



# The case for investing in improved digital connectivity in Harlan County

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# Foreword



**Colby Hall**

EXECUTIVE DIRECTOR, SHAPING OUR APPALACHIAN REGION

## 'No Holler Left Behind'

Eastern Kentucky is rewriting its economic story. As the Executive Director of Shaping Our Appalachian Region (SOAR), our focus above all is attracting the people and businesses that will power our future. When we ask people what they need to relocate, stay, or invest: one answer consistently ranks top alongside housing, healthcare, and education: high-speed broadband.

That's why SOAR made connectivity its top priority. We worked with international consultancy FarrPoint and Connect Humanity to better understand the scale of economic benefits of investing in broadband infrastructure. As this new study illustrates, expanding connectivity in Harlan County alone could generate an estimated \$70 million plus in direct economic benefits over the next decade. And that's just the beginning: better broadband access will unlock opportunities in telehealth, education, and productivity, driving long-term growth. Investments in connectivity truly pay for themselves.

According to the FarrPoint report, improved broadband could also result in over 1,000 people either re-locating or staying in Harlan, bringing cumulative economic impact of over \$57 millions over 15 years.

Yet, while connectivity is foundational to our economic resurgence, many of our towns still lack access to the same quality Internet as other places across the country. To compete in today's digital world, we urgently need to change that.

This case study highlights the transformative potential of connectivity investments for our entire region and beyond. We are deeply grateful to people and partners like Congressman Hal Rogers, Governor Andy Beshear, and the Appalachian Regional Commission (ARC), who are leading the charge to accelerate broadband development. May their efforts inspire economic development leaders, foundations, and other leaders to join us in this mission.

Together, we can ensure every community in Eastern Kentucky and even beyond Appalachia has the connectivity needed to compete in a rapidly changing world.

## Key report takeaways

Harlan's population is down by 66% since the 1940s.



30% of population live below the poverty line.



Potential benefits of **\$5.6 million** from increasing adoption of digital connectivity.



Reducing the impact of depopulation could deliver benefits of **\$57.2 million**.

Improving broadband coverage and quality could yield economic benefits of **\$8.7 million**.



Investing in digital connectivity has the potential to generate a total economic impact of **\$71.5 million**.



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# Introduction

## Background

Digital connectivity is becoming increasingly critical for driving economic growth, attracting investment, creating jobs, and improving outcomes for communities. As technology advances, having and adopting robust digital infrastructure is essential for supporting various sectors and industries, enabling them to thrive in a competitive environment. It is also of paramount importance for the communities covered, not only by creating jobs but also by providing access to e-services and enhancing community social outcomes.

A Federal Communication Commission (FCC) report indicated that 18 million Americans lack access to high-speed broadband. However, this is widely seen as a significant underestimate of the true problem, with alternative measures of access to broadband service putting the number of unserved Americans as high as **42 million**. In rural areas such as Harlan County, it is recognised that the availability and adoption of digital connectivity are poor, and this is increasingly becoming a barrier to economic and social advances.

This report identifies and quantifies the case for investing in improved digital connectivity within Harlan County.

This independent report has been produced by FarrPoint for One Harlan County, in association with Connect Humanity and Shaping Our Appalachian Region (SOAR).

## About FarrPoint

FarrPoint is an independent technology consultancy that specializes in digital connectivity. We provide independent advice on the commercial and technical considerations of the design of national and regional connectivity strategies, economic assessment, technical planning and modeling, use case development, procurement support, and implementation assurance.

Our team comprises of a mix of consulting technologists, economists and data analysts who work together to provide experience, expertise, and complementary resources to clients in the public and private sectors.

Our approach is unlike many other consultancies; what clients get from FarrPoint is pragmatic guidance from a team that understands the commercial, regulatory, and policy considerations, plus how these connectivity and technology solutions can be delivered on the ground to deliver the desired benefits.

As trusted advisers, we build strong relationships with our clients based on empathy, flexibility, and independence. With decades of experience advising clients on connectivity, telecoms, and enterprise IT, we continue to evolve and innovate. We believe connectivity is the underlying mechanism for bringing social and economic benefits to communities.







# Harlan County's People



## Harlan County's People

Harlan County, Kentucky, has a rich and complex history, characterized by its coal mining heritage, strong community bonds, and a culture deeply influenced by Appalachian traditions. The people of Harlan County have faced numerous challenges over the decades, many driven by the decline in the coal industry. Yet, despite these challenges, the community exhibits resilience, pride, and a strong sense of identity.

Harlan County is located in southeastern Kentucky, in the heart of the Appalachian Mountains. The area was originally inhabited by Native American tribes, including the Cherokee. European settlers arrived in the 18th century, and the county was officially formed in 1819. The discovery of coal in the late 19th century transformed the region, bringing an influx of workers and establishing coal mining as the backbone of the local economy. This era also saw the rise of company towns, where mining companies owned homes, stores, and other facilities, exerting significant control over the workers' lives.

The decline of the coal industry in the region began in the late 20th century, particularly from the 1980s onward. Several factors drove this decline, including increased international competition, environmental regulations, automation of mining technology, and the depletion of accessible reserves.

The decline of coal mining in Harlan County has profoundly impacted the local economy and community. This once thriving industry that supported entire communities has diminished, resulting in population decline as residents seek opportunities elsewhere. Efforts to diversify the economy, including promoting tourism and developing alternative industries, have been met with mixed success as the county continues to grapple with these challenges.

Harlan's population of 26,831 is down from over 75,000 in the 1940s.



19% of population is older than 65 years, compared to 17% nationally.

30% of population live below the poverty line, compared to 12.5% nationally.

69 life expectancy, compared to 77 nationally.



12,962 houses in Harlan County.



40% of under 18-year-olds live below the poverty line, compared to 15% nationally.

36% have high school or equivalent degree, compared to 91% nationally.



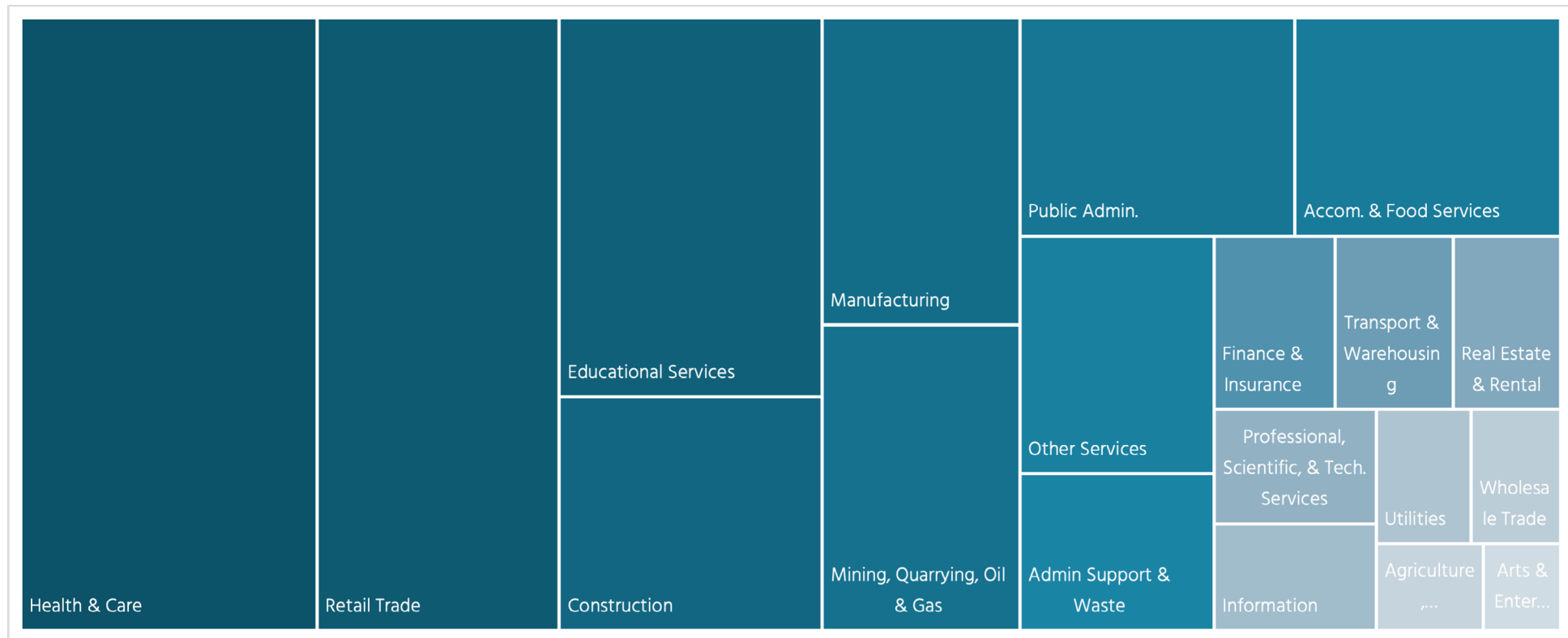
10.5% hold a bachelor's degree or higher, compared to 37.5% nationally.

# Harlan County's Economy

Harlan County's economy employs nearly 7,500 people and is valued at \$679 million. The top three most significant industries in Harlan County are Healthcare and Social Assistance, Retail Trade, and Educational Services. The median household income is just over \$35,000, approximately half of the national average (\$74,500), with the median male and female earnings at \$35,000 and \$28,000, respectively.

The median property value in Harlan County was \$71,300 in 2022, which is nearly 4 times lower than the national average of \$281,900. In 2023, 14.5% of the population was living with severe housing problems.

30% of the Harlan County population lives below the poverty line, a number higher than the national average of 12.5%. The latest unemployment rate in Harlan County was 8.2%, double the headline US rate (4.1%).





# Benefits of Improved Digital Connectivity

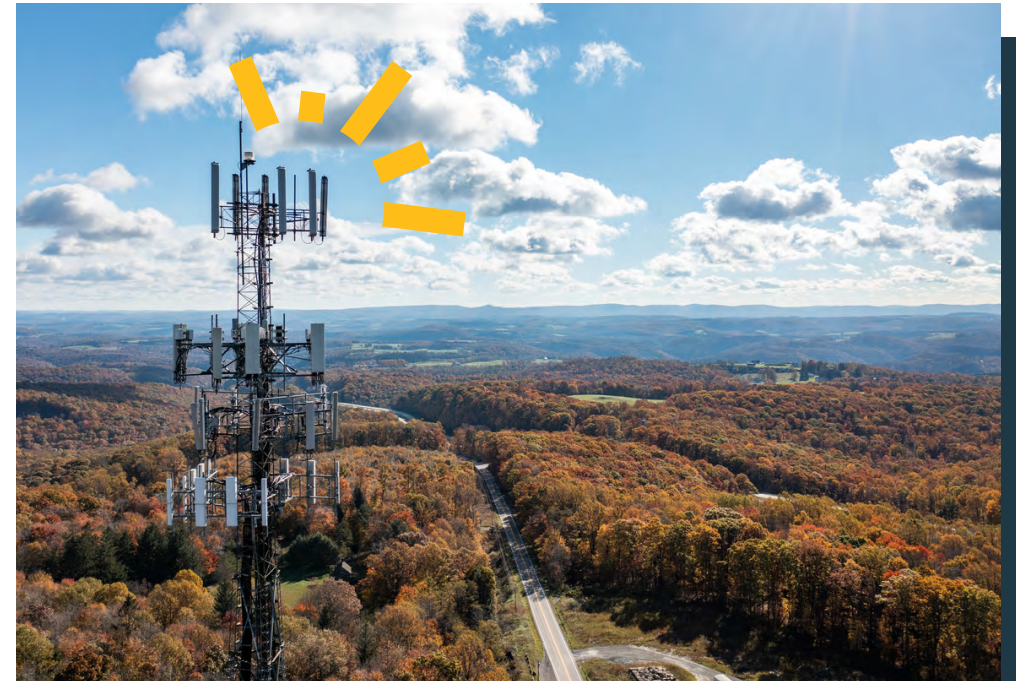


# Benefits of Improved Digital Connectivity

## Approach

The technical feasibility of delivering digital infrastructure to rural communities is not a significant barrier; the primary challenge lies in the cost of implementation and, more crucially, in demonstrating the perceived value or economic return on such investments. While various forms of infrastructure can provide connectivity, they each have limitations. For instance, a wired connection to a premise is straightforward and tangible, as it involves a physical line that transmits signals directly, ensuring reliable connectivity. In contrast, mobile and other wireless technologies are less tangible and are more susceptible to environmental factors like topology, which can significantly impact their effectiveness. These limitations make wireless options less reliable in certain rural areas compared to fixed connections. Ultimately, the challenge is balancing the high costs of infrastructure with the need to provide effective, value-driven connectivity solutions that meet the unique demands of rural communities.

FarrPoint has many years of experience and understanding of working with rural communities and the challenges they face with connectivity. We used this knowledge, combined with our expertise in digital connectivity and economic impact assessments, in our approach.



## Digital Connectivity is a key economic enabler

Digital connectivity is becoming more vital in driving economic growth, attracting inward investment, creating jobs and improving outcomes for people and communities. Improving availability and access to improved broadband is important for many of the key sectors within Harlan County and plays a crucial role in attracting inward investment to the area:

- Improved digital connectivity enhances connectivity and communication, creating significant transformational opportunities for **professional services and remote working**. Faster and more reliable broadband enables video conferencing, cloud-based collaboration, and greater access to digital tools, fostering increased productivity and efficiency. Professionals can now work from anywhere, reducing the need for commuting and allowing businesses to access a global talent pool.
- Making better use of digital connectivity is vital for driving innovation and growth in **Manufacturing, particularly in the automotive industry**, by enabling more efficient and streamlined production processes. Enhanced connectivity supports the integration of advanced technologies like IoT, AI, and robotics, leading to smarter, automated factories. This transformation facilitates real-time data collection and analysis, improving decision-making and predictive maintenance and optimizing supply chain management. Access to advanced digital connectivity enables the creation of digital twins, allowing manufacturers to simulate and refine production processes. The automotive industry and its wider supply chain help to drive innovations in autonomous vehicles and smart manufacturing, enhancing product quality and reducing costs while enabling rapid adaptation to market demands.
- As with other areas of Manufacturing, improved connectivity is also key to driving the expansion and innovation within the **Aerospace Industry** supply chain. Better broadband enables real-time data sharing and improved communication across stakeholders. It supports IoT integration for precise tracking, enhances AI-driven analytics for demand forecasting, and increases supply chain visibility. This leads to optimized operations, reduced delays, and improved efficiency, ultimately lowering costs and enhancing responsiveness to market demands.
- Increasing access to digital connectivity can also drive investment in **Clean Energy Manufacturing**; on one hand, it enables smart grid technologies and real-time data monitoring for efficient energy distribution. Broadband and cellular connectivity allows remote management of renewable energy systems, enhances predictive maintenance, and enables seamless integration of distributed energy resources, improving efficiency and reliability in clean energy production and distribution.
- **Healthcare** is the largest sector in Harlan's economy. Better digital connectivity improves access to telemedicine/ telecare, enhances real-time data sharing, and supports remote patient monitoring. It enables efficient coordination among healthcare providers, boosts patient engagement, streamlines operations, reduces costs, and enhances the overall quality of care. On the supply chain side, many of the benefits of improved connectivity are similar to those seen elsewhere within Manufacturing, for example, real-time data sharing and improved supplier coordination. It facilitates advanced analytics for demand forecasting and inventory management (e.g. enhancing IoT integration for tracking medical supplies). This results in optimized operations, reduced waste, lower costs, and improved responsiveness to market changes.
- Digital connectivity offers many benefits to **Retail, tourism, and accommodation and food services** through seamless e-commerce platforms. It can also support data analytics for personalized marketing, demand



forecasting, and real-time inventory management. For tourism, it also enables efficient booking systems, virtual and augmented reality tours/ activities, and real-time updates on travel services.

- Finally, the **Digital Economy** sector is based upon reliable and robust digital connectivity to ensure seamless communication, data transfer, and access to cloud-based services. For data centers, good quality fiber connectivity is crucial for providing the bandwidth and low latency needed to efficiently handle vast amounts of data. As highlighted across the other key sectors, strong connectivity underpins e-commerce, financial services, and remote working, driving economic growth and innovation while minimizing downtime and enhancing overall performance.

“Providing access to broadband has been a top priority for the Harlan County Fiscal Court over the last six years. Investments by the federal government, state government, local government, and private sector providers have expanded that access across our county. We still have much work to do in this area to improve access in underserved areas and expand it to unserved zones. We are committed to continually evaluating improving this infrastructure while striving to see it more affordable for anyone who desires better connectivity. Access to broadband is as essential as access to water and electricity in today’s evolving world and broadband is critical to improving education outcomes and creating more good paying jobs.”



**Dan Mosley**

HARLAN COUNTY JUDGE/EXECUTIVE



## Importance of increasing broadband coverage

Historically, broadband coverage in many parts of Harlan County has been poor due to the region's rural nature, making deployment costs prohibitively high, as shown in the Digital Connectivity Mapping. However, current efforts within the area, including a \$2.7 million investment from the Appalachian Regional Commission (ARC) and funding from the Federal Communications Commission's Rural Digital Opportunity Fund (RDOF), and enhanced Alternative Connect America Model (E-ACAM) initiatives, will improve broadband access across the county. These investments represent significant steps toward enhancing connectivity and bridging the digital divide in Harlan County. Nevertheless, based on FCC maps, we estimate that there will be over 6,450 premises in the county that still experience poor connectivity despite these initiatives, with 135 of this currently expected to have no broadband connection despite the ongoing government initiatives. This highlights the ongoing need for further investment to ensure that all communities and businesses have access to reliable, high-quality digital connectivity.

Increasing broadband coverage is crucial for driving economic growth, as it enables greater access to digital tools, services, and markets. High-speed internet allows businesses to operate more efficiently, reach global customers, and adopt innovative technologies, leading to increased productivity and competitiveness. **Research** on the roll out of broadband across the OECD, shows that providing broadband coverage to those without can lead to a 0.47% annual increase in GDP, and improving speeds for those under-served can increase it by 0.09%. Applying this to the improved coverage for 6,315 households who are under-served and 135 unserved in Harlan County could result in an estimated \$2,700,000 boost to the county's GDP, over 15 years, demonstrating the significant economic impact that enhanced broadband access can have on the local economy.

In addition, it is widely acknowledged that homes with access to a reliable, high-quality broadband connection are valued higher than those without. A strong digital infrastructure not only enhances daily living but also increases property desirability, making robust broadband access a key factor in determining a home's market value and overall appeal. **Research** has shown that homes with access to a 25 Mbps broadband connection have approximately 3% higher value than similar homes in neighborhoods with 1 Mbps, with other **evidence** suggesting that underserved homes also receive a premium through improved connectivity. Applying this to the improved coverage for 6,450 households in Harlan County could result in an estimated overall increase in home value of \$6,000,000.

This analysis indicates that improving the coverage and quality of broadband connectivity to 6,450 premises in Harlan County could generate an economic impact of \$8,700,000 over 15 years, significantly contributing to its long-term economic growth and development.

**\$8.7 MILLION**  
**FROM IMPROVING BROADBAND COVERAGE**  
**AND QUALITY**





## Significance of enhancing digital connectivity adoption

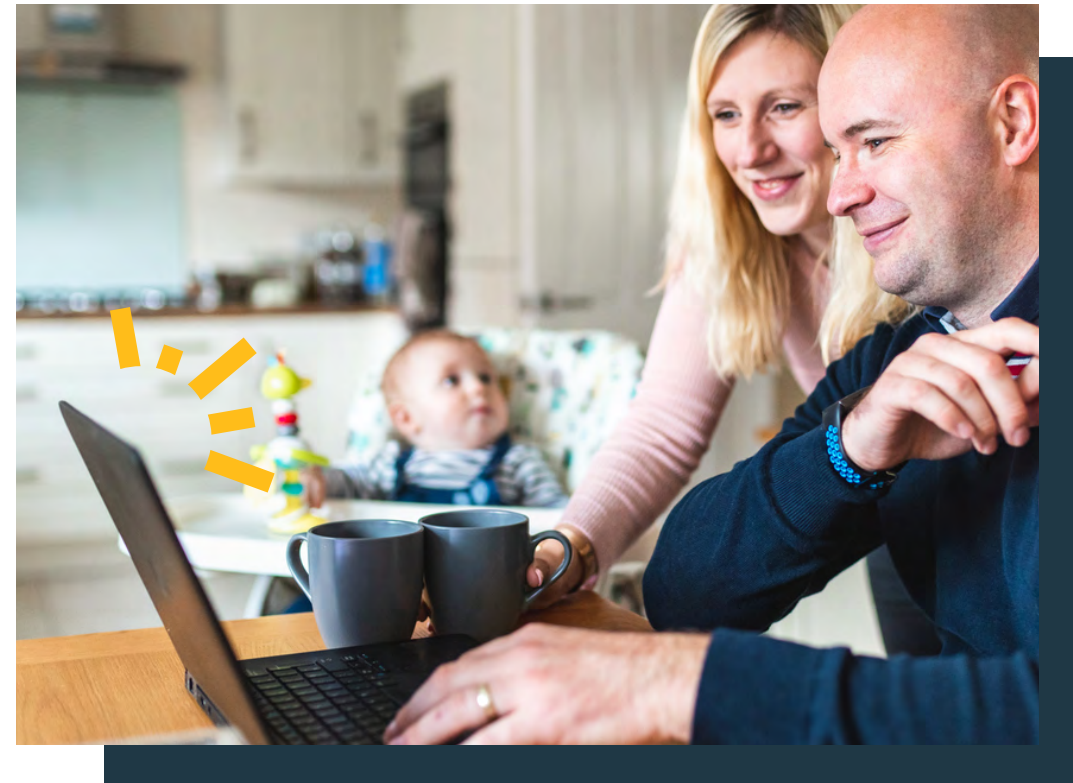
To fully harness the economic benefits of digital connectivity, it is crucial to ensure not only that high-quality digital infrastructure is available but also that there is widespread digital adoption.

Whilst the availability of infrastructure is a barrier to some households adopting digital services, other key factors include affordability, digital literacy, and concerns about online security and well-being. High costs for devices and internet services can make digital access unattainable for low-income individuals and communities. Additionally, a lack of digital skills prevents many people from effectively using technology, limiting their ability to benefit from online resources and opportunities. Cultural resistance and concerns over privacy and security further complicate adoption, creating additional obstacles to achieving widespread digital inclusion.

Evidence from the most recent Census shows that only 79.5% of households in Harlan County have a broadband internet subscription (compared to 85.7% in the state of Kentucky and 88.3% across the US). Additionally, only 85.7% of homes in the county have access to a computer (compared to 91.7% in Kentucky and 93.9% nationally).

Without adopting online connectivity these households have not been able to realise the true economic returns available to them. By applying the GDP increase from the utilisation of broadband connectivity, analysis suggests that if the communities and businesses across Harlan County were able to maximize their adoption of digital connectivity, this could impact the local economy by \$5,600,000 over 15 years.

**\$5.6 MILLION**  
FROM INCREASING ADOPTION OF DIGITAL  
CONNECTIVITY







## Case Study 1: “Affordability is one of the key barriers to school kids accessing the Internet in Harlan”

Jeff Phillips, who works at the Harlan County Board of Education and also the local school, said that good connectivity is a big part of children’s education in Harlan.

Luckily the school has reliable high-speed broadband, that serves staff and pupils well when they are on premises. The picture changes quite a lot when it comes to internet access at home. “I wouldn’t be able to work from home simply because my broadband is not good enough”, said Jeff.

Both availability and affordability are big issues to school kids accessing the internet at home. Access to the internet is key to digital inclusion, as it is used by school kids for research, homework and collaboration. With the county being one of the lowest earning in the region and having high broadband prices, affordability gap is even wider in Harlan.

“During Covid we had school buses with Wi-Fi serving those with no internet access to ensure that school kids could continue their learning by going online.” It seems that similar interventions would be beneficial post-covid and ensure digital divide is minimized.





## Impact of digital connectivity on reducing depopulation

A major challenge for Harlan County is depopulation due to a weakening economy. The county's population has dropped by over 36% in the past 40 years and is expected to continue decreasing in the coming decades.

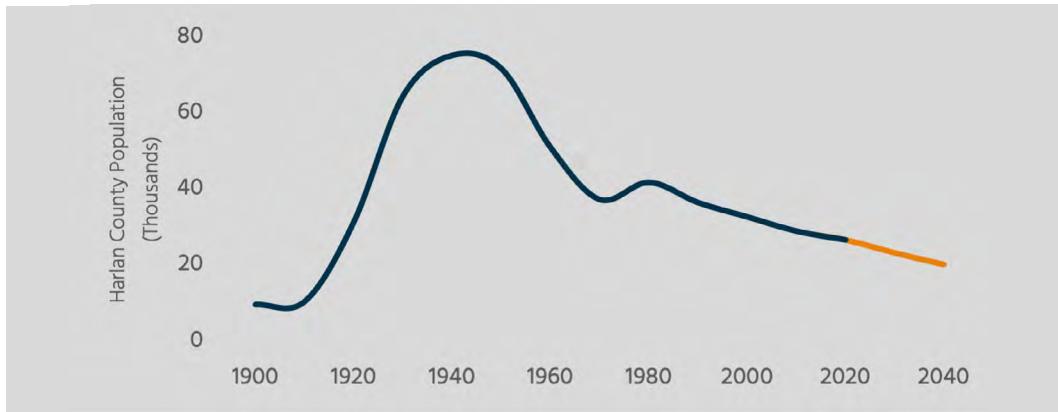


Figure 1: Harlan County Population (Source: US Census, Kentucky State Data Center)

**Research** has shown that providing broadband access to rural areas is important for mitigating depopulation trends. By addressing locational disadvantages, improved digital connectivity facilitates remote work, supports digital sector growth, and enhances market access and innovation. High-speed broadband also boosts housing opportunities and e-services. Evidence indicates that depopulation rates in areas with better digital connectivity have been 0.4% more favorable compared to areas without broadband expansion.

Applying this analysis to population projections for Harlan County suggests that improved broadband could result in over 1,000 people either re-locating or staying in the county. This could result in an economic impact of over \$57,200,000 over 15 years.

**\$57.2 MILLION**  
 FROM REDUCING THE IMPACT OF DEPOPULATION





## Case Study 2:

# “Poor connectivity would have been ‘the deal breaker’ for buying my dream house in Harlan”

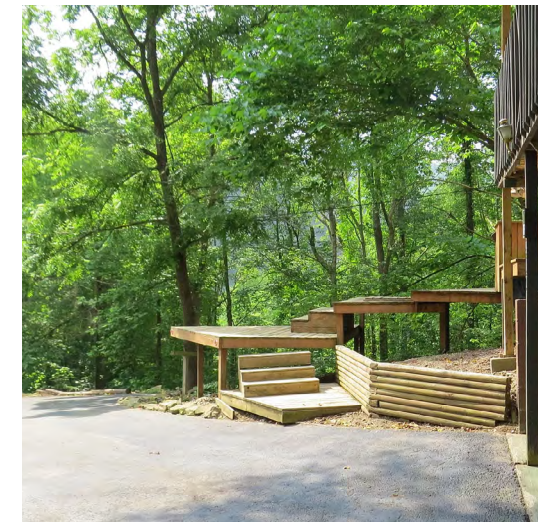
Pedro Morgado, a manager in software development, originally from Florida, found his dream home nestled in the scenic mountains of Harlan. Captivated by the area’s beauty and the house he saw online, he decided to make the big move. However, one critical issue nearly derailed his plans: a lack of connectivity.

Working remotely, he knew reliable fiber broadband was essential, so he asked the real estate agency about it before committing. If fiber internet wasn’t available, it would have been the deal-breaker. There was no cell coverage on premises, but fortunately, the home had excellent fiber service, which sealed the deal.

While the fiber has rarely gone down—only during power outages—he now pays \$114 monthly, more than double the \$55 he paid in Tampa, Florida. Despite the steep cost, the internet has been his lifeline, especially since cell reception in Harlan, both at his home and in the center of town, is notoriously poor. Pedro also uses fiber to connect his internet of things devices. Without fiber, not only would he struggle to work, but even making phone calls would be a challenge.

In the end, reliable broadband was one of the key considerations securing his dream home in the mountains of Harlan.

\*Pedro relocated to Harlan through the SOAR Remote Worker Attraction Program





## Overall impact of improved digital connectivity

Digital connectivity is becoming increasingly critical for driving economic growth, attracting investment, creating jobs, and improving outcomes for communities. As technology advances, having a robust digital infrastructure is essential for supporting various sectors and industries, enabling them to thrive in a competitive environment.

For Harlan County, expanding broadband access and promoting digital adoption are key to unlocking its economic potential. Improved connectivity will enhance business operations, support job creation, and make the area more appealing to investors. Ensuring widespread access to high-quality broadband is fundamental to the county's long-term development and overall prosperity.

Our analysis indicates that boosting the availability and adoption of digital connectivity in Harlan County could generate a substantial economic impact of \$71,500,000 for the region's businesses and communities. This increase in connectivity would enhance growth, efficiency, and overall prosperity.

**\$71.5 MILLION**

**OVERALL ECONOMIC IMPACT OF INVESTING IN  
DIGITAL CONNECTIVITY**



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