

Are We There Yet?

Affordability,
Adoption,
Equity,
and the
United States's
Universal
Broadband Goals

John B. Horrigan, PhD

Published by the Benton Institute for Broadband & Society
December 2023

Summary

How should broadband adoption, affordability, and equity impact the Federal Communications Commission (FCC)'s assessment of the availability of broadband for all Americans? A review of recent research indicates that it is not enough for networks to meet just certain deployment benchmarks. Consumer behavior is part of the picture: We cannot reach our universal broadband goals without widespread adoption, and we cannot achieve universal broadband adoption if service is not affordable. Evidence of extensive build-out of very-high-speed networks is a partial indicator of progress toward universal broadband goals. Whether service offerings are affordable and how adoption of them unfolds along lines of income, race, ethnicity, and geography are also important metrics.

Determining whether the United States is progressing toward its universal broadband goals means more than measuring the “where” and “how fast.” The FCC must also include metrics about affordability, adoption, and equity. With broadband adoption gaps still very real and the Affordable Connectivity Program that addresses some of them at risk of ending, the FCC should come to the determination that universal broadband goals are not being met. Specifically:

- Large gaps in broadband adoption between low- and upper-income households suggest that the cost of service, rather than just consumer preference, is inhibiting subscription. Survey research supports this idea, as national surveys of low-income households find that they most often identify cost of the monthly subscription as a reason they lack service.
- The FCC should recognize that, while pegging an affordability standard to a percentage of disposable household income has merit, other methods yield valuable insights. In particular, consumer surveys inquiring about ability to pay, experience with service disconnection, and other elements can help develop a comprehensive estimate of households' ability to pay for broadband and the tools that permit use of digital content.
- Employing consumer surveys to help determine affordability-of-services standards also contributes to understanding equity and inclusion issues, in that such surveys can examine the degree to which affordability varies by race, ethnicity, geography, and other demographic characteristics of interest.
- Because subscribing to both mobile and fixed services is the norm in the United States, affordability of service should encompass both service types.

Going forward, the FCC should take a systematic approach to tracking broadband affordability. This would include measuring:

- The price of service paid by consumer income category. This would include what households pay monthly for wireline service and wireless service.
- The speeds to which households subscribe by household income.
- The computing devices households have for internet access and the annual cost households pay for computer purchases and maintenance.
- Consistency of service in a given year, that is, whether a household lost service due to economic difficulties.
- Awareness and use of discount programs for service, e.g., the Affordable Connectivity Program and Lifeline.

To achieve this, the FCC could do for broadband adoption what it has done for measuring network speeds, namely, launch a Measuring Broadband Adoption in America initiative modeled on the “Measuring Broadband America” program. The goal would be to develop an approach to measuring adoption and affordability that has widespread acceptance among relevant stakeholders. Measuring Broadband Adoption in America would track change over time in adoption, affordability, and equity measures that are key to assessing progress toward universal broadband goals. By tracking measures of universal broadband beyond network deployment, the FCC can help ensure that there is equitable access to the internet’s benefits for all Americans.

These recommendations are based on an analysis that explores issues of broadband adoption, affordability, and equity. Research into these issues finds that:

1. **As many as half of low-income households are “subscription vulnerable.”** People living at or near the poverty line may be subject to service disconnection if their economic fortunes change. They express worry about service affordability.
2. **Low-income households do not enjoy the ubiquitous connectivity upon which their higher-income peers rely.** They are about half as likely as middle- and upper- income households to have both wireless and wireline means to go online.
3. **Limits on access have deleterious consequences for social and economic equity.** Service affordability—and its impact on adoption—contributes to foregone opportunities for jobs and health care services for low-income households. Internet access and use impacts outcomes in these and other realms.

Background

The Federal Communication Commission (FCC)'s Seventeenth Section 706 Report Notice of Inquiry asks whether advanced telecommunications capability (i.e., broadband) is being deployed in a reasonable and timely fashion in the United States. The FCC proposes to focus the inquiry on the universal service goals adopted by Congress in Section 706 of the Telecommunications Act of 1996: universal deployment, affordability, adoption, availability, and equitable access to broadband throughout the United States.

The FCC is positing that widespread deployment of high-speed networks is necessary—but not sufficient—for attaining universal service goals. Equitable uptake is an important objective, which in turn may hinge on service affordability and a household's decision to subscribe. This analysis explores data on service affordability as a way to understand broadband adoption patterns and equity in the deployment of broadband in the United States.

I. For Too Many People in the United States, Broadband Service Is Not Affordable

For sizable proportions of low-income U.S. households—as many as half—monthly internet service costs place a strain on their household budgets. People living at or near the poverty line may be subject to service disconnection if their economic fortunes change. They express worry about service affordability.

A. The Success of the Affordable Connectivity Program Points to Struggles for Low-Income Households

The rapid uptake of the Affordable Connectivity Program (ACP) serves as a strong indicator of how many low-income U.S. households struggle with broadband service affordability. Since the inception of the ACP (and its predecessor, the Emergency Broadband Benefit Program), some 22 million households have enrolled—meaning that **18 percent of all broadband-subscribing households** rely on the ACP to support their monthly service. Research shows that enrollment in the ACP has been particularly strong in high-poverty cities¹ and, when analyzing subscription rates at the five-digit zip code level, in places with a high share of households experiencing severe poverty.² Research also shows that the ACP has played an important role in sustaining gains in broadband adoption in recent years, especially in high-poverty counties.³

B. The “Subscription Vulnerable” Cannot Consistently Afford Broadband Service

Surveys investigating the affordability of monthly high-speed internet service show that sizable numbers of low-income households struggle to pay their internet service bill. A 2021 national survey of low-income households (i.e., those with annual incomes below \$50,000) classified nearly half (49 percent) as “subscription vulnerable,”⁴ meaning that broadband service is tenuous for them. For example, The Pew Research Center found in 2021 that, during the pandemic, 34 percent of low-income broadband users had trouble paying their internet bill.⁵ The EveryoneOn national survey of low-income households found that 18 percent suffered service disconnection during the pandemic. In the City of Philadelphia, about one-third (31 percent) of the lowest-income households lost service because of the pandemic's economic disruption.⁶

When asked directly what monthly price they would be able to pay for broadband, 40 percent of low-income households in the EveryoneOn survey say their preferred bill would be \$0. Another 22 percent would feel comfortable with a bill of \$25 per month, and 38 percent could handle entry-level plans in the range of \$55 per month.⁷

C. At Least 36 Million Households Find Broadband Service Prices Hard to Afford

The survey research documenting what people are able to pay for service suggests that millions of households below the median household income level find service unaffordable. Some 62 percent of households whose incomes are \$50,000 or less say they can only handle a bill of \$25 or less—which is below most entry-level service offers. Assuming that a lower number (40 percent) in the \$50,000-to-\$75,000 income range have this view means that, overall, 28 percent of U.S. households find broadband prices to be an affordability problem.⁸ That comes to approximately 36 million households.

II. Broadband Adoption Patterns

Since the FCC includes adoption as one of the universal service goals for broadband,⁹ the commission should include an evaluation of adoption patterns as a criterion by which the “reasonable and timely deployment of advanced telecommunications capability” is judged. In the Report on the Future of the Universal Service Fund, the FCC proposed to measure progress toward the universal adoption goal by examining:

1. **the rate at which people who have a service available to them subscribe to that service; and**
2. **whether universal service programs and congressionally appropriated programs—like the Affordable Connectivity Program, Lifeline, and E-Rate—are widely available and meet the broadband needs of eligible households and institutions.**

The preceding analysis shows that low-income households live in a very different world than upper-income households when it comes to adoption of tools to access the internet. They are about half as likely to have wireline broadband subscriptions at home. And, as analysis shows, low-income households are much less likely to have both wireline and wireless access to the internet, which has become standard for most middle-income and upper-income homes.

A. Broadband Adoption Patterns Track Income Levels

Given that the monthly cost of an internet connection is the main reason people choose not to subscribe to home broadband service,¹⁰ it is no surprise that broadband adoption patterns track household income levels. This shows up consistently in analysis of broadband adoption data.

The Lewis Latimer Plan, the National Urban League’s approach to digital equity, uses the \$50,000 annual income threshold as a dividing line for understanding broadband adoption gaps by income. Below the \$50,000 annual household income level, 2019 American Community Survey data show that 54 percent of households subscribe to home wireline broadband; above the middle-income level of \$75,000 in annual income, 84 percent have home wireline broadband subscriptions. The Pew

Research Center in 2021 found similar gaps, with 57 percent of households with annual incomes under \$30,000 having broadband subscriptions at home, compared with 93 percent for households with annual incomes over \$100,000.¹¹

B. Broadband Adoption Patterns Vary By Race, Ethnicity, and Geography

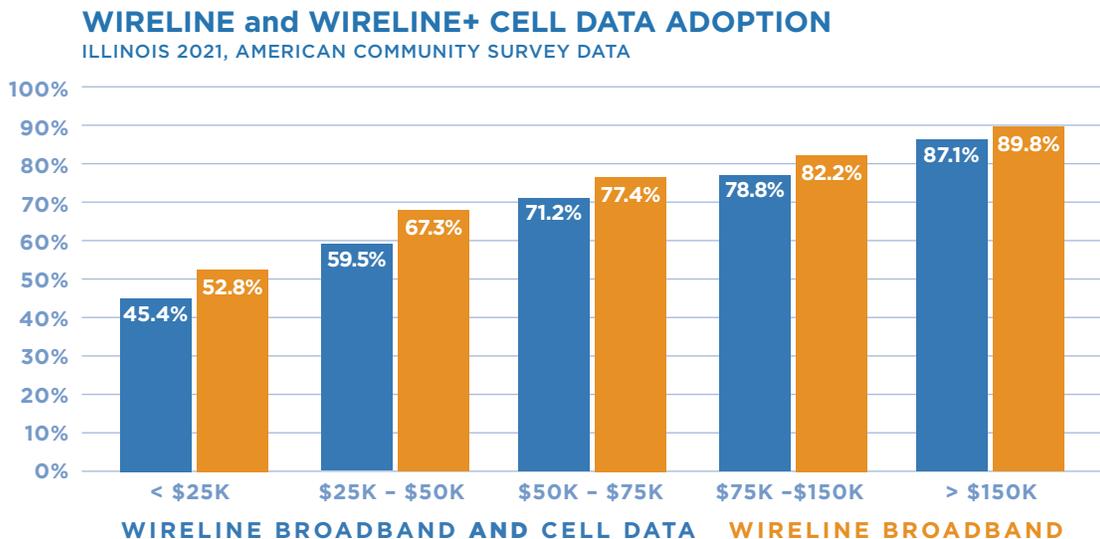
Rates of home broadband adoption also play out differently depending on race and ethnicity as well as geography. The Latimer plan notes that broadband adoption rates are 72 percent for white Americans, compared with 64 percent for non-white Hispanic/Latinx households, 61 percent for Black households, and 59 percent for Native Americans/Alaskan Natives.

As for rural Americans, a 2021 Pew Research Center survey found that 72 percent of rural residents had a home broadband subscription, compared with 79 percent of those living in suburban locations. Lower broadband adoption in rural areas is likely a function of household income and network quality. Poor network quality may make rural households reluctant to invest in a home subscription, and there is evidence that rural homes have access to networks with slower connection speeds than urban areas do.

It is also worth noting how race and rurality interact. The Joint Center for Political and Economic Studies in 2021 analyzed broadband adoption in 152 counties that make up the Black Rural South. In these counties, 38 percent of African American residents lacked home internet access, compared with 23 percent of white residents.¹²

C. Today’s Standard for Ubiquitous Connectivity Is Fixed + Mobile Broadband

Although rates of fixed broadband adoption are important metrics, the norm in America today (as the Benton Institute has noted before¹³) is for people to have both fixed service subscriptions at home and mobile broadband (or cellular data) subscriptions. The data on adoption patterns for both access tools are similar to those for wireline adoption. As an example of this, the chart below shows wireline broadband adoption rates along with adoption of both wireline and cellular data for Illinois for 2021. The gap between low-income and high-income Illinois residents for wireline and cellular data adoption is somewhat greater than that for wireline subscriptions alone.



The data, particularly broadband adoption patterns by income, show how affordability and adoption interact. At the same time, affordability of service is not the entire picture when looking into barriers to home broadband adoption. Research has consistently shown that, while service affordability is the chief reason respondents cite as to why they do not subscribe to home broadband service, other reasons are important.¹⁴ Concern about the privacy and security of personal data is a barrier for 42 percent of low-income households, and 47 percent of low-income households say the cost of a computer is too much. Some 55 percent of respondents say the monthly cost of an internet subscription is too expensive.

III. Interventions Are Needed to Ensure Equitable Access to Broadband

Interventions to address affordability issues for low-income households play a role in advancing equity in broadband adoption—not just along income categories but also for groups such as Blacks and Latinos that have traditionally trailed in broadband adoption. Appropriating additional funding for the ACP is, therefore, foundational to advancing digital equity and thus meeting our universal broadband goals.

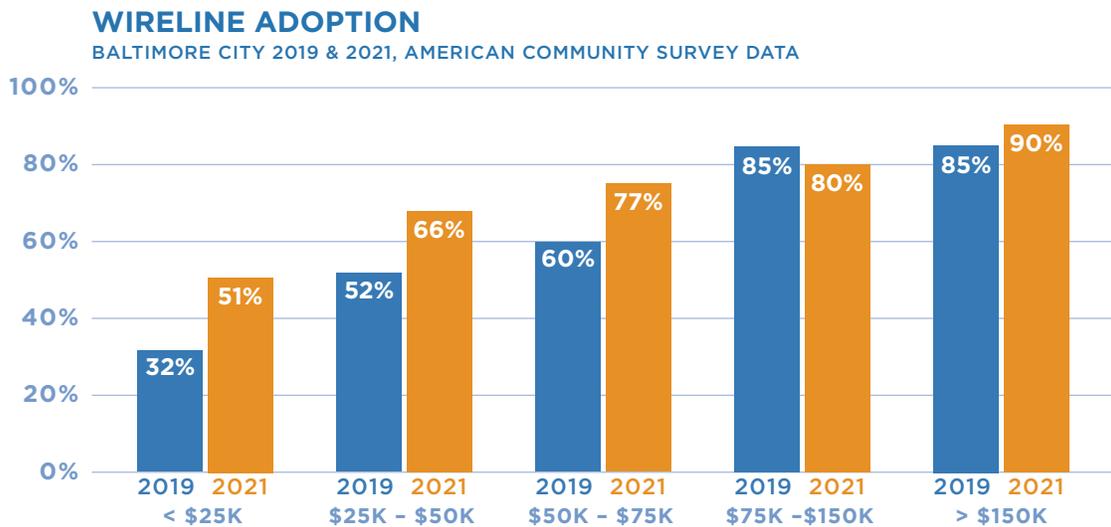
Different adoption patterns across income cohorts come as no surprise, and the resulting inequities can have clear impacts on people's lives: People living in connected homes have higher incomes, are more satisfied with their lives, feel they have better futures, and are more likely to receive health care treatment.

- Research has established a link between households that have used discount programs to get online and increases in household incomes.¹⁵ The “wired and hired” effect identifies a \$2,200 boost in household incomes, likely from employment effects associated with having service, in places that had access to Comcast Internet Essentials discounts, in contrast to places without discount offers available.
- The impact of discount programs also shows up in examining people's life satisfaction. Newly connected households who used discount programs to get online exhibited higher levels of satisfaction about their lives and future prospects.¹⁶ Since people's attitudes about their lives and aspirations typically translate into positive income impacts, the research suggests a link between home wireline access and getting ahead.
- Equity in the provision of telehealth services is another example of the difference internet access can make in people's lives. During the pandemic, Johns Hopkins University researchers found far greater reliance on audio-only telehealth visits than video visits among patients with low rates of access to and use of digital resources—such as those living in rural counties and predominantly Black neighborhoods in East and West Baltimore, as well as older adults.¹⁷ Telehealth also aids in the treatment of opioid abuse, as patients using telehealth services had a greater chance of retention in treatment programs than those not using telehealth in their treatment plan.¹⁸

The use of the internet for economic advancement and health care can change with adoption patterns. One way to illuminate this point is through a case study of adoption patterns in recent years in Baltimore. Traditionally near the top of lists of least-wired cities, Baltimore City experienced an increase in household wireline adoption from 59.4 percent in 2019 to 69.9 percent in 2021 (twice the rate of national growth in broadband in this period). This time frame coincided not just with the pandemic's emergence but also with efforts to address digital access gaps at a time when having internet service at home was urgent. The Emergency Broadband Benefit (EBB) Program came online, and enrollment among Baltimore City

residents was stronger than in many other cities.¹⁹ EBB enrollment, federal investments in economic recovery, and local philanthropic initiatives are likely reasons for Baltimore’s 10-point broadband adoption growth between 2019 and 2021.

Baltimore’s aggregate growth in broadband adoption is notable, but so are the population subgroups that experienced that growth. In a city that is majority Black, home wireline adoption grew from 47 percent in 2019 to 65 percent in 2021 for Black Baltimore City residents. The broadband boost was also significant for low-income residents from 2019 to 2021, as the following chart shows.



This is a focus on one city, but analysis of national data on wireline broadband adoption rates and ACP enrollment supports the notion that interventions to address affordability issues for low-income households make a difference in aggregate adoption figures.²⁰ The ACP has helped lock in the 2019-to-2021 gains in broadband adoption nationally, with particular impacts for very-low-income households and places with large shares of African American and Latin households.²¹

IV. Measuring American Broadband Adoption

Determining whether the United States is progressing toward its universal broadband goals means more than measuring the “where” and “how fast.” The FCC must also include metrics about affordability, adoption, and equity.

As the discussion above about internet adoption patterns and equity suggests, there are substantial variations in the means by which people go online. The variations are perhaps most striking along economic lines, but they also exist for racial and ethnic categories as well as geography.

The preceding analysis also illustrates the internet affordability problem from two perspectives. Survey research shows that nearly half of low-income households are “subscription vulnerable” in that service disconnection may be one missed paycheck away. The other side is the ACP—its quick embrace by more than 22 million households shows not just how the pandemic made home internet access more important than ever, but also how cost relief is so vital for many. With broadband adoption gaps still very real and the program that addresses some of them at risk of ending, the FCC should not come to the determination that universal broadband goals are being met.

Going forward, the FCC should take a systematic approach to tracking broadband affordability. This would include measuring:

- The price of service paid by consumer income category. This would include what households pay monthly for wireline service and wireless service.
- The speeds to which households subscribe by household income.
- The computing devices households have for internet access and the annual cost households pay for computer purchases and maintenance.
- Consistency of service in a given year, that is, whether a household lost service due to economic difficulties.
- Use and awareness of discount programs for service, e.g., the ACP and Lifeline.

This ambitious measurement agenda would likely build on other government efforts (e.g., the National Telecommunications and Information Administration's Internet Use Survey) but would require additional research approaches. To achieve this, the FCC could do for broadband adoption what it has done for measuring network speeds, namely, launch a Measuring Broadband Adoption in America initiative modeled on the commission's "Measuring Broadband America" program.²² The goal would be to develop an approach to measuring adoption and affordability that has widespread acceptance among relevant stakeholders and can track change over time in adoption, affordability, and equity measures that are key to assessing progress toward universal service goals.

Endnotes

- 1 John B. Horrigan, "It's No Time to Disarm in the War Against the Digital Divide." Benton Institute for Broadband & Society, November 29, 2022. Available online at: <https://www.benton.org/blog/its-no-time-disarm-war-against-digital-divide>
- 2 Horrigan, John B. and Whitacre, Brian and Galperin, Hernan, Understanding the Affordable Connectivity Program Enrollment: Drivers of Uptake (August 1, 2023). John B. Horrigan, Benton Institute, Brian Whitacre, Oklahoma State University, and Hernan Galperin, University of Southern California "Understanding the Affordable Connectivity Program Enrollment: Drivers of Uptake." Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4527856
- 3 John B. Horrigan, "Gain and Sustain: The Affordable Connectivity Program is Getting More People Online." Benton Institute, November 1, 2023. Available online at: <https://www.benton.org/blog/gain-and-sustain-affordable-connectivity-program-getting-more-people-online>
- 4 John B. Horrigan, "Affordability and the Digital Divide." EveryoneOn, December 2021. Available online at: <https://static1.squarespace.com/static/5aa8af1fc3c16a54bcbb0415/t/61ad7722de56262d89e76c94/1638758180025/EveryoneOn+Report+on+Affordability+%26+the+Digital+Divide+2021.pdf> (EveryoneOn national survey)
- 5 Colleen McClain, "34% of lower-income home broadband users have had trouble paying for their service amid COVID-19." Pew Research Center, June 3, 2021. Available online at: <https://www.pewresearch.org/short-reads/2021/06/03/34-of-lower-income-home-broadband-users-have-had-trouble-paying-for-their-service-amid-covid-19/>
- 6 "Connecting Philadelphia: 2021 Household Internet Assessment Survey." October 2021. Available online at: <https://www.phila.gov/media/20211019110414/Connecting-Philadelphia-2021-Household-Internet-Assessment-Survey.pdf>
- 7 John B. Horrigan, "Affordability and the Digital Divide." Op cit.
- 8 The 40% figure rests on the assumption that fewer households in the \$50,000 to \$75,000 annual income range will find a broadband bill of \$25 or less a struggle than the lowest income group (the 62% whose household incomes are less than \$50,000 and who say the internet is not affordable). Thus, 40% of \$50,000-\$75,000 households who find service unaffordable plus 62% of under \$50,000 income households comes to 36 million U.S. households who find service unaffordable.
- 9 Federal Communications Commission, Report on the Future of the Universal Service Fund (WC Docket No. 21-476 at ¶11) adopted August 12, 2022.
- 10 John B. Horrigan, "Affordability and the Digital Divide." Op cit.
- 11 Andrew Perrin, "Mobile Technology and Home Broadband 2021," Pew Research Center, June 3, 2021. Available online at: <https://www.pewresearch.org/internet/2021/06/03/mobile-technology-and-home-broadband-2021/>
- 12 Dominique Harrison, "Affordability & Availability: Expanding Broadband in the Black Rural South. October 6, 2021. Available online at: <https://jointcenter.org/affordability-availability-expanding-broadband-in-the-black-rural-south/>
- 13 John B. Horrigan, "Reimagining Lifeline: Universal Service, Affordability, and Connectivity." February 2022. Available online at: https://www.benton.org/sites/default/files/reimagininglifeline_final1_0.pdf
- 14 John B. Horrigan, "Affordability and the Digital Divide." Op cit.
- 15 Zuo, George W. 2021. "Wired and Hired: Employment Effects of Subsidized Broadband Internet for Low-Income Americans." American Economic Journal: Economic Policy, 13 (3): 447-82. DOI: 10.1257/pol.20190648
- 16 John B. Horrigan, "Access and Impacts: Exploring how internet access at home and online training shape people's online behavior and perspectives about their lives." Technology Policy Institute, May 2021. Available online at: <https://techpolicyinstitute.org/wp-content/uploads/2021/06/HorriganIE.pdf>
- 17 Helen K. Hughes, Brian W. Hasselfeld, Jeremy A. Greene, "Health Care Access on the Line — Audio- Only Visits and Digitally Inclusive Care." New England Journal of Medicine, November 17, 2022. Available online at: <https://www.nejm.org/doi/full/10.1056/NEJMp2118292>

- 18 Lindsey R. Hammerslag, Aimee Mack, Redonna K. Chandler. "Telemedicine Buprenorphine Initiation and Retention in Opioid Use Disorder Treatment for Medicaid Enrollees." JAMA Network Open. 2023;6(10):e2336914. Available online at: <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2810828>
- 19 John B. Horrigan, "Broadband Benefit has thus far enrolled just 1 in 12 eligible households, but places with low broadband adoption rates show better results." Benton Institute. July 15, 2021. Available online at: <https://www.benton.org/blog/emergency-broadband-benefit-has-thus-far-enrolled-just-1-12-eligible-households-places-low>
- 20 Horrigan, John B. and Whitacre, Brian and Galperin, Hernan, Understanding the Affordable Connectivity Program Enrollment: Drivers of Uptake, op. cit.
- 21 John B. Horrigan, "Gain and Sustain: The Affordable Connectivity Program is Getting More People Online." Op. cit.
- 22 Eric W. Burger, Padma Krishnaswamy, Henning Schulzrinne, "Measuring Broadband America: A Retrospective on Origins, Achievements, and Challenges." ACM SIGCOMM Computer Communication Review, Volume 53, Issue 2, April 2023. Available online at: <https://dl.acm.org/doi/10.1145/3610381.3610384>



John B. Horrigan is a Benton Senior Fellow. He is a national expert on technology adoption, digital inclusion, and evaluating the outcomes and impacts of programs designed to promote communications technology adoption and use. Horrigan served at the Federal Communications Commission as a member of the leadership team for the development of the National Broadband Plan. Additionally, as an Associate Director for Research at the Pew Research Center, he focused on libraries and their impact on communities, as well as technology adoption patterns and open government data.



Broadband Delivers Opportunities
and Strengthens Communities