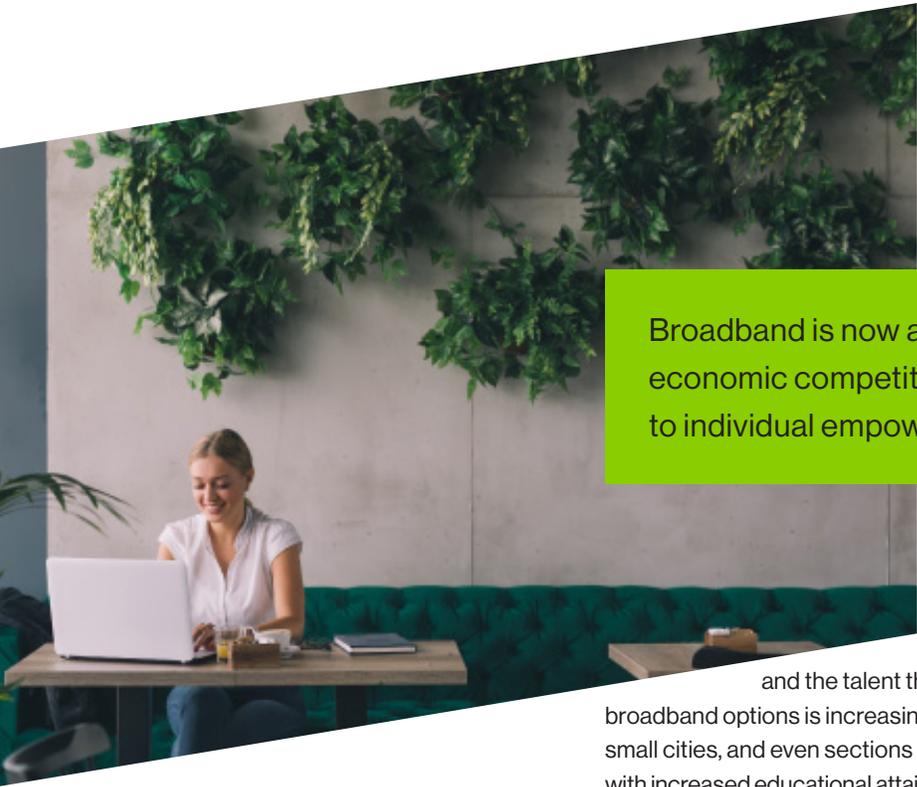


# Broadband

How governments can navigate technologies, infrastructure, and market players to create globally competitive, equitable service for residents and businesses





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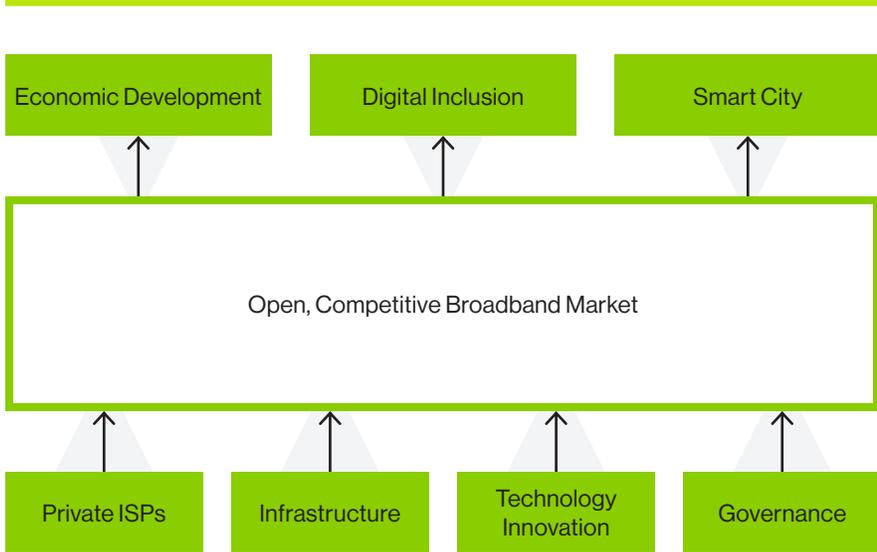
## Executive summary

Broadband is now a crucial aspect of productivity and economic competitiveness as well as an important tool to individual empowerment.

For cities and states, it drives economic growth and attracts 21st century innovative businesses and the talent they desire. On the flip side, the absence of quality broadband options is increasingly a non-starter for economic growth in rural areas, small cities, and even sections of global metropolises. Broadband access is associated with increased educational attainment and economic development. As Smart City applications are becoming increasingly attractive, the proliferation of technological devices relies on ubiquitous broadband.

Unfortunately, the U.S. has some of the worst broadband performance in the developed world, with poor access, few choices, high prices, and slow speeds. While certain locations may meet global standards in one of those categories; even the best U.S. broadband markets have substantial opportunity to improve. Forward-looking governments are tackling the issue of managing their broadband markets strategically—however even the most sophisticated city and state governments struggle to overcome the complexity and deliver superior outcomes for their residents.

Although broadband internet looks more and more like a public utility—an infrastructure-heavy service that meets a basic need for all residents and is associated with high barrier-to-entry infrastructure costs—it is not subject to the same kinds of public oversight and regulation as other utilities. The infrastructure is a patchwork of public and privately controlled assets. And due to combination of historical and federal rule-making history and federal rule-making, cities are rarely, if ever, able to deliver broadband outcomes by fiat. Cities must play a delicate role in partnering with internet carriers. If they push too hard, carriers will flee, give in too easily and get trapped in a slow, expensive internet for decades.



Playing this role correctly is essential to shaping how broadband is administered and what outcomes are delivered to residents and businesses. The broadband infrastructure is both publicly and privately controlled. It includes fiber-optic cable (fiber) conduit, right of way, light poles, small cells and more. Each city has a unique mix of ownership, franchise control, and desirability of locations. But the future of each of those technologies includes a role for fiber. Cities see the need to deliver fast, cost-effective broadband across their cities.

All of this is complicated further by the evolving technology of broadband delivery that can stymie even the most sophisticated and proactive of governments. The move towards mobile broadband, especially 5G, is predicted to reshape the landscape.

However, it will require the same core properties as previous broadband regimes—notably wide proliferation of fiber and competition. Rural broadband markets have low density of users, making different technologies and business models attractive. How heavily to invest in public Wi-Fi as an economic development/digital inclusion tool, while managing the risks of technological dead ends, is an open question for each location.

Ultimately, cities that succeed have strong internal governance. In the 21st century, broadband isn't just the purview of a single department. It requires coordinating streets, inspection, technical, legal, as well as the economic and service departments to manage both the sophisticated technology and the needs of diverse stakeholders.

## Broadband definitions and implications

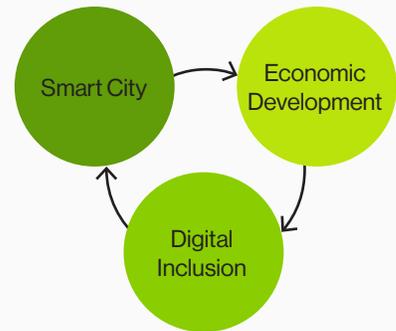
Broadband internet is simply internet that is deemed sufficiently fast to meet the needs of average users. The speeds themselves are subjective. Although other countries routinely deliver one gigabit per second or faster download speeds, the Federal Communications Commission (FCC) defines broadband as 25 megabits-per-second (mbps) for downloads and 3 mbps for uploads. The FCC definition has increased in speed several times in the last decade, driven by the acceleration of technology as well as consumer expectations. And there is every reason to believe that the acceptable speeds will increase again soon, as those same forces continue to accelerate.

**Does your institution have a clear understanding of broadband? Are you prepared to meet even faster minimum standards in the future?**

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# Broadband benefits

The stakes are high for getting broadband right. Academics and thought leaders agree that broadband delivers significant benefits today and will unlock even greater ones in the future. From increased educational attainment to improved delivery of city services, broadband access helps residents and businesses.



## ✓ Economic development

A common theme across every geography is that broadband is no longer optional. Businesses cannot locate in regions, or even buildings without the speeds and prices they need to function in a globalized world. Larger, more internet-dependent businesses may even require more intensive infrastructure including multiple providers and direct fiber connections to ensure uptime.

Locations across the country are working hard to develop the jobs and amenities to keep young people local and attract new talented individuals. The quality broadband options can be a make-or-break issue. Rural areas, small cities, and even sections of global metropolises are at risk of being left behind without acceptable broadband performance.

**Is broadband access preventing your location from unlocking good jobs?**

## ✓ Digital inclusion and education

Broadband has become inextricably embedded into modern life. More knowledge has migrated online, and jobs more frequently require internet

skills. This has led to rising concerns about the impacts on those who cannot participate fully in the internet-enabled world. They may not be able to find jobs, apply for benefits, or execute other necessary activities.

Those individuals that lack access to the internet are missing opportunities—the so-called digital divide between those that have internet, and those that do not. The most high-profile concern about digital inclusion that children have appropriate and equitable internet access. Research has shown improved educational outcomes associated with broadband access. Institutions, foundations, and others are deploying creative solutions to close this digital divide, with varying levels of success.

There is a crucial distinction between “internet access” (i.e., the technology/price option to use the internet exists) and “internet adoption” (i.e., the active use of the internet). Concerns about surveillance, especially for immigrants, have added new barriers to internet adoption in addition to the difficult ones related to cost and technological fluency. Savvy cities are tackling the digital divide from many angles—using

trusted partners in the community, public institutions like libraries, hardware lending, and free Wi-Fi programs to overcome concerns.

**How are you solving the digital divide? Are your approaches sufficient to the challenge?**

## ✓ Smart city applications

While the term “Smart City” has often been controlled by vendors, the promise of the concept is real. Technology and data have revamped private life. And they can deliver a host of new and innovative solutions to civic challenges. Costs savings, carbon and water savings, ease of reporting and communication, improved experience for residents and businesses. But governments are still working to determine exactly which solutions will work, and are mature enough to deploy, and how they can manage the cybersecurity and privacy risks.

**Are you preparing for a smart city future? Are you capturing smart city benefits? Do you understand the risks of your smart city solutions?**

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## Federal broadband legislative trends

Over the past few years, the legislation governing broadband have shifted substantially. During the Obama administration, federal courts ruled that high-speed internet service is a utility – a decision that affirmed the government’s view that broadband is as essential as the phone and power, and should be available to Americans. In doing so, they paved the way for more ubiquity of broadband, but also more oversight. However, that regime was never implemented.

Under the Trump administration, the federal landscape has shifted to favor carriers. The Federal Communications Commission (FCC) supports a policy

to preempt local government control of mounting assets for mobile broadband (e.g., light poles), guaranteeing carriers rapid access to the municipal assets at favorable rates. This policy is supposed to speed up the deployment of new technologies, such as 5G, but many cities are concerned that this will cost them control and leasing dollars, as well as hurt aesthetics.

The most high-profile discussions of this policy have been in U.S. megacities, where carriers are anxious to serve a dense landscape of valuable customers. Small city and rural broadband will likely be driven by different legislative trends. There

has been bipartisan signaling for some time about the interest in infrastructure spending for rural broadband. Federal infrastructure dollars could kick off a new series of exciting opportunities for broadband projects, the way the TARP funding did in the in late 2000s.

**Is your institution prepared to compete for federal dollars? Would a change of administration render your work to date moot?**

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## Broadband technology and market

Today, businesses and individuals have come to expect the rapid acceleration of technology performance generally (e.g., Moore’s Law) and broadband performance in particular.

Broadband is delivered via a series of physical technologies—fiber, switches, small cells, Wi-Fi routers, etc. In almost all contexts, this technology is owned and controlled by private firms. Most businesses and residents interact with telecommunications carriers (e.g., AT&T and Verizon) who control the so-called “last mile” connection to the user. Behind the scenes are the “backhaul” providers—specialized firms that provide wholesale data-interconnection services. And there are a series of new firms trying to develop the next

generation of internet delivery (e.g., fixed wireless, mesh networks, etc.).

These “backhaul” providers need access to government assets: the right to operate within the jurisdiction (via franchise agreements), the right of way to dig in the street (via permitting), and the right to mount hardware on desirable city-owned assets (e.g., poles and buildings). Governments engage and regulate these entities with a combination of regulatory “sticks” (e.g., laws, policies, and fees) and incentive “carrots” (e.g., monetary incentives, permits, and public/private partnerships) to shape the broadband market. Some cities are even using municipally-owned networks to compete with these carriers.

**Are you getting the best service you can for your residents? Do you understand the motivations of the firms that operate in your jurisdiction?**

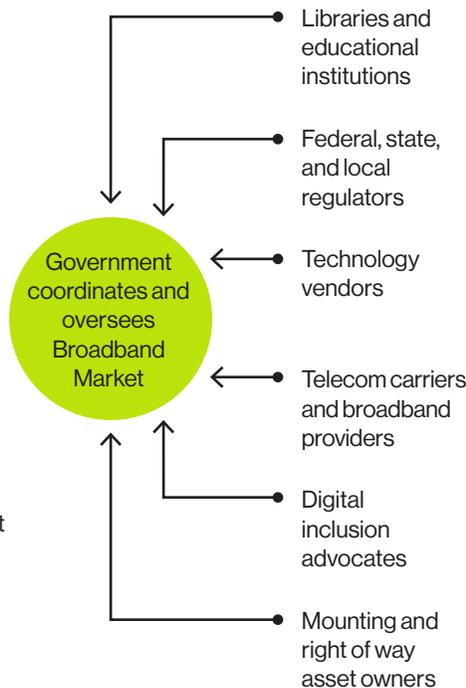
Fiber-optic cable is the backbone of the internet. It is infinitely fast and long-lasting. However, laying fiber, both in the streets and in buildings, is expensive and disruptive, particularly in dense, urban contexts. This gives a strong incumbent advantage to those that already own/control fiber networks. Cities often tackle this incumbent advantage by attempting to “level the playing field” with forms of two-tiered regulation (e.g., preferential access) to stimulate competition.

The expense of laying and maintaining fiber also creates financial incentives to develop other wireless technologies to transmit data (e.g., 5G). While there is substantial innovation in delivery of wireless broadband over short distances, fiber remains by far the leader in moving large volumes of data over large distances. Therefore, all of these technologies must eventually “come to ground” to move data via fiber. This reaffirms fiber’s place as a future-proof broadband investment.

Cities also need to consider who controls the fiber. Even a fiber-rich environment, if it is controlled by a monopolistic actor who can throttle speeds without losing market share, can deliver suboptimal outcomes. The end goal is ubiquitous, accessible fiber that allows for competitive access by broadband providers. This will create a proliferation of offerings and drive competition on key service aspects like access, speed, price, and reliability.

**How are you enabling fiber proliferation? Is the fiber controlled solely by carriers? Is the full speed of the fiber being offered to residents and businesses?**

The traditional broadband connection is a so-called “wired” connection, where the physical cable (or Wi-Fi) connects



to the user. This allows for maximum speeds and stability. It remains the gold standard of broadband. Wired connections are also frequently “un-metered,” meaning that the amount of internet use does not affect the price.

With the proliferation of smartphones, mobile broadband (e.g., LTE) is becoming increasingly important in the broadband landscape. It is currently notably slower than wired internet, and is also a “metered” technology—where

users are charged by the volume of data. However, there are beginning debates about whether mobile broadband will soon be sufficient to meet the public’s baseline expectations associated with broadband. 5G is cited by some sources as the technology that may close the gap between wired and wireless broadband performance.

5G is a highly anticipated technology, accompanied by a lot of vendor-driven hype, as well as confusion and uncertainty. 5G is simply faster mobile broadband speeds than are currently available today, promising connections up to one gigabit per second. According to proponents, smartphones will soon be able to upload and download data at speeds similar to current top-of-the-line wired connections. While it is likely that wired connections will “one-up” mobile again in terms of speeds offered, a step-change increase in mobile broadband speeds will have important implications. Vendors, governments, and experts are scrambling to understand what will be possible with this new generation of wireless speeds—new opportunities will create new winners and losers.

**Is your institution prepared for 5G? What possibilities will it unlock? What do you think your institution’s role is to make 5G possible?**

## Government approaches to the broadband market

The end goal of equitable, reliable broadband reaching all residents can only be achieved by ubiquitous, accessible fiber that allows for competitive access by broadband providers. This will create a proliferation

of offerings and drive competition on key service aspects like access, speed, price, and reliability. But each city needs to use its unique context and strengths to reach that common end state. While a massive, municipally controlled fiber

build-out will deliver universal fiber access and allow the city to control key service outputs that is not within the reach of all cities. Strategic cities are solving this challenge by building off their current strengths to improve broadband

in their city. In some cities like Chattanooga or Lafayette, a municipal model is logistically manageable and palatable to the populace. In London, a formerly centralized system telecom created a platform for access to a common network. In others cities, they are combining existing fiber (e.g., subways, disaster resilience, and schools) to create the beginnings of an open network.



## How a proactive government can move forward

**Governments can improve their broadband performance by advancing a few straight-forward topics.**

- 1 Focus on market conditions:** The outputs of the broadband—access, speed, price—are the most visible aspects of broadband. But broadband outputs are very difficult to regulate. There are roles for end-of-pipe solutions, particularly around digital inclusion. But demanding certain prices or speeds can drive away carriers or quickly become obsolete as expectations change. Location of infrastructure, the market dynamics with private actors, the regulatory regime are all crucial inputs to shaping the broadband market outputs. When governments manage the whole broadband ecosystem, they can create a dynamic market that can thrive over time.
- 2 Strengthen governance:** Managing broadband successfully requires collaboration between many relevant departments and stakeholders. Some

stakeholders control crucial right of way and mounting assets. Others are focused on education and inclusion. While still others look at the economy and budget. Cities that succeed understand their role and the players involved, and are cutting across these divisions to deliver holistic, future-proof strategies.

- 3 Government as a platform:** Governments control a series of key assets required for broadband proliferation. Right of way, physical assets (such as streets, light poles), and government buildings as all valuable and necessary. Governments can make these available under the right conditions to partners who can deploy appropriate broadband hardware. Savvy use of city assets to facilitate innovation, competition, and improved service delivery
- 4 Future-proof investments:** In a rapidly changing technology landscape, governments need

to be sure that their approach is nimble and flexible. The landscape is littered with obsolete government technology. Governments need to make investments they know can handle the uncertainty of the future, while generally shifting the burden of selecting and investing in specific technology to the private sector whenever possible.

- 5 Additional focus on those most in need:** Even well-managed, dynamic markets will not deliver all the broadband needs of the most vulnerable residents. Leaders are devoting additional focus and resources to multi-pronged solutions. They are tackling language, culture, trust, hardware, technological fluency, perceived relevance, and ability to pay—in addition to the classic topic of internet accessibility. A city that measures the adoption, rather than access, by vulnerable populations can ensure they know these efforts are moving towards their desired results.

## Why Guidehouse

Guidehouse has partnered on broadband topics with governments including the largest cities in the U.S. to small cities and rural communities, market players and non-profits. We deliver market and infrastructure analytics, broadband strategy, digital inclusion approaches, negotiation strategies, and implementation support including RFP management, asset leasing, and program management.

Following our recent merger with Navigant, we proudly serve our government clients through our unified commitment to their success, providing them with greater focus and innovative solutions. Our firm brings together a multitude of professionals to offer capabilities for the Federal, State and Local governments, and multilateral organizations. Our unwavering passion for excellence influences all aspects of our business from our core competencies of leadership, quality, and ethical behavior to our cutting-edge, customized solutions.

Our Vision at Guidehouse is to earn a seat at the table for our clients' most complex issues, creating limitless value and meaningful impact for societies and our world. We are committed to leading the industry in driving effectiveness across government agencies.

