

# Comprehensive Broadband Municipal Strategy Report

University of Texas at Dallas  
Master of Public Affairs  
Spring 2024 Capstone



- **This report contains:**
- Synthesized case studies
  - Funding Analysis
  - Stakeholder Interviews
  - Strategic Recommendations



## Capstone Objective

For our capstone project, our team aimed to develop a detailed research report that outlines best practices by conducting a thorough funding analysis, and synthesizing diverse case studies on municipal broadband strategies. This endeavor builds upon prior research efforts and includes a qualitative stakeholder analysis, focusing on the efforts, successes, challenges, and perspectives of broadband initiatives in the Dallas-Fort Worth Metroplex. The insights derived from this stakeholder analysis are integrated with knowledge obtained from the literature review of various case studies and the current funding opportunities identified through our funding analysis. This comprehensive approach enables us to offer nuanced recommendations and strategies for enhancing municipal broadband deployment and adoption, tailored to communities' unique needs and circumstances with the Dallas-Fort Worth area.



Joshua Blubaugh  
MPA, MPP  
joshuablubaugh@yahoo.com



Willia Jones  
MPA  
willialjones@gmail.com



Giwon Heo  
MPA  
phi129@naver.com

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# EXECUTIVE SUMMARY

In today's digital age, equitable access to broadband is a fundamental pillar of modern society, critical for socio-economic advancement. This report from the University of Texas at Dallas, conducted as a part of our Spring 2024 Capstone, explores the intricate landscape of municipal broadband within the Dallas-Fort Worth Metroplex, aiming to highlight best practices, challenges, and strategic recommendations for enhancing broadband deployment and adoption.

Our comprehensive analysis includes a review of existing literature, a funding analysis identifying current opportunities, and a qualitative stakeholder analysis to understand the efforts, successes, and challenges faced by various broadband initiatives. The core of our findings is synthesized from diverse case studies and stakeholder perspectives, providing a deep insight into the regulatory, economic, and social dynamics shaping broadband access in urban and rural settings.

Key challenges identified include the economic burden of infrastructure in rural areas, regulatory hurdles that limit municipal interventions, and the socio-economic disparities exacerbated by the digital divide. Additionally, monopolistic control by incumbent internet service providers significantly stifles competition and innovation within the broadband market. These monopolies often result in higher prices and lower quality of service. Our strategic recommendations focus on leveraging municipal capabilities such as comprehensive urban and rural planning, enhancing public-private partnerships, and advocating for policy reforms that facilitate broadband expansion and inclusivity. Furthermore, apartment buildings, where the affordability gap is significantly pronounced, are recommended as a targeted demographic for stakeholders to achieve the most effectiveness.

This report serves as a vital resource for policymakers, stakeholders, and community leaders, offering actionable insights to foster a connected community where digital access drives economic vitality, educational opportunities, healthcare access, and civic engagement in the Dallas-Fort Worth area and beyond.

We want to thank Connor Sadro from the North Central Texas Council of Governments and Jennifer Sanders and Yumna Bham of the North Texas Innovation Alliance for their partnership with this report. We also want to thank our professor and Program Director, Dr. James Harrington, for his support and counsel while conducting our research. This appreciation extends to the stakeholders whom we had the opportunity to interview. Their insights have enriched our analysis and significantly shaped our understanding and strategic recommendations.

# INTRODUCTION AND BACKGROUND

In an age where digital connectivity is as critical as water and electricity for socio-economic advancement, broadband access emerges not merely as a utility but as a fundamental pillar of modern society. This report embarks on an exploratory study into the intricate landscape of municipal broadband, aiming to illuminate the pathways and pitfalls that lie in enhancing broadband deployment and adoption in alignment with the unique dynamics of community needs in the Dallas-Fort Worth metroplex.

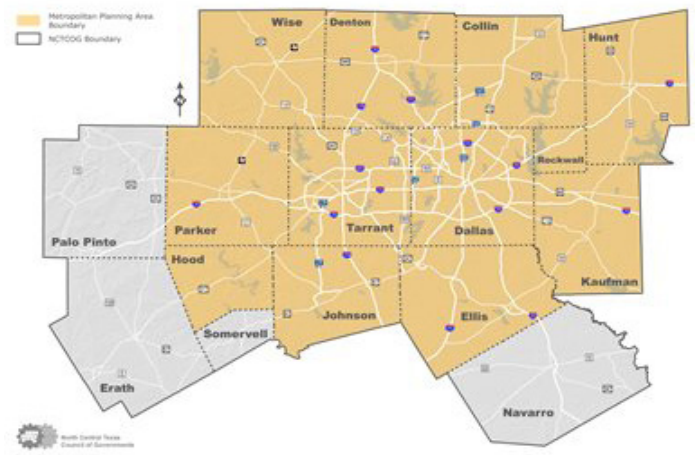
The need for broadband connectivity is increasingly urgent in our digital-centric global economy. From e-commerce and remote education to telehealth services and digital governance, the fabric of daily life is interwoven with the threads of digital interactions. However, this transition to a digital society underscores a stark reality: the digital divide. This divide, a multifaceted chasm marked by disparities in broadband access, mirrors existing socio-economic inequalities and actively contributes to their perpetuation. It hinders the growth, resilience, and competitiveness of communities stranded on the wrong side of this divide. Our investigation is rooted in recognizing broadband as a critical infrastructure essential for fostering economic vitality, educational opportunities, healthcare access, and civic engagement. Small to Medium-sized Enterprises (SMEs), the backbone of the local economy, depend heavily on reliable broadband for operations, underscoring the need for robust broadband services. Yet, the quest for universal broadband access encounters diverse challenges, from the daunting economics of infrastructure deployment in rural locales to the regulatory mazes that stymie municipal broadband initiatives.

Central to our discourse is exploring the digital divide's impact across various communities, focusing on the unique challenges faced in rural versus urban settings. Rural areas grapple with the economic calculus of low population densities against high infrastructural costs. At the same time, urban regions confront their own obstacles, including regulatory constraints and the competitive dynamics of Internet Service Providers (ISPs). Our analysis extends to the innovative responses by municipalities to navigate

state-imposed restrictions, leveraging assets like Municipal Electric Utilities (MEUs) to foster competitive environments and drive broadband expansion. Amidst these explorations, the debate around municipal broadband unfolds, revealing a spectrum of perspectives. Advocates hail it as a crucial mechanism to deliver essential services to underserved areas, challenging the status quo of private provision. Critics, however, caution against potential pitfalls, including governmental overreach and financial sustainability concerns. This report delves into these dialogues, seeking to distill insights and strategies that resonate with the aspirations for digital equity and regional development.

## North Central Texas Council of Governments (NCTCOG)

North Central Texas Council of Governments (NCTCOG) is a voluntary association of local governments established to assist in regional planning. The image below indicates the entire NCTCOG region, with the shaded yellow area indicating the metropolitan planning boundary.



Broadband access is particularly critical for the NCTCOG region, which encompasses a diverse mix of urban, suburban, and rural areas, each facing distinct challenges in broadband deployment and adoption. The NCTCOG region includes major urban centers in Dallas and Fort Worth, alongside numerous smaller municipalities and rural areas spread across its membership. This diversity means that while some

parts of the region may enjoy robust broadband infrastructure and high levels of connectivity, other areas, especially rural ones, may suffer from inadequate access, thereby exacerbating the digital divide.

The significance of addressing broadband issues for NCTCOG lies in the fundamental role that connectivity plays in regional development. For urban areas within NCTCOG, enhancing broadband infrastructure is essential to support the growing demands of a dense population, including businesses, education institutions, and healthcare services, which increasingly rely on digital platforms. In suburban and rural areas, the challenge is not only to build out necessary infrastructure but also to ensure that it is affordable and accessible to all residents, thereby fostering inclusivity and preventing any parts of the region from being left behind in the digital era.

Moreover, the counties and municipalities that make up the NCTCOG—ranging from densely populated counties like Dallas and Tarrant to more rural ones like Ellis and Kaufman—reflect the broader national struggle with the digital divide but within a more concentrated geographic area. This makes the region an important focal point for initiatives aimed at overcoming barriers to broadband access and utilization. The diversity within the NCTCOG region underscores the need for tailored broadband strategies that consider the specific needs and circumstances of its member governments.

In fact, our investigation reveals significant disparities in broadband access across the NCTCOG region, emphasizing the need for tailored solutions to bridge the digital divide. Rural areas within the region struggle with the economic feasibility of broadband infrastructure due to low population densities and high deployment costs. In contrast, urban areas face challenges related to regulatory constraints and monopolistic control of the market by private ISPs. Stakeholder feedback underscores a critical demand for policy interventions that facilitate easier market entry and foster a competitive environment for ISPs, thereby improving service quality and affordability.

## **Our Strategy**

This report aims to cast a comprehensive light on the municipal broadband landscape, drawing

from an extensive literature review, case studies, and stakeholder analyses. It seeks to unravel the complexities of the digital divide, digital readiness, and their socio-economic ramifications, particularly within the regulatory milieu of Texas. By examining the legislative barriers and the pioneering efforts of cities like Mont Belvieu and Brownsville, alongside the implications of broader initiatives like Google Fiber, this study aspires to enrich the dialogue on municipal broadband deployment. This report endeavors to offer actionable insights by threading together the narratives of diverse municipalities, from the regulatory hurdles they navigate to the innovative solutions they deploy. These insights aim to guide regional broadband strategies, fostering an environment where digital access and equity are not lofty ideals but tangible realities for the communities within the North Central Texas Council of Governments (NCTCOG) region and beyond.

Through this exploration, the report underscores the indispensable role of broadband connectivity in catalyzing economic development, enhancing educational access, improving healthcare outcomes, and enriching civic life. In doing so, it lays the groundwork for informed decision-making and strategic action that can bridge the digital divide, ensuring that the benefits of the digital age are accessible to all, irrespective of geographic, demographic, or socio-economic distinctions.

# LITERATURE REVIEW

Exploring the digital divide, digital readiness, and its socioeconomic impact has significantly enriched our understanding of the challenges and opportunities within the municipal broadband landscape. Scholars have highlighted the persistent digital divide among low-income families since the 1990s, emphasizing the correlation between limited Internet access, digital readiness, and social inequalities. This sets the stage for our analysis of Texas’s regulatory environment and its implications for municipal broadband deployment strategies. Texas and fifteen other states impose restrictions limiting public entities’ involvement in delivering broadband services. These legislative barriers significantly influence municipal broadband deployment plans by delineating the scope of activities municipalities can undertake in broadband delivery. Central to understanding Texas’s regulatory landscape is the Texas Utilities Code, § 54.201, a pivotal piece of legislation that governs municipal broadband initiatives within the state.

Enacted in September of 1997, the Texas Utilities Code, § 54.201, specifically bars municipalities from directly offering certain types of telecommunications services to the public or indirectly through a private

telecommunications company. This regulation presents a considerable hurdle for cities and towns eager to improve local broadband access and bridge the digital divide within their communities. However, the law does provide limited leeway for communities that lack any private telecom company offering broadband services, allowing for municipal involvement under certain conditions. Despite these stringent restrictions, several cities in Texas have creatively navigated these laws to advance their broadband initiatives. Mont Belvieu serves as a prominent example of this ingenuity. In 2016, the city built a fiber network to offer broadband services to its residents, circumventing state restrictions by leveraging a local district court’s decision. The court ruled that Mont Belvieu possessed the authority to provide Internet service because, under the state’s legal framework, the Internet does not qualify as a telecommunication service as defined by the relevant statutes. This ruling marked a significant milestone, highlighting a path forward for municipal broadband projects under Texas’s restrictive regulatory environment.

Further developments in Texas’s broadband policy landscape occurred in 2019 when Governor Greg Abbott signed legislation that permitted electric cooperatives to offer broadband services to their customers. This legislative change represented a step towards expanding broadband access in underserved areas. However, the state’s regulatory posture continues to actively discourage electric cooperatives from engaging in broadband delivery in many instances, reflecting the ongoing challenges and complexities of enhancing broadband access under Texas’s regulatory framework (BroadbandNow).

Outside of Texas’s experience, the broader examination

## Common Terms and Definitions

### **Broadband**

Defined as a high-speed internet service that provides users with fast, continuous access to the internet. Instead of one technology, the FCC defines it as internet service with a minimum download speed of 25 megabits per second (Mbps) and a minimum upload speed of 3 Mbps.

### **Digital Divide**

The gap between individuals, households, businesses, and geographic areas at different socioeconomic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities.

### **Digital Readiness**

The measure of one’s capacity to engage with digital technologies. This includes skills, access to technology, and attitudes towards technology’s role in one’s life.

### **Digital Redlining**

The practice where services (especially internet access) are not provided or are provided at reduced quality to certain areas, often based on the racial or economic makeup of those areas.

### **Internet Service Provider (ISP) Monopoly**

A market condition where a single provider or a small number of large providers dominate the broadband service market, potentially leading to higher prices and lower service quality for consumers.

of the digital divide in Appalachia and other regions reveals a multifaceted challenge encompassing accessibility, digital readiness, and socioeconomic disparities. The digital divide's persistence, particularly in economically disadvantaged and rural areas, underscores the critical need for innovative municipal broadband deployment strategies. These strategies, ranging from PPPs to the utilization of public utility networks, demonstrate the potential of municipal broadband to bridge digital divides and enhance community connectivity.

### Literature Review Methodology

The selection criteria for our case studies were meticulously developed to ensure a comprehensive understanding of the diverse strategies municipalities employ to bridge the digital divide. This was achieved through an extensive literature review, employing a keyword search tailored to uncover broadband deployment initiatives. Our initial phase involved sourcing, reading, annotating, and summarizing relevant literature to gain a broad overview of the field. Through this process, we aimed to identify the strategies employed and the successes, challenges, and lessons learned from various broadband initiatives. Upon reviewing our initial findings, we identified gaps in the literature that necessitated further exploration. We noticed no case studies on Mont Belvieu, a municipality that had taken an innovative approach to establishing a municipal ISP despite strict state restrictions. This information gap led us to a case study on Brownsville, Texas, which modeled its public-private partnership based on the legislative adaptation in Mont Belvieu. This gave us valuable insights into the approach of Mont Belvieu indirectly and allowed us further insight into another strategy from a city in Texas.

The case studies of Chattanooga, Tennessee, and LaGrange, Georgia, alongside the innovative approaches in Brownsville, Texas, and the transformative impact of Google Fiber in Kansas City, Kansas, and Austin, Texas, further contribute to our understanding of municipal broadband deployment. These examples highlight the diverse strategies municipalities employ to address digital divides, navigate legislative and regulatory hurdles, and leverage partnerships and technological advancements for improved

broadband access and socioeconomic outcomes. Moreover, as discussed through various models and case studies, the economic and policy implications of municipal broadband projects provide invaluable insights into the challenges and opportunities associated with municipal broadband initiatives. These analyses emphasize the importance of adaptive strategy development, stakeholder collaboration, and innovative financing and partnership models in achieving project viability and sustainability within the complex regulatory and competitive landscapes.

Our objective throughout this process was to outline the various methods—ranging from municipal ISPs to PPPs and other innovative approaches—utilized by municipalities to address and overcome the digital divide. Each case study was chosen based on its ability to provide insights into different aspects of broadband deployment, including strategy formulation, stakeholder engagement, legislative navigation, and the overall impact on community digital inclusion. From the comprehensive review and analysis of these case studies, we derived relevant lessons that could be applied within the NCTCOG context. These lessons encompass the importance of adaptive strategy development in response to regulatory landscapes, the value of stakeholder collaboration in enhancing project legitimacy and community buy-in, and the critical role of innovative financing and partnership models in achieving project viability and sustainability.



## The Digital Divide, Digital Readiness, and Its Socioeconomic Impact

Since the 1990s, scholars have highlighted the digital divide among low-income families, with limited access to the Internet and technology correlating with social inequalities (Katz & Gonzalez 2016). This gap between demographics and regions with limited or no access to modern information and communication technology is emulated in many ways and is well documented in academic and policy literature. In 2014, Horrigan discussed the inadequate state of digital readiness among individuals regarding their understanding of Internet-related terminology and confidence in using technology (i.e., computers) to search for information online. He made a critical observation about the efforts to address the digital divide, pointing out an overlap between digital accessibility and digital readiness. Specifically, some Americans have access to internet infrastructure but lack the ability to utilize it, which reduces the potential benefits of broadband technology.

LaRose et al. (2010) argues that in the United States, the lower rate of broadband availability is often due to economic factors that make it unprofitable to provide service to areas with low population density, which leads to higher costs per new subscribers or to areas with residents who have lower disposable incomes. Additionally, the market can fail to supply an adequate level of broadband when the demand isn't high enough to attract private companies. This lack of demand might stem from several issues, such as stakeholders misinterpreting market needs, coordination issues among potential user groups, or failing to appreciate broadband's benefits fully. These market failures suggest that there may be strong economic arguments for public investments in infrastructure. Moreover, broadband's potential to benefit other sectors through innovation means its underemployment can lead to broader systemic failures, further justifying the need for public intervention in network development. Interventions are crucial to prevent a new form of discrimination known as "digital redlining," where the private sector

overlooks communities in dire need of adequate broadband infrastructure. This situation exacerbates social inequalities by denying essential digital access to already marginalized groups. Consequently, addressing the digital divide requires a multifaceted approach that involves infrastructure development and enhancing digital literacy and readiness among underprivileged populations to address Horrigan's observation and ensure they can fully participate in the digital world.

While promoting free-market competition among broadband services remains a key goal for local economies, the reality shows that many private ISPs have secured monopolies by investing in exclusive Right-of-Way infrastructure (Sadro 2023). Once an ISP establishes such a monopoly, it becomes exceedingly difficult for new entrants to break into the market, as they can't afford to develop competing infrastructure at a similar scale. Given the detailed exploration of the monopolistic tendencies within the broadband industry and the subsequent barriers to market entry for new ISPs, pertinent criticism arises from such monopolies' economic and social ramifications. The exclusive control by private ISPs stifles competition and restricts innovation within the sector. By monopolizing the broadband infrastructure, these entities effectively limit consumer choices and inflate prices, undermining the principle of free-market competition. Furthermore, the monopolistic grip on broadband services exacerbates the digital divide, leaving economically disadvantaged and rural communities at a significant disadvantage. The lack of competition disincentivizes investment in underserved areas, perpetuating a cycle of inequality in digital access. This scenario underscores the urgent need for regulatory interventions and policy reforms aimed at dismantling these monopolies and fostering a truly competitive broadband market that serves the public interest, ensuring equitable access to high-speed internet across all communities.

This divide is particularly evident in the Appalachian region, where industry disinvestment, particularly coal mining, has drastically diminished economic opportunities. This reduction in economic vitality directly contributes to a scarcity of critical infrastructure and government services. Traditionally, this is evident in the inadequacies of roads and schools, but now it extends to broadband or high-speed internet,

perpetuating a concerning trend of decline and disparity.

### Case Study: Appalachia

Research by McDaniels (2022) highlights the significant disparity in broadband access across Appalachia, with an average of 78.3% of households connected, dropping to below 60% in more rural counties. This gap is attributed to the high costs of rural infrastructure development and monopolistic market conditions, which exacerbate access issues for economically disadvantaged and minority populations. The absence of robust broadband infrastructure has severe implications for education and healthcare access, directly affecting socioeconomic outcomes in these communities. This situation significantly undermines educational quality in these regions. The challenge of securing internet access results in a lower completion rate of homework assignments, declining grades, and, ultimately, a reduced likelihood of students pursuing education beyond high school. McDaniels further emphasizes the critical role of broadband access in ensuring quality healthcare. The availability of telehealth services has become a crucial lifeline for many rural Appalachians who face difficulty accessing medical professionals due to their remote locations.

McDaniels critiques the monopolistic dominance of private Internet Service Providers (ISPs) in these regions, advocating for state and local government interventions to mitigate these monopolies. However, existing state laws often restrict or outright impede the development of municipal broadband networks, calling for a federal response to preempt such regulations. This is a common theme throughout the literature and is a concern we address comprehensively, as localities have found innovative maneuvers to overcome these obstacles. The case study advocates for adopting PPPs and using public utility networks as strategic avenues for expanding broadband access in Appalachia. PPPs could capitalize on the expertise and resources of the private sector while alleviating the financial commitments required from the public sector.

Similarly, converting existing public utility infrastructures for broadband is an economically viable option for extending services, especially in rural

areas with pre-existing infrastructure. Chattanooga, Tennessee, exemplifies the potential of municipal broadband to drive local economic development, with its public utility, EPB, utilizing its fiber network to deliver high-speed internet services. This endeavor has contributed to job creation and the attraction of significant corporate investments to the region. The broadband initiative in Chattanooga is frequently highlighted as a successful example of a well-executed municipal project, even in economic and academic journals that often critique various municipal broadband efforts developed in recent years. A crucial component of this strategy that McDaniels advocates for is the appeal for federal legislation aimed at facilitating such initiatives by counteracting restrictive state laws. Enabling these expansion strategies is vital for bridging the digital divide in Appalachia, he contends, and it reflects the broader challenges faced by the United States in ensuring broadband access, underscoring the imperative for inventive solutions that leverage the strengths of both the public and private sectors towards achieving universal digital inclusion.

*"More than 20 percent of households in Appalachia are connected, dropping to 40% in rural counties...attributed to high infrastructure costs..."*

Despite criticisms that government-led broadband initiatives might deter competition and result in inefficient resource use, McDaniels argues that municipal broadband represents one of the few feasible solutions for addressing the digital divide in many rural areas. This stance emphasizes the need for a nuanced approach to broadband expansion in Appalachia, incorporating municipal networks, PPPs, and the innovative application of public utilities. These challenges of supporting communities that have been marginalized or neglected in the digital age, including local initiatives aimed at resolution, restrictive state legislation, and the complex landscape of federal funding, as briefly outlined above, are comprehensively examined in the subsequent section.

Neuchterlein and Shelanski's (2022) core argument emphasizes that while speed, scale, and efficiency

are critical, they do not inherently ensure equity. They argue that the government’s role becomes crucial in addressing the digital divides that market forces alone cannot bridge—particularly in making broadband accessible and affordable for low-income users and ensuring its deployment in rural areas with low population densities. They argue against heavy regulation like rate caps and facilities-sharing obligations, suggesting instead that the focus should be on explicit subsidy programs. These programs would aim to lower broadband bills for low-income families and support broadband providers in extending their services to high-cost rural areas, contingent upon their commitment to maintaining specified service levels. McDaniels advocates for government intervention to break ISP monopolies and support municipal broadband efforts, particularly in rural areas. In contrast, Neuchterlein and Shelanski caution against heavy-handed regulation, proposing instead targeted subsidy programs to make broadband more accessible and affordable. This divergence reflects a broader debate on the role of government in ensuring broadband access: whether it should enable market forces with minimal intervention or actively participate in the market, especially where private enterprise fails to provide necessary services.

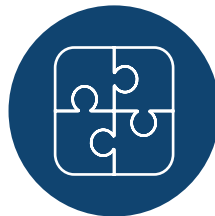
This examination delves into the significant issues affecting broadband access, offering an in-depth exploration of the strategic and legislative hurdles that must be navigated to achieve equitable digital inclusion. Through a detailed analysis, we aim to highlight the multifaceted approach required to bridge the digital divide, emphasizing the critical role of local solutions, policy reform, and collaborative efforts between the public and private sectors.

## Focus: How Broadband Access Affects North Texas



**47% of low income households**

Feel confident in basic digital skills (i.e., accessing a website).



**50% of households in 75216 do not have broadband**

Whereas 95% of Dallas County has broadband connectivity.



**22% of low income households**

Earning less than \$50,000 lack a computer.

# Case Studies: Municipal Broadband Deployment

Case Study Title	Legislative Challenges & Strategies	Municipal & Community Initiatives	Economic & Labor Market Impact	Public-Private Partnerships (PPPs)	Digital Divide & Equity	Opposition & Support	Technology & Infrastructure	Community Engagement & Advocacy
The Effects of Lifting Restrictions in the State of Colorado	High	High	Medium	Medium	High	High	High	Medium
Success in Chattanooga	Medium	High	High	Low	Medium	High	High	Medium
The LaGrange, Georgia Municipal Broadband Initiative	Low	Medium	Low	Medium	High	Medium	Medium	High
Google Fiber in Kansas City, Kansas and Austin, Texas	Low	Medium	Medium	High	High	Medium	High	High
Adapting to Restrictive State Law: Brownsville, Texas	High	High	Low	High	Medium	Medium	Medium	High

## Overview

Federal and state regulations, local innovation, and evolving legislation significantly shape the landscape of municipal broadband in the United States. A thematic analysis of the case studies reviewed reveals that municipal broadband initiatives are deeply influenced by legislative environments, requiring active legal and community responses to navigate and overcome restrictions. Community engagement emerges as a pivotal element, with public support and participation playing a crucial role in the success of these projects. Economic and labor market impacts are mixed, with some areas witnessing significant benefits while others find the effects less immediate or direct. The digital divide and related social inequalities are central concerns, with initiatives aiming to provide equitable access to all community members. Infrastructure and technology challenges are prevalent, with municipalities striving to meet high-speed connectivity goals amidst varying expectations. Opposition from incumbent ISPs and competitive market dynamics pose significant hurdles, necessitating strategic responses. Finally, innovative

funding and investment strategies are critical for ensuring municipal broadband projects' financial sustainability and long-term viability. The table above reports the frequency of the themes mentioned in each case study.

This report delves into the experiences of specific municipalities, exploring how they have innovated within the bounds of regulation and what lessons can be drawn from their triumphs and challenges.

### The Effects of Lifting Restrictions in the State of Colorado

The State of Colorado provides a pertinent example of how state restrictions have impacted municipal broadband efforts, how municipalities have adapted to the restrictions, and a pivotal repeal in 2023 that marks a new chapter in the municipal broadband narrative.

State-imposed restrictions have historically presented significant barriers to developing municipal broadband networks. In Colorado, legislation such as SB 152

## Focus: State Restrictions on Broadband and FCC Preemption

A recurring theme in the literature is the emergence of municipal broadband services in communities driven by dissatisfaction with existing service providers or an outright absence of access. This phenomenon underscores a governmental response to market failure, where private broadband networks fall short of addressing 21st-century community needs. However, the development of municipal broadband networks is significantly shaped by state-imposed limitations and the intricate legal framework concerning the Federal Communications Commission's (FCC) authority to preempt such restrictions.

State legislation imposing restrictions on municipalities' entry into the broadband market is often justified as measures to ensure fair competition and mitigate financial risks. Such laws receive robust support from private internet service providers, who engage in intensive lobbying efforts to maintain them. The experiences of Wilson, North Carolina, and Chattanooga, Tennessee, serve as prominent examples, with both municipalities petitioning the Federal Communications Commission (FCC) to override state statutes limiting their capability to extend broadband services to neighboring areas in need. These two areas could provide internet services to citizens within their jurisdiction, but state law prevented them from servicing surrounding areas as the demand increased. As Cobb (2018) illustrates, the FCC's attempts to preempt these state restrictions were grounded in its mandate under the Telecommunications Act of 1996, aimed at eliminating barriers to broadband infrastructure investment and promoting competition. This initiative, however, was met with legal challenges that culminated in the Sixth Circuit's decision, which found the FCC lacked the authority to preempt state control over municipal entities. Drawing on the Supreme Court's decision in *Nixon v. Missouri Municipal League*, this ruling applied the clear statement rule, requiring unmistakably clear congressional intent to preempt state power.

Cobb contends that the restrictions imposed by states have curtailed the development of municipal broadband networks and contributed to the persistent digital divide, particularly affecting rural communities where economic viability for private ISPs is less apparent. The broadband access gap remains a significant issue, with rural Americans facing considerably lower access rates than their urban counterparts. The literature thus far corroborates this sentiment, as explained in the subsequent case studies. Cobb highlights the cases of Wilson's Greenlight and Chattanooga's EPB to illustrate how municipal networks can stimulate competition, improve service quality, and make broadband access more affordable, challenging the claims of opponents who fear government inefficiency and the crowding out of private investment. This makes them a critical tool for offering alternatives in communities served by only private ISPs, contributing to a fairer market.

Conversely, the debate surrounding the FCC's preemption authority underscores the friction between federal aspirations to widen broadband access and concerns regarding state sovereignty. Within the Sixth Circuit's ruling, Judge White's dissent proposed a more confined interpretation of the clear statement rule. As suggested by Cobb, this approach might balance the FCC's directive to enhance broadband deployment with the need to uphold state authority. Specifically, it could pave the way for overriding state statutes that exclusively aim to govern the communications market, thereby eliminating barriers to investment in broadband infrastructure and stimulating competition. The critical issue then becomes whether existing state restrictions genuinely support economic growth, workforce development, and the closure of the digital divide or if they inadvertently promote digital redlining, worsening the problem. By concentrating on regulations affecting the communications market, a potential compromise emerges that safeguards state sovereignty while enabling communities to address their specific needs.

effectively curtailed the ambitions of municipalities eager to provide local, high-speed internet services to their communities. A significant restriction was the legislation requiring municipalities interested in entering the broadband market to obtain voter permission. This did not obligate municipalities that received affirmative votes for a public ISP to follow through with implementation, but it legally permitted them to do so if they chose. These restrictions limited municipalities' ability to enter the broadband market and stifled innovation and competition, leaving many areas underserved or with limited broadband options. Despite these restrictions, municipalities in Colorado sought creative ways to circumvent legislative hurdles. Localities across the state held vote referendums, and overwhelmingly, many implemented broadband networks to bridge the gap between served and underserved (or unserved) communities. By September 2021, 408 communities had implemented municipal fiber-to-the-home networks, with speeds up to 1 Gbps and occasionally up to 10 Gbps (Landgraf 2023).

Another interesting finding was that MEUs in some cities provided a unique advantage. According to Landgraf (2020), MEUs were associated with lower incumbent maximum speeds for DSL and cable in states without municipal broadband restrictions, suggesting a potential threat to incumbent ISPs that could spur improvements in service quality. For example, Seamans (2012) finds that private providers are quicker to upgrade in the presence of a city with an MEU. This indicates that cities with MEUs were better positioned to challenge the status quo and advocate for the removal of restrictive laws, leveraging their existing infrastructure to push for broadband expansion.

*"By September 2021, 408 communities had implemented municipal fiber-to-the-home networks... By 2023, SB 152 was repealed, ending the restrictive legislation...motivated by the mere volume of successful referenda indicating the public was supportive..."*

By 2023, SB 152 was repealed, ending the restrictive

legislation. The pro-repeal movement was motivated by the mere volume of successful referenda indicating the public supported municipal broadband services. Chuang (2023) suggests that federal broadband grants provide an additional incentive, as restrictions on public provision require states to justify the equitable distribution of funds. The repeal reflected a broader shift towards embracing municipal broadband as a vital component of public infrastructure, capable of bridging the digital divide and enhancing community connectivity.

### Success in Chattanooga, Tennessee

Chattanooga's Electric Power Board (EPB) leveraged a combination of federal stimulus funding and municipal investment to launch one of the fastest municipal broadband services in the United States, boasting speeds up to 10 gigabits per second. This investment aimed to enhance local economic development, improve public services, and address the digital divide. The initiative placed Chattanooga at the forefront of municipal broadband deployment, drawing national attention to the potential of public utilities in providing high-speed internet services.

Ford and Seals (2021) provide a rigorous statistical analysis to assess the labor market outcomes associated with Chattanooga's broadband investment. Contrary to expectations and despite the significant municipal investment in broadband infrastructure, their findings suggest no economically significant changes in key labor market indicators, including private-sector labor force participation, employment status, wages, and IT employment, following the broadband deployment. Despite the city's significant financial commitment, which included a \$111.6 million federal grant and \$229 million in debt, the study found no statistically significant improvements in key labor market indicators such as employment rates, wages, and IT job creation post-GON deployment. This suggests that contrary to expectations, Chattanooga's labor market did not experience direct, measurable benefits from establishing its municipal broadband network.

Conversely, Kock (2018) presents a broader perspective, highlighting the potential of municipal broadband to drive economic development by attracting technology firms and human capital. Chattanooga's

MBN, developed by the publicly-owned electric power provider EPB, transitioned the city into a tech hub, fostering a creative economy and stimulating competition among ISPs. This narrative suggests that MBNs can indirectly contribute to economic vibrancy by enhancing the city's attractiveness to high-value industries and skilled workers, potentially leading to long-term labor market benefits not immediately observable in quantitative studies.

*“Municipal Broadband Networks can indirectly contribute to economic vibrancy by enhancing the city’s attractiveness to high-value industries and skilled workers...”*

Both studies shed light on the significant challenges faced while implementing MBNs. The high initial costs, legal battles, and opposition from incumbent ISPs are formidable barriers. Ford and Seals (2021) underscore the financial strain of maintaining operational viability, while Kock (2018) emphasizes the critical role of federal funding and municipal bonds in overcoming these obstacles. For example, Chattanooga’s EPB faced significant opposition from incumbent telecommunications companies, including a coordinated public relations campaign to discredit the municipal broadband effort. This opposition materialized through four lawsuits challenging the city’s right to establish and expand its broadband service. These legal challenges represented operational hurdles and significant financial and reputational risks to the project. The lawsuits initiated by incumbent providers sought to halt the deployment of Chattanooga’s municipal broadband, leveraging arguments centered around state regulations and the fair competition principle. Kock emphasizes that overcoming these hurdles required strategic litigation, community engagement, and leveraging federal funding to fortify the project against such attacks. Chattanooga’s success story, thus, is not merely a technical achievement but also a testament to strategic financial planning and the ability to navigate regulatory and competitive landscapes.

The discrepancy between the optimistic narrative of economic development potential and the empirical

findings on labor market impacts invites a critical examination of MBN initiatives. The expectation that broadband access automatically translates into direct labor market improvements may oversimplify the complex mechanisms of economic development. Chattanooga’s case illustrates that while MBNs can enhance a city’s technological infrastructure and attractiveness to businesses, these advantages might not be immediately reflected in traditional labor market metrics. Moreover, the operational challenges, including the initial financial investment and ongoing competition with incumbent providers, highlight the necessity for municipalities considering MBNs to conduct thorough cost-benefit analyses. These analyses should account for the direct economic impacts and the broader, potentially intangible benefits related to enhanced connectivity, innovation capacity, and long-term economic competitiveness.

### The LaGrange, Georgia Municipal Broadband Initiative

The LaGrange, Georgia, Municipal Broadband Initiative, highlighted by Hsieh et al. (2012), provides an insightful exploration into the complex landscape of implementing universal broadband access in communities characterized by diverse needs and economic statuses. The initiative’s aim to catalyze economic growth, enhance digital literacy, and bridge the digital divide reflects a profound understanding of the transformative potential of broadband connectivity. Yet, the experiences of LaGrange underscore the critical importance of ensuring economic sustainability and addressing the nuanced expectations of a technologically diverse community. Central to the LaGrange initiative was a public-private partnership (PPP) model, which encountered significant challenges despite its innovative approach. This partnership, forged between the city and private entities such as Charter Communications and WorldGate Communications, sought to leverage existing cable infrastructure to offer all households an Internet TV service (LITV), ostensibly at no extra cost. This model, while groundbreaking, brought to light the intricacies of aligning public objectives with private sector profitability—a delicate balance that proved challenging to maintain.

LaGrange, Georgia, is a small city with a population

of around 27,000 (31,551 as of 2024). The technology at the heart of LaGrange's project was an Internet TV service (LITV), which aimed to leverage existing cable infrastructure to provide free Internet access through hybrid co-axial and fiber-based networks. This approach, while innovative, resulted in mixed perceptions of service adequacy. Economically disadvantaged users appreciated the enhanced digital participation LITV offered. In contrast, users with higher socioeconomic status and prior technology experience found the service lacking compared to traditional PC broadband, highlighting the need for future projects to carefully consider the technological expectations and needs of different community segments. This disparity also hinted at the inherent challenge of competing with more technologically advanced services offered by private ISPs, especially when the initiative could not match the performance and features expected by more affluent users.

The project faced instability due to resistance from economically advantaged households, critiques regarding taxpayer money usage, and the financial struggles of involved companies, culminating in the primary service provider's bankruptcy. Economically advantaged households in LaGrange expressed critiques centered around the perceived misuse of taxpayer funds, questioning the legitimacy of providing free Internet service to all residents irrespective of their ability to pay. Furthermore, some voiced concerns that the initiative unfairly subsidized lower-income residents, thereby exacerbating tensions related to class and the appropriate use of public resources. The bankruptcy of WorldGate, the primary service provider for LaGrange's municipal broadband initiative, resulted from the inability to achieve the expected profit margins from perceived subpar technology. This was exacerbated by the dissatisfaction of more affluent users who were not the primary target for the LITV service, leading to a critical shortfall in sustaining operational viability.

Reflecting on the LaGrange experience through the lens of actor-network theory offers valuable insights into the dynamics of stakeholder engagement and the socio-technical ecosystem that influences broadband adoption. The theory's emphasis on the interactions between technology, individuals, and institutions reveals the fragile alliances and competing

interests that must be navigated to sustain broadband initiatives.

This underlines the crucial balance required to maintain such initiatives and the impact of technological determinism and misaligned efforts, which can derail projects intended to foster social inclusion and economic development. The social dimensions, particularly the stark socioeconomic and racial divides, underscore the urgency of designing broadband programs that bridge the digital divide and address underlying social inequalities. To navigate these challenges, future municipal broadband projects must adopt a holistic approach that addresses the socio-technical ecosystem, encompassing infrastructural, economic, and human factors influencing broadband adoption. This involves moving beyond merely providing access to ensuring the initiative is aligned with the community's broader needs and capabilities. Additionally, addressing the legal and competitive landscape, including opposition from private ISPs, is essential. By adopting proactive engagement strategies and exploring collaborative models, future projects can create a more stable environment conducive to the successful deployment of municipal broadband services. Critical to future successes will be the ability to design inclusive services, foster resilient and supportive networks, address the socio-technical dimensions of broadband adoption, and navigate the competitive landscape effectively.

*"Future municipal broadband projects must adopt a holistic approach that addresses the socio-technical ecosystem..."*

### Google Fiber in Kansas City, Kansas, and Austin, Texas

The deployment of Google Fiber in Kansas City, Kansas, followed by Austin, Texas, represents a notable deviation from traditional approaches to broadband infrastructure development through public-private partnerships. Unlike conventional models where municipal initiatives like the one in LaGrange, Georgia, primarily rely on direct government investment and management, Google Fiber's projects in these cities



were predicated on a competitive, corporate-driven model. This model emphasizes significant private-sector investment coupled with strategic public-sector facilitation and support, creating a distinctive collaborative framework aimed at deploying high-speed broadband networks (Sisson, 2017; Dale, 2015).

In both Kansas City and Austin, the Google Fiber initiative commenced with a highly publicized competition, inviting cities across the United States to vie for becoming the tech giant's next broadband deployment location. This competitive process, a departure from the more straightforward municipal broadband projects, engaged communities and local governments in unprecedented ways. It ensured Google Fiber's investments were not only eagerly anticipated but also received robust local government support, underscored by significant regulatory concessions and incentives, including streamlined permit processes and access to municipal infrastructure at reduced or no cost (Alizadeh, Grubestic, & Helderop 2017). While instrumental in expediting Google Fiber's deployment, these regulatory concessions introduced complex dynamics in urban governance and public resource allocation. For instance, the Kansas City agreement provided Google with extensive access to city infrastructure without the customary fees. This move sparked discussions about corporate welfare and the equitable use of public assets. The trade-offs between attracting significant private investment in broadband infrastructure and ensuring fair and equitable public benefits from such investments became a central governance challenge.

The primary objective behind the introduction of Google Fiber in Kansas City and Austin was to harness high-speed broadband to bridge digital divides, foster economic development, and enhance access to educational resources. The expectation was that gigabit-speed internet would democratize access to digital opportunities and stimulate local innovation ecosystems. However, the reality of these initiatives' impact on digital equity has been nuanced. While there has been an undeniable increase in broadband speeds and competition in the markets Google Fiber entered, persistent challenges remain in ensuring that these benefits equitably reach all communities, particularly low-income and underserved areas. Efforts to address these challenges, such as the grassroots campaign

in Kansas City to raise awareness and facilitate pre-registration in minority-dominated areas, highlight the complex interplay between technology deployment strategies and community engagement practices. These efforts, though commendable, underscore the inherent difficulties in achieving comprehensive digital equity through models that rely heavily on private sector initiative and investment.

*"The trade-offs between attracting significant private investment in broadband infrastructure and ensuring fair and equitable public benefits from such investments became a central governance challenge..."*

The outcomes of Google Fiber's deployment in Kansas City highlighted the transformative potential and the limitations of relying on a single private partner for broadband expansion. While the project significantly improved broadband speeds and attracted tech-related growth, it also exposed the challenges of reaching underserved communities. The innovative 'fiber hood' approach, which required neighborhoods to demonstrate an interest in the service before deployment, inadvertently underscored the digital divide by revealing stark disparities in broadband access and adoption across different parts of the city. In Austin, the project was initiated with a more evident emphasis on digital equity and community benefits. The agreement included specific provisions to connect public institutions and underserved areas, reflecting a more concerted effort to ensure that the benefits of high-speed internet access were more evenly distributed. Despite these intentions, the project in Austin, too, faced challenges in fully bridging the digital divide, as operational and market realities complicated the delivery of services to all residents equally (Stratton, Grubestic, & Helderop 2022).

While both Kansas City and Austin aimed to leverage Google Fiber to address the digital divide and foster economic development, their paths reflected their unique urban contexts and the evolving strategy of Google. Kansas City's role as the inaugural Google Fiber city meant navigating uncharted waters, with the city and Google learning and adapting in real-

time. By benefiting from hindsight, Austin could negotiate more specific commitments to digital equity but still encountered obstacles in realizing these goals fully. One significant challenge of the Google Fiber projects was their failure to bridge the digital divide fully. Despite the initial excitement and the undeniable increase in broadband speeds in served areas, the projects struggled to extend their reach to all residents, particularly those in low-income and underserved neighborhoods. While innovative, the “fiberhood” strategy often resulted in higher-income areas meeting registration targets more swiftly than their lower-income counterparts, thus reinforcing pre-existing digital divides. The reliance on community interest and pre-registration inadvertently prioritized areas with existing high levels of digital literacy and access, leaving behind those most in need of improved broadband services. Furthermore, the operational and market realities faced by Google Fiber, including the high costs of infrastructure deployment and challenges in building out the network to less densely populated or economically disadvantaged areas, underscore the limitations of relying solely on private sector initiatives for community-wide broadband access. These challenges starkly contrast with the municipal ISP model, where the emphasis can be more directly placed on universal service and digital equity from the outset.

Municipal ISPs, such as the one in Chattanooga, Tennessee, operate under a model where the city itself invests in and manages the broadband infrastructure. This model provides cities with direct control over the deployment process, pricing, and policies aimed at ensuring equitable access to high-speed internet. In contrast, the Google Fiber model relies heavily on private investment and decision-making, with the public sector providing support through regulatory concessions and infrastructure access. This fundamental difference means that cities have less control over the outcomes of broadband deployment, particularly in terms of equitable access and service pricing. The reliance on the private sector to lead these initiatives can lead to gaps in service provision, particularly when economic or operational considerations outweigh the goal of universal access. Moreover, the regulatory concessions granted to Google Fiber raised important questions about the use of public resources and the role of local governments

in facilitating private broadband projects. While these concessions were instrumental in bringing Google Fiber to Kansas City and Austin, they also sparked debates over corporate welfare and the equitable distribution of public benefits derived from such investments.

### **Adapting to Restrictive State Law: Brownsville, Texas**

Mont Belvieu, Texas, stands as a beacon for cities navigating the restrictive broadband landscape of Texas, proving that municipal entities can indeed enter the broadband market despite formidable legislative barriers. This pioneering effort, however, has not been extensively explored in academic literature, leaving a gap in our understanding of the challenges and successes faced by public entities in broadband provision. Amidst this backdrop, Brownsville, Texas, emerges as a compelling case influenced by Mont Belvieu’s trailblazing path, demonstrating innovation and resilience in its quest to enhance broadband access under similarly restrictive state laws (Guo 2023).

The foundation for Brownsville’s strategy can be traced back to the precedent set by Mont Belvieu, Texas. In a landmark decision, Mont Belvieu successfully obtained permission from state courts to build and operate its municipal broadband network, challenging the Texas municipal broadband prohibition. This case demonstrated that the state’s broadband restrictions were not insurmountable, offering a glimmer of hope for municipalities like Brownsville that aspired to improve their broadband infrastructure. Brownsville’s administration and legal team meticulously analyzed the Mont Belvieu ruling, extracting key insights and strategies that could be applied to their context. This careful study allowed Brownsville to strategize its broadband project’s planning and implementation phases with a keen understanding of the legal landscape and potential pathways to circumvent state preemption laws.

Brownsville’s broadband initiative was catalyzed by the city’s determination to eradicate its status as one of the “Worst Connected Cities,” a designation it received multiple times from the National Digital Inclusion Alliance. The city’s strategic pivot from directly confronting Texas’s preemption laws to forming a PPP with Lit Communities signifies a

nuanced approach to overcoming legislative hurdles. This partnership allowed Brownsville to bypass the state's direct municipal broadband provision prohibitions by blending private sector capabilities with public oversight and investment. Through this collaboration, Brownsville and Lit Communities embarked on a venture to construct an essential middle-mile infrastructure underpinned by a \$19.5 million investment from the city, which attracted a \$70 million contribution from Lit. This significant pooling of resources underscores the potential for municipal investment to spur substantial private-sector engagement in broadband infrastructure development.

Despite this innovative approach, Brownsville's project faced opposition from incumbent ISPs. These incumbents, which had previously overlooked the broadband needs of Brownsville's residents, contended that the PPP project constituted an unnecessary expenditure of taxpayer funds and highlighted potential risks associated with municipal involvement in broadband provision. In response, the city underscored the inadequacies of the incumbents' services and affirmed its commitment to achieving city-wide connectivity. This stance not only rebutted the criticisms but also emphasized the PPP model's capacity to enhance market competition by creating an open-access middle-mile network. Such a network paves the way for diverse ISPs to offer services in Brownsville, fostering a competitive environment that promises improved service quality and affordability for residents.

Brownsville's broadband journey offers valuable lessons for other municipalities. Despite restrictive state legislation and market barriers, Brownsville enhanced its digital connectivity by strategically using federal funding and an innovative public-private partnership model. It's a blueprint for cities looking to improve their broadband infrastructure. By engaging in a PPP with Lit Communities, Brownsville positioned itself in a way that avoided the direct provision of broadband services, sidestepping the restrictions imposed by state preemption laws. This arrangement aligned with the legal framework and presented numerous operational advantages. The partnership allowed Brownsville to leverage private sector expertise, capital, and efficiency, reducing the

city's burden regarding maintenance and customer service responsibilities. Moreover, this model fostered a competitive broadband market within the city, a significant departure from the monopolistic or duopolistic environments often seen in markets served solely by incumbent ISPs.

*"The City underscored the inadequacies of the incumbents' services and affirmed its commitment to achieving city-wide connectivity..."*

Moreover, Brownsville's concerted efforts to rally community champions and stakeholders highlight the indispensable role of collective advocacy and support in bringing broadband projects to fruition. First, the city recognized the importance of having strong leadership advocating for the broadband initiative. Upon recognizing the detrimental impact of poor broadband access on Brownsville's economic and social well-being, the newly elected mayor prioritized broadband enhancement as a key agenda item. His public commitment and vocal support for the project served as a rallying cry for the community and signaled the seriousness of the city's intent to address the digital divide. Secondly, Brownsville engaged in extensive community outreach and education to build awareness about the importance of broadband access and the specifics of the proposed project. This involved organizing town hall meetings, workshops, and presentations where residents could learn about the benefits of improved broadband access, understand the public-private partnership model, and express their concerns and needs. This direct engagement helped demystify the project for the community and build a base of informed supporters who could advocate for the initiative within their networks. Furthermore, Brownsville capitalized on the expertise and networks of local institutions and organizations. By involving entities such as economic development agencies, the local community college, school districts, and utilities in the planning and advocacy process, the city ensured that the broadband project had champions across various sectors. These partnerships broadened the project's support base and provided valuable insights into the community's diverse needs and how the broadband infrastructure could be designed to meet those needs effectively.

In addition to leveraging local knowledge and support, Brownsville sought out and fostered relationships with external advisors and experts in broadband and digital equity. The involvement of a community development banker from the Federal Reserve Bank of Dallas, recognized as an “original instigator” for the project, exemplifies how Brownsville drew on external expertise to guide its strategy. Her insights into the root causes of digital divides, potential solutions, and best practices from other communities were instrumental in shaping Brownsville’s approach and building a robust case for the project.

As inspired by the Mont Belvieu ruling, the strategic behind-closed-doors planning with the city commission exemplified Brownsville’s cautious and calculated approach to broadband project development. By keeping its strategies confidential until the appropriate moment, the city ensured it could navigate the complex legal and regulatory environment without tipping off potential opposition or complicating its plans with premature disclosure. As cities across Texas and beyond grapple with similar challenges, Brownsville’s example illuminates the possibilities in strategic partnerships, legislative adaptation, and community engagement in bridging the digital divide.

## Reoccurring Literature Review Themes

Our investigation through the wide array of municipal broadband studies reveals a tapestry of challenges, innovations, and opportunities. From the persistent digital divide to the intricate dance of regulatory navigation, the themes uncovered in our literature review illuminate the critical role of broadband access in achieving socioeconomic equity and community vitality.

### Key Takeaways:

- **Regulatory Hurdles and Local Innovation:** The resilience and creativity of municipalities like Mont Belvieu and Chattanooga showcase the possibility of overcoming restrictive state laws to foster broadband access. This underscores the importance of adaptable regulatory frameworks that empower rather than hinder municipal broadband initiatives.
- **Socioeconomic Impacts and the Digital Divide:** The exploration of cases across different regions highlights the digital divide not just as an issue of connectivity, but as a multifaceted challenge encompassing digital readiness and socioeconomic disparities. Municipal broadband projects emerge as pivotal in not only providing infrastructure but also in facilitating the inclusion of underserved populations.
- **Strategic Deployment and Community Engagement:** Successful broadband initiatives are characterized by strategic planning, stakeholder collaboration, and innovative funding models. Engaging communities and understanding their needs is paramount to designing broadband solutions that truly address the digital divide.
- **Economic and Policy Implications:** While municipal broadband projects hold significant potential for economic development and social equity, they also confront financial sustainability challenges and competitive dynamics. This calls for a balanced approach in policy-making that supports public investments in broadband while fostering a competitive and inclusive market.

These themes will guide our exploration of how the NCTCOG region can harness lessons learned from across the country.

## Economic Vitality and Policy Implications of Municipal Broadband Projects

The financial and economic modeling of municipal broadband projects plays a vital role in understanding their viability and impact. Mack and Grubestic (2009) underscore the importance of incorporating local characteristics, like population density and income levels, into forecasting models to enhance the accuracy of broadband service availability predictions. Their findings advocate using spatial econometric models, which demonstrate superiority over traditional methods by offering a nuanced understanding of regional broadband needs and potentials. This may be useful for municipalities contemplating a public broadband network or expanding their existing network.

Another vital aspect to consider in the discussion on the financial sustainability of municipal broadband, particularly fiber-to-the-home (FTTH) projects, is the critical role of community engagement and PPPs in ensuring project success. A comprehensive analysis by Yoo, Lambert, & Pfenninger (2022) reveals a sobering outlook for the financial health of these initiatives. The study, covering fifteen U.S. municipal FTTH projects between 2010 and 2019, highlights that most projects struggled to achieve short-term solvency without external financial support or debt restructuring. The critical insight here is the emphasis on revenue generation as a pivotal factor for success, far outweighing the impacts of capital cost and operational efficiency. This analysis advises municipalities to conduct thorough revenue potential evaluations and economic implications assessments before venturing into the competitive broadband market. Essentially, ensuring long-term revenue is more important than construction efficiency.

Further complicating the financial landscape are the competitive responses from incumbent providers and the need for frequent financial interventions to sustain project viability. Projects often necessitated additional funding sources to remain operational, indicating a significant discrepancy between initial financial forecasts and actual performance. This

financial strain underscores municipalities' need to approach broadband projects with rigorous due diligence, realistic revenue forecasts, and strategic planning to navigate the competitive and regulatory challenges inherent in deploying municipal broadband. This consideration becomes even more critical for municipalities given that federal funding for broadband initiatives, such as those enabled by President Biden's Infrastructure Act, might fluctuate and not always be as accessible as they are at present. One study critically examines municipal broadband's purported benefits, revealing several financial and operational challenges. Municipal broadband systems frequently encounter significant financial difficulties, leading to underperformance and, in some cases, the necessity for privatization due to substantial losses (Beard et al., 2021; Yoo & Pfenninger, 2017). Despite the considerable investment required, the evidence supporting the economic advantages of municipal broadband in small, rural communities remains inconclusive, hindered further by the scarcity of data for comprehensive empirical research (Ford & Alan Seals, 2021). The findings indicate no significant economic improvements in the labor market attributable to the broadband investment. This includes metrics such as private-sector labor force participation, employment status, wages, IT employment, self-employment, and business income.

Moreover, the study points out that establishing municipal broadband networks in areas already served by private broadband providers does not significantly affect economic outcomes compared to cities without existing networks. Investments in municipal broadband often occur in cities that also manage municipal electric services or are constrained by state regulations. In rural areas, investments are justified by the lack of adequate broadband services. While the research controls for endogeneity, funds allocated for municipal broadband might be more effectively utilized in other areas, such as improving educational services. It questions the significant impact of municipal broadband on labor markets, especially given the modest enhancements in coverage and transmission speeds offered by these projects. Although there may be benefits for certain skilled workers, the evidence for widespread economic effects or reductions in broadband prices resulting from municipal broadband entry is limited, according to the study. This does not imply that these initiatives

are unworthy of consideration but that their value can be challenging to quantify.

Nevertheless, contradictory studies show that government actions have social and individual benefits, whether through purely municipal efforts or public-private collaborations. Recognizing the economic challenges is crucial for identifying the obstacles that must be addressed, yet it's equally important to consider the broader, sometimes intangible, impacts of such interventions. Additionally, economic analyses do not always capture the full spectrum of benefits provided by municipal broadband projects. In the case of Chattanooga, the city's municipal broadband has significantly upgraded its technological infrastructure, resulting in enhanced public services and a more interconnected community. Additionally, it has acted as a powerful stimulant for innovation and economic growth, drawing in new businesses and facilitating job creation (Kock 2018). This success story underscores the wide-ranging advantages of municipal broadband that extend beyond direct financial gains, highlighting its role in community development and societal progress.

*"Economic analyses do not always capture the full spectrum of benefits provided by municipal broadband projects..."*

The discussion on the broader broadband market provides further context. Most markets, including the broadband industry, are generally not subject to economic regulation, as durable monopolies do not dominate them and exhibit potential for competitive entry and technological changes (Neuchterlein & Shelanski, 2022). The U.S. broadband industry, in particular, is categorized as a competitive market, inappropriate for the economic regulation applied to static monopolies. The emergence of competitive broadband markets in the U.S., primarily attributed to the unique market structure stemming from the popularity of cable television, contradicts predictions of cable monopolies and showcases the dynamics of competition driving massive investments in infrastructure to meet consumer demand for increasing speeds. Some federal policymakers advocate for regulating the broadband market like

a public utility, proposing either to expand public subsidy programs or to impose price controls similar to those applied to telephone monopolies in the past (Neuchterlein & Shelanski, 2022). However, price regulation in a competitive market could significantly reduce incentives for investment and innovation, potentially chilling competitive entry and expansion. This approach contrasts with fostering a regulatory environment that encourages private investment and deploying faster and more widespread broadband networks, highlighting the importance of creating adequate incentives for private enterprise in this dynamic market.

The complexity and uncertainty surrounding the economic viability of municipal broadband underscore why federal and state legislations tend to impose stricter regulations on municipalities venturing into the broadband market. Public investment, derived from taxpayer money, carries inherent risks, as evidenced by unsuccessful ventures like the project in LaGrange. This instance also reveals the challenges associated with public-private partnerships, where the bankruptcy of WorldGate questioned the assumption that private companies are always more financially and operationally stable. Nevertheless, the LaGrange study also underscored the profound impact internet access could have on individuals previously without this resource, which was impossible without the PPP intervention. While this qualitative study focused on a specific region, it elicited powerful responses from participants that resonated with potentially similar sentiments in other communities, often overlooked in economically-centric analyses. For instance, a quote from a resident in a low-income area using the LITV service expressed a heartfelt plea during the interview, stating, "Please don't take it away. I cannot live without it." Another participant lamented the discontinuation of the service, highlighting the convenience it brought into her life, such as paying bills online and browsing the internet. These testimonies underscore the significant, life-changing benefits of broadband access beyond the scope of financial and operational metrics, revealing a deeper, often unquantified value of municipal broadband initiatives.

PPP-community funding models and other nontraditional funding sources offer innovative pathways to expanding broadband infrastructure,

particularly in contexts where traditional market mechanisms fall short. These approaches, however, are not without their challenges, especially when navigating the intricate web of net neutrality and regulatory frameworks that govern the telecommunications sector.

*“Testimonies underscore the significant, life-changing benefits of broadband access, beyond the scope of financial and operational metrics, revealing a deeper, often unquantified value of municipal broadband initiatives...”*

Neuchterlein and Shelanski (2022) provide a critical examination of how regulatory provisions, especially those related to “nondiscrimination” obligations, rate regulation, and the potential reclassification of broadband services, present considerable challenges for the involvement of the private sector in PPPs. These regulations can induce hesitancy among ISPs and other private entities, wary of how such rules might alter business models, revenue opportunities, and operational freedoms. For public entities, understanding these regulatory dynamics is crucial to structuring PPPs that can address and align with the motivations and concerns of private partners, ensuring the sustainability and appeal of broadband projects. Furthermore, the role of subsidies and the necessity for a competitive neutrality policy highlight significant considerations for policymakers. Subsidies encouraging broadband deployment should not distort market efficiency by favoring certain providers over others. The concern is that subsidies, if not carefully designed, can lead to a competitive bias. A less efficient but subsidized ISP might outcompete a more efficient, unsubsidized one by leveraging the subsidy to offer lower prices. This scenario underscores the critical balance between fostering competition and ensuring equitable access to broadband services.

The Brownsville, Texas, case illustrates a practical manifestation of these challenges within the context of PPPs and regulatory constraints. Brownsville embarked on a partnership with a private entity to develop its broadband infrastructure, navigating Texas’s stringent regulations on municipal broadband.

The city’s strategy, leveraging public investment to catalyze private sector participation, aimed at creating a resilient broadband network capable of serving its residents comprehensively. However, the project encountered resistance from incumbent ISPs, highlighting the contentious nature of public investment in broadband infrastructure. These incumbents argued that the PPP constituted an unnecessary use of taxpayer money, igniting a debate on the role of public funds in competitive markets. At the same time, Brownsville residents consistently sought equitable broadband access, an area where the private incumbents had failed to meet community needs adequately. This gap between resident needs and incumbent ISP offerings underscored the necessity of Brownsville’s initiative to ensure that all community members could benefit from reliable and affordable broadband, thus enhancing overall digital inclusion in the city.

The interconnectedness of broadband applications and adoption underscores a critical aspect of digital inclusion strategies. This observation by LaRose et al. (2010) highlights the nuanced barriers to broadband adoption, particularly among low-income households. While the financial capability for subscriptions might exist, as evidenced by expenditures on cable TV and telephone services, reallocating these funds towards broadband requires access and a compelling value proposition. This is where the role of public education becomes paramount. In rural settings, the study’s findings emphasize the limited effectiveness of infrastructure investment without simultaneous efforts to educate the community on the tangible benefits of broadband. Such education can catalyze a shift in perception, positioning broadband as another utility and a gateway to enhanced educational, informational, and economic opportunities. Thus, the approach to increasing broadband adoption must be twofold: expanding the infrastructure while investing in awareness and educational initiatives highlighting the transformative potential of Internet access.

## Future Directions and Technological Advancements

As we look to the future, municipal broadband initiatives and the broader landscape of broadband connectivity are clearly on the cusp of significant evolution. The ongoing challenges and lessons learned from past efforts provide a rich foundation for anticipating future directions in technology and policy. LaRose et al. (2010) elucidate the distinctions between wireline and wireless access technologies, emphasizing how these differences impact the cost of deployment, speeds, and the types of services that can be supported. With wireline broadband technologies like DSL, coaxial cable, fiber optic cable, and BPL offering direct physical connections and wireless technologies offering mobility, choosing between these methods involves strategic considerations for municipalities aiming to enhance connectivity.

Advancements in fiber optic technologies, such as enhanced passive optical networks (PONs), promise to deliver unprecedented bandwidth and reliability, catering to the burgeoning demands of modern internet users and IoT ecosystems (Grubestic et al., 2019). This is particularly pertinent given the technologically superior nature of optical fiber, which affords high-quality transmission and scalable improvements. It presents a compelling case for its prioritization of public broadband infrastructure investments. The operational efficiency, scalability, and future-proof nature of fiber optics stand as a testament to its potential to bridge the digital divide. Thus, municipalities should prioritize investments in fiber infrastructure as a means of enhancing connectivity and a strategic economic development tool. The contrast in household penetration levels between cable, DSL, and fiber technologies in the U.S., as noted by LaRose et al. (2010), alongside the international trend towards incorporating more fiber into national networks, underscores the dynamic nature of broadband adoption and the critical role of public investment in catalyzing this transition. This involves leveraging federal and state grants, public-private partnerships, and innovative financing models to support the deployment of fiber networks, especially in underserved and rural areas. The current

federal funding exclusively supports installing and expanding fiber broadband networks.

An interesting paradigm shift may be on the horizon for broadband connectivity, blending the lines between mobile and fixed-line services. According to Neuchterlein and Shelanski (2022), although it is currently expected to view mobile and fixed-line broadband as complementary due to the mobility gap of fixed-line services and the pricing gap of mobile services, the advent of 5G technology promises a significant transformation. With its smaller, more numerous wireless cells and dense fiber backhaul networks, 5G could narrow these gaps. Reducing the number of users sharing spectrum in any given cell could diminish the reliance on usage-based pricing, making mobile broadband more cost-competitive with fixed-line services for bandwidth-intensive applications. This technological evolution could drive fixed-line providers to integrate wireless nodes extensively, enhancing their service mobility. Such competitive dynamics might blur the distinctions between mobile and fixed-line broadband and potentially double the number of market competitors, signifying a dramatic shift towards a more integrated broadband ecosystem.

The evolution of municipal broadband initiatives necessitates adaptive policy frameworks encouraging innovation while safeguarding the public interest. Regulatory flexibility, exemplified by the repeal of restrictive laws in Colorado (Chuang, 2023), can catalyze the expansion of municipal broadband by removing barriers to entry and promoting competition. Future legislative efforts should aim to harmonize federal, state, and local regulations, fostering an environment conducive to the growth of municipal and cooperative broadband models. Moreover, policies should emphasize the equitable distribution of broadband services, ensuring that advancements do not exacerbate existing digital divides but contribute to universal digital inclusion. The persistent digital divide is not merely a matter of physical access but also encompasses disparities in digital readiness and technology adoption (Katz & Gonzalez, 2016). Efforts to enhance digital literacy and readiness among diverse socio-economic groups are paramount. This includes integrating digital literacy programs into public education curriculums, community centers, and libraries tailored to the unique



needs of various demographic segments. Particular attention should be paid to overcoming adoption hesitancy among economically disadvantaged communities, addressing both the affordability of services and the perceived relevance of the Internet to individuals' lives. The experiences of cities like Chattanooga and Brownsville illustrate the efficacy of innovative deployment models and the significance of community engagement in the success of broadband initiatives. Future directions should explore hybrid models that combine municipal, cooperative, and private sector resources to address specific community needs. Engaging local stakeholders—residents, businesses, educational institutions, and healthcare providers—in the planning and implementation phases ensures that broadband services are designed with the community's interests at heart. Moreover, municipalities should foster transparent communication and collaboration, enabling residents to participate actively in shaping their digital futures.

As we approach a fully interconnected IoT paradigm, the demand for robust, high-speed internet infrastructure will escalate. Municipal broadband projects must anticipate and adapt to technological convergence, ensuring that networks can support a wide array of IoT applications—from smart city technologies to telehealth services. This necessitates ongoing investments in network capacity, security, and resilience, positioning municipalities to leverage IoT innovations for economic development, environmental sustainability, and enhanced quality of life. Exploring 5G's potential to harmonize the mobile and fixed-line broadband landscape underscores the importance of forward-looking policies and investments. By preparing for a future where the distinctions between different types of broadband are less pronounced, municipalities can ensure that their broadband initiatives remain adaptable, inclusive, and aligned with the evolving needs of their communities.

## Key Takeaways

- **Digital Connectivity as Essential Infrastructure:** Broadband is no longer a luxury but a fundamental infrastructure, crucial for socio-economic development akin to water and electricity. Its pivotal role in enabling access to e-commerce, remote education, telehealth services, and digital governance underscores its centrality in modern society.
- **Bridging the Digital Divide:** The digital divide is a multifaceted challenge that reflects and exacerbates socio-economic inequalities. Addressing this divide requires not just infrastructure development but also efforts to enhance digital readiness and socioeconomic equity through targeted initiatives.
- **Innovative Municipal Broadband Responses:** Municipalities across the United States are creatively navigating legislative and economic hurdles to deploy broadband, showcasing the importance of local innovation in meeting community-specific needs.
- **The Role of Public-Private Partnerships (PPPs):** PPPs emerge as a strategic approach to overcome financial and regulatory barriers, facilitating the deployment of broadband services. These partnerships leverage the strengths of both the public and private sectors to expand access and improve service quality.
- **Regulatory Environment and Legislative Challenges:** The complex regulatory landscape, characterized by state-imposed restrictions, highlights the need for adaptable policies that support municipal broadband initiatives while fostering a competitive and inclusive market.
- **Socioeconomic Impacts and Community Engagement:** Engaging communities in the planning and implementation of broadband projects is crucial. Understanding and addressing the unique needs of different demographics ensures that broadband solutions are inclusive and equitable.
- **Future Directions and Technological Advancements:** Looking forward, the focus should be on adapting to technological advancements, such as 5G, and exploring hybrid deployment models. This includes preparing for a future where broadband services support a wide array of applications, from smart city technologies to telehealth, ensuring that networks are robust, secure, and capable of meeting future demands.

# FUNDING ANALYSIS

► The timeline of broadband funding in the United States, spanning from the Telecommunications Act of 1996 to the Infrastructure Investment and Jobs Act of 2021, illustrates the federal government’s strategic use of policy and funding to bridge the digital divide, particularly in response to national crises. Notable infusions of funding tend to follow economic downturns or periods of societal need, with the most significant investments occurring after the 2008 financial crisis and during the COVID-19 pandemic. Another observation is that the progression of funding initiatives reflects an evolving understanding of broadband’s role in socioeconomic stability and growth, with each subsequent program building upon the learnings of its predecessors to ensure more efficient allocation of resources and to address the urgent connectivity needs of the modern era.



## Telecommunications Act of 1996

A significant shift in broadband policy aimed at dismantling regulatory barriers and fostering competition within the telecommunications industry. It represented a movement towards ensuring advanced telecommunications capabilities were available to all Americans, regardless of their location or socioeconomic status.

## American Recovery and Reinvestment Act of 2009

Established the Broadband Technology Opportunities Program (BTOP) with a budget of \$7.2 billion. This program focused on bridging the digital divide through infrastructure development, public computer centers, and sustainable broadband adoption projects, emphasizing future-proof technologies and access expansion in rural and low-income areas. Broadband Initiatives Program (BIP): Also established under the American Recovery and Reinvestment Act of 2009, BIP was a significant effort by the USDA to support broadband deployment in rural areas. With nearly \$3.6 billion in inflation-adjusted financial obligations, BIP was the largest among three key USDA programs during the fiscal years 2009–21, serving a population of over 4 million in its project service areas.

## Connect America Fund (CAF) (2011)

A key FCC initiative reallocating resources from the Universal Service Fund’s High-Cost program to support high-speed internet infrastructure expansion in areas where deployment costs are high. It included Phase I for immediate infrastructure build-out in unserved areas and Phase II for a competitive bidding process to allocate funds more efficiently.



**Critical Observation:** While efforts have significantly advanced broadband infrastructure, a persistent gap remains between the deployment of services and the realization of their full socioeconomic potential. Looking ahead, policy and funding must pivot to address the sustainability of broadband ecosystems, ensuring that investments lead to long-term benefits. This includes supporting ongoing operational costs, fostering local content and services to drive engagement, and developing robust digital skills programs.

### Present Day

As Texas finalizes BEAD application details, the future of the ACP hangs in balance. Other funding opportunities can be found in the subsequent section.

2015

2020 2021

2024

#### Rural Digital Opportunity Fund (RDOF)(2020)

Provided \$20.4 billion over ten years to support broadband network construction in rural communities, aiming to address connectivity challenges in these areas.

#### Affordable Connectivity Program (ACP) (2021)

A FCC initiative that provides a monthly discount on broadband service and connected devices to eligible low-income households, aiming to mitigate the digital divide. This was a response to the COVID-19 pandemic and started in 2021.

#### Infrastructure Investment and Jobs Act (IIJA) of 2021

Allocated an unprecedented \$65 billion towards enhancing residential broadband services across the United States. This act includes multiple programs, such as:

- The Broadband Equity, Access, and Deployment (BEAD) Program: With a fund of \$42.45 billion for broadband infrastructure deployment and adoption projects.
- The Enabling Middle Mile Broadband Infrastructure Program: With a \$1 billion allocation to expand middle mile infrastructure.
- The Tribal Broadband Connectivity Program (TBCP): A \$2 billion fund aimed at supporting broadband deployment on tribal lands.
- The Digital Equity Act Programs: With \$2.75 billion dedicated to promoting digital inclusion and equipping communities with necessary digital skills.

## Previous Funding Opportunities

The FCC had previously taken a relatively hands-off approach (i.e., *laissez-faire*) to regulate the broadband market (Neuchterlein and Shelanski 2022). That shifted with the Telecommunications Act of 1996, representing a watershed moment in broadband policy, aiming to dismantle regulatory barriers and foster competition within the telecommunications industry. Its vision was to ensure that advanced telecommunications capabilities were timely deployed to all Americans, irrespective of geographic, demographic, or socioeconomic status (Mack & Grubestic 2009; Cobbs 2018; McDaniels 2022). However, the Act's legacy is multifaceted, marked by significant achievements and notable challenges. The Act's encouragement for municipalities to enter the broadband market was pivotal in initiating a wave of public internet service providers, aimed at offering affordable access to residents. Although met with resistance from private ISPs, this move underscored the potential role of municipal networks in promoting digital equity. It also focused attention on the digital divide; the Act catalyzed a national discourse on the importance of broadband accessibility, leading to various initiatives aimed at connecting underserved communities. However, the unbundling rules, intended to stimulate competition by requiring incumbents to share their infrastructure with newcomers, resulted in regulatory disputes and litigation, stymieing the rapid deployment of new technologies. Additionally, the Act inadvertently triggered a lobbying frenzy from private ISPs aimed at curbing the growth of municipal broadband, leading to legislative restrictions in many states, including Texas. This environment created a complex regulatory landscape that municipal initiatives had to navigate, often at the cost of delaying or limiting the scope of projects.

Broadband Technology Opportunities Program (BTOP), established under the American Recovery and Reinvestment Act of 2009, marked a significant federal investment in broadband infrastructure, mainly targeting unserved and underserved areas. With a budget of \$7.2 billion, the program aimed to bridge the digital divide through infrastructure

development, public computer centers, and sustainable broadband adoption projects. (How did it differ from the Telecommunications Act of 1996). BTOP investments in fiber optics and wireless networks significantly modernized the broadband infrastructure, emphasizing future-proof technologies and expanding access in rural and low-income areas. The program's alignment with the National Broadband Plan (published in March 2010) and its focus on educational and economic development projects showcased a holistic approach to leveraging broadband for societal benefits. One of the primary challenges faced by BTOP was the difficulty in measuring the tangible impacts of its funded projects over the long haul. At the outset, BTOP projects were propelled by an urgent need to address immediate connectivity gaps, often without establishing robust ongoing evaluation and assessment mechanisms. This lack of comprehensive frameworks made it challenging to track the progress of initiatives, evaluate their success in real-time, and adjust strategies as needed. The question of sustainability is central to understanding the effectiveness of BTOP. While the program succeeded in deploying infrastructure and enhancing access in the short term, the long-term viability of these projects—especially in terms of maintenance, upgrades, and financial sustainability—remained uncertain. Without a clear path to sustainability, the risk of “connectivity deserts” re-emerging or persisting, despite initial investments, is heightened. Another significant point LaRose et al. (2014) mentions is that the diverse nature of BTOP projects, ranging from infrastructure development to digital literacy initiatives, complicates the task of measuring overall program impact. The varied outcomes across different communities and project types necessitate a nuanced approach to evaluation beyond simple metrics of broadband speed or subscriber numbers.

Despite rural communities being a primary beneficiary of BTOP's efforts, they often faced challenges related to the quality of broadband infrastructure and the speeds available. Part of this is because rural areas' geographic isolation and economic constraints add layers of complexity to broadband deployment efforts. The high costs of deploying infrastructure in sparsely populated or difficult-to-reach areas often exceed the budgetary allocations of programs like BTOP, compromising the quality and speed of service.

Beyond the logistical challenges, policy and regulatory barriers have also played a role in exacerbating the urban-rural digital divide. Issues such as right-of-way access, pole attachment fees, and regulatory uncertainty can stymie broadband expansion efforts, making it difficult for BTOP and similar initiatives to achieve their full potential in rural communities.

The Connect America Fund (CAF) was introduced by the FCC in 2011 as a transformative step in reallocating resources from the Universal Service Fund's High-Cost program towards bridging the broadband accessibility gap. The genesis of CAF marks a strategic shift in federal policy, focusing on expanding high-speed internet infrastructure to areas where the cost of broadband deployment is prohibitively high. This shift acknowledges the essential role of broadband in modern life, from education and health to commerce and communication, especially in rural communities. CAF operated under two main phases: Phase I targeted broadband infrastructure immediately, offering funds to providers to build out broadband in unserved areas, and Phase II extended this approach, employing a more targeted and efficient mechanism to allocate funds through a competitive bidding process, known as the Connect America Fund Phase II auction. This process ensured that subsidies were directed toward projects that promised the most significant impact regarding coverage and cost-effectiveness.

The FCC announced the Rural Digital Opportunity Fund in 2020, which will provide \$20.4 billion in funding over a ten-year period to support the construction of broadband networks in rural communities. The RDOF is structured to facilitate the construction and expansion of broadband networks, focusing on areas lacking access to speeds of at least 25 Mbps download and 3 Mbps upload. This focus on unserved communities is a critical component of the fund's strategy to bridge the digital divide, aiming to catalyze economic growth, enhance educational opportunities, and improve healthcare access through telemedicine. Comparatively, the RDOF represents an evolution from previous funding efforts, such as the Connect America Fund (CAF) and the Broadband Technology Opportunities Program (BTOP). While these programs laid the groundwork for expanding broadband access, the RDOF is more ambitious in scope and scale. It introduces a competitive bidding

process known as a reverse auction to allocate funds more efficiently and effectively. This process incentivizes providers to propose solutions that offer the best value for money, promising to deliver faster internet speeds to rural areas at a lower cost to the taxpayer. Winners have been allocated more than \$6 billion to build and operate networks over the next 10 years under the RDOF program, according to the FCC, with another \$14 billion still earmarked for the program.

## Key Takeaways

- **Shift in Regulatory Approach:** The Telecommunications Act of 1996 marked a significant shift from a laissez-faire approach to a more proactive stance in regulating the broadband market, aiming to foster competition and ensure nationwide deployment of telecommunications services.
- **Challenges in Measuring Impact:** Both the Telecommunications Act and BTOP faced challenges in measuring their long-term impacts and ensuring the sustainability of funded projects, underlining the need for robust evaluation frameworks.
- **Rural Broadband Deployment:** Despite efforts, rural communities continue to face challenges related to the quality and speed of broadband infrastructure, compounded by geographic isolation, economic constraints, and regulatory barriers.
- **Municipal Broadband Initiatives and Challenges:** The Telecommunications Act of 1996 encouraged municipalities to provide broadband services, recognizing municipal networks' potential to advance digital equity and ensure affordable access. However, municipalities faced formidable challenges in entering the broadband market, notably due to aggressive opposition from private ISPs. This opposition was not just commercial but also legislative, with ISPs lobbying for laws that restrict or complicate municipal broadband efforts. Additionally, the legal landscape for municipal broadband has been complicated by varying political ideologies, leading to a patchwork of state laws and regulations that reflect these ideological divides. These factors combined to create a challenging environment for municipalities, despite the clear potential benefits of municipal broadband in promoting wider, more equitable access to high-speed internet.

## Current Funding Opportunities

Despite these extensive federal initiatives, an estimated 11.8 million locations remain unserved or underserved, highlighting the persistent digital divide (Fast Company 2023). This disparity underscores the necessity for continued, targeted investment in broadband infrastructure, particularly in rural and marginalized communities. That is being answered with significant broadband funding and development with the Infrastructure Investment and Jobs Act (IIJA) of 2021, an ambitious federal initiative to address the pressing need for equitable broadband access across the United States. Spearheaded by President Biden, the IIJA earmarks an unprecedented \$65 billion towards a suite of programs designed to enhance residential broadband services significantly. This move reflects the government's recognition of broadband as an essential utility akin to water and electricity for the 21st-century American household.

### Broadband Equity, Access, and Deployment (BEAD) Program

Central to this initiative is the NTIA's Broadband Equity, Access, and Deployment (BEAD) Program, which boasts a \$42.45 billion fund allocated for projects that support broadband infrastructure deployment and adoption. This colossal financial injection is distributed among states, territories, Washington D.C., and Puerto Rico, with the explicit aim of catalyzing the expansion of broadband infrastructure into unserved and underserved areas. The BEAD program's architecture necessitates that states first establish a comprehensive mechanism for soliciting proposals from internet service providers (ISPs), which includes a rigorous grading process and a subsequent challenge period for rejected proposals. This procedural groundwork ensures that only the most viable and impactful projects move forward, albeit introducing a competitive element among states vying for timely access to limited resources and workforce capabilities necessary for broadband installation. The program is referred to as a second iteration of CAF (Broadband Breakfast).

Texas, notably, has emerged as a primary beneficiary under the BEAD program, receiving an allocation of \$3.3 billion—nearly double that of California, the next highest recipient. This funding is poised to significantly enhance Texas's broadband infrastructure, pending approval of its initial BEAD proposal. The approval process is marked by a call for comprehensive stakeholder feedback, underscoring the participatory approach adopted in shaping the state's broadband strategy. Additionally, the passage of Proposition 8 enables the creation of a \$1.5 billion Broadband Infrastructure Fund (BIF), further bolstering Texas's capacity to extend broadband access across the state.

This funding, administered by the NTIA, requires states to follow detailed guidelines for awarding and monitoring subgrantees. The Texas Comptroller's Broadband Development Office (BDO) is tasked with executing these directives and establishing a competitive application process for potential subrecipients. This process is designed to ensure the equitable and efficient distribution of funds, aiming to connect unserved and underserved areas to reliable broadband. The BEAD program in Texas is characterized by its inclusive and strategic approach. The requirement for a Five-Year Action Plan submitted to the NTIA underscores the program's long-term vision. This plan serves as a comprehensive needs assessment, guiding the BDO in developing a tailored grant program to meet the state's unique broadband objectives. The emphasis on public engagement further demonstrates Texas's commitment to incorporating diverse perspectives into its broadband strategy. By soliciting feedback from residents and stakeholders, the BDO aims to ensure that the final proposals reflect the needs and concerns of all Texas communities. The BEAD initial proposal was submitted to NTIA on December 23, 2023. Approval is still pending.

A significant challenge facing stakeholders in Texas—and indeed, a problem echoed across the United States—relates to the accuracy of national and state broadband maps. These maps are crucial for identifying unserved and underserved communities, yet they have been subject to criticism for their reliance on broadband providers' self-reported data. This method has historically led to inaccuracies, with providers overreporting their coverage and service quality, thus skewing the allocation of funds intended

for broadband expansion and leaving many without adequate services (The Wall Street Journal, 2023). The FCC has attempted to address these concerns by updating the maps and establishing a challenge process. However, this process has revealed its own complexities, with over four million challenges filed, indicating significant discrepancies between reported and actual service coverage.

The state procured LightBox to create a comprehensive statewide broadband infrastructure assessment in Texas. Despite the initial ambition, the project encountered significant issues, particularly regarding the accuracy of the broadband coverage indicated on the map (Sadro 2023; Texas Tribune 2023). This discrepancy has led to a shift away from using the state-produced map to guide the distribution of broadband funding in favor of the FCC national broadband map, which also faces scrutiny. This pivot underscores the difficulties in creating reliable broadband maps that accurately reflect service availability, an issue not unique to Texas but also prevalent at the federal level. The reliance on these maps for allocating substantial funds from the bipartisan infrastructure law underscores the critical nature of their accuracy.

Furthermore, the financing mechanisms for broadband expansion in Texas illuminate the broader challenges of infrastructure investment in rural areas. The requirement for telecommunications companies to secure a letter of credit covering a significant portion of the project costs creates a barrier disproportionately affecting smaller, rural providers. While aimed at ensuring the financial viability of projects, this policy inadvertently privileges large service providers and exacerbates the digital divide. Totelcom, a rural internet service provider, and Etex Telephone Cooperative, another provider serving East Texas, exemplify the significant hurdles small, rural companies face in accessing federal broadband funding. Both companies are challenged by a stringent requirement to secure a letter of credit from a significant bank covering at least 25% of proposed project costs. This condition poses a considerable barrier, particularly for Totelcom, whose business relies on local banking relationships that do not meet federal prerequisites. Consequently, Totelcom's CEO, Jennifer Prather, faces the dilemma of whether to undertake the burdensome process of establishing a

new banking relationship with a federally approved bank, risking significant financial assets without any guarantee of grant approval. Similarly, Etex, despite being a larger entity, anticipates difficulties in scaling their projects due to financial constraints imposed by their existing banking arrangements, as noted by CEO Charlie Cano (Texas Tribune 2023). These examples underscore the critical need for policy adjustments and support mechanisms that recognize and mitigate the barriers to expanding broadband access in rural Texas.

The stringent regulations for accessing broadband expansion funds, including the requirement for telecommunications companies to secure substantial letters of credit, are in part a response to the significant defaults—estimated at \$2.8 billion—stemming from the Rural Digital Opportunity Fund. Karen Lightman from Carnegie Mellon University's Heinz College underlines the pivotal role of public-private partnerships and proactive state support in addressing these challenges. She suggests that to navigate and overcome these hurdles, a concerted effort is needed to establish collaborative frameworks that leverage both public resources and private sector capabilities, ensuring that rural areas are not left behind in the digital age (Texas Tribune, July 2023). Specifically, addressing the challenges faced by Totelcom and Etex could involve the Texas BDO providing enhanced technical assistance, including guidance on navigating the federal grant application process and financial planning support. Additionally, the introduction of state-backed financial instruments could empower local banks to issue the required letters of credit without assuming excessive risk. This strategy would mitigate one of the primary hurdles faced by rural providers, aligning with the goal of expanding broadband access in underserved areas.

### **The IJA also introduces several other critical programs, including:**

- NTIA's Enabling Middle Mile Broadband Infrastructure Program: With a \$1 billion allocation, this program focuses on expanding middle mile infrastructure to reduce internet connectivity costs for unserved and underserved areas.
- NTIA's Tribal Broadband Connectivity Program

(TBCP): This \$2 billion fund is directed towards tribal governments to support broadband deployment on tribal lands, incorporating essential services such as telehealth and distance learning.

- NTIA's Digital Equity Act Programs: With \$2.75 billion dedicated to promoting digital inclusion, this initiative aims to equip all individuals and communities with the digital skills and technology necessary for full participation in the nation's economy.

The Texas BDO within the Comptroller's Office is spearheading efforts to enhance digital equity across the state in alignment with the Digital Equity Act (DEA) of 2021, which is part of the larger Infrastructure Investment and Jobs Act (IIJA). The DEA aims to ensure all residents and communities in Texas, especially the underserved and unserved, have the necessary information technology capacity for full participation in society, democracy, and the economy. This includes initiatives focused on digital literacy, accessibility of online social services, and improving broadband access and adoption measurements in rural areas. The BDO's involvement with the DEA represents a strategic and inclusive approach to addressing digital disparities across Texas. By engaging in comprehensive public engagement efforts, the BDO aims to integrate the voices of all Texans into the development of the Texas Digital Opportunity Plan (TDOP). This plan will outline the state's vision and goals for enhancing digital opportunity and detail the strategies for achieving these objectives. Public engagement has been a cornerstone of this process, utilizing State Digital Equity Planning Grant (SDEPG) funds to conduct surveys, listening tours, and roundtables to gather insights and feedback from communities statewide.

Moreover, the BDO has embarked on several active programming efforts to deepen its understanding of the digital landscape in Texas. Collaborations with the Texas Workforce Commission and Texas A&M AgriLife Extension are key to mapping the broadband workforce and identifying digital opportunities. Additionally, the development of interactive data dashboards, slated for launch in Spring 2024, will provide a detailed view of the state's digital access and opportunities, enhancing the planning and

implementation of targeted interventions. The draft of the TDOP, currently awaiting approval from the NTIA, encapsulates the BDO's comprehensive strategy for digital equity. This strategy encompasses assessing digital access, identifying barriers to digital opportunities, and detailing collaborative efforts with stakeholders to overcome these challenges. Following a public comment period, the BDO submitted the TDOP to the NTIA, signaling a crucial step towards realizing Texas's digital equity goals.

As the NTIA prepares to release the Notice of Funding Opportunity (NOFO) for the State Digital Equity Capacity Grant Program, the BDO is poised to further design and implement competitive grant programs. These programs will focus on advancing digital literacy, device access, affordability, cybersecurity awareness, and other critical digital opportunity initiatives. Through these concerted efforts, the BDO is actively working to bridge the digital divide, ensuring every Texan has the resources and skills needed to thrive in an increasingly digital world.

### Affordable Connectivity Program (ACP)

These efforts are complemented by the U.S. Department of Agriculture's Rural Utilities Service and the FCC's Affordable Connectivity Program (ACP) Fund, which provide direct subsidies and support for broadband deployment in rural areas and to qualifying households.

The Affordable Connectivity Program (ACP) is a pivotal FCC initiative to ensure that low-income households can afford the broadband they need for work, school, healthcare, and more. Launched as a successor to the Emergency Broadband Benefit Program, the ACP provides a monthly discount on broadband service and connected devices to eligible households, marking a significant step towards mitigating the digital divide. This program is crucial in a landscape where access to reliable, affordable broadband is increasingly seen as a necessity rather than a luxury. By offering up to a \$30 monthly discount on broadband services and a one-time discount of up to \$100 for a laptop, desktop computer, or tablet purchased through participating providers, the ACP extends a lifeline to families struggling to keep up in the digital age. With over 18 million households enrolled, the program is crucial for



ensuring access to high-speed, affordable internet but is projected to run out of funds by March 2024 unless Congress acts. \*Update: the program is in windown and will not be renewed.

Beyond federal efforts, state-level initiatives continue to play a crucial role in addressing local broadband needs. For instance, the American Recovery Plan Act of 2021 has enabled states to utilize Fiscal Recovery Funds and Capital Projects Funds for broadband expansion, illustrating the multifaceted approach required to achieve comprehensive national broadband coverage. Concerns with the sustainability of the ACP have surfaced as many wait for further guidance from the FCC on the program's future funding mechanisms and eligibility criteria if the program survives.

## Focus: Texas BEAD 5-Year Plan Details

The Texas BEAD Five-Year Plan outlines a comprehensive strategy aimed at ensuring all Texans have access to affordable, high-quality broadband, essential for participation in the digital economy. The plan is structured around six key objectives grouped into three main goals: Deployment and Access, Affordability and Adoption, and Program Success.

### 1. Deployment and Access

- **Universal Access:** Prioritize bringing broadband to unserved areas first, then to underserved areas, while efficiently using funds. Emphasize inclusion of Community Anchor Institutions (CAIs) and leverage the Extremely High Cost Per Location Threshold (EHCPLT) to manage costs in deploying preferred technologies like fiber.
- **Funding Optimization:** The BEAD program will be competitive and efficient, encouraging diverse participation, leveraging workforce development, and optimizing funding by utilizing existing assets and mitigating deployment barriers.

### 2. Affordability and Adoption

- Ensure broadband services are affordable, particularly in high-cost areas, by requiring low-cost service options in BEAD-funded projects and supporting consumer subsidy programs like the FCC's Affordable Connectivity Program (ACP).
- Boost broadband subscription rates across households, businesses, and CAIs by improving digital literacy, leveraging community organizations, and optimizing public investment in digital programs.

### 3. Program Success

- Engage with stakeholders throughout the program to understand needs and incorporate feedback into planning and implementation.
- Design the grant process to ensure federal compliance, encourage broad participation, and ensure a transparent and efficient process for application, evaluation, and monitoring.

### Key Considerations

- **Public-Private Partnerships and Cooperatives:** Texas law restricts BEAD funding to noncommercial providers if a commercial provider has also applied for the same location, promoting a competitive environment that still allows for local and community-based proposals.
- **Timeline:** The first round of BEAD subawards is expected to be distributed by mid-2025, with the project completion stretching into 2030.

### For Municipalities

- Municipalities are encouraged to actively engage with the BDO, providing input on local needs and priorities, and collaborate on broadband deployment and adoption strategies.
- Explore opportunities for enhancing digital literacy and infrastructure within your communities by participating in BEAD-funded projects and other complementary initiatives.
- Familiarize with the BEAD program requirements, including the focus on universal access, affordability, and program success principles to ensure proposals align with state and federal objectives.

# STAKEHOLDER ANALYSIS

## Overview

The stakeholder analysis is a fundamental component of our endeavor to bridge the extensive literature on bridging the digital divide within the context of the Dallas-Fort Worth metroplex. This analysis is instrumental in untangling the complex web of interactions, decisions, and impacts that shape municipal broadband strategies. By dissecting the layered narratives of those directly influenced and affected by broadband initiatives, we gain invaluable insights into crafting actionable, evidence-based recommendations for policy and implementation.

## Grounded Theory

Grounded Theory is a systematic methodology in the social sciences that involves building theories through methodically gathering and analyzing data. Grounded Theory is distinguished by its iterative data collection, analysis, and theory development process, which coincides. In Grounded Theory stakeholder analysis, we allow data to guide the emergence of concepts and patterns rather than starting with a preconceived theory. This is achieved through detailed interviews and observations with various stakeholders, which are then transcribed and subjected to open, axial, and selective coding. Open coding helps identify, name, and categorize phenomena in the text. This leads to the development of categories linked through axial coding, which involves identifying relationships between categories. Finally, selective coding integrates and refines the categories around a core category, fleshing out the theory grounded in the observed data. The use of Grounded Theory in our analysis aids in understanding the nuanced perspectives and motivations of stakeholders involved in municipal broadband strategies. Grounded Theory helps us construct a grounded understanding of the most likely effective strategies for bridging the digital divide by deeply analyzing the interactions, decisions, and impacts reported by stakeholders. This approach ensures that our recommendations for policy and implementation are deeply rooted in empirical evidence and are tailored to the specific realities

and challenges identified through our stakeholder engagement.

## Data Collection and Methodology

Our primary data was gathered through interviews with a strategic cross-section of city and county officials. These dialogues were crafted to probe deeply into the broadband ecosystem, revealing dynamics around community needs, equity, and the enthusiasm for leveraging grants designed to fortify broadband infrastructure. The research team procured contact information from an NCTCOG representative and obtained comprehensive consent to engage with potential respondents. We extended communication to 11 stakeholders from the provided list, receiving affirmative responses from 5. Regrettably, due to an unforeseen technical malfunction, the data from one respondent could not be recorded and was consequently excluded. Ultimately, we interviewed 4 stakeholders, each embodying a distinct municipal perspective.

The methodology embraced by our team adheres to stringent ethical standards and rigorous academic protocols, as ratified by the Institutional Review Board (IRB) at the University of Texas at Dallas. Each interaction with stakeholders was structured to prioritize privacy, confidentiality, and respect for the invaluable expertise our participants brought to the table. We avoided using personal identifiers and sensitive information, instead using city size as a classification system. This ensures the extracted knowledge is rich in content while maintaining the anonymity of our contributors. The minimization of risks and maximization of benefits was a deliberate strategy to safeguard participant welfare and bolster the integrity and applicability of our findings. Participants were assured of their prerogative to an opt-out option from recording, with assurances that their inputs would act as catalysts for regional development and policy refinement.

Upon completing the interviews, the research collective utilized ATLAS.ti, a qualitative analysis software, to import and examine the data. This initial review ensured accuracy and provided an overarching

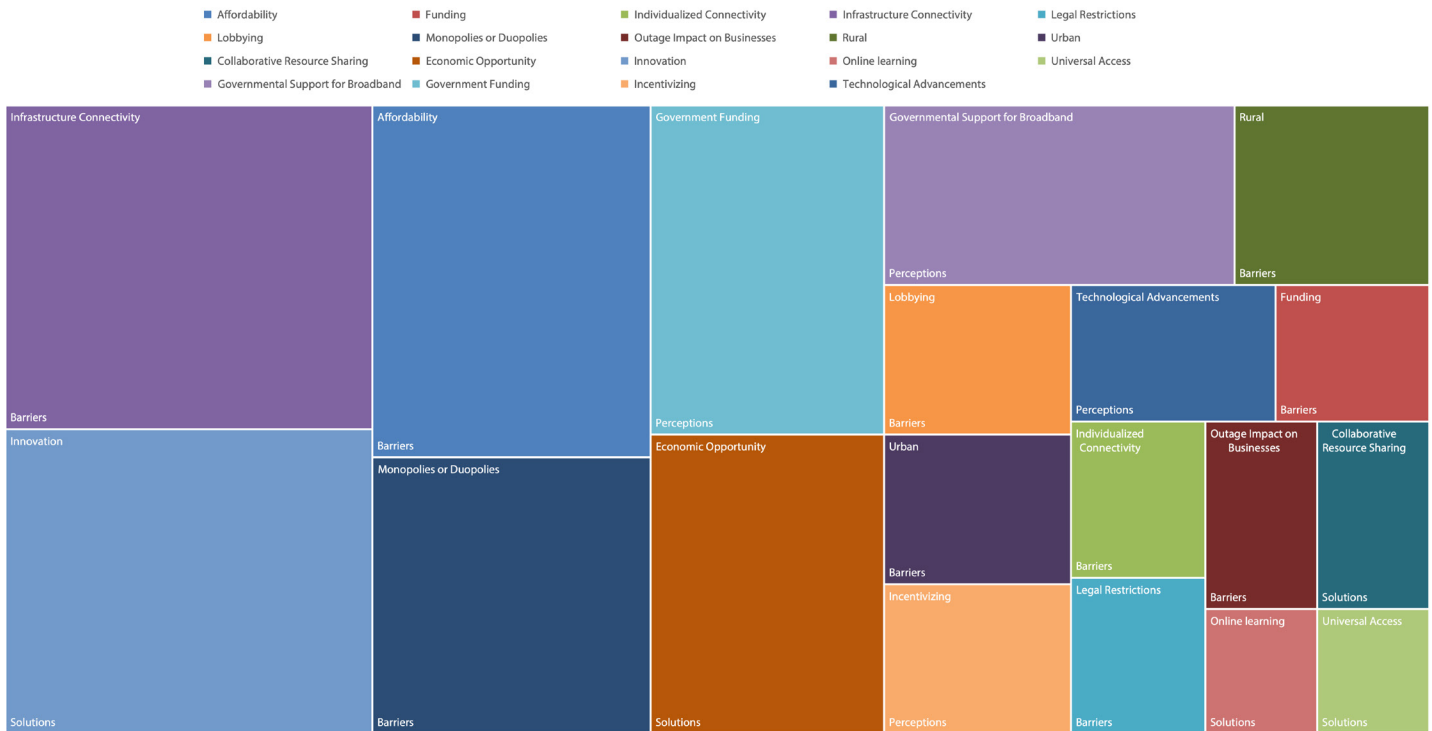
perspective of emergent themes. Subsequently, we coded the interviews, organizing them into clusters based on shared attributes. Certain codes, such as Economic Development and Economic Opportunities, were amalgamated for conceptual clarity. After analyzing the list of quotations and associated codes, we introduced a column for groupings in our data table. This addition revealed that some data points were associated with two or three groupings, necessitating further examination to determine whether they aligned more closely with one group or truly spanned multiple categories.

Upon closer inspection of the groupings table, we revised the codes based on a more nuanced understanding. For instance, a quotation initially grouped under “Solutions, Barriers” was associated with Innovation and Infrastructure Connectivity codes. Further analysis suggested a more fitting code of Infrastructure Savings. Consequently, we removed this quotation from the mixed grouping and categorized it solely under “Solutions.” Another quotation initially grouped under “Solutions, Barriers,” related to the “Outage Impact on Business and Economic Opportunity,” discussed how internet

outages in urban areas of the metroplex affect economic opportunities. Since Economic Opportunity is primarily a component of Solutions, and the primary issue discussed was the impact of outages (a barrier), we reassigned this quotation to the “Barriers” group only, removing the Economic Opportunity code.

In the analysis, participants are referred to as a national nonprofit, school district, large city, and small town. The national nonprofit offers a macro-level view while also having extensive experience collaborating with key stakeholders in the Dallas-Fort Worth area. The school district offers a focused lens on the intersection of education policy and community dynamics, providing critical insights into the ripple effects of broadband accessibility on educational equity and outcomes in North Texas. The large city stakeholder carries the dual narrative of abundance and disparity—on the one hand, possessing significant resources and capacity for infrastructure initiatives, and on the other, grappling with similar challenges identified in scholarly literature, such as pockets of underserved populations and the heavy-handed influence of major private broadband entities. The perspective of the small town reveals the granularity of challenges

Code	Main Group	Count
Affordability	Barriers	14
Funding	Barriers	3
Individualized Connectivity	Barriers	3
Infrastructure Connectivity	Barriers	17
Legal Restrictions	Barriers	3
Lobbying	Barriers	4
Monopolies or Duopolies	Barriers	11
Outage Impact on Businesses	Barriers	3
Rural	Barriers	5
Urban	Barriers	4
Collaborative Resource Sharing	Solutions	3
Economic Opportunity	Solutions	10
Innovation	Solutions	16
Online learning	Solutions	2
Universal Access	Solutions	2
Governmental Support for Broadband	Perceptions	9
Government Funding	Perceptions	11
Incentivizing	Perceptions	4
Technological Advancements	Perceptions	4



faced by smaller communities, which contend with the struggle for adequate broadband services in sparsely populated areas and the burgeoning issue of rapidly growing ‘boom towns’ within the region’s urban spread. Despite the low population density, the area lacking adequate broadband was affluent, making it particularly insightful for the research team.

The spectrum of perspectives captures the unique experiences of diverse municipal entities, each contributing substantive insights to the broader narrative of broadband connectivity within the Dallas-Fort Worth area. These varied viewpoints yield a rich compilation of data, enhancing the report’s depth and enabling the research team to formulate nuanced recommendations informed by a comprehensive understanding of the region’s distinct challenges and opportunities. Drawing from this range of insights, the research team is positioned to craft strategies that are both empirically driven and finely tuned to the particular needs and circumstances characterizing each municipal setting, ensuring recommendations are robust and practically applicable to the region’s broadband issues.

## Group 1: Barriers

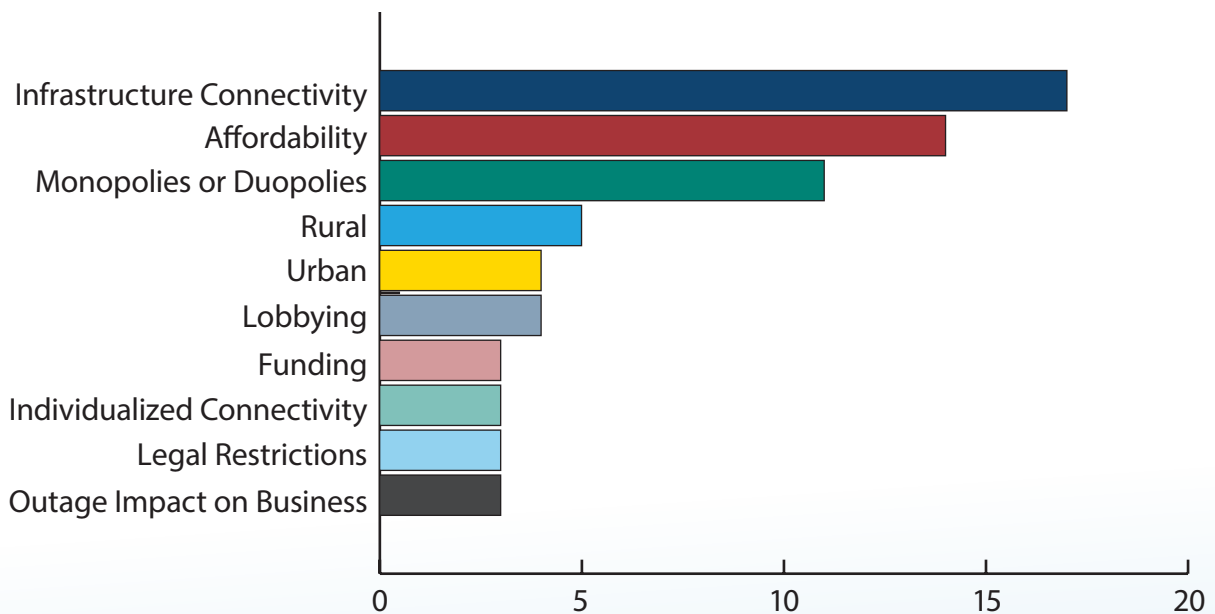
The data indicates that barriers remain a dominant concern, with 67 mentions. These barriers range from infrastructural issues to legal restrictions. Notably, stakeholders frequently cited the affordability gap as a significant hurdle to broadband access. This challenge is not merely a function of availability but also economic capacity, indicating that infrastructure alone does not guarantee access. As mentioned by stakeholders, legal restrictions further complicate the landscape by preventing municipal networks from serving citizens directly. Monopolies or Duopolies in the market exacerbate the service delivery for customers who can purchase broadband, with either shoddy internet with subpar infrastructure, like the case in South Dallas copper

thefts, or high costs, and likely the combination of the two.

### Infrastructure Connectivity

Infrastructure connectivity was the most mentioned. Infrastructure connectivity as a barrier unfolds into a multifaceted issue. In South Dallas, where there is copper cable internet and thus subpar infrastructure, there is a higher risk for service outages, which disrupts economic opportunity as businesses are forced to close without the ability to accept payments, which are typically done electronically. When the research team asked if the stakeholders were aware of the issue, they replied and discussed that there were, and in fact, reported two outages, one lasting for two and a half weeks, the other lasting for one month. The stakeholder described how the "AT&T outage" affected a minority-owned business, "and there was a woman-owned business...a funeral home..."

## Theme Frequency Table and Chart: Barriers



Affordability	14	Monopolies or Duopolies	11
Funding	3	Outage Impact on Businesses	3
Individualized Connectivity	3	Rural	5
Infrastructure Connectivity	17	Urban	4
Legal Restrictions	3		
Lobbying	4		

who said things are backing up, we can't get things done. I can't accept credit cards...". We coded this as infrastructure connectivity and outage impact on business, highlighting that lack of secure infrastructure connection impacts businesses.

Interestingly, the digital divide manifested uniquely for a small town in the area. While 75% of the town enjoyed sufficient fiber to the home Internet, about 25% of the town—comprising older, affluent neighborhoods with large, low-density lots—struggled with subpar connectivity. In these areas, the return on investment for internet providers didn't add up, resulting in reliance on outdated coax or DSL technologies or even fixed wireless with poor coverage and performance. Despite the financial capability, these neighborhoods were neglected, as "the numbers don't work out for the provider, so they don't go in there."

This scenario was an outlier within our stakeholder analysis and literature review, highlighting that infrastructure connectivity issues can transcend economic barriers and are sometimes a matter of strategic corporate decision-making. This stakeholder recognized that "lack of sufficient broadband is a problem," especially for downtown businesses that previously grappled with inadequate coaxial connections. The recent surge in economic and residential development, often called a 'boom town' effect, played a pivotal role in attracting AT&T's attention to enhance infrastructure in both the bustling downtown and the emerging neighborhoods. Consequently, these new areas now enjoy comprehensive broadband coverage, with developers ensuring that "there's fiber to the home" for each new residence.

The initial deficiency in broadband connectivity in residential areas and the delay in modernizing downtown infrastructure were partly attributed to the town's unique fiscal policies. Unlike cities such as "Denton, Garland, and Austin," which benefit from their own electric utilities, this town did not share a "similar tax revenue structure." Such municipal utilities in other cities facilitate the laying of fiber, thereby accelerating broadband deployment. In this case, the town's approach to taxation and utility management hindered early investment and development of necessary broadband infrastructure.

Despite the outlier's description of infrastructure connectivity barriers, there was a resounding discussion of one broadband provider in the area: AT&T. The service outages in South Dallas are a struggle extending beyond outages, reflecting a systematic challenge in expanding infrastructure. The area is locked out of the competitive market due to AT&T's dominance, as underscored by the large city's bid to introduce middle-mile infrastructure intended to invite last-mile providers. This investment, however, is impeded by AT&T's stance, as one stakeholder put it, "...the investment for them, they are locked out of the South of the city because AT&T doesn't let them in."

Moreover, discussions unveiled that while there is an appetite for large-scale investment, notably in areas ripe for revitalization, the calculus for such investments is hindered by the absence of essential services and infrastructural elements. As one stakeholder explained, "...you know, we really need to have basic services in these areas like transportation. Are we in a transportation corridor?...if you're saying that, hey, I can get a lower entry price and in South Dallas good, but we don't have the transportation porters...". The stakeholder articulated a prevailing sentiment: AT&T and similar providers operate on a profit-first basis, expecting cities to bear the initial investment costs for infrastructure buildouts. They noted, 'AT&T's stance will gladly do that. You pay for it, and we still own it and we get all the profit from it.' This approach creates a catch-22 scenario; without infrastructure, areas remain unattractive for business, and without business interest, these areas can't generate the profitability needed to attract service providers.

The difficulty of infrastructure investment is not limited to urban areas. It is echoed by stakeholders noting AT&T's 'forecast mode' strategy, where the company passively waits for local governments to make the first move. One stakeholder from a school district observed, 'AT&T does not push that whatsoever... they're kind of they're in forecast mode based on what developments are happening.' This stance exacerbates the divide, with providers riding the coattails of municipal investment rather than initiating development, mainly when the costs associated with deploying actual fiber are steep.

## Monopolies or Duopolies and Lobbying

This leads us to one of the main topics: stakeholders frequently discuss monopolies or duopolies in the broadband industry. There is significant concern that private broadband providers engage in monopolistic practices and act as barriers to improving broadband accessibility rather than working to improve it. There is significant concern that private broadband providers, such as AT&T, engage in monopolistic practices and act as barriers to improving broadband accessibility rather than working to improve it. This pattern is seen in behaviors such as controlling the wiring within apartment buildings and effectively denying property owners—and, by extension, the residents—the ability to choose their provider. As one stakeholder put it, “they’d have to buy it all out. And it’s just like a cost.”

Moreover, stakeholders expressed frustration with the monopolies or duopolies companies like AT&T and Charter Spectrum hold in specific communities. Residents and businesses are left without a choice, subject to the prices set by these providers, or with no services at all. Such a stranglehold allows these companies to pick “the winners and losers,” and in instances like copper theft, where redundancy should be a safety net, there is none. This lack of competition leads to a disregard for the affected communities, as they “are crapping on these people in these areas because they know that they lack a voice and they don’t have the finances to do this to, to really fight back.”

There are efforts to dismantle these monopolies by fostering a more open and competitive environment, especially in the southern parts of the city that suffer from “different infrastructure desserts.” Despite these efforts, the city faces considerable pushback from incumbents like AT&T, who are not only unwilling to solve the problem by lowering prices but are also reluctant to allow others to solve it, expecting instead that “the real solution city of Dallas is you pay the subsidies, you just pay the full price on behalf of these residents.” This stakeholder perceived affordability programs, such as ACP, as temporary solutions, which is a resounding theme in this section and in the discourse around perceptions of government funding.

Stakeholders also highlighted the substantial influence

AT&T wields through lobbying efforts. We found that most quotations in this category were also coded with lobbying, indicating that private broadband providers are determined to resist attempts to make their services more affordable. The only quote coded with lobbying and not with Monopolies or duopolies mentions how “big and powerful” AT&T is with their efforts to pour millions lobbying and advising the state government on legislation. This theme is also heavily present in the literature. One stakeholder narrated scenarios where AT&T presents information to the Council Members who “after they finish reading it look up at AT&T in the Council Chamber and nod their head and say, did I do OK?” even claiming that “they are bought by AT&T.” In Dallas, the fight against such entrenched interests is tough; AT&T is not keen “to change the dynamic in the city of Dallas,” as one stakeholder notes, they have shown that they can “meet with the Council members and threaten them to withhold their support.” This theme extends to the political arena where, despite a majority of Council Members who may naturally lean towards supporting the constituents’ interests, the influence of AT&T proves divisive, creating a split that often correlates with political ideology. These accounts paint a picture of a divided landscape, especially pronounced between the north and south of Dallas. In the north, a plethora of service providers exist, offering redundancy and choice. Conversely, in the South, monopolistic conditions prevail. The absence of secondary providers leads to both a lack of service and an affordability issue, as one interviewee explained: “it’s much easier for us to [resell internet service] in the north of the city because of the saturation than it is for us to do that in the South of the city.”

## Affordability

Affordability emerged as a central theme, revealing complexities beyond mere infrastructural deficiencies. For instance, in the south of Dallas, some constituents had fiber in their area, but the problem was the monopolistic control in the south versus the highly saturated network in the north. This severely impacts the affordability of broadband service because there is a lack of competition. One interviewee outlined the dichotomy in access, “there’s infrastructure there, but I just can’t afford it.” This affordability gap is cited as a primary barrier to connectivity, with two-thirds of

unconnected individuals citing cost as the prohibiting factor. Addressing this requires strategies beyond infrastructure deployment, such as direct-to-resident programs like the Affordable Connectivity Program, which aim to subsidize costs for those in need.

A stakeholder representing a school district highlighted another facet of affordability. While students might be provided devices, the rest of their families often struggle with the cost of broadband. The stark reality is that they say, “there is enough fiber optic available or multiple sources to get it” but that “it comes down to affordability.” The stakeholder describes a situation that was not mentioned in the literature, where families may opt for a mere cell phone with data, bypassing the cost of home broadband, which is less than ideal for comprehensive family use. Amid these challenges, there was a notable push during the pandemic for more affordable home fiber connections. Still, such programs risk fading out, creating uncertainty for families that may soon face additional expenses.

The pandemic revealed a harrowing figure shared by a stakeholder: 13,000 families in one county amidst the sprawling metroplex lacked basic connectivity, leaving children academically and economically behind. This lack of access to remote learning is a stark indicator of how affordability barriers can perpetuate cycles of poverty and hinder educational progress. It also reveals that affordability programs such as the ACP are important for immediate accessibility concerns, but they are not panaceas, as evident by their fluctuating cycles. The resultant connectivity instability underscores the importance of sustainable models for affordability.

Another stakeholder confirms this perspective that affordability is not just about temporary fixes or subsidies. Providers like AT&T have been criticized for their reluctance to adjust prices, relying on subsidies to fill the affordability gap. This creates an environment where connectivity depends on the fluctuating availability of financial assistance rather than a stable, fair pricing model accessible to all. The discourse on affordability isn’t just about temporary fixes or subsidies. It’s about seeking long-term solutions that cater to consumers’ diverse economic realities.

What was particularly interesting was a statistic

highlighted by one stakeholder representing a nonprofit. In multi-dwelling units, where many lower-income residents live, a staggering 25% of the digital divide is attributed to affordability issues. When customers must purchase directly through one service provider, especially one who may be one or one of two providers in the area, like AT&T, you may have to pay “\$70 to \$80 for 200 Mg circuit.” Managed service providers offer a glimmer of hope, potentially driving down costs significantly if property owners pass on the savings, citing plans that cost \$15. This hints at a solution where accessibility is not only about the presence of service but also the ease with which residents can obtain it without burdensome steps or financial barriers. We discuss that more in the Solutions category.

### **Legal Restrictions, Urban Connectivity, Individualized Connectivity, and Rural Challenges**

Legal restrictions pose a significant barrier in Texas, where laws prevent municipal networks from providing retail services to citizens. This limitation stifles local governments from becoming providers and directly challenging the status quo of internet service offerings. Such laws, originally intended to regulate cable TV networks, now hamper the expansion and affordability of broadband by disallowing municipalities from filling the connectivity void, especially where private providers deem investment unviable. This limitation is emblematic of the larger challenge within the digital equity “Zeitgeist” – as one stakeholder referred to it – and it reflects a national conversation on the need for legislative reforms to enable local solutions for broadband deficits.

The urban digital divide is also pronounced, characterized by a discrepancy in connectivity within the city itself. Despite the advances in some areas, pockets of Dallas remain underserved, contradicting early judgments that the issue has been “already fixed.” For a city with a population exceeding a million, the realization that about 150,000 people are without adequate internet access highlights a critical failure. Stakeholders point out that significant portions of the population are “wholly without,” a condition exacerbated by the oversight in current funding allocations. This misallocation is particularly detrimental in urban areas where a substantial



population is either unserved or underserved, creating a “baby in the bathwater” effect, where the nuances of need within the community are overlooked due to broader data analysis.

Rural areas confront a different spectrum of challenges. There’s an intricate balance between the perceived demand economics of scale and the actual service provision. The high price of broadband services in rural areas persists due to limited auctions, a factor that perpetuates the affordability gap, as the demand does not bring down the cost as it might in more densely populated regions. As one small-town stakeholder had mentioned earlier, the “old legacy neighborhoods” in his town, representing the 25% without fiber access, despite possessing the economic means, suffer from poor internet coverage and performance because they do not fit the profitability models of internet providers. This reveals a nuanced layer of the digital divide where economic affluence doesn’t necessarily guarantee infrastructure investment; instead, it is the economic calculus of service providers that often dictates the expansion of connectivity. Further complexity arises when considering the findings of studies shared by the stakeholders. These studies often reveal underserved areas in terms of bandwidth, pointing to the persistence of digital deserts even within traditionally disadvantaged areas. Despite efforts to attract various providers and attempts to secure funding through grants, many initiatives fall flat, leaving neighborhoods in a state of connectivity limbo.

Another disparity highlighted is how “it’s innovative not to have it by Gigabit anymore,” forcing families to prioritize individual connectivity over a more comprehensive household solution. While the stakeholder mentions innovation, the business practice mentioned is not perceived as a solution but, in fact, a barrier. In the face of these individual connectivity patterns, families often opt for separate data plans for each member rather than a unified home broadband service. The approach to internet access within a household becomes fragmented, with each person potentially relying on their mobile data plan. This piecemeal approach to connectivity reflects the affordability issue at its core, where even with sufficient infrastructure, the cost remains a barrier to comprehensive access.

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## Group 2: Solutions

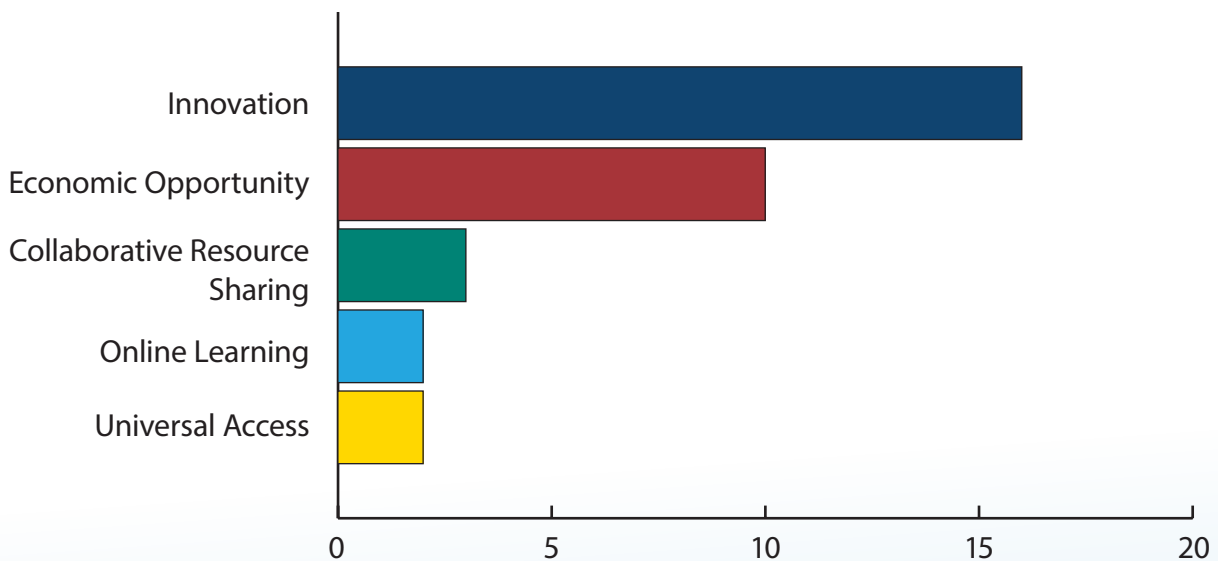
Solutions, the second most frequently cited category with 33 quotations, emphasize innovation and collaborative resource sharing. Innovative approaches to service provision, such as leveraging managed service providers in apartment buildings, have emerged as a promising solution to drive down costs and increase access. Stakeholders also highlighted the potential for municipal governments to act, suggesting that they could incentivize providers to expand service or partner with HOAs to cover the difference in ROI expectations.

### Innovation

Solutions to connectivity challenges, particularly in broadband equity, require innovative thinking and collaborative resource sharing. Treating internet

service as a utility represents a transformative idea in the industry. A stakeholder suggested allowing retail energy companies to use shared infrastructure, similar to a utility, which could dismantle barriers to competition and catalyze change. This requires significant political will, as one nonprofit stakeholder indicated. They envision internet service as part of the essentials subsidized by programs like HUD, akin to utilities like water and electricity. Another stakeholder, again drawing a parallel to how electricity is managed, posits treating broadband like a utility. This could revolutionize the industry by removing the singular control of service providers like AT&T and creating a more competitive marketplace where residents can shop for their preferred service; as one stakeholder suggested, "Everyone has power, and no one cares about it. Then, they can shop for whatever service provider they want, and ERCOT controls the power grid. You just pay a price to connect to it." This utility-like model contrasts starkly with the current broadband setup, where providers control entire neighborhoods, limiting consumers to their fiber options and pricing

## Theme Frequency Table and Chart: Solutions



Collaborative Resource Sharing	3
Economic Opportunity	10
Innovation	16
Online learning	2
Universal Access	2

structures. The push for a “localized broker model” by one stakeholder – a sort of connectivity marketplace – where users can choose from various providers and pay a service fee could introduce a level of consumer choice and control not currently seen in the broadband market.

Adaptation in the product offerings within apartment buildings reflects such innovation, disrupting traditional models that favor incumbent monopolies. In the past, a resident moving into an apartment would typically deal with incumbents like AT&T, undergoing processes similar to setting up service in a single-family home, including credit checks and package selection—a barrier to quick and easy access. This environment has given rise to the managed service provider (MSP) industry, which presents an innovative solution to these challenges. MSPs focus on serving the connectivity infrastructure within a building or community rather than individual units. This approach bypasses traditional providers’ retail models by creating a single network that serves the entire building. MSPs negotiate with incumbent providers like AT&T and Spectrum for wholesale access to infrastructure—what is referred to as the “pipe” coming into the property. They then offer connectivity services at significantly reduced rates, which they can do because of their efficiency and bulk buying power.

As we mentioned previously about the significant statistic shared by one stakeholder on the lack of affordability and monopolistic control in apartment buildings, this model transforms the market dynamics, creating a competitive landscape where residents benefit from economies of scale. MSPs can offer rates substantially lower than typical retail options, providing affordable, high-speed internet to residents without the complexity of individual billing. A stakeholder mentioned, “They can offer this at a unit price level of say like \$10, \$15 dollars, \$20 a unit or a household...And it’s severely undercuts what’s offered on the retail market, right?” Moreover, the MSP model is a prototype for integrating broadband as an essential service within existing infrastructures. It showcases a move toward a competitive marketplace that could compel incumbent providers to compete on pricing, enhancing overall infrastructure efficiency.

The transition toward an MSP-centric system represents

a significant stride toward democratizing broadband access within communal living environments. It also illustrates a step towards weaving connectivity into the fabric of residential infrastructures, thus ensuring that it becomes a given, rather than a privilege, for apartment dwellers. The mention of a “competitive marketplace” where multiple MSPs vie to provide services also suggests potential benefits, such as improved service quality and customer support, arising from the need to stand out in a competitive field. This innovation in delivering broadband service aligns with the broader push to treat internet access as a utility, ensuring it is available, reliable, and affordable for all.

School districts, faced with the challenge of ensuring student connectivity, have taken innovative steps like installing private LTE towers and utilizing the newly available spectrum to bolster their network capacity. This approach, prompted by the COVID-19 pandemic, has provided coverage in dense areas with traditionally poor connectivity, reflecting a commitment to overcome infrastructural challenges creatively. The school district’s pilot projects – which included plotting the residences of 13,000 students using a GIS and implementing targeted connectivity solutions based on those heatmaps – represent a hands-on approach to directly addressing the needs within the community. As stated by the stakeholder, the ultimate goal is comprehensive coverage: “You get a one to one. You also get connectivity. That was the ultimate goal.”

Small towns have also innovated, using the resources available to provide for their residents’ broadband needs. When faced with limitations on broadband provision, they have placed wireless access points outside public libraries or loaned out personal hotspots, creating a web of connectivity that has remained popular and highly utilized. Small towns with more financial flexibility have used their tax revenues creatively to provide for residents universally. In areas expecting growth, stakeholders suggested direct negotiations between HOAs and service providers, with HOAs potentially subsidizing the infrastructure cost to meet providers’ ROI targets. This direct engagement strategy circumvents the traditional service provision model, offering a localized solution that empowers communities and reduces reliance on

broad policy changes or public funding.

### Economic Opportunity and Online Learning

The concept of economic opportunity resonated strongly in our discussions, clearly standing out as a key motivator behind the push for more robust broadband infrastructure. Stakeholders were vocal about the profound impact that connectivity can have on economic growth and social mobility, framing it as an essential tool for individual and collective advancement. We also realized that online learning, another code in the Through the lens of our interviews, it became evident that the ability to learn online—a crucial aspect of modern education and a distinct code within our Solutions group—is inextricably linked to economic prospects. Furthermore, this intersection of online learning and economic opportunity captures a broader, more dynamic picture: access to high-speed internet is not just a luxury but a necessity for participating effectively in today's economy. Stakeholders suggested that such connectivity lays the groundwork for economic resilience, allowing individuals and communities to adapt to rapid technological changes and evolving job markets.

Broadband is seen not just as a means to an end but as a vital player in lifting individuals out of public housing and improving their quality of life. The debate on whether infrastructure leads to economic development or vice versa is encapsulated in the phrase, "Build it, and they will come." This encapsulates the essence of economic opportunity linked with infrastructure development, suggesting a synergistic relationship where each drives the growth of the other. Another stakeholder recognized the vast potential of broadband as an economic opportunity, remarking on how digital access at home can drastically improve personal development. By enabling research and learning from the comfort of one's home, connectivity directly contributes to individual growth and community enrichment. One school district illustrated this by stressing the importance of immediate connectivity, where even the simple act of accessing social media or other apps is not just about staying connected but seizing moments of opportunity that might otherwise be lost. Moreover, the infrastructure becomes a foundation for more profound economic shifts. As one stakeholder pointed out, the pandemic

served as a wake-up call, illustrating that staying current with connectivity is not optional but essential for maintaining economic vitality. The emphasis on driving development as an integral part of economic growth reflects a broad understanding that the absence of progressive infrastructure development will impede broader economic goals in the long run.

Economic opportunity through broadband also emerges in discussions about remote work's prevalence in specific communities. One stakeholder observed that their municipality had one of the highest rates of home-based workers, highlighting the critical need for robust connectivity to support this modern workforce. Collectively, these perspectives underscore the role of connectivity not just as a technical necessity but as an economic imperative. Whether enabling a student to connect for education or empowering a remote worker, each broadband access point is a potential economic and social advancement driver.

### Collaborative Resource Sharing and Universal Access

Roundtable discussions within communities and contracts with innovation alliances have led to collaborative resource-sharing initiatives. These partnerships foster digital inclusion and equip the community with tools and knowledge, preparing them to navigate the digital world safely. An example cited was a Dallas-based initiative providing mobile device protection to the public free of charge, illustrating the proactive steps taken to ensure secure and equitable digital participation.

Turning to universal access, the vision is clear and expansive—connectivity should be an available resource, as ubiquitous as any essential service. The sentiment is that broadband should be a right, ensuring that each person has the freedom to explore and engage with the digital world without barriers. Stakeholders speak passionately about creating an environment where, ideally, anyone could access the internet from any corner of the universe, echoing the sentiment, "I want every person. I don't need to say student, but student plus family. To have the availability at any given time to research, to look up, to connect with peers, connect with, you know, socially connect with job at any given corner of the universe."

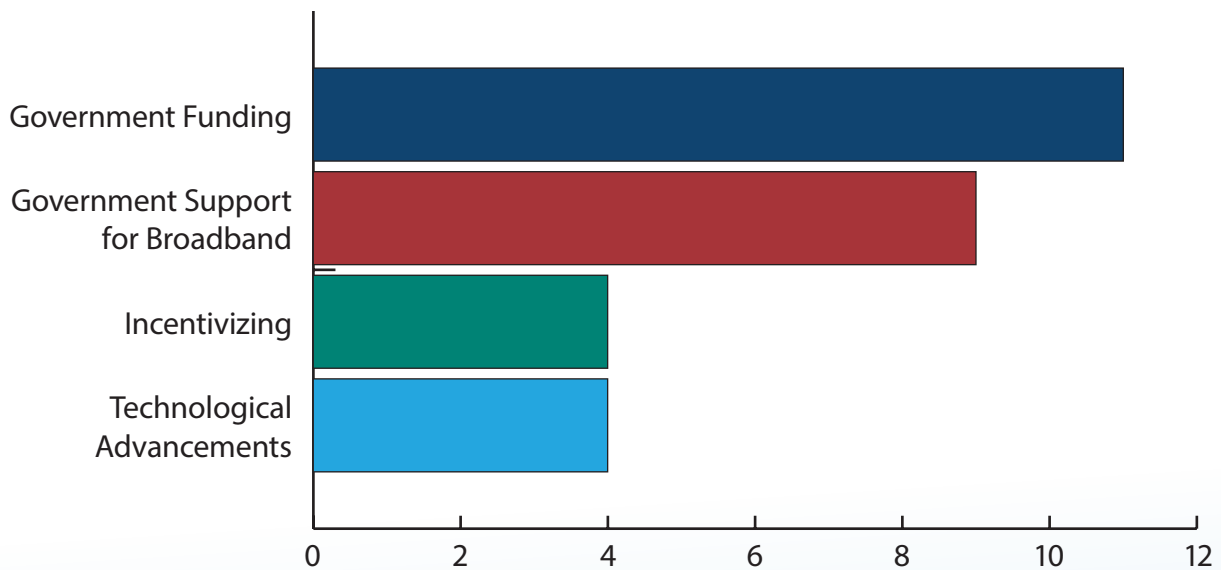
## Group 3: Perceptions

Perceptions, with 28 quotations, revealed stakeholders' varied interpretations of broadband, from how they view governmental support to technological advancements and opinions on municipality incentivizing. Stakeholders expressed mixed feelings about the effectiveness of government interventions, with some appreciating the support as crucial for progress. In contrast, others criticized it for not adequately addressing the root causes of digital disparities. Opinions also varied on how municipalities could incentivize improvements in broadband infrastructure, suggesting a need for more innovative and collaborative approaches to transform broadband access into a universally available resource.

## Government Funding and Incentivizing

In the perceptions surrounding government funding for broadband initiatives, stakeholders have expressed a mixture of skepticism and hope. The intricacies of federal funding allocation, specifically to programs like ACP (Affordable Connectivity Program), are scrutinized for their efficacy and renewal, especially during election cycles. A stakeholder from a national nonprofit pointed out the precarious standing of such programs, noting, "it's not looking good for ACP to be renewed during this election year," emphasizing the volatility of funding in the political sphere. Moreover, discussions within the community, as captured by a large city stakeholder, revealed a divide in attitudes towards government-sponsored internet services. According to the stakeholder, some see it as a privilege that should be paid for, reflecting a view possibly tinted by generational wealth. In contrast, others

## Theme Frequency Table and Chart: Perceptions



Governmental Support for Broadband	9
Government Funding	11
Incentivizing	4
Technological Advancements	4
Rural	5
Urban	4

advocate for government intervention to assist those in underserved or unserved areas.

The ACP also elicits skepticism from stakeholders regarding its efficacy as a long-term solution for broadband equity. Coded under both Government Funding and Incentivizing, one stakeholder's critique encapsulates the core of this skepticism: "It is a band-aid at best. There are structural issues, and the ACP doesn't provide any incentive for the major players." This observation underscores the concern that the ACP may fall short in fostering significant, lasting changes towards the affordability of broadband services. The stakeholder further contends with the repercussions of government subsidies, asserting, "it's only lining their coffers through subsidies." This statement directly challenges the perception of the effectiveness of government funding in driving industry reform, suggesting it might instead consolidate the power of established corporations contrary to the program's incentivizing intent. Of course, this may also be due to the monopolistic nature of the market, which lacks the competitive pressure that typically drives innovation and price reduction. If the market were to host multiple players, it is reasoned that price reductions could lead to decreased subsidy amounts and a narrowed beneficiary pool.

Further insights from city stakeholders suggest that funding discussions have grown increasingly prominent within communities, citing various tranches of funding such as coronavirus relief and the American Rescue Plan Act (ARPA) funds. Intriguingly, the distribution method, especially with the Broadband Equity, Access, and Deployment (BEAD) program, demonstrates a shift from direct government distributions to more complex state-mediated allocations, with population size being a significant determinant, as seen in the example of Texas. However, an apparent disconnect was noted by a large city stakeholder concerning the actual deployment of these funds. Despite the allocation formula being based on population, which would favor urban centers, the stakeholder points out a disparity, stating, "And yet, in the initial kind of the initial conversations and the initial kind of estimates, it was going to be like, hey, 85% of the funding came based upon the people who were in cities. But we estimate that like 95% of the funding is going to go out to the rural areas."

The allocation of state funding in combination with the federal funding coming in is perceived to be favorable for local control, as one stakeholder describes working with the governor on "how to address initiatives" and "make sure that we have some local money set aside to support the Broadband Office."

### Governmental Support for Broadband

Government Support for Broadband is another prominent theme. For instance, the role of the government in funding the "middle mile" of broadband infrastructure is highlighted as an essential but non-revenue-generating investment. A stakeholder points out the economic disincentive for private companies to invest in this area, saying, "that's why AT&T doesn't provide to these like 5 farmhouses out there because the cost of rolling the middle mile all the way out there and then connecting those five, there's a huge cost that they'll never get back." The focus then shifts to how governmental funding can spur broader economic development. The state can indirectly stimulate city growth and attract residents by investing in broadband. However, a stakeholder from a small yet affluent town observed a paradoxical situation: parts of their community suffer from inadequate infrastructure connectivity, yet they are disqualified from grant funding due to their wealth. Despite the community's need for better infrastructure, their economic standing puts them in a unique bind where financial resources are ample, but grant eligibility is absent.

As discussed by stakeholders, government support for broadband involves intricate planning and assessing risks versus rewards. The contemplation is not only about the allocation of funds but also about the strategic considerations that come into play when executing broadband expansion. For example, the deployment of 'middle mile' infrastructure with government support is viewed as an investment with substantial economic ripple effects. As one participant explains, "we're gonna give you \$100,000 matching grant... that's one thing because it does benefit, you know, a lot of folks." This reflects the common strategy of using financial incentives to stimulate development and modernization in targeted areas. However, a pointed observation was made regarding the specific

allocation of funds and the realistic outcomes. The stakeholder outlines a scenario where, despite government investment, “it’s another to say, hey, we’re gonna spend \$1,000,000 to benefit [a business] and one other HOA. And nobody else.” This presents a cautionary note on ensuring that government support doesn’t narrowly benefit specific areas while excluding others, highlighting the need for broad and inclusive planning.

The competitive dynamics of the broadband market further complicate the situation. As described, even when government-supported projects begin, they may not preempt market forces. A company like Pavlov Media might start the infrastructure project, but another company, like Astound, can strategically enter the market and connect neighborhoods, capitalizing on the investments already made. This is exemplified by the real-life experience of stakeholders, who say, “We have neighborhoods now... getting lit up by a completely different company.” Such market realities prompt a critical approach to policy and investment, as there’s an inherent risk that public funds might inadvertently subsidize infrastructure that benefits competitors who can move faster. This is acutely articulated, “So there’s the risk we could put all that money into it and get subverted by somebody else.” The discourse then pivots to the procedural aspect of these initiatives—permits. The new benchmark for broadband expansion success is encapsulated in the act of pulling permits, which conveys a tangible commitment to development. As stated, “The metric you need to follow is who’s pulling permits... First person to pull a permit is the first person to hit a neighborhood.” There is a critical inflection here for municipalities to...

### Technological Advancements

Perceptions of technological advancements shape stakeholders’ understanding of the digital divide and its implications for community development. Within the significant city context, a stakeholder discusses the broader spectrum of digital services, like advanced traffic control for public safety, which is more easily implemented in technologically dense areas. They note the disparity between different parts of the city: “Things like having controlled traffic lights... we could do that way easier in the north of

the city... Than we can in the South of the city. And then you have pockets in the South of the city where you don’t have anything.” This uneven distribution of technology fosters a digital divide in broadband availability and the ancillary services that contribute to a city’s operational efficiency and safety.

The impact of technological advancements on accessibility to information is also noted by a school district stakeholder, reflecting on the shift from traditional to digital media: “Well, now I can go online and I can get the same copy of a million times, you know?” This evolution has transformed how individuals access information, making it more abundant and readily available than ever before. However, the dialogue within the school district reveals a recognition that while technological innovation is surging, the foundational digital infrastructure is lagging: “You know we’re just we missed something there... especially as our technology innovation world keeps skyrocketing and growth that we haven’t even addressed some of the basic minimums.” It’s an acknowledgment that in the rush to advance, some essential building blocks of the digital framework are overlooked.

In the realm of employment, the stakeholder’s observation on the rise of remote work highlights the diminished need for proximity to urban centers, saying, “that circle of where I can be goes from a mile 2 miles, 10 miles, 50 miles and they’re comfortable with doing that.” Technological advancements have facilitated a decentralization of the workforce, allowing individuals greater flexibility in where they live and work. This aspect was also emphasized within the ‘Solutions’ category, particularly in discussions concerning economic opportunity.

### Final Thoughts

The legacy of exclusion in South Dallas continues to shape today’s broadband landscape. The connectivity issues in southern Dallas are not isolated incidents but are deeply intertwined with a history of systemic exclusion. Addressing the digital divide requires not only contemporary solutions but also an acknowledgment of these historical underpinnings to ensure that our strategies do not perpetuate past injustices but actively dismantle them. Stakeholders

emphasize the necessity for an equity-centered approach to broadband policy. Such an approach should not only aim to rectify disparities in service provision but also serve as a form of restorative justice for communities that have suffered long-term institutional neglect. This approach extends beyond the south of Dallas, affecting many underserved communities region-wide. As highlighted by a nonprofit stakeholder, apartment buildings often concentrate on digital inequities. Residents typically face monopolistic practices that limit their internet provider options, raising costs.

There is a pressing need to view broadband as a public utility—a vision both ambitious and fraught with legislative and political challenges. That is why it is essential to recognize this is a long-term vision. The potential benefits, however, are compelling, as transforming broadband into a utility could democratize access, ensuring that every resident has the right and the means to connect. This reimagining of broadband infrastructure as a public utility underlines the need for radical, equity-driven interventions that look beyond mere access to consider affordability, reliability, and inclusivity.

The phenomenon of lack of broadband access also affects smaller towns, where broadband equity varies: 75% of a typical small town might enjoy sufficient fiber internet, while 25% of its older, affluent neighborhoods face coverage gaps due to financial non-viability for providers. While this situation is undoubtedly an outlier for rural communities across the state, it presents an interesting case study highlighting the unique challenges and potential strategies for enhancing broadband access in similar areas.

The discussions and findings from this analysis lead us directly into the next section, where we will align these insights with existing literature. This will enable us to formulate comprehensive recommendations and best practices, grounding our approaches in empirical evidence and the lived experiences of those most affected by digital disparities. This synthesis will guide effective policy-making and foster a more equitable technological future for the Dallas-Fort Worth metroplex.

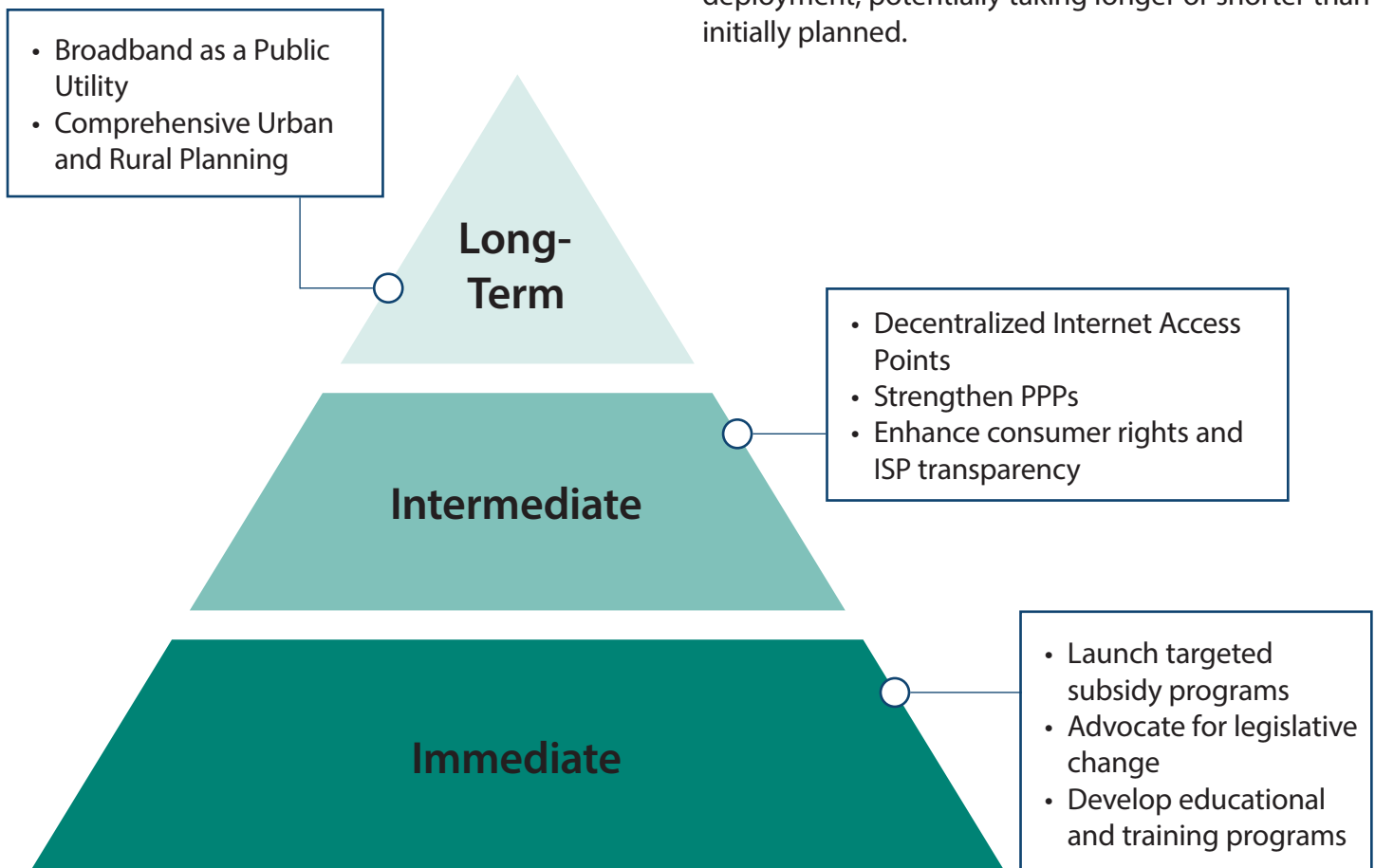
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# STRATEGIC RECOMMENDATIONS

After carefully examining the stakeholder analysis results and correlating them with insights drawn from our comprehensive literature review, it becomes evident that the challenges of infrastructure connectivity, affordability, and monopolistic practices are profoundly interlinked. These challenges reflect a broader systemic issue within urban and rural broadband deployment—particularly in regions like Dallas-Fort Worth, where legislative constraints and historical inequities have resulted in traditional and digital redlining and complicated straightforward solutions. Given these complexities, our recommendations are structured into immediate, intermediate, and long-term strategies to pragmatically address the multifaceted nature of broadband access and its vital role in socio-economic development in the Dallas-Fort Worth metroplex.

The recommendations outlined are categorized into immediate, intermediate, and long-term frameworks, each with specific timeframes tailored to the complexity and scale of the initiatives proposed. Immediate recommendations are set within 0-3 years and designed to swiftly address the most pressing barriers to broadband access, responding to urgent community needs. Intermediate recommendations span 3-7 years involve more substantial projects and policy shifts that require thorough planning and are poised to yield significant impacts within that period. Long-term recommendations extend beyond seven years and are strategic, aiming to fundamentally transform the broadband landscape. These are focused on deep structural changes that demand extensive time, resources, and a sustained commitment. It's important to note that these are frameworks, and the actual time to realization can vary based on local conditions, regulatory environments, and the scale of deployment, potentially taking longer or shorter than initially planned.



## Strategic Recommendations Chart

Intermediate	
Launch Targeted Subsidy Programs	Implement localized subsidy programs that directly address the affordability barrier in underserved communities. These programs can be managed through city or county budgets to supplement federal initiatives like the ACP, specifically targeting populations identified in stakeholder discussions that are severely disadvantaged due to current pricing structures.
Advocacy for Legislative Change	Initiate and support advocacy efforts to modify state laws restricting municipal broadband initiatives. Engage with legislators, stakeholders, and community activists to push for changes that allow cities and towns more autonomy in providing internet services.
Develop Educational and Training Programs	Collaborate with local schools, libraries, and community organizations to offer digital literacy programs for all age groups. This initiative will help bridge the digital divide by equipping residents with the necessary skills to leverage broadband technology for educational, professional, and personal growth.
Intermediate	
Decentralized Internet Access Points	Expand the implementation of Wi-Fi kiosks and public Wi-Fi zones in parks, community centers, and other public spaces. This provides immediate connectivity solutions, encourages community engagement, and facilitates access to digital services for economically disadvantaged populations.
Strengthen Public-Private Partnerships (PPPs)	Foster partnerships between municipalities and private firms to deploy broadband infrastructure in areas not financially viable for private companies alone. These partnerships can leverage public assets and private expertise to enhance service delivery and infrastructure buildout.
Enhance Consumer Rights and ISP Transparency	New municipal regulations should improve transparency and fairness in the broadband market, particularly in monopolized areas. These regulations would require Internet Service Providers (ISPs) to provide clear and transparent pricing and service information. This initiative is crucial for empowering consumers and ensuring they can make informed decisions based on a clear understanding of the costs and terms of service.
Long-Term	
Broadband as a Public Utility/Universal Access	Work towards recognizing broadband as a public utility. This long-term goal involves extensive legislative lobbying and public support but is crucial for ensuring universal access to reliable and affordable broadband. Treat broadband infrastructure similarly to other public utilities (water, electricity), which would radically alter the provisioning landscape and potentially dismantle monopolistic barriers.
Municipal Broadband Networks	Explore the feasibility of establishing municipal broadband services as a public utility. This approach would allow direct competition with private ISPs and serve as a benchmark for reasonable pricing and service quality, thus addressing both affordability and the quality of infrastructure.
Comprehensive Urban and Rural Planning	Integrate broadband planning into broader urban and rural development initiatives. Ensure that new developments and significant urban revitalization projects include fiber broadband infrastructure as a fundamental component, thus avoiding the perpetuation of digital deserts; “dig once” policy.

The recommendations are informed by successful practices observed in municipalities confronting similar broadband challenges. For instance, Chattanooga’s municipal broadband initiative, frequently highlighted in academic and policy discussions, was pivotal in fostering economic development and enhancing market competition. This example resonates with the issues stakeholders identified in Dallas, where limited competition and high prices have stifled broadband access. In Colorado, legislation once barred municipalities from entering the broadband market without conducting a public referendum. The overwhelming support for these referendums eventually led to the repeal of restrictive laws, indicating robust public backing that could potentially support long-term efforts in other regions facing similar legislative barriers. Mont Belvieu, Texas, serves as another inspirational model, where proactive local government actions overcame state restrictions, aligning with our long-term goal of advocating for legislative reform. The city’s initiatives underline local efforts’ transformative impact and community engagement’s critical role in advancing beneficial broadband policies. However, as one stakeholder mentioned, their success is also partly due to existing electric cabling, which enables an existing revenue stream and provides easement for installing fiber optic where it does not exist.

Similarly, the case of Brownsville, which managed to navigate Texas’s restrictive legal landscape through innovative PPPs, provides a blueprint for intermediate strategies. Their approach demonstrates the potential of strategic alliances to overcome legislative barriers and enhance broadband access without direct municipal provision of services. Despite facing hostility from incumbent ISPs who were resistant to narrowing the affordability gap, Brownsville was well-prepared. Through their PPP with Lit Communities, the municipality invested \$19.5 million, and the company invested \$70 million. This substantial financial collaboration highlights how strategic partnerships can facilitate significant infrastructure development, with PPPs that enable universal access and treat broadband as a public utility seen as more favorable. While this has happened in Brownsville, the outcomes in Kansas City and Austin, Texas, with Google Fiber illustrate a different dynamic. In these cities, despite increased accessibility and the implementation of

innovative “fiberhood” strategies aimed at bridging the digital divide, the projects revealed persistent challenges in achieving comprehensive digital equity. While successful in increasing broadband speeds and fostering economic development, efforts to enhance connectivity often failed to reach all communities equitably, especially low-income and underserved areas. The Google Fiber initiative, relying heavily on private-sector investment coupled with public-sector facilitation, demonstrated the complexities of balancing significant private investments with the equitable distribution of public benefits, thus contrasting sharply with the more community-focused approach in Brownsville. Thus, while we recommend PPPs as an intermediate solution, the ability to provide universal access is mixed and depends on the contractual arrangement between the service provider and the government entity. A more long-term solution is treating the commodity as a public good, advocating for broadband as a fundamental utility that should be accessible to all, irrespective of economic status or geographical location. This means equity and profitability must coexist, and governmental control is essential in providing this balance.

Strategic partnerships in the Dallas-Fort Worth metroplex can take various forms, demonstrating that not all partnerships need to follow the traditional PPP model directly linked to ISPs. For example, one stakeholder described the effectiveness of MSAs in multi-dwelling units. These agreements enable the implementation of a centralized broadband infrastructure that serves entire buildings rather than individual units, effectively bypassing traditional service models and reducing costs. This approach contributes to making broadband a public utility and integrates it into broader urban and rural planning. Ensuring that new developments, particularly multi-dwelling units, include broadband infrastructure from the outset can significantly enhance connectivity and support comprehensive community development. This can move us closer to the goal of universal access and establishing broadband as a widely accepted public utility.

Municipalities do not necessarily need to be the last-mile provider, and in some cases, they may not have “the appetite to do so,” as one stakeholder described.

This perception aligns with cautionary financial tales about the complications for municipalities in taking on full-service provision. However, municipalities can effectively provide the middle-mile infrastructure and collaborate with private companies to handle the end-service delivery. This strategy allows municipalities to manage cost control and quality of service without the entire burden of being a direct provider. With substantial incoming infrastructure funding, there are opportunities for this theory to become a reality. This recommendation is also shared with the city of Dallas's Broadband & Digital Equity Strategic Plan as it would "enable cost-effective" and "best-in-class City networking." Cities can also be strategic by connecting fiber to city buildings and routing it to areas with low broadband investment.

An intermediate recommendation we found compelling involves urging municipalities to pass new regulations requiring ISPs to provide clear and transparent pricing and service information. This measure aims to empower consumers by ensuring they can access straightforward and understandable data about the services they purchase. This is crucial in markets dominated by a few providers. For example, stakeholders have raised concerns about how ISPs often obfuscate actual service costs and capabilities by promoting terms like "gigabytes" without adequate context, leading to consumer confusion. This lack of transparency can result in households opting for individual data plans rather than a comprehensive family broadband solution, increasing overall costs and complicating digital access. By mandating that ISPs detail their service offerings in clear, understandable language, municipalities can help prevent potentially deceptive practices and promote a fairer, more competitive market. This approach enhances consumer rights and encourages ISPs to improve their service quality to maintain customer satisfaction and market share.

Another intermediate recommendation for municipalities eager to revive economic development is decentralizing internet access points. This strategy provides immediate and universal connectivity to residents, particularly benefiting disadvantaged communities, and stimulates economic activity. As more people are drawn to public spaces with internet access, local businesses experience increased foot

traffic and can operate more efficiently, leveraging digital services and platforms. This aligns with the pronounced theme of economic opportunity identified in our stakeholder analysis, where connectivity is seen not just as a utility but as a critical driver of economic growth and social mobility. As one stakeholder aptly noted, "Build it, and they will come," suggesting that the presence of broadband infrastructure itself can stimulate economic development and attract new opportunities. Moreover, the integration of broadband into everyday life becomes a foundation for profound economic shifts, as the pandemic highlighted the critical nature of staying connected not only for maintaining economic vitality but also for enabling significant societal advancement. This recommendation aligns closely with the city of Dallas's goal of implementing fixed wireless networks by using rooftops of Dallas Independent School District (DISD) buildings to cover most student addresses, particularly focusing on lower-income families to ensure they have sufficient capacity.

A more immediate recommendation for municipalities eager for economic development revival is to develop educational and training programs addressing technology skill gaps. These programs are crucial, especially in disadvantaged communities where access to affordable internet can transform daily life. For instance, in LaGrange, Georgia, the Municipal Broadband Initiative revealed that lower-income households significantly benefited from subsidized internet access, enabling them to integrate online activities into their daily routines. This transition was profound, with many residents finding internet access essential beyond casual use. However, the LaGrange experience highlighted the challenges of aligning public objectives with private profitability and managing community expectations around technology services. Despite offering Internet TV services ostensibly at no extra cost through a PPP model, the project faced pushback from higher-income households and encountered financial difficulties, ultimately leading to the primary service provider's bankruptcy. These dynamics underscore the need for educational initiatives that facilitate access and foster a comprehensive understanding of broadband's benefits. This is critical in overcoming perceptions that internet service is a luxury rather than a fundamental right—a view often held by those

with generational wealth, according to insights from one of the stakeholders and hinted at the LaGrange case study.

Moreover, training should address practical connectivity solutions for families where parents might have individual data plans but lack a unified home broadband setup that supports educational activities for children. This was a significant issue highlighted by one stakeholder. Such educational programs would ensure that all community members, irrespective of socioeconomic status, can fully leverage the economic and social benefits of broadband access. There is also discussion in Dallas about expanding the Digital Navigators program, which currently helps families enroll in ISPs' low-cost programs and federal subsidy programs, like ACP. The Digital Navigators program provides digital skills training and other best practice programs.

With the expiration of the ACP and the pervasive concern over affordability barriers identified in the literature and stakeholder feedback, municipalities are encouraged to implement localized subsidy programs. These programs would directly address the affordability issues in underserved communities, managed through city or county budgets to supplement fading federal initiatives like the ACP, specifically targeting populations identified in stakeholder discussions who are at a severe disadvantage due to current pricing structures. As one stakeholder emphasized, it's important to recognize that private companies have no incentive to change their pricing models under the current system, where ACP funds often bolster company revenues. Without such funding, individuals face prohibitively high broadband fees and struggle to maintain connectivity. Thus, while this policy targets immediate financial relief, it should operate with broader strategies to improve infrastructure connectivity and break up monopolistic practices in the sector. This dual approach ensures that while immediate needs for affordable access are met, long-term structural challenges are also addressed to create a sustainable improvement in broadband access and equity.

As we stand on the brink of a technological renaissance, the recommendations outlined in this document offer a roadmap toward a more

connected and equitable future. The urgency to act underscores the rapidly evolving digital landscape and the persistent disparities that broadband access can help mitigate. Stakeholders across the Dallas-Fort Worth metroplex—from local government officials and business leaders to community advocates and educators—are called to embrace these strategies and advocate for the recognition of broadband as a public utility. This pivotal transformation will ensure universal access to reliable and affordable broadband, laying a foundation for enduring socio-economic development.

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