FROM the GROUND UP:
INVESTING in the HUMAN INFRASTRUCTURE of BROADBAND

by **COLIN RHINESMITH, PhD** and **REVATI PRASAD, PhD**

with significant contributions
from **CAROLINE STRATTON, PhD** and **LARRA CLARK**

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Broadband Delivers Opportunities
and Strengthens Communities

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The ENDURING and UNIVERSAL NEED for the HUMAN INFRASTRUCTURE of BROADBAND

Access to broadband impacts economic growth, educational attainment, civic engagement, health care, and agriculture. Universal broadband access increases U.S. economic resilience in the face of natural disasters. But while internet access is a precondition to digital equity, importantly, broadband adoption, or an internet subscription at home, matters even more.

We've long understood the societal risks of uneven adoption of the internet. As far back as 1995, the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA) found that while all socioeconomic groups were making gains, disparities in computer and internet use were persistent along income, race, gender, geographic, and disability divides. Fifteen years later, the Federal Communications Commission (FCC) reported in its 2010 National Broadband Plan that while 65 percent of Americans used broadband at home, that means there were still 35 percent (roughly 80 million adults) who did not. The FCC reported that "some segments of the population— particularly low-income households, racial and ethnic minorities, seniors, rural residents and people with disabilities" were being left behind.

But 30 years after NTIA's initial findings, these same disparities continue. While 95 percent of all households have at least one type of computer (e.g., desktop, laptop, smartphone, or tablet), "smartphone-only" households are "more likely to make $25,000 or less annually, be headed by someone 65 years and over, or have a Black or Hispanic householder." Smartphone-only users are at a disadvantage when it comes to particular activities online.

Understanding that certain socioeconomic groups have been and remain disproportionately impacted by digital inequality, Congress recognized that additional investments were needed to help vulnerable populations get and stay online. In 2021, Congress included the Digital Equity Act in the Infrastructure Investment and Jobs Act, giving NTIA the tools to comprehensively address the digital divide with special attention to specific "covered populations":

1. Individuals who live in covered households;

2. Aging individuals;

3. Incarcerated individuals (as defined by the State or Territory), other than individuals who are incarcerated in a federal correctional facility;

4. Veterans;

5. Individuals with disabilities;

6. Individuals with a language barrier, including individuals who—

   a. Are English learners; and

   b. Have low levels of literacy;

7. Individuals who are members of a racial or ethnic minority group; and

8. Individuals who primarily reside in a rural area.

Why do these particular populations need equitable solutions to digital equity challenges?

- People who live in low-income households have difficulty paying for internet service because of their limited monthly incomes.

- Aging individuals may have concerns about safety and technology use; they may also be impacted by disabilities that make it challenging to obtain and use accessible digital technologies.

- Members of racial or ethnic minority groups have lower rates of broadband adoption and computer usage largely because many racial or ethnic minority groups also live in lower-income households.

- Rural residents face challenges accessing affordable and reliable high-speed internet service.

While these covered populations appear discrete on the page, many people belong to multiple categories simultaneously. And data compiled by the U.S. Census Bureau shows that, taken together, the covered populations make up a majority of the population. Across 50 states, covered populations represent anywhere from 70 percent to 95 percent of the population.

The Digital Equity Act investment builds on a long-standing understanding of the digital divide and how human support, in addition to the measures to improve infrastructure and the affordability of broadband service, is needed to ensure universal broadband adoption.

As new technologies—such as artificial intelligence, smart computing, and other machine-learning-driven advances—become widely integrated into our society and economy, the need for the people and organizations that support the use of these broadband-enabled advancements only grows. A recent study by the National Skills Coalition (NSC) analyzed 43 million "Help Wanted" ads and found that 92 percent of jobs required digital skills. NSC contrasted this sizable demand against findings from a previous study, the Organisation for Economic Co-operation and Development (OECD) Survey of Adult Skills, identifying that "31 percent of US workers ages 16-64 had limited or no foundational digital skills." Bridging this gap in the demand for digital skills and their prevalence in the workforce will require dedicated attention and investment.

Vulnerable populations beyond those legally defined as "covered populations"—such as LGBTQ+ individuals and domestic violence survivors—also may need on-demand support from those who are aware of unique risks and opportunities.

To further quantify the need for the human infrastructure of broadband through ongoing investments in digital equity, it's important to first paint a picture of what this human infrastructure of broadband looks like in action. In communities across the United States, the people and organizations that comprise the human infrastructure of broadband—including schools, public libraries, and other community-based organizations—are working collectively to finally close the digital divide.

INTRODUCTION

When the COVID-19 pandemic forced people to shelter in their homes, individuals and families found themselves unable to access what they needed—broadband service—at the moment when they needed it the most. The human infrastructure of broadband stepped in to help. Schools ran device-lending programs. Local nonprofits helped people sign up for subsidized broadband. Digital equity coalitions emerged to coordinate support. Digital navigators helped people establish email accounts.

HOW CAN WE SUPPORT AND SUSTAIN THE HUMAN INFRASTRUCTURE OF BROADBAND EVEN AFTER CURRENT FEDERAL INVESTMENTS HAVE ENDED?

Some of these programs had been doing this work for years, but the scale of disruption was such that they expanded the services they provided and prioritized one-to-one direct support. And organizations that had never before considered integrating "digital equity" into their work recognized a need and rolled up their sleeves. Connecting people to the internet is essential because it ensures that all people in the United States can fully participate in the digital economy, our society, and our democracy.

The "human infrastructure of broadband" refers to the people and organizations that provide direct support to individuals to access affordable internet and devices and teach people the digital skills necessary to make use of connectivity and fully participate in modern society.

Infrastructure **becomes visible only upon breakdown**. Otherwise it operates in the background of daily life, largely invisible when it is functioning as intended. But when a water main breaks, a power grid fails, or a cell network has an outage, we are forced to recognize

A COLLABORATIVE RESEARCH PROJECT with LEADERS in the FIELD

The Benton Institute for Broadband & Society is leading the Human Infrastructure of Broadband Project in close collaboration with an advisory committee of prominent leaders and researchers in the field:

- **Larra Clark,** American Library Association

- **Colin Rhinesmith,** Digital Equity Research Center, Metropolitan New York Library Council

- **Caroline Stratton,** National Digital Inclusion Alliance

Over the course of a year, we conducted surveys, wrote case studies, and held convenings of experts and policy entrepreneurs. *The Human Infrastructure of Broadband: Looking Back, Looking Around, and Looking Ahead* explained how this work is the necessary social and relational complement to the work of building physical infrastructure. The report provides the historical and conceptual underpinnings of this work, as well as a landscape assessment of the ongoing efforts in the field. The dozen case studies that followed delve into our taxonomy of programs—core, complementary, and coalition—to understand how they function and whom they are best positioned to serve.

The partners in this research have deep knowledge of and extensive experience in broadband policy and digital equity issues.

the essential role that infrastructure plays in our lives. Infrastructure failures can also reveal broader systemic inequities because they often disproportionately impact marginalized communities. The human infrastructure of broadband provides a lifeline particularly for vulnerable populations most impacted by social and digital inequality.

How can we support and sustain the human infrastructure of broadband even after current federal investments have ended?

The crisis of the pandemic prompted a significant investment in helping to get people online. The Consolidated Appropriations Act, the CARES Act (Coronavirus Aid, Relief, and Economic Security Act), and the American Rescue Plan Act (ARPA) directed resources for the expansion of broadband infrastructure and digital equity. The Infrastructure Investment and Jobs Act built on these foundations, directing $42.5 billion for infrastructure deployment, $14.2 billion for the Affordable Connectivity Program, and $2.75 billion to digital equity.

BECAUSE

THE EXISTING DIGITAL DIVIDE IS LARGELY AN ARTIFACT OF ENTRENCHED ECONOMIC AND RACIAL DISPARITIES;

NEW TECHNOLOGIES WILL EMERGE, CAUSING OUR DEVICES AND SKILLS TO BECOME OUTDATED; AND

OUR LIVES WILL BECOME EVER MORE DIGITIZED,

WE WILL NEED PEOPLE AND ORGANIZATIONS THAT HELP CONNECT OTHERS TO THE INTERNET.

Beyond this federal investment, however, funding sources for digital inclusion programs are few and far between. Ironically, the scale of recent public funding can give rise to questions from philanthropies asking why their money is needed and what their role should be. With the National Telecommunications and Information Administration (NTIA) receiving 700 applications from digital equity organizations requesting more than $6.5 billion in funding—a sum five times the amount of funding available in the first round—we know current federal funding is not enough.

The **American Library Association** "provides leadership for the development, promotion, and improvement of library and information services and the profession of librarianship to enhance learning and ensure access to information for all." Libraries are critical nodes for connectivity, and librarians have long served as the human infrastructure of broadband. The technology and people at over 17,000 public library locations have "helped millions of Americans get online for the first time to complete essential tasks including job searches, homework, and applications for veteran and healthcare benefits."

The **Benton Institute for Broadband & Society** is an over-40-year-old nonprofit focused on broadband policy, working to make sure everyone in the United States can use and benefit from high-quality, affordable broadband. Benton provides timely information, rigorous evidence, practical guidance, and advocacy support to policymakers and broadband practitioners, researchers, and advocates to articulate and implement a "broadband for all" agenda.

The **Digital Equity Research Center at the Metropolitan New York Library Council** until recently served as the home for Director Dr. Colin Rhinesmith. Rhinesmith is a nationally recognized expert in the field of digital inclusion and broadband adoption. He founded this community-engagement and participatory research center to advance digital equity in the Metropolitan New York area and beyond. During this project, Dr. Rhinesmith transitioned to a new role as a visiting associate professor in the School of Information Sciences at the University of Illinois Urbana-Champaign.

The detrimental consequences of not having internet access—on income, on health care, on accessing government services—for our society will be devastating.

This report looks to the future, bringing together insights from previous research and convenings, to craft recommendations for how we can strengthen and sustain the human infrastructure of broadband.

- Section I presents our recommendations for how to sustain this work going forward, informed by our research and the policy and expert convenings we conducted.

- Sections II and III draw on case studies we commissioned and the three expert working groups we convened to present the dynamics of the human infrastructure of broadband at work.

- We close by reiterating the ongoing, universal need for a human infrastructure of broadband and call on our field to build on the current momentum now.

While we outline potential actions at the national level, we are focused on local and state actions, too.

This report is written for policymakers at all levels of government, philanthropic and nonprofit organizations, and other stakeholders. We look forward to working with project partners and others on implementing the recommendations to sustain the human infrastructure of broadband even after current federal investments have ended.

The **National Digital Inclusion Alliance** is a nonprofit organization based in the United States that "combines grassroots community engagement with technical knowledge, research, and coalition building to advocate on behalf of people working in their communities for digital equity." With more than 1,900 affiliates from all 50 states, the District of Columbia, American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and 41 Tribal entities, NDIA represents a national social movement for digital equity. These affiliates represent the human infrastructure of broadband in action.

INVESTING in the HUMAN INFRASTRUCTURE of BROADBAND

Several impactful models to boost broadband use and adoption are evolving. Leaders in the digital equity field must think strategically and holistically about how to sustain, improve, and expand the human infrastructure of broadband. Action is required at the local, state, and national levels if meaningful, effective, and sustainable support is to be established.

This section outlines specific actions that key stakeholders—including policymakers, philanthropic organizations, corporate partners, and communities—can take now to ensure that current digital equity services do not abruptly end, stranding people on the wrong side of the digital divide.

In October 2024, we assembled a group of distinguished policy entrepreneurs (listed in sidebar) who have extensive experience in broadband deployment, community development, and digital opportunity. The Benton Institute for Broadband & Society team presented our research findings from the prior phases of the Human Infrastructure of Broadband project, including the outcomes from expert working groups; the Core, Complementary, and Coalition case studies; and the landscape assessment. In a discussion led by Dr. Colin Rhinesmith and Dr. Revati Prasad, participants shared their expertise on policy interventions and their knowledge of community development and digital equity issues. Based on their collective input and building on the project's research, we have developed a framework to sustain this work even after current federal investments have ended.

PARTICIPANTS in the POLICY CONSULTATION

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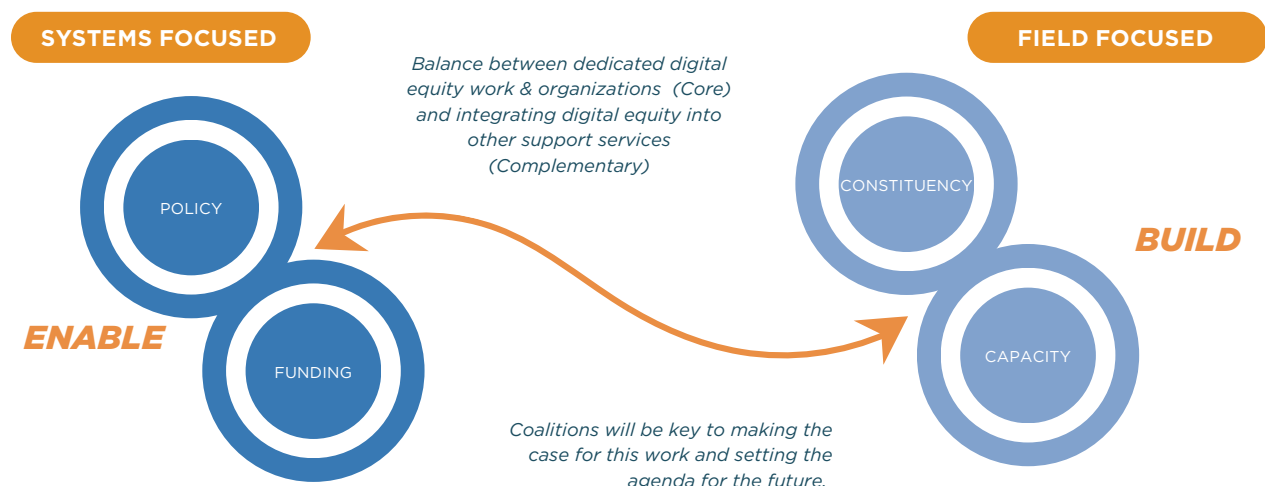**Christa Vinson,** Rural LISC

Brian Vo, Connect Humanity

A FRAMEWORK for SUSTAINABILITY

Figure 1 captures our recommended framework that includes systems-level factors and reflects the on-the-ground environment—both of which impact the human infrastructure of broadband. Before diving into a (non-exhaustive) list of actions that will advance digital equity at local, state, and national levels, we outline some key principles of our approach.

BALANCE: Our research consistently demonstrates that supporting the human infrastructure of broadband requires both a dedicated investment in digital equity and concerted efforts to integrate digital equity into other support services. We use the term "core" to refer to contexts in which pursuing digital equity is a primary mission and the term "complementary" to refer to contexts in which digital equity efforts support the pursuit of a different mission, such as providing health care or education to the public (that is, helping people adopt and use technology complements achieving an organization's primary mission). We find that both core and complementary programs are necessary. While health care, education, and workforce programs can address some portion of digital support needs (complementary), people still need a trusted place to go for on-demand support (core). Complementary programs might serve a narrow base of clients (e.g., students, patients, residents of affordable housing); core programs can provide technology support to all comers.

AGENDA SETTING: The COVID-19 pandemic was the most persuasive argument in favor of directing critical resources to broadband access and adoption. Going forward, coalitions will be key to advancing the argument and the agenda at the local, state, and national levels. Coalitions can draw organizations that are new to the work but can see the value of direct human support to broader societal goals. Coalitions will be key to reinforcing learnings and improving implementation by disseminating best practices and connecting organizations to expertise.

Figure 1: INVESTING in the HUMAN INFRASTRUCTURE of BROADBAND

SYSTEMS FOCUSED

FIELD FOCUSED

Balance between dedicated digital equity work & organizations (Core) and integrating digital equity into other support services (Complementary)

POLICY

CONSTITUENCY

ENABLE

BUILD

FUNDING

CAPACITY

Coalitions will be key to making the case for this work and setting the agenda for the future.

Strengthening and sustaining the human infrastructure of broadband will be a collective effort. The following recommendations invite policymakers at all levels of government, nonprofits, advocates, philanthropic organizations, and other stakeholders to envision their roles in the shared effort of advancing digital equity.

SYSTEMS-FOCUSED

1 Ensure a **supportive policy environment** that builds on existing wins and establishes incentives and oversight for future progress.

The response to the pandemic and the infrastructure investment that followed reflected serious forward momentum in supporting the physical and human infrastructure of broadband. We must not squander that momentum. Most urgently, this should include these actions:

- **Create a permanent affordable connectivity program.**

    The loss of the Affordable Connectivity Program (ACP) reverberated throughout the field. The cost of internet access remains the most significant barrier to wireline and wireless broadband adoption. A national replacement to the ACP or state efforts like New York's Affordable Broadband Act are needed to ensure that all consumers can take advantage of e-commerce, health care access, and other online resources.

- **Empower state broadband offices to conduct ongoing oversight.**

    The discussions about the loss of the ACP also drew attention to the knowledge and capacity that can be squandered when promising initiatives are allowed to sunset. Policy consultation participants argued that state broadband offices must remain active and operational beyond the life of current infrastructure deployment programs. These roles will help consolidate knowledge, ensure ongoing attention to digital equity, and provide oversight to ensure that government, industry, and nonprofits are all delivering on the promises they make.

2 Develop **innovative approaches to financing** this work.

Our research not only surfaced the ongoing need for investments in the human infrastructure of broadband; it also underscored the importance of establishing funding mechanisms not tied to an annual appropriations process, or a one-time infusion of

funds. The field needs consistent streams of funding. Recommended approaches included strategies akin to supplemental Pell Grants, revenues from online gambling, and congressionally established nonprofit foundations:

- **Create mechanisms within state budgets to address the digital divide.**

  Digital equity advocates can play an essential role in organizing for local and state digital equity funding. Organizing efforts have led to significant legislation, such as the Digital Equity Act (HB 1723) in Washington State, focused on "closing the digital equity divide by increasing the accessibility and affordability of telecommunications services, devices, and training." Maryland, New York, and Illinois are some of the other states that have developed their own grant programs through state legislation. These initiatives have given states a leg up in preparing for funding from the federal government, as well as being prepared after these federal programs have ended. Our case study about the City of Seattle's Technology Matching Fund (TMF), which is funded by cable franchise fees, offers another model for funding digital inclusion activities at a local level.

- **Integrate direct digital support funding into housing programs, telehealth, workforce development legislation, and elsewhere.**

  Discussions in our expert working groups and policy consultation highlighted some existing public benefit programs that are already devoting resources to direct digital support and pointed to where programs, such as the U.S. Department of Housing and Urban Development (HUD)'s ConnectHome initiative, provide opportunities for multiple stakeholders to work together to design community-specific solutions to digital inequities. These examples offer lessons that can be replicated through both state- and federal- supported initiatives. The National Skills Coalition and Federal Reserve Bank of Atlanta have argued that all workers need the opportunity to develop the digital skills needed to engage with current and future technologies. Federal legislation, such as the Workforce Innovation and Opportunity Act, should include funding to support the foundational digital skills that workers need to stay competitive in our global economy. The Department of Health and Human Services (HHS) and Department of Veterans Affairs provide resources and services to support people's access to telehealth. HHS and state health agencies can support the human infrastructure of broadband in communities by providing grants and other resources to core, complementary, and coalition entities that help government health agencies achieve their missions.

- **Develop a market-based mechanism to support community-based investments.**

  [The Community Development Financial Institutions (CDFI) Program](#), through the U.S. Department of the Treasury, supports mission-based organizations by providing financial assistance awards and technical assistance grants to help meet the unique needs of economically underserved communities. A similar market-based program should be created to support core, complementary, and coalition digital equity organizations interested in offering products and services to strengthen the human infrastructure of broadband.

- **Leverage e-commerce revenues to fund digital equity initiatives.**

  E-commerce sales continue to be a significant and growing part of the U.S. economy. In in November 2024, the [U.S. Census Bureau estimated](#) that e-commerce sales for the third quarter of 2024 were $300 billion. Revenues from online retailers, financial institutions, and other businesses should be leveraged to help fund digital equity initiatives that further support financial goals of e-commerce enterprises.

- **Call on place-based philanthropy to prioritize digital equity.**

  The COVID-19 pandemic showed the incredible strength of community foundations and other philanthropic partners in supporting the three legs of the digital inclusion stool described in this report. Philanthropy must continue to help build local capacity through grants that support organizing and community coalition building efforts.

- **Ease administrative burdens on small organizations to pursue funding.**

  Smaller organizations that have built trust and ties especially in marginalized communities often lack the administrative capacity to apply for large federal or state grants. As our research showed, Northwest Center, a community-based organization that has prioritized community voice, faces the all-too-common challenge of securing grant funding. The ACP outreach grants administered by the FCC, which supported many of the programs in our database, opted for a subrecipient model [explicitly because](#) it facilitates "smaller entities that may not have the capacity or resources to apply for grants and comply with reporting requirements and allows for leveraging pass-through entity resources and expertise."

FIELD-FOCUSED

1 **Expand the constituency** with diverse stakeholders from the local business community, financial institutions, and organizations representing covered populations.

The human infrastructure of broadband is also the human infrastructure of telehealth, e-government, e-commerce, and every other part of society that requires the internet to participate. For-profit businesses, government, health care, and other sectors are able to fulfill their missions and achieve their goals because of the human infrastructure of broadband. Digital equity advocates can show other people how to see themselves in the work toward digital equity by connecting it to the issues that matter to them. Tangibly, this means:

- **Build a bigger table.**

  The field of digital equity should be more expansive, from local to national levels. Developing networks with representatives from covered populations, businesses, local government, financial institutions, and many others will be necessary to grow a national social movement for digital equity. Covered populations represent a wide swath of the American public. Older adults, veterans, and rural residents, for example, include extremely diverse sets of socioeconomic groups. Building bridges across these groups and the organizations that represent their interests will be necessary to garner stronger support for digital equity and the human infrastructure of broadband.

- **Make the case.**

  There is an urgent need to develop high-level arguments that make it easy for other stakeholders to understand the stakes and support the work of the human infrastructure of broadband. This includes using language that connects with specific audiences. Terms such as "workforce development," "social determinants of health," and "financial inclusion" have existing stakeholders in philanthropy, community development, and public health. Weaving together the parlance of digital equity with the terminology of these established sectors will help us form stronger alliances and networks.

- **Shine a spotlight.**

  State broadband and digital equity offices should continue to create opportunities for digital equity grant recipients to showcase their work and elevate their communities in the work to advance digital equity in the coming years. Highlighting

leaders across the state can help others to see and emulate what leadership looks like in the digital equity field. Many states have held convenings, such as statewide digital equity summits, to bring core, complementary, and coalition entities together. Additional convenings and opportunities for sharing best practices and building relationships across the state can help disseminate learnings and increase the visibility of the human infrastructure of broadband.

- **Identify the anchors for growing constituencies at local and national levels.**

    Coalitions need leadership and direction in order to ensure lasting impact. At a local level, advocates and practitioners should identify the leaders in digital equity ecosystems who are best positioned to corral and coordinate action. At the national level, this could take the form of a national foundation, similar to the National Park Service or the Ad Council, to leverage funding from public and private partnerships and other investments in digital equity. Similar to the Digital Equity Foundation Act, this foundation would "award grants, support research, provide training and education, engage with stakeholders, collect data, and promote policies to improve digital equity outcomes." This foundation can serve as a steward for ongoing support after current investments have ended.

2 **Build capacity among organizations, local governments, and others** to create and sustain healthy digital equity ecosystems in rural, Tribal, suburban, and urban communities across the country.

In the wake of the pandemic, the human infrastructure of broadband has grown significantly, developed greater expertise, and gained more visibility. We need to continue to build on this momentum and consolidate and cultivate the capacity of the field by taking steps such as these:

- **Create a people pipeline: workforce development for the human infrastructure of broadband.**

    Our research demonstrated that the human infrastructure is distributed and not always apparent. Often assistance is provided by those who do not have direct digital support as a part of their job responsibilities, but they are whom people turn to. Librarians, for instance, are often called upon to stretch their scope. Recognizing that someone will have to provide this support, we have to ensure that they are properly resourced, knowledgeable, and trained.

- **Develop, disseminate, and institutionalize best practices, toolkits, and models that integrate digital equity into other support services.**

    Our research—particularly the taxonomy of core, complementary, and coalition models—demonstrates a range of approaches for how local capacity can be built by leveraging partnerships and developing trust. One clear and consistent finding across our research was that digital equity cannot be divorced from other forms of need and so the most effective organizations consider wraparound services for individuals and families in need. We need to lighten the load for this work by examining and elevating how successful programs are doing this work.

- **Support research that identifies needs and promising approaches to this work and demonstrates the impact of digital support and the costs of digital exclusion.**

    We need to understand where to target limited resources, what approaches prove fruitful, and the impact of digital equity interventions. This research and learning work is essential to building a broader coalition by successfully making the case for the human infrastructure of broadband and drawing in additional stakeholders. Most crucially, we need to ensure that the work itself is informed by evidence. Support for research must entail financial support and the research expertise, particularly for smaller organizations where staff capacity is already overtaxed. Strengthening data literacy among small organizations is essential, equipping them with the skills to navigate, interpret, and leverage data for their own advocacy, sustainability, and decision-making.

WE NEED TO ENSURE THAT WE RESEARCH *WITH,* NOT *ON,* COMMUNITIES.

    We need to ensure that we research *with,* not *on,* communities. A community-engaged approach and participatory action research center community storytelling and equity by allowing participants to share their lived experiences, which should be highlighted through their own words, voices, and perspectives. Critically, data justice must be integral to this work, ensuring that data is collected, used, and governed in ways that protect community rights and agency.

CORE, COMPLEMENTARY, and COALITION:
The THREE C's of the HUMAN INFRASTRUCTURE of BROADBAND

Earlier in this project, we developed a taxonomy for the **operational models of the human infrastructure of broadband**. Additionally, we conducted 12 case studies (see Appendix 2) to investigate multiple examples of the three models—core, complementary, and coalition. Taken together, the case studies indicate features of each model, including their relative advantages and common challenges. This section presents an overview of the three models, which informed our recommendations above.

No single model is preferable. In fact, a mix of the three models in every community has the greatest potential to serve those most impacted by social and digital inequalities. All three models need ongoing support. Digital navigators play a critical role across all models, bridging the gap between technology and users by providing device setup, digital skills training, and connectivity assistance.

CORE

The "core" model refers to organizations for which digital inclusion work is central to their primary mission. The two types of organizations categorized in the core model are public libraries and digital-inclusion-focused nonprofits. Public libraries provide information services for communities, which include supporting public access and use of digital information. Digital-inclusion-focused nonprofits are oriented around the pursuit of digital equity.

The four organizations profiled in core case studies all provide skills training, along with other digital navigation services. The nonprofits, Free Geek and Everyone On, offer resources such as devices, digital skills curricula, and train-the-trainer programs to facilitate other organizations' digital inclusion efforts.

The two significant comparative advantages of the core model are that these organizations typically have the **greatest subject-matter expertise** about digital inclusion in their communities and they **serve the greatest possible range of people and needs**. The two advantages are related: diverse members of the public seek support with everything from general digital skills training to highly specific uses of technology that require advanced digital skills, so organizations and staff continuously adapt services proactively and reactively. In addition, services are generally available to all, with few limitations on who can seek support.

Finding consistent and sustainable sources of support is critical particularly for core organizations because the availability of external funding and the attention to their primary mission have fluctuated over time. Library operating funding may be more stable because of the local obligation to provide information services to the public on an ongoing basis; however, funds specifically for digital navigation and other tech support are more episodic. For instance, since its inception, the digital navigator program that the Mercedes Library in Texas began in 2021 has been funded by three different grants. As a small library, it needs additional funding to continue to deliver technology support services, to compensate qualified team members for leading this work, and to grow this program beyond regular library patrons.

Our core nonprofits demonstrate the importance of diverse sources of funding and revenue. Everyone On came close to shuttering, but it has been able to fund its work through a combination of federal and state grants, public-private partnerships, and philanthropic support to sustain its work. In addition to grants, Free Geek generates revenue by selling some of the devices it refurbishes.

Our core case studies underscore the relational aspects of direct support work. Digital navigators need people skills to develop engaging relationships with community members.

Technical support abilities are not the only priority when choosing strong candidates for this work. These organizations also stressed that one-on-one, recurrent support can be emotionally challenging for digital navigators as they hear about community members' challenges. Training staff on establishing boundaries and ensuring that they have support for their emotional labor are essential.

Partnerships are necessary for core organizations to amplify their reach. Free Geek chose to partner with another nonprofit, Guerreras Latinas, to provide services at a new location in East Portland, Oregon, putting the organization in close physical proximity to the people it hoped to serve. The Denver Public Library's partnership with the Department of Human Services helps it better serve people with intellectual and developmental disabilities.

Core organizations have a great deal to offer others in the digital inclusion field, including complementary organizations, in terms of resources, experience, and connections. But dedicated funding may be needed to take on and sustain collaborative services (e.g., convening coalition meetings, training staff of other organizations).

COMPLEMENTARY

The "complementary" model refers to organizations that have layered digital inclusion work onto existing endeavors, because these organizations recognized that digital equity furthered their overarching mission. Organizations like schools, health care providers, and housing authorities aren't the first places a person might turn to for help accessing and using the internet. These places might also be restricted to specific populations, such as students or residents in public housing.

The five case studies for this model all reflect a shared commitment to enhancing connectivity and digital skills through tailored and community-centric approaches.

COMPLIMENTARY CASE STUDIES:

Mass General Brigham Understands That Digital Equity Supports Health Equity

Northwest Center Engages Community, Advances Digital Skills

The Cuyahoga Metropolitan Housing Authority Leans Into Collaboration

North Carolina Community College System Brings the Classroom to the Learners

Digital Connect Makes Digital Navigation Approachable

Complementary programs are best positioned to **leverage existing resources and relationships** to amplify their digital inclusion work. As our case studies demonstrate, the Cuyahoga Metropolitan Housing Authority was able to access funds from the U.S. Department of Housing and Urban Development to support digital navigation work. The Digital Connect Initiative in Arizona was able to experiment and learn, develop a strong vision for the organization, and become competitive for grants because its parent company, Gila River Telecom, was committed to supporting the work. Complementary programs are able to draw in people they already serve. A consistent and sustained presence is essential to earning community trust, particularly in underserved areas, and complementary programs can build on existing trust. The Tribal government's messaging around the Digital Connect Initiative helped legitimize the work and engender trust among Gila River Indian Community members.

Because complementary programs have existing missions, adding a new work stream can present a number of challenges. Adding digital inclusion activities requires institutional commitment and buy-in. Mass General Brigham, for instance, recognized digital equity as a component of broader inequities that impacted the health of historically marginalized groups. The hospital's Digital Access Coordinator program was supported by the organization's United Against Racism initiative. For the North Carolina Community College system, digital navigators proved key to retaining students throughout the instructional period. By supporting those who might otherwise drop a course due to frustration, lack of access to a computer, or lack of consistent access to broadband, digital navigators helped meet the educational goals of the colleges.

Layering additional services can require particular expertise among staff. Many of the complementary organizations that we profiled emphasized providing services to community members, by community members. Recruiting staff from the communities they serve has helped increase local leadership, ownership, trust, and accountability. But integrating new services in existing workflows is not straightforward. Mass General Brigham compared different strategies on how best to integrate direct digital support with clinical care.

Strong partnerships allow programs to share resources, avoid duplication of efforts, and enhance their collective impact. For the North Carolina Community College system, partnerships have been critical for raising awareness about learning opportunities and providing venues for class instruction. Bringing the classroom to the community accommodates those for whom commuting is difficult or prohibitive and provides a level of comfort and familiarity conducive to learning.

THE "COMPLEMENTARY" MODEL ILLUSTRATES THE POWER OF COMMUNITY-ROOTED, COLLABORATIVE APPROACHES TO BRIDGING THE DIGITAL DIVIDE.

The "complementary" model illustrates the power of community-rooted, collaborative approaches to bridging the digital divide. Integrating digital skills programs with other community resources (e.g., financial literacy, housing assistance) addresses the interconnected challenges of digital

exclusion. However, although these programs are able to access particular sources of funding in times of financial crunch, digital support services might be the first to be jettisoned.

COALITION

Coalitions bring together a variety of organizations aimed at advancing digital equity.
Their membership can be made up of core and complementary programs, but together, they are focused on digital equity.

COALITION CASE STUDIES:

Black Churches 4 Digital Equity: Community Anchors and Committed Advocates

Seattle's Equity-Based Approach to Digital Inclusion

The Kūpuna Collective Impact

This model's comparative advantages are recruitment, coordination, and advocacy. Firstly, coalitions are key to recruiting new organizations into digital equity ecosystems, as well as connecting them to expertise and knowledge. Black Churches 4 Digital Equity is a coalition aimed at educating and activating Black church leaders in service of digital equity, coordinated by the Multicultural Media, Telecom, and Internet Council (MMTC). Since its inception, Black Churches 4 Digital Equity has facilitated intense learning for nearly 50 church leaders, helping transform their churches into digital equity leaders in their communities. This case study highlights the importance of the Black church as a community leader and demonstrates the value of community-specific anchor institutions in digital equity.

Coalitions are valuable outlets for sharing resources, including financial resources. The City of Seattle does not directly run coalitions, but it leverages the power of municipal leadership to support coalitions. Using the Technology Matching Fund (TMF), which is funded by cable franchise fees, the City of Seattle provides financial support to local organizations providing navigator services, digital skills training, or device distribution. The City also supports initiatives like the Digital Equity Learning Network, which connects grantees, city officials, and other stakeholders, creating a regional ecosystem of shared learning and mutual support. Sharing best practices and centralizing resources and knowledge enable small organizations to implement community-focused solutions.

While coalitions can be formed and run voluntarily, our case studies demonstrate that there are significant benefits to having an anchor organization that provides crucial administrative support. The Kūpuna Collective in Hawai'i is run by the Hawai'i Public Health Institute and the University of Hawai'i Center on Aging. The Kūpuna Collective provides administrative and technical support, holding regular coalition calls that have fostered cross-sector collaboration and led to initiatives such as tailored digital skills courses in libraries and low-cost broadband advocacy. Similarly, the Black Churches 4 Digital Equity effort was able to be launched quickly and effectively because of MMTC's organizational reputational capital and the vibrant network of the program's founder, Dr. Fallon Wilson.

Lastly, coalitions are necessary to develop and advance a shared agenda. Black Churches 4 Digital Equity was incredibly active in the advocacy to continue ACP. More than 400 Black church leaders signed a letter to then–Vice President Kamala Harris. Churches hosted a week of nationwide community activations and took their ACP stories to Capitol Hill to advocate for digital equity.

Coalitional approaches to digital equity—exemplified by the City of Seattle, the Kūpuna Collective, and Black Churches 4 Digital Equity—demonstrate the power of collaboration in bridging the digital divide.

A robust and resilient human infrastructure of broadband will rely on all three operational models—core, complementary, and coalition—to successfully address the problems of broadband access, adoption, and effective application. Our research reveals how these models provide support, what they are best suited to accomplish, and the support they need in turn to help all people use broadband to better their lives.

SKILLS, SERVICE, and DEVICES:
The WORK of the HUMAN INFRASTRUCTURE of BROADBAND

Through our landscape assessment, we identified three main services that the human infrastructure of broadband supports:

- Helping people build digital skills;

- Connecting people to broadband services; and

- Providing access to devices and device maintenance.

We convened three expert working groups addressing the three services, recruiting experts and leaders in the field. Drawing on these discussions, this section presents our findings about current best practices and the support needed to continue to provide these services. Specific insights from the expert working group discussions informed our recommendations above.

HELP PEOPLE BUILD DIGITAL SKILLS

The human infrastructure of broadband plays an essential role in helping people to gain the skills needed to participate fully in our economy and society. The field uses a variety of terms for this work, such as digital skills, digital literacy, and technology literacy. For example, the **American Library Association defined digital literacy** thusly:

> "Digital Literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills."

The National Skills Coalition **defined "digital skills"** as a combination of foundational skills, such as "email, simple spreadsheets, data entry, or timecard software," and industry-specific skills, "such as bookkeepers using QuickBooks, manufacturing workers using AutoCAD, or home

health aides using electronic medical records." These are the skills that everyone needs in order to work, learn, and play online.

Digital skills are often defined by a person's digital needs. For example, people often visit public libraries because there is something they are trying to learn. As one of our expert working group participants explained:

> Very often, if a learner is walking in the door, they have a functional thing they want to do, and the skill is a mechanism to help them do that. I want to be able to talk to my kids' teacher. I want to be able to video chat with my grandmother in a different country. I need to be able to do online banking.

In our expert working group sessions, participants described the dynamic or tension that often exists between offering on-demand support to learners, based on people's individual specific needs, and classroom-based digital skills offerings that involve several people at one time. Individual on-demand support is extremely helpful and effective in a one-on-one setting that can be tailored to unique lived experiences and needs. However, as our expert working group members explained, this is one of the "biggest pain points," particularly when it comes to scaling on-demand services, because it can often be more expensive, requiring greater human support. Classroom settings may be more appropriate for advanced skills, like those skills mentioned above. In these classroom settings, our experts described learners as:

> People who **a)** have some idea of what they need to learn, **b)** who are motivated enough to make a commitment over time, **c)** because a structured curriculum is effective for that type of learning, and lastly **d)** because often you want to be able to demonstrate to someone else that you acquired this skill.

Our experts also discussed the need for comprehensive assessments and standardization in digital skills training. This is particularly important to assist learners in being able to demonstrate to employers that they have the skills needed for a particular job. Digital badges might be a solution to this problem. As the ALA's Center for the Future of Libraries describes, [digital badges](#) "offer opportunities to recognize individuals' accomplishments, skills, qualities, or interests and help set goals, motivate behavior, represent achievements, and communicate success in learning offered through schools, professional settings, or daily life."

The need for privacy and safety training is also essential to ensure that people are well equipped to prepare themselves against digital harms, such as online scams, surveillance, and misinformation. Our experts described that not everyone faces the same kinds of risks or threats. Therefore, tailored training is needed to ensure that solutions are best suited for specific populations. For example, many surveys of older adults have found increasing concern about online safety: in its online survey of 2,807 adults ages 18 and older, [AARP Research found](#)

that 34 percent of people ages 50 and older cited privacy concerns as a top barrier to adopting new technology. Integrating privacy and safety training into digital skills on-demand or classroom offerings can help to ensure that digital skills training is effective.

Participants in our expert working groups also pointed to best practices in teaching digital skills. This includes integrating skills into all touchpoints with learners and using storytelling and humor to make learning fun. They also stressed that safety is a practice. In other words, you can't download something safely one time and then automatically be safe in the future. Learners need to understand that being safe online is an ongoing practice. Lastly, as our experts explained, it's essential for trainers to build trust with learners, particularly in one-on-one classes. This sense of trust helps learners feel comfortable sharing more about their needs and challenges. However, as one of our experts described, "trust is not tapioca pudding, just add water. It takes time to build." One way to build this trust is by employing people from communities most impacted by the digital divide.

PARTICIPANTS in EXPERT WORKING GROUP: SKILLS

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CONNECT PEOPLE to BROADBAND SERVICES

There is an ongoing need for affordable and reliable broadband access, yet significant questions remain regarding how this access should be funded. A national survey of participation in the FCC's Affordable Connectivity Program (ACP) revealed the demand for financial assistance for broadband requested by military families, older adults, people living in rural areas, and other covered populations. Among those who participated in this national survey of ACP participants, 81 percent of ACP parents worried about their children falling behind in school without home internet access, 75 percent of ACP participants feared losing access to online health care services, and 65 percent of ACP participants feared losing their jobs without the financial assistance provided through the program. Twenty-three million people were enrolled in ACP before the program ended on June 1, 2024, after Congress failed to reauthorize funding.

The ACP was a positive development, but it relied on the human infrastructure of broadband to be effective. Many organizations worked on behalf of the FCC to help many of the 23 million

households to enroll in the ACP program. Then, with the loss of the program, not only did these households that had enrolled in the program lose this safety net, but also, small, new, or nonprofit networks that were counting on ACP funding became concerned about how they could sustainably serve their communities without the program. At the same time, the human infrastructure of broadband lost trust from the communities they serve. Unfortunately, the loss of the Affordable Connectivity Program hung heavily over all of our expert convenings.

There is a national need for a renewed ACP. Otherwise, as our experts explained, we are only left with bandages. Experts mentioned that digital equity advocates need to put pressure on ISPs to make sure they offer low-cost plans that are easy for people to enroll in. NDIA's Grading Internet for Good helps people evaluate low-cost plans' affordability and quality. One promising development is using federal housing subsidies to cover the cost of internet service. Experts in our working groups also recommended that digital equity advocates work with local governments to provide their own networks over the long term. Other efforts mentioned included increasing access to public Wi-Fi and offering incentives for anchor institutions to provide community Wi-Fi networks and Wi-Fi hotspots.

PROVIDE ACCESS to DEVICES and DEVICE MAINTENANCE

The experts in our working group session expressed concern that most people, even those in the digital equity field, do not see this "third leg of the stool" as an area in need of funding. One expert described the need for affordable device access as "the red-headed stepchild of the digital equity world." As this individual told us, before he started working in this field, "If you had said 1 in 5 people don't have a computer at home—I would not have believed you." Data from national studies provide additional evidence of this disparity in digital device access. For example, in 2024, the Pew Research Center presented findings from a national survey to show that 15 percent of U.S. adults are "smartphone dependent" and that those who live in lower-income households are more likely to have smartphone-only internet access at home.

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Dr. Dominique Harrison, Minority Broadband Initiative, NTIA

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Rebecca Ranallo, Cuyahoga County Public Library

Jesse Shekleton, JCE Co-op

Monique Tate, CTNY

Several people in our working group session talked about their efforts to get people free or affordable devices, which relies on a process of device refurbishing and reuse. The focus for refurbishers tends to be on establishing an efficient model to ensure that they are getting enough devices in and then getting them back out to people who need them. As our experts described, "Devices can't sit around—they aren't fine wine—so if you don't want to hand people vinegar, you need a lean, efficient system."

Many of the most active refurbishers are also using the refurbishing model as a teaching tool to help people understand the dual benefits of providing families in need with low-cost devices while keeping these same devices out of landfills to protect the environment. The Kramden Institute in North Carolina uses the refurbishing process as a chance for high schoolers to learn technical skills. As our experts explained, this hands-on experience tells you about "the power of demystifying technology ... especially at a moment when technology aims to be seamless and invisible— cracking open the hood can be incredibly empowering."

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Adam Sharma, Human-I-T

Casey Sorensen, PCs for People

Karisa Tashjian, Digitunity

Marvin Venay, Tech Goes Home

The "Learn to Earn" model was also mentioned as very popular among refurbishers and others who support access to low-cost devices for individuals and families in need. Our experts, particularly those working to provide people with new devices, underscored the value of "unboxing" technology and the excitement to learn that comes with it. Many refurbishers' distribution models rely on **"learn to earn"** programs. For example, people can take a three-week skills course and get an appropriate device at the end of it.

We also heard several best practices when it comes to providing affordable devices. One best practice is to have tech support built into device offerings. As one of our experts described:

> It isn't as simple as handing people a device. A device in some ways is the gateway to a bunch of other services. How you ensure the devices stay in "working order"? So they have to run a call center, but also a place for people to go when they have problems.

Another best practice is to go where people are. Computer refurbishers often partner with other community-based organizations and help them do the work. This is why understanding the entire digital equity ecosystem matters when making sure that people can gain access to the digital inclusion services they need.

CONCLUSION:
ENGAGE NOW

We close with a call to arms. We must engage now to leverage the energy and momentum established through federal investment.

The current funding for digital equity will not permanently close the digital divide. It cannot. We must demonstrate why (and which) needs persist, and how a more robust and resilient human infrastructure of broadband can help us tackle these ongoing challenges.

The cost of broadband remains a primary obstacle for adoption. And as the research on subscription vulnerability has shown, adoption can be fragile as people lose jobs or encounter other financial challenges.

Skills are outpaced by evolving technologies—and emerging threats. The rollout of generative artificial intelligence (AI) has prompted global calls for AI literacy, positioning it as the "new digital divide." In December 2024, government agencies began recommending the use of end-to-end encrypted communications, a new practice for the majority of people, because the U.S. phone network had been infiltrated by hackers linked to China.

Devices are designed to be disposable or become obsolete. Device refurbishers and right-to-repair advocates have gained ground by highlighting the environmental impacts of e-waste and pushing approaches to keep devices operational longer. But device maintenance and eventual replacement remain continuing needs.

These are not challenges merely for the "covered populations." The ongoing digitization of our lives, commerce, and public services continues to push us all online. The human infrastructure of broadband extends a hand to pull us more online. We must help the helpers. Investing in their capacity, securing resources for their work, and helping them to connect better to the communities they serve and across sectors will all be crucial to capitalize on the current investment and build sustainably for the future.

APPENDIX 1:
PARTICIPANTS in the WORKING GROUPS and POLICY CONSULTATION

We extend our sincere appreciation to all those who contributed their expertise, time, and commitment to this research project.

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APPENDIX 2

CASE STUDIES for CORE, COMPLEMENTARY, and COALITION MODELS

CORE – Organizations with Digital Equity at Their Core

Denver Public Library, People Skills Are the Most Important Quality When Choosing Digital Navigators by Shelli Golson-Mickens

The Mercedes Library Exemplifies a Vital Effort to Promote Digital Independence by Shelli Golson-Mickens

How Everyone On Navigates Change to Deliver Digital Equity by Chris Ritzo

Free Geek, Devices, and Digital Equity by Caroline Stratton

COMPLEMENTARY – Integrating Digital Equity into Other Support and Services

Mass General Brigham Understands That Digital Equity Supports Health Equity by Chris Ritzo

Northwest Center Engages Community, Advances Digital Skills by Grace Tepper

The Cuyahoga Metropolitan Housing Authority Leans Into Collaboration by Chris Ritzo

North Carolina Community College System Brings the Classroom to the Learners by Tsion Tesfaye

Digital Connect Makes Digital Navigation Approachable by Jess Auer

COALITION – Working Collaboratively to Advance Digital Equity

Black Churches 4 Digital Equity: Community Anchors and Committed Advocates by Jess Auer

Seattle's Equity-Based Approach to Digital Inclusion by Stacey Wedlake

The Kūpuna Collective Impact by Grace Tepper

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