana needs to close the gap in order to position the state as an international leader in technology investment, innovation and employment.

The potential economic and social impact as a result of such expansion would highly benefit Indiana residents who currently cannot employ broadband-based technologies. Additionally, the availability of broadband could play a vital role in economic competitiveness and growth of rural business. Broadband has been likened to the electricity of the 21st century, signifying its value as a basic rather than luxury service. Broadband expansion—particularly in

\[^{148}\text{Ibid (p.27)}\]
\[^{149}\text{Ibid (p.22)}\]
rural areas—warrants statewide attention and effort. For these reasons, we recommend the following actions to maximize broadband expansion:

- Indiana should focus on decreasing regulations and streamlining processes for broadband network expansion, paying special attention to the regulatory and policy areas discussed in this report as it applies to broadband wireless infrastructure as a primary solution.

- State level incentives should decrease or partially subsidize the costs of broadband Internet in rural areas for telecommunications companies and consumers alike. This could be achieved by tax incentives to service providers for expansion of broadband to rural areas.

- Indiana should develop digital literacy educational programs to educate Indiana residents regarding the benefits and uses of broadband Internet. Heightened digital literacy will increase consumer adoption rates and potential positive economic impacts in areas of new deployment.

- Indiana should adopt the general recommendations of the Indiana Rural Broadband Working Group (IRBWG), which are captured in this report, and focus on improving broadband service to rural Indiana.\(^ {150} \) These include the following:

  1. Streamline permit, zoning, and approval process.

  2. Increasing rural broadband adoption to provide more customer density.

3. Identification of the most under-served and unserved areas where potential demand exists using accurate mapping and then engaging communities and providers through a RFI process.

- A fourth recommendation by the working group, “carrier neutral access point” is assumed under the next recommendation below, and should be a goal of the proposed Rural Broadband Center, to encourage a public-private approach to broadband that provides a “best fit” high bandwidth presence, wired or wireless, to rural Indiana communities through a prescribed combination of incentives and appropriate fixed and wireless technologies.

- A final recommendation is the State should fund and empower a Rural Broadband Center to accelerate broadband expansion and development in rural Indiana, paying special attention the strategic plans and lessons learned from this report. The Center should be responsible for reviewing annually the existing status of fixed and wireless broadband and develop a long-term plan to improve the state’s broadband development by working directly with individual counties and rural municipalities, serving as a facilitator to review and analyze broadband options, and working directly with the Rural Broadband Working Group.

In a speech in Cedar Falls, Iowa on January 14, 2015, President Obama announced steps he planned to discuss in his State of the Union address and in his forthcoming budget proposals to Congress to promote access to fast and affordable broadband across America. Included in his Iowa address were a number of recommendations that also have been proposed in this DPI report, including removing regulatory barriers and improving investment incentives. This presidential focus on broadband expansion underscores the national level of interest and
importance of broadband to our communities, our economy, and our technology ecosystem. Fortunately, Indiana is poised to take advantage of these initiatives. The roadmap for legislative reform, coupled with state and local economic incentives and assistance is clear. In the end, only time will tell if Indiana will remain a broadband “overachiever.”
## Table 4:

**Policy Change Matrix by State**

<table>
<thead>
<tr>
<th>State Name</th>
<th>Year Posted</th>
<th>Bill</th>
<th>Status</th>
<th>Policy Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorado</td>
<td>2014</td>
<td>HB 14-1327</td>
<td>Passed</td>
<td>Eliminate state sales tax on broadband equipment and enable carriers to more easily access public rights-of-way and utility trenching projects for network build-outs.</td>
</tr>
<tr>
<td>Colorado</td>
<td>2014</td>
<td>HB 14-1331</td>
<td>Passed</td>
<td>Deregulate basic phone service, though would maintain oversight in limited areas that are still high cost to serve.</td>
</tr>
<tr>
<td>Colorado</td>
<td>2014</td>
<td>HB 14-1330</td>
<td>Passed</td>
<td>Update certain telecommunications terms, such as &quot;exchange area.&quot;</td>
</tr>
<tr>
<td>Colorado</td>
<td>2014</td>
<td>HB 14-1329</td>
<td>Passed</td>
<td>Officially deregulate Internet-based services, such as Vonage and Skype.</td>
</tr>
<tr>
<td>Colorado</td>
<td>2014</td>
<td>HB 14-1328</td>
<td>Passed</td>
<td>Puts unused cash from the High Cost Fund to use for rural infrastructure.</td>
</tr>
<tr>
<td>Connecticut</td>
<td>2013</td>
<td>HB 6401</td>
<td>Rejected</td>
<td>Clarify the state's authority to regulate interconnected voice over Internet protocol service</td>
</tr>
<tr>
<td>Connecticut</td>
<td>2013</td>
<td>SB 888</td>
<td>Introduced</td>
<td>Allows cell phone towers to be built on public lands on a presumption that the will of telecommunications companies is in the interest of the public good.</td>
</tr>
<tr>
<td>Georgia</td>
<td>2014</td>
<td>HB 176</td>
<td>Passed</td>
<td>Limits cell tower application to $500, automatic approval if no review after 150 days.</td>
</tr>
<tr>
<td>Georgia</td>
<td>2014</td>
<td>HB 282</td>
<td>Rejected</td>
<td>Municipal broadband is unrestricted in Georgia</td>
</tr>
<tr>
<td>Michigan</td>
<td>2014</td>
<td>SB 636</td>
<td>Passed</td>
<td>Streamline regulations on &quot;landline&quot; telephone service providers so as to facilitate transitioning customers to a wireless (cell phone or VOIP) system, and allow phone companies to discontinue landline service after 2016.</td>
</tr>
<tr>
<td>Michigan</td>
<td>2013</td>
<td>HR 5016</td>
<td>Introduced</td>
<td>Pre-emption of State Laws (blocking municipal broadband)</td>
</tr>
<tr>
<td>Michigan</td>
<td>2011</td>
<td>HB 4314</td>
<td>Passed</td>
<td>Provides for a number of changes to the Michigan Telecommunications Act.</td>
</tr>
<tr>
<td>Michigan</td>
<td>2012</td>
<td>HB 6022</td>
<td>Passed</td>
<td>To transfer authority over the revenue from a state telecommunications right-of-way tax authorized by a 2002 law to the state “metropolitan authority” proposed by House Bill 6025 and Senate Bill 1366.</td>
</tr>
<tr>
<td>State</td>
<td>Year</td>
<td>Bill Number</td>
<td>Status</td>
<td>Summary</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
<td>------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Michigan</td>
<td>2011</td>
<td>HB 4314</td>
<td>Passed</td>
<td>“Modernizing” Michigan’s telecommunications law in order to attract investment and to make Michigan more competitive relative to other states.</td>
</tr>
<tr>
<td>Missouri</td>
<td>2013</td>
<td>HB 331</td>
<td>Passed</td>
<td>Expanded access and improved broadband and wireless service through rapid deployment of broadband and wireless network infrastructure</td>
</tr>
<tr>
<td>Missouri</td>
<td>2014</td>
<td>SB 650</td>
<td>Passed</td>
<td>Eight new sections relating to wireless communications infrastructure deployment</td>
</tr>
<tr>
<td>Missouri</td>
<td>2014</td>
<td>SB 653</td>
<td>Passed</td>
<td>Provide a consistent rate for which municipalities can charge utility companies for pole attachments needed for cable</td>
</tr>
<tr>
<td>South Dakota</td>
<td>2014</td>
<td>HB 1166</td>
<td>Passed</td>
<td>Expands the services and devices that can be provided by the telecommunications fund which was established 25 years ago</td>
</tr>
<tr>
<td>South Dakota</td>
<td>2014</td>
<td>HB 1063</td>
<td>Passed</td>
<td>Repeal certain outdated and obsolete provisions regarding the Bureau of Information and Telecommunications.</td>
</tr>
<tr>
<td>South Dakota</td>
<td>2014</td>
<td>SB 49</td>
<td>Passed</td>
<td>Establish the fee charged by registers of deeds for documents filed by the Department of Transportation disposing of highway right-of-way that is no longer needed for highway purposes.</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>2014</td>
<td>HB 1314</td>
<td>Passed</td>
<td>Work to ensure better oversight of large telecommunications utility mergers and acquisitions.</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>2014</td>
<td>SB 258</td>
<td>Introduced</td>
<td>Permits the public utilities commission to authorize certain telephone companies to permanently discontinue service.</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>2013</td>
<td>HB 368</td>
<td>Passed</td>
<td>Changes certain provisions of the telecommunications planning and development advisory committee.</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>2012</td>
<td>HB 1305</td>
<td>Rejected</td>
<td>Reestablishing the exemption from property taxation for telecommunications poles</td>
</tr>
<tr>
<td>New Jersey</td>
<td>2012</td>
<td>SB 830</td>
<td>Rejected &amp; Reintroduced</td>
<td>Revises State regulation of competitive services provided by telecommunications and cable television companies</td>
</tr>
<tr>
<td>New Jersey</td>
<td>2011</td>
<td>A 3766</td>
<td>Rejected</td>
<td>Telecommunications deregulation bill.</td>
</tr>
<tr>
<td>New Jersey</td>
<td>2011</td>
<td>S 2664</td>
<td>Rejected</td>
<td>Telecommunications deregulation bill.</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2013</td>
<td>HB 1604</td>
<td>Introduced</td>
<td>Telecommunications deregulation bill, promotes power to telecommunication companies.</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2011</td>
<td>HB 1882</td>
<td>Rejected</td>
<td>Deregulates cell tower construction process.</td>
</tr>
<tr>
<td>North Carolina</td>
<td>2013</td>
<td>HB 664</td>
<td>Passed</td>
<td>Facilitate the deployment of mobile broadband and other enhanced wireless communications services by streamlining the processes used by state agencies.</td>
</tr>
<tr>
<td>North Carolina</td>
<td>2013</td>
<td>HB 390</td>
<td>Passed</td>
<td>Various changes to the laws relating to state information technology governance.</td>
</tr>
<tr>
<td>North Carolina</td>
<td>2011</td>
<td>HB 129</td>
<td>Passed</td>
<td>Prevents local government owned networks</td>
</tr>
<tr>
<td>State</td>
<td>Year</td>
<td>Bill Number</td>
<td>Status</td>
<td>Policy Change</td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
<td>-------------</td>
<td>----------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vermont</td>
<td>2014</td>
<td>HB 297</td>
<td>Passed</td>
<td>Telecom restructuring</td>
</tr>
<tr>
<td>Vermont</td>
<td>2014</td>
<td>S 248a</td>
<td>Passed</td>
<td>Cell tower application process streamlined</td>
</tr>
<tr>
<td>Vermont</td>
<td>2014</td>
<td>HB 693</td>
<td>Introduced</td>
<td>To keep the cell tower application process in place permanently (remove sunset)</td>
</tr>
<tr>
<td>Washington</td>
<td>2014</td>
<td>HB 2253</td>
<td>Passed</td>
<td>Makes it easier for workers to get an electrician’s license</td>
</tr>
<tr>
<td>Washington</td>
<td>2014</td>
<td>HB 2175</td>
<td>Passed</td>
<td>Improves wireless competition</td>
</tr>
<tr>
<td>Washington</td>
<td>2013</td>
<td>HB 1183</td>
<td>Passed</td>
<td>Alters the criteria which personal wireless service facilities must meet in order to be exempt from certain environmental requirements.</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>2014</td>
<td>HB 595</td>
<td>Passed</td>
<td>Deregulation of telecommunication services</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>2014</td>
<td>S 66.0404</td>
<td>Passed</td>
<td>Deregulation of cellular tower permit process</td>
</tr>
</tbody>
</table>

This policy matrix was developed from the legiscan.com search engine and database. The “policy change” column provides a brief interpretation of core areas affected by each legislative change.
Many of the states discussed in this report have legislation that opens state-owned lands and state-owned buildings up for wireless antenna and tower placement. This map, depicting such locations, was developed by the Indiana State Land Office. (2014). Available at: [http://www.in.gov/idoa/StateLandOffice/Relic/index.html](http://www.in.gov/idoa/StateLandOffice/Relic/index.html)
Figure 11:

OIT Map of Underserved Areas (Including wireline coverage)

Courtesy of the Indiana Office of Technology (IOT), the map listed above illustrates the served and underserved broadband areas throughout the state of Indiana. These served areas are by either wire line including fiber, cable, or DSL as well as wireless broadband. The blue shaded regions are those areas receiving broadband services, while the white patches on the map are those regions needing to accelerate the process of broadband deployment.  

As you can see in the map in Figure 12 above, the patches of white (depicting unserved broadband areas) have grown larger. That is because this map illustrates those areas served by only wireless broadband. To deploy wireless broadband throughout the state, it is important to highlight the key unserved areas on this map as well as the state-owned properties map above. In order to determine the best cell tower locations to facilitate wireless broadband expansion, it is important to evaluate and analyze the data from these maps.  

153 Ibid.
Figure 13:

Zayo Group, LLC Fiber Map with Identified Underserved Areas

This map was generated from the Zayo Group LLC website.\textsuperscript{154} The orange lines represent live, long haul lit fiber supported by Zayo Group, LLC. The dashed circles represent unserved or under-served area of the state.

Figure 14:

Indiana Fiber Network, LLC Fiber Map with Identified Underserved Areas

This map was generated from the Indiana Fiber Network (IFN) LLC website. The red lines represent live, long haul lit fiber supported by IFN. The dashed circles represent unserved or under-served area of the state.

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About the Digital Policy Institute

The Digital Policy Institute (DPI) is an independent, interdisciplinary research and policy development organization located at Ball State University in Muncie, IN. The DPI has served as a catalyst for research and education on digital media issues since 2004. DPI serves as a neutral entity to empower others to make educated decisions about digital issues. With many major research studies, frequent media appearances, countless national policy summits, seminars and webinars, and dozens of articles, blogs and op-ed pieces published, DPI’s presence has been established as one of the leading telecom policy catalysts outside the Washington beltway. It also is represented on a federal advisory committee created by the Federal Communications Commission. In this report, DPI presents a non-biased blueprint to expand broadband telecommunications in Indiana, particularly in rural areas.  

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He served for seven years as an attorney, specializing in communications policy proceedings, at the Federal Communications Commission (FCC) in Washington. He then became deputy general counsel of the National Association of Broadcasters (NAB) in Washington. During his 20

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For over four years he has represented the DPI on the FCC's Consumer Advisory Committee, including as chair of that federal advisory committee's former "Media Working Group” and now as co-chair of its “IP Transition Working Group.” He is a long-time board member of the Broadcast Education Association in Washington and became president of that national organization in April 2014.

Mr. Umansky is a frequent speaker at communications industry meetings and often is quoted on communications policy matters in industry and general press and also on radio and television programs. He is a graduate of Carleton College and the Washington University School of Law and is a member of the District of Columbia and Missouri bar associations.

NOTICE

The opinions, comments and recommendations expressed in this paper are those of the individual authors and the Digital Policy Institute (DPI) alone and do not necessarily represent the views of Ball State University. The Digital Policy Institute may be contacted at policy@digitalpolicyinstitute.org.