

The Broadband Imperative for Digital Age Libraries

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I. INTRODUCTION

When asked about the future of libraries in the digital age, Vint Cerf, Chief Internet Evangelist at Google said, “You have no idea how eager I am to ensure that the notion of ‘library’ does not disappear –

it's too important.”¹ While acknowledging libraries' value, his statement is also disturbing, implying that libraries' very survival is in jeopardy. Yet part of Cerf's concern stems from his own work. After all, Google has revolutionized how people access knowledge, allowing people direct access to information without needing intermediary institutions such as libraries. A world of information is just a click-of-a-mouse or touch-of-a-screen away, throwing the 21st century library into an identity crisis. Nonetheless, the role of the “library” as a portal of free information open to all has almost universal and enduring appeal. So how do we ensure that the library doesn't disappear in this new digital age?

Broadband provides part of the answer. Digital media offers libraries the opportunity to create, store, analyze, and make available digital information for the general public. In fact, some libraries are transforming themselves to become centers of creation. Whether or not libraries can embrace these new opportunities depends on the quality of their Internet connectivity. To remain responsive to their communities' needs and embrace these digital opportunities, libraries need robust, high-speed wireless, and wireline broadband connections at affordable rates. Unfortunately, many libraries are still struggling to obtain even basic broadband connectivity, which is inhibiting their ability to adapt, grow, and thrive in this new digital world.

This brief essay describes the broadband imperative for libraries. It begins by surveying some of the ways that forward-looking libraries are embracing technological change and taking advantage of digital media tools to re-position themselves for the future. Next, this essay documents libraries' dire shortage of high-speed broadband connectivity and explains what it will take to connect all libraries to gigabit speeds. Finally, this essay suggests how an investment in high-capacity broadband for libraries can pay off in terms of both economic development and digital equity for everyone in their communities.

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¹ Paul Sawyers, *The Future of Libraries*, INSIDER (Aug. 22, 2013), <http://thenextweb.com/insider/2013/08/22/the-future-of-libraries/#gref> [<https://perma.cc/R33Z-ZLM4>].

II. LIBRARIES HAVE A LONG HISTORY OF ADAPTING TO SOCIETAL CHANGE, BUT THE GROWTH OF DIGITAL TECHNOLOGIES POSES A SPECIAL CHALLENGE.

Libraries have always adapted to the most readily available technology. As far back as 2300 BCE libraries stored legal papers, bills, divorce papers, literature, and poems written on clay tablets.² The Library of Alexandria was famous for its huge collection of papyrus scrolls, and many of the most famous thinkers and philosophers used those documents in their studies. From ancient times to the present, libraries have served not just as sources of knowledge, but also as meeting places and facilitators of research and new ideas. From private and monastic libraries, to subscription and membership-only libraries, and then to circulating and public libraries, libraries have evolved throughout history from serving as storehouses of information for the elite to interactive, democratizing resources for everyone.

The rapid digital dynamic of the 21st century brings forth a new chapter in libraries' evolution and spurs an entirely different type of transformation. The Internet makes troves of information available to anyone with a computer and an Internet connection. Rather than bemoaning these changes and clinging to the past, libraries across the country are embracing technological change and are incorporating digital technologies into their core community services. The digital tools being integrated into library curriculum were unimaginable even a decade ago: videoconferencing, digital media labs, 3D printers, wireless devices, and wearables, etc. Libraries today are almost unrecognizable compared to libraries of just a generation ago.

In the past five years alone, "makerspaces" have become a significant new library trend.³ Makerspaces, which refer to designated areas for people to create their own software, videos, and gadgets, are the perfect example of the technological innovation that modern libraries foster. Makerspaces are part of the larger Do-It-Yourself (DIY) Movement, which also includes "Hackerspaces" (sometimes used interchangeably with makerspaces but with a focus on

² *Id.*

³ *Make It @ Your Library Website Launches, Connecting Librarians with Makerspace Projects and DIY Resources*, AM. LIBR. ASS'N (Oct. 28, 2013), <http://www.ala.org/news/press-releases/2013/10/make-it-your-library-website-launches-connecting-librarians-makerspace> [<https://perma.cc/5NTW-J4LX>].

technology), “Fab Labs” (fabrication labs) and other designated areas for learning and creation.⁴

Fayetteville Free Library’s Makerspace in New York, which is considered the first public library makerspace, started with a single MakerBot Thing-O-Matic 3D printer. Now it houses both Apple & PC computers, a “Green Screen” wall, video cameras, podcasting equipment, and Adobe Creative Suite. These digital tools allow anyone to become their own movie producer or app developer.

While not directly concerned with rows of manuscripts, makerspaces and the larger DIY Movement go hand-in-hand with the public library’s traditional role as a catalyst of knowledge in communities.⁵ Accordingly, the Institute for Museum and Library Services (IMLS) has thrown its support behind this movement by funding digital studios, tech-focused technology, and various digital media labs. In addition, over one hundred members of the Urban Libraries Council signed a letter to President Obama pledging the commitment of public libraries to being centers of creation, and the American Library Association (ALA) started holding webinars that focus specifically on makerspaces.⁶

Makerspaces and digital literacy programs are often designed specifically to attract young people. For instance, the Brooklyn Public Library (BPL) started a program for teens to learn new digital skills. In addition to training teens in the technologies that may be required for future educational and job opportunities, these programs also educate librarians about what tech trends will endure, and which may not. The Carnegie Library of Pittsburgh initiated a technology-based elementary outreach program called BLAST (Bringing Libraries and Schools Together) to integrate a wide variety of technologies that support literacy and learning.⁷ Similarly, Denver Public Library offers

⁴ CHRISTINA BENTON ET AL., MICH. ST. U. EDA U. CTR. FOR REGIONAL ECON. INNOVATION, MAKERSPACES: SUPPORTING AN ENTREPRENEURIAL SYSTEM 7-8 (2013), http://reicenter.org/upload/documents/colearning/benton2013_report.pdf [<https://perma.cc/7NHX-X39C>].

⁵ Sarah H. Scott, *Making the Case for a Public Library Makerspace*, PUB. LIBR. ONLINE (Nov. 11, 2012), <http://publiclibrariesonline.org/2012/11/making-the-case-for-a-public-library-makerspace/> [<https://perma.cc/W9K3-DY35>].

⁶ *MakerSpaces in Libraries*, URB. LIBR. COUNCIL, <http://www.urbanlibraries.org/-makerspaces-in-libraries-pages-338.php> [<https://perma.cc/BZ5Q-2SVB>].

⁷ Rachel Nard, *All Hands on Tech: Exploring Technology in Kids Library Programming*, LIBR. AS INCUBATOR PROJECT (Oct. 13, 2015), <http://www.libraryasincubatorproject.org/?p=17346> [<https://perma.cc/XD9R-6NKW>].

a proactive summer program in neighborhood libraries to introduce at-risk teens to careers in STEM (Science, Technology, Engineering and Math).

There are countless examples of libraries with innovative programs and makerspaces, such as libraries that provide access to music and film recording studios, offer creative writing centers with digital platforms for publishing, or stream major art galleries to create visual museums. The Digital Public Library of America (DPLA) hosted at the Boston Public Library offers an extensive digital network of the country's libraries, archives, and museums.⁸ DPLA has even proposed a side-shoot project, DPLA Local, which would provide these digital services directly to local libraries. When fully realized, DPLA Local could transform community libraries into greater cultural portals. Stepping into your local Oklahoma library could be like stepping into the Metropolitan Museum of Art.

Some libraries are doing without books entirely. Omaha, Nebraska recently launched a bookless library called Do Space.⁹ Do Space is a technology library that offers free Internet access with speeds up to ten gigabits per second (Gbps) as well as computers, 3D printers, and other tools. While the phrase "bookless libraries" might raise some eyebrows, Director Rebecca Stavick says that "libraries as places are full of tools. Books are tools, scrolls are tools, and computers are tools." A bookless library is still a new concept. The first bookless, all-digital public library, BiblioTech, was founded in San Antonio, Texas in 2013. BiblioTech lends e-readers and digital content instead of physical books and also provides access to desktop computers, iPads, video tables, educational games, and more. By offering digital services in a low-income area, BiblioTech actively seeks to bridge literacy and technological gaps.¹⁰

These technological gaps, which often fall along racial and socioeconomic lines, are commonly referred to as the "digital divide."

⁸ AMY K. GARDNER, ASPEN INST., *RIISING TO THE CHALLENGE: RE-ENVISIONING PUBLIC LIBRARIES 21-22* (2014), <http://csreports.aspeninstitute.org/documents/AspenLibrariesReport.pdf> [<https://perma.cc/8CG5-FZRQ>].

⁹ Bill Kelly, *In Omaha, A Library with No Books Brings Technology to All*, NPR (May 31, 2016), <http://www.npr.org/sections/alltechconsidered/2016/05/31/477819498/in-omaha-a-library-with-no-books-brings-technology-to-all> [<https://perma.cc/Y9KX-X89C>].

¹⁰ *About BiblioTech*, BIBLIOTECH, <http://bexarbibliotech.org/about.html> [<https://perma.cc/CV7Z-48A5>].

Modern libraries are uniquely positioned to bridge the digital divide because they are already easily accessible in their communities, they are already regarded as trusted public institutions that provide a broad range of information services, and they already support diverse constituencies.¹¹ In addition, the idea that libraries should provide technology to communities is a widely held belief. A 2015 Pew library survey found that 70% of respondents thought libraries should teach digital skills.¹² ALA found that 97.5% of public libraries offer public Wi-Fi, 98% offer technology training, 89.5% offer access to e-books, 96.5% offer online homework assistance, and 95.6% offer online job resources.¹³

By providing public access to these technologies, libraries provide access to vital lifeline services. People visit their local libraries to search online job openings, do schoolwork, file their taxes, access online government services, and conduct legal or medical research. Many of these services or information sources are no longer offered in print format. If people don't have broadband access at home – which is the case for about one-third of American homes – then they must turn to other public institutions such as the library.¹⁴ In fact, library resources are often full to capacity, a testament to the valuable service they provide to their communities. Computer desktops regularly have waiting lists, laptops and tablets are checked out, and library Wi-Fi is heavily used. Increasingly, libraries seek to integrate technology into the everyday fabric of library services.

The digital revolution, which could have led to the demise of libraries, is instead contributing to their rebirth. But, whether they are

¹¹ URB. LIBR. COUNCIL, MAKING CITIES STRONGER: PUBLIC LIBRARY CONTRIBUTIONS TO LOCAL ECONOMIC DEVELOPMENT 2 (2007), <http://www.urban.org/sites/default/files/alfresco/publication-pdfs/1001075-Making-Cities-Stronger.PDF> [https://perma.cc/A5KE-MSVK].

¹² LARRA CLARK & KAREN A. PERRY, AM. LIBR. ASS'N, AFTER ACCESS: LIBRARIES & DIGITAL EMPOWERMENT (2015), http://www.ala.org/advocacy/sites/ala.org.advocacy/files/content/ALA%20DI%20After%20Access_final_12%2017%2015.pdf [https://perma.cc/R3U4-P2PY].

¹³ JOHN C. BERTOT ET AL., INFO. POL'Y & ACCESS CTR., 2014 DIGITAL INCLUSION SURVEY: SURVEY FINDINGS AND RESULTS 10-11 (2015), <http://digitalinclusion.umd.edu/sites/default/files/uploads/2014DigitalInclusionSurveyFinalRelease.pdf> [https://perma.cc/MD5S-MPTX].

¹⁴ John Horrigan & Maeve Duggan, *Home Broadband 2015*, PEW RES. CTR. (Dec. 21, 2015), <http://www.pewinternet.org/2015/12/21/home-broadband-2015/> [https://perma.cc/W7JT-5W5X].

able to rise to the challenge will depend in part on whether they can obtain access to the underlying high-capacity broadband necessary to fuel that change.

III. LIBRARIES NEED AFFORDABLE HIGH-CAPACITY BROADBAND TO SECURE THEIR FUTURE.

Libraries cannot position themselves for the future and realize their full potential in the digital world without high-capacity broadband. Webinars, virtual field trips, online tutorials, and bookless libraries – all of these exciting Internet-based services rely on access to high-speed broadband networks.

Broadband is defined as an “always-on” direct connection to the Internet and to other private data networks and services.¹⁵ For residential consumers, the Federal Communications Commission (FCC) decided that the minimum connection should be twenty-five Megabits per second (Mbps) for downloads and 3 Mbps for uploads.¹⁶ But libraries require much more bandwidth than the typical residential consumer. According to ALA, libraries serving communities under 50,000 should have at least one hundred Mbps and libraries serving communities with 50,000 people or more should have one Gbps capacity.¹⁷ The National Broadband Plan realized the importance of gigabit speeds and called for all anchor institutions to reach that level of connectivity by 2020. While significant strides have been made in the past few years, this goal likely will not be met. As of 2015, 82% of libraries, and 96% of rural libraries, have less than one hundred Mbps broadband capacity.¹⁸ In addition, by the time anchor

¹⁵ *Types of Broadband Connections*, FED. COMMC'N COMM'N (June 23, 2014), <https://www.fcc.gov/general/types-broadband-connections> [<https://perma.cc/KWE5-K2TP>].

¹⁶ *FCC Finds U.S. Broadband Deployment Not Keeping Pace*, FED. COMMC'N. COMM'N (Feb. 4, 2014), <https://www.fcc.gov/document/fcc-finds-us-broadband-deployment-not-keeping-pace> [<https://perma.cc/NR7T-Z4HC>].

¹⁷ AM. LIBR. ASS'N, COMMENT ON MODERNIZING THE E-RATE PROGRAM FOR SCHOOLS AND LIBRARIES 5 (2014), http://www.ala.org/advocacy/sites/ala.org.advocacy/files/content/advleg/pp/pub/file/ala_erate_comments_4_7_2014.pdf [<https://perma.cc/78DN-MKZF>].

¹⁸ *ALA, COSLA Help Libraries LEAP Ahead and Increase Broadband Capacity*, AM. LIBR. ASS'N (Oct. 19, 2015), <http://www.ala.org/news/press-releases/2015/10/ala-cosla-help-libraries-leap-ahead-and-increase-broadband-capacity> [<https://perma.cc/N827-8NXT>].

institutions achieve gigabit speeds, new technologies will demand even higher speeds. Greater effort must be made to improve libraries' broadband connectivity in order to meet these future demands.

Model programs like San Antonio, Texas and Cuyahoga County, Ohio demonstrate the difference that gigabit connections can make to a community. All twenty-nine library branches in San Antonio and nearly all libraries in Cuyahoga County have robust, one-gigabit broadband connections. Both library systems have used this connectivity to transform the library system into a "creative commons," a reliable environment where patrons can obtain digital literacy skills. San Antonio Public Library uses its fiber network to provide a wide range of community services, including hosting "Teen Tech Week," providing coding classes so that residents can develop computer software skills, and providing a maker fair so that library patrons can showcase the products and services developed at their local library.¹⁹ The Cuyahoga County Public Library is opening several "Innovation Centers" at its library branches, and has also provided a broadband portal so that library patrons can learn about their healthcare options and enroll online in insurance programs.²⁰ This trend in online services learning will only continue to grow in a more digitally-connected world, and libraries will need gigabit speeds or better to keep pace.

However, not all libraries are as fortunate. Even though virtually all public libraries offer public Internet access, not all libraries are able to muster the necessary broadband to deploy new Internet-based services to their communities. A variety of studies show that libraries across the country are underserved and unconnected. A California state library system survey found that 27% of libraries were still using T-1s, a very old and slow technology providing about 1.5 Mbps.²¹ According to ALA, 42% of all public libraries have a broadband

¹⁹ SAN ANTONIO PUB. LIBR., <http://mysapl.org/Home.aspx> [https://perma.cc/CW9P-H7DF].

²⁰ Karen Farkas, *Cuyahoga County Public Library Opens Innovation Center*, CLEVELAND.COM (Feb. 12, 2016) http://www.cleveland.com/metro/index.ssf/2016/02/cuyahoga_county_public_library_4.html [https://perma.cc/7WVX-6CJB].

²¹ GERALD MAGINNITY & JARRID KELLER, CAL. ST. LIBR., HIGH-SPEED BROADBAND IN CALIFORNIA PUBLIC LIBRARIES: AN INITIATIVE OF THE CALIFORNIA STATE LIBRARY 33-34 (2015), http://www.library.ca.gov/lds/docs/Public_Library_Broadband_Assessment_2014.pdf [https://perma.cc/U47T-2RZL].

connection at ten Mbps or slower, which is only 1% of the gigabit speeds that the National Broadband Plan demanded.²²

The connectivity constraints are especially obvious in rural America. Only 4% of rural libraries have speeds of one hundred Mbps or higher compared to 36% of their urban counterparts.²³ The library in Red Lodge, Montana, a tourist town close to Yellowstone, has Internet speeds of just five Mbps because no provider will offer service. Due to low population density, greater geographical distances, and topographical barriers, Internet service providers often can't build out to these remote locations. As a result, rural libraries cannot offer support services, such as Internet and computer training classes, or innovative initiatives such as makerspaces.²⁴ Yet it is in these rural areas where public access to Internet is especially crucial since these communities are least likely to have broadband connections at home.²⁵

IV. ATTEMPTS TO ADDRESS LIBRARIES' DIGITAL NEEDS HAVE MADE PROGRESS BUT HAVE NOT SOLVED THE PROBLEM.

As noted above, libraries need one hundred Mbps to one Gbps speeds in order for them to be future-ready and forward-looking, but most libraries have connection speeds that are far slower than these targets. There have been several attempts to address this shortage (discussed below) that have made progress in improving libraries' connectivity, but policy-makers will need to step up their efforts to make adequate speeds a reality for all libraries.

²² INFO. POL'Y & ACCESS CTR., PUBLIC LIBRARIES AND BROADBAND 2-3 (2015), http://digitalinclusion.umd.edu/sites/default/files/BroadbandBrief2015_1.pdf [<https://perma.cc/7ZGH-8D9Q>].

²³ BERTOT ET AL., *supra* note 13.

²⁴ BRIAN REAL ET AL., INFO. TECH. & LIBR., RURAL PUBLIC LIBRARIES AND DIGITAL INCLUSION: ISSUES AND CHALLENGES 6-7 (2014), <https://ejournals.bc.edu/ojs/index.php/ital/article/viewFile/5141/pdf> [<https://perma.cc/4ZK2-X4PT>].

²⁵ Only 55% of rural households subscribe to broadband as of the end of 2015, a drop of 5% since the previous Pew study in 2013. See JOHN B. HARRIGAN & MAEVE DUGGAN, PEW RES. CTR., HOME BROADBAND 2015, at 8 (Dec. 21, 2015), <http://www.pewinternet.org/files/2015/12/Broadband-adoption-full.pdf> [<https://perma.cc/4G7V-HZLN>].

A. *The Broadband Technology Opportunities Program (BTOP)*

The Broadband Technology Opportunities Program (BTOP) made great strides in connecting libraries to high-speed broadband. The American Recovery and Reinvestment Act of 2009 authorized the National Telecommunication and Information Administration (NTIA), an arm of the U.S. Department of Commerce, to award over \$4 billion to build broadband infrastructure, improve public access to technology resources and expand digital literacy training. The BTOP program succeeded in connecting over 25,000 anchor institutions, including about 2,000 libraries, about 12% of all 17,000 library branches.²⁶ While the BTOP program provided essential “middle mile” connections to communities and libraries across the country, many libraries are still in need of high-capacity “last mile” connections to connect to these “middle mile” networks.²⁷

B. *ConnectED Library Challenge*

President Obama announced his ConnectED Library Initiative in April 2015²⁸ to complement the ConnectED goal of connecting 99% of American students to high-speed broadband in the classroom by 2018.²⁹ The ConnectED Library Challenge realizes the crucial role that libraries play in a child’s education and seeks to integrate the library within the school system. The ConnectED Library Challenge aims to provide a library card to every child enrolled in school and to make digital resources, such as eBooks, readily available. The ConnectED Library Challenge recognizes that learning does not end in the classroom. It recognizes that the nation’s libraries create dynamic learning environments by bringing together trained information

²⁶ *NTIA-BTOP Program*, SCH., HEALTH & LIBR. BROADBAND COALITION, <http://www.shlb.org/policy/BTOP-Program> [<https://perma.cc/HN3U-PQNR>].

²⁷ *U.S. Public Libraries and the Broadband Technology Opportunities Program*, AM. LIBR. ASS’N (Feb. 2013), <http://www.ala.org/advocacy/pp/pub/books> [<https://perma.cc/684Q-63CD>].

²⁸ *ConnectED Initiative*, THE WHITE HOUSE, <https://www.whitehouse.gov/issues/education/k-12/connected> [<https://perma.cc/H9FV-3RNX>].

²⁹ *ConnectED Library Challenge*, INST. OF MUSEUM & LIBR. SERV., <https://www.ims.gov/issues/national-initiatives/connected-library-challenge> [<https://perma.cc/5XN2-YZBQ>].

professionals, collections of print and online resources and free access to high-speed Internet. But this initiative does not address libraries' need for greater broadband.

C. *E-rate*

"E-rate" is the name of the FCC program that provides funding for schools and libraries to improve their telecommunications and broadband services.³⁰ The Telecommunications Act of 1996 required the FCC to develop a program to ensure that all schools, libraries, and health care providers acquire advanced telecommunications services. The FCC began the E-rate program in 1997 to provide discounts to libraries and schools for telecommunications services, Internet access, Wi-Fi, and other related costs, such as internal wiring.³¹

E-rate has been pivotal in connecting libraries. In 1996, only 28% of all libraries had at least one branch that offered public access Wi-Fi;³² by 2014, virtually all libraries offered public Wi-Fi. But the quality of these connections often lags behind the needs of library patrons. School and library organizations, including the Schools, Health & Libraries Broadband (SHLB) Coalition, submitted studies and evidence that more funding was needed to ensure that schools and libraries could afford to purchase higher quality connections. In 2014, the FCC decided to add \$1.5 billion more into the E-rate program, increasing the total annual funding from \$2.4 billion to approximately \$4 billion per year. Equally important, the FCC also adopted the SHLB Coalition's recommendations to allow E-rate subsidies for dark fiber connections and special construction. Dark fiber refers to raw optical fiber strands that do not have electronics attached to the ends of the cable. Libraries can then lease these "unlit" cables for considerably discounted rates and attach their own electronics to "light" the fiber. The availability of financial support for dark fiber and self-construction is intended to drive greater investment into broadband networks serving both schools and libraries. These new fiber rules take effect in 2016 and as of this writing (in mid 2016) over five hundred E-rate applicants have

³⁰ Sawyers, *supra* note 1.

³¹ *E-Rate and Universal Service*, AM. LIBR. ASS'N, <http://www.ala.org/advocacy/telecom/erate> [<https://perma.cc/7XRJ-GS2W>].

³² *Id.*

already indicated an interest in receiving bids for dark fiber service.³³ Traditional broadband companies are opposed to the use of E-rate funding for these projects, however, and it is yet to be seen whether this program will be successful.

The FCC also took several steps to increase libraries' provision of public Wi-Fi. In 2014, the FCC allowed libraries the option of outsourcing the management of their Wi-Fi network to a third party in order to reduce costs and administrative burdens on the libraries and schools.³⁴ The FCC also decided that larger library systems needed additional funding and discounts for internal connections, broadband distribution services, and equipment. The E-rate funding for eligible large libraries was increased from \$1 per square foot to \$5 per square foot to reflect the fact that libraries have become the number one source for public Internet access in the country, particularly for adults who do not have home computers or lack high-speed Internet connectivity.³⁵

D. *State Initiatives*

There have been several instances of states attempting to address libraries' digital needs. For instance, the nonprofit Corporation for Education Network Initiatives In California (CENIC) partnered with the Califa Group to bring gigabit speeds to all libraries across California by connecting them to CaIREN, a high-capacity 3,800-mile fiber optic network.³⁶

A few years ago, Georgia also put forth a state initiative to improve library technology. The Georgia Public Library Service reviewed its master services contract with a single vendor and found it could cut costs in half and increase average broadband capability from three Mbps to twenty-eight Mbps by switching to multiple contracts with different vendors. Georgia also found, however, that the quality of

³³ See generally *Schools and Libraries E-Rate*, UNIVERSAL SERV. ADMIN. CO., <http://usac.org/sl/tools/apply-to-erate/default.aspx> [<https://perma.cc/HCJ3-X3VJ>].

³⁴ *Modernizing the E-rate Program for Schools and Libraries*, FED. COMM'CN COMM'N, <https://www.fcc.gov/document/fcc-releases-e-rate-modernization-order> [<https://perma.cc/VU3W-3ENA>].

³⁵ GARDNER, *supra* note 8, at 37.

³⁶ *Broadband Project*, CALIFA GROUP, <http://califa.org/broadband-project/steps-to-connect-to-calren> [<https://perma.cc/AN4E-VQW5>].

service was uneven and is now looking at a hybrid arrangement to acquire some economies of scale while still promoting competition among a handful of vendors across the state.³⁷

E. *Foundation Grants and Nonprofit Solutions*

The Bill and Melinda Gates Foundation administered an Opportunity Online broadband grant program to libraries for several years. In addition to funding computer hardware for libraries, it also funded state-level efforts to improve Internet connections in libraries and helped libraries apply for federal broadband (BTOP) funding.³⁸ While the Opportunity Online provided millions of dollars to libraries across the nation and around the world, it ceased operating a few years ago.

The Knight Foundation offers another example of foundations fueling innovation in libraries. The Knight News Challenge on Libraries, a competitive grant program that awards winners a share of \$3 million, is meant to leverage libraries as a platform to build more knowledgeable communities and help carry the values of libraries into the future.³⁹ The Knight Foundation found that digital rights, digital preservation, and the maker movement were the most prominent themes among winners.⁴⁰ Libraries have used Knight Foundation funding to reinvent themselves by building, for example, new digital media labs, makerspaces, and recording studios. For instance, Ideas Box in Detroit created a portable library with books and technological tools that could be accessed throughout the community, such as the

³⁷ KAREN PERRY, CHIEF OFFICERS OF ST. LIBR. AGENCIES, COSLA PLANNING GUIDE FOR LIBRARY BROADBAND CONNECTIVITY 8 (2014), http://www.cosla.org/documents/Broadband_Guide_2014.pdf [<https://perma.cc/5EJZ-G2Z2>].

³⁸ *Program Information*, NTIA BROADBANDUSA, <http://www2.ntia.doc.gov/information> [<https://perma.cc/RLF6-P8K9>].

³⁹ *Winners: How Might We Leverage Libraries as a Platform to Build More Knowledgeable Communities?*, KNIGHT FOUND., <https://www.newschallenge.org/challenge/libraries/brief> [<https://perma.cc/H4X2-ETG3>].

⁴⁰ Chris Barr, *22 Ideas Win Knight News Challenge: Libraries*, KNIGHT FOUND.: KNIGHTBLOG (Jan. 30, 2015), <http://www.knightfoundation.org/blogs/knightblog/2015/1/30/22-projects-win-knight-news-challenge-libraries/> [<https://perma.cc/4L34-UDZE>].

park or local recreation center.⁴¹ These grants are intended to reinvent the ways in which people experience the library, providing citizens with the tools and information they need to contribute and strengthen our democracy.⁴² But these grants do not directly fund the broadband connections that are necessary for these digital resources to succeed.

V. LIBRARIES CAN USE BROADBAND TO LEAD THE WAY IN ADVANCING COMMUNITIES.

Libraries with high-speed broadband not only become centers of knowledge, creation, and innovation but also transform their communities. Public libraries are technological gateways providing a wide range of resources that meet personal and professional needs, support local economics, and build stronger communities. Ultimately, the future of the library in the digital age lies not simply in creating makerspaces and investing in digital tools within the library; the future library must extend beyond its walls to advance a community, both economically and through digital inclusion. Ultimately, broadband will be most impactful if it is provided not just *to* the library but *through* the library to the surrounding community. The following section discusses how broadband can help the library extend its reach beyond traditional media to strengthen the community as a whole.

A. *Economic Development*

All policy-makers, whether Republican or Democrat, favor economic growth. Jobs, investment, and entrepreneurial empowerment are all shared policy goals. Libraries can contribute to economic development in their communities, often by leveraging broadband access.

During the “Great Recession,” libraries took on the role of helping

⁴¹ Allister Chang & Richard Tao, *Pop-up Media Centers Connect Detroit Communities with Information*, KNIGHT FOUND.: KNIGHTBLOG (Dec. 22, 2015), <http://www.knightfoundation.org/blogs/knightblog/2015/12/22/pop-media-centers-connect-detroit-communities-information/> [https://perma.cc/LQW5-BEAX].

⁴² *Knight News Challenge on Libraries Awards \$3 Million for Innovative Ideas*, KNIGHT FOUND. (Jan. 30, 2015), <http://www.knightfoundation.org/press-room/press-release/knight-news-challenge-libraries-awards-3-million-i/> [https://perma.cc/BT8E-6Q9W].

people find and secure employment. Libraries' public access computers experienced a surge in usage as people who could not afford broadband at home headed to the library to fill out job applications, sharpen their resumes, and take online classes to improve their skills.⁴³ Many libraries expanded their offerings to promote employment opportunities. The Memphis Public Library offers a mobile career center (called JobLINC) that travels to various neighborhoods to help people prepare resumes, improve interviewing skills, conduct job searches, and apply for jobs using onboard laptops.⁴⁴ The Business and Job Center at the Richland Library, South Carolina has computers specifically designated for job seekers.⁴⁵ Regina Smith, Director of Detroit's Parkman Library, says that she helps people who have never touched a computer mouse learn the digital skills necessary to apply for jobs. Patrons of the Detroit Library consider digital skills so closely tied to employment that they have even started calling her the "Jobs Lady."⁴⁶

In addition to helping employ people in the community, libraries have also taken on the role of business incubators. In addition to providing high-speed broadband access, libraries provide computers, specialized printers, miscellaneous office equipment, and free space to help small businesses get started. Boston Public Library is expanding its business library to create an informal business networking space. Similarly, Arizona State University has established a network of business incubators located inside public libraries called the "Alexandria Network."⁴⁷ The network enables people to connect, collaborate, and find valuable resources together.⁴⁸ Libraries not only

⁴³ Use of public access computers in Colorado grew 11% in 2009 after growing just 2% in 2008. See KEITH CURRY LANCE ET AL., *LIBR. RES. SERV., THE IMPACT OF THE RECESSION ON PUBLIC LIBRARY USE IN COLORADO* 13 (2011), <http://files.eric.ed.gov/fulltext/ED520930.pdf> [<https://perma.cc/EM3D-BFQ7>].

⁴⁴ *JobLINC*, MEMPHIS PUB. LIBR., <http://www.memphislibrary.org/joblinc/> [<https://perma.cc/D64B-M8EL>].

⁴⁵ Sawyers, *supra* note 1.

⁴⁶ Telephone Interview with Regina Smith, Director, Detroit Pub. Libr. Parkman Branch (May 25, 2016).

⁴⁷ Emily Badger, *Why Libraries Should Be the Next Great Start-Up Incubators*, THE ATLANTIC: CITYLAB (Feb. 19, 2013), <http://www.citylab.com/work/2013/02/why-libraries-should-be-next-great-startup-incubators/4733/> [<https://perma.cc/L4W4-HJNM>].

⁴⁸ Kelly, *supra* note 9.

supply tools and spaces for small businesses but also necessary information and guidance. They help small businesses craft business plans, provide information on regulations associated with incorporating, and offer specialized services to specific populations and sectors.⁴⁹ In fact, almost 700 small businesses surveyed reported that they could not have started, grown, or improved their business without the public library.⁵⁰

Libraries also have several secondary economic effects. Due to the fact that libraries are safe, trusted places, businesses and people feel comfortable locating near them. Similarly, libraries contribute to public safety and create a livable community that is attractive to workers. They also create an educated workforce by offering digital literacy training. Furthermore, libraries generate foot traffic, spurring “halo spending” at local businesses. The chain reaction from library patrons who go shopping before or after time in the library benefits the entire community. A recent study found that the average library visitor spends between \$7 and \$9 on nearby businesses per library visit.⁵¹ This adds up to between \$9.8 and \$15.6 million spent annually at nearby businesses that can be directly linked to libraries.

Libraries’ full potential as economic actors has yet to be unlocked. Libraries could serve as branches of the Small Business Administration to approve loans to small businesses or house local economic development agencies. But these innovative roles of libraries working outside their walls and in the community will not be fully realized until all libraries and remote libraries have access to high-speed broadband.

B. *Digital Inclusion*

Not only can libraries bolster the economy, they can also help to address the digital divide and promote digital equity.⁵² By extending

⁴⁹ URB. LIBR. COUNCIL., *supra* note 11, at 19.

⁵⁰ DEBORAH DIAMOND ET AL., U. OF PA.: FELS INST. OF GOV’T, *THE ECONOMIC VALUE OF THE FREE LIBRARY IN PHILADELPHIA 10-22 (2010)*, http://www.freelibrary.org/about/Fels_Report.pdf [<https://perma.cc/4GG9-8RRB>].

⁵¹ CARNEGIE MELLON UNIV. CTR. FOR ECON. DEV., *COMMUNITY IMPACT AND BENEFITS (2006)*, <http://www.ala.org/research/librariesmatter/node/111> [<https://perma.cc/L68D-7YPB>].

⁵² See NAT’L DIGITAL INCLUSION ALL., www.digitalinclusionalliance.org [<https://perma.cc/V5QG-6DNT>]. While the term “digital divide” has been used for twenty

broadband service to the surrounding communities, libraries have the power to bridge the gap between the digital “haves” and “have-nots.” For years, libraries have been providing Internet access to patrons inside their brick-and-mortar locations through computer labs and public Wi-Fi, but those solutions are restricted by computer availability and the library’s hours. Libraries are now exploring ways to move beyond their walls and provide wireless connectivity to residential consumers.

For instance, libraries in Chicago, New York, Kansas City, and other cities have launched hotspot lending programs for low-income families that also included computer literacy training for parents.⁵³ New York City provided 10,000 mobile hotspots to patrons across three library systems. In 2014, Chicago Public Library launched its “Internet to Go” program to provide mobile hotspots to under-connected neighborhoods.⁵⁴ It identified neighborhoods that have a broadband adoption rate under 50%, meaning half of the people do not have Internet access at home. These are the populations that benefit most dramatically from hotspot lending programs. Mobile Beacon, a nonprofit company, provides low-cost Internet access and mobile hotspots for educational institutions.⁵⁵ The hotspot lending programs have expanded to include small towns. The State Library of Kansas is now allowing nineteen Kansas local libraries to lend portable Wi-Fi hotspot devices,⁵⁶ as is the State Library of Maine.⁵⁷

years, the term implies a static, “on or off” evaluation of connectivity, when the reality is that the amount of bandwidth necessary to conduct daily activities changes over time, and even households with a slow broadband connection may fall behind. Broadband practitioners prefer the term “digital equity,” which suggests an ongoing effort to ensure that all segments of society have adequate bandwidth and the digital skills to use the Internet.

⁵³ Timothy Inklebarger, *Bridging the Tech Gap*, AM. LIBR. MAG., Sept.-Oct. 2015, at 16, https://americanlibrariesmagazine.org/wp-content/uploads/2015/09/0915_AmLib.pdf [<https://perma.cc/G989-MJSN>].

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ The Capital-Journal, *State Library lends Wi-Fi hotspot devices to patrons*, TOPEKA CAPITAL-JOURNAL (Feb. 21, 2015), <http://cjonline.com/news/local/2015-02-21/state-library-lends-wi-fi-hotspot-devices-patrons> [<https://perma.cc/QET5-RSE3>].

⁵⁷ *Check-out the Internet Project*, ME. ST. LIBR., http://www.maine.gov/msl/libs/grant_projects/washington_county_wifi_grant.shtml [<https://perma.cc/LQ35-FVGS>].

Hotspot lending programs have connected thousands of families across America in this manner. Yet there are only so many hotspots. In fact, the New York Public Library website says that all of its 10,000 hotspots are already loaned out.⁵⁸ The Seattle Public Library has a waiting list of over 1,000 library cardholders for the 325 available devices.⁵⁹ In order to avoid these limitations, libraries need more funding for devices, but they also need additional broadband capacity to carry this increased Wi-Fi traffic.

In addition to handing out hotspots to promote digital inclusion, libraries can also extend their signals beyond the library walls. So-called “white space” spectrum has the potential to allow libraries to extend their signals for miles. White space spectrum, sometimes referred to as “super-Wi-Fi” although it is not technically Wi-Fi, can be used to extend Internet signals from the library to the community over unused frequencies that were previously used to transmit television signals. Because “white spaces” spectrum occupies the lower-frequency TV bands, the signals can travel quite far. Libraries can put up antennas on their building and transmit over the white spaces spectrum to a second antenna in a park or other community building miles away from the library. Local residents can then connect to the remote antenna using local Wi-Fi signals. The Gigabit Libraries Network is a consortium devoted to bringing white space networks to libraries nationally and globally and already has several pilot programs in place across the country.⁶⁰ White space signals can carry data signals for miles and can pass through walls and other obstructions that normally limit wireless connectivity. Providing broadband connectivity to libraries could then translate to providing broadband connectivity *through* libraries and to surrounding residences and businesses. “Free, public wireless Internet access brought to you by your local public library” would generate enormous goodwill for libraries and in turn create an argument for increasing their funding. Using this unlicensed “white spaces” spectrum could also provide a valuable “second responder” network in the case of a

⁵⁸ N.Y. PUB. LIBR., <http://hotspot.nypl.org/> [<https://perma.cc/VKQ6-7Q8P>].

⁵⁹ Eyragon Eidam, *Wi-Fi Hot Spots for Rent: How Public Libraries Are Changing with the Times*, GOV'T TECH. MAG. (Jan. 14, 2016), <http://www.govtech.com/network/Wi-Fi-Hot-Spots-for-Rent-How-Public-Libraries-Are-Changing-with-the-Times.html> [<https://perma.cc/PRU2-QXEL>].

⁶⁰ GIGABIT LIBR. NETWORK, <http://gigilibraries.net/page-1712342> [<https://perma.cc/2JDF-TUES>].

national emergency. If these pilot programs are successful, libraries could have the potential to provide broadband to nearby housing communities and beyond. But these wireless extensions of the library's service can only work if the library itself has a sufficiently high-bandwidth connection to the Internet that is capable of handling the additional data.

Libraries are also weaving themselves into the fabric of communities through remote librarians. Topeka, Kansas has one main library serving a large community of 179,000 people. Rather than build more brick-and-mortar libraries, it is investing in digital content, and then placing librarians around the city embedded in workspaces, community centers, and innovation centers to help people access the digital content. Another example is the Free Library of Philadelphia's Techmobile, which brings wireless Internet access, laptops, iPads, and a digital resource specialist to neighborhoods for hands-on-experience, digital training, and more.⁶¹ Just as Starbucks coffee retail stores are becoming embedded in grocery stores, future librarians could soon be stationing themselves at Wal-Mart as a way for Wal-Mart to attract customers.

Libraries have the power to connect entire communities. In rural areas, libraries even have the power to help build their own wireless networks, thus providing Internet access to an entire town. Normally, private sector companies, or failing that, local mayors would take the lead on implementing projects like these, but in small towns, the library may become the broadband champion. Connecting libraries to high-speed broadband is still crucial even when great progress is made connecting municipal offices and residences to broadband. While connecting an entire city is ideal, these larger projects take considerably more time. Connecting a library system, however, can instantaneously connect that community. Furthermore, library, school, and government entities can work together. For instance, by sharing a broadband network, anchor institutions and government networks can significantly lower the cost of broadband for every agency. Municipal, residential, school, and library broadband – all of these efforts are puzzle pieces in the larger common goal of connecting all Americans to a digital world.

When providing funding to libraries, it is important to realize that providing Internet to a library is not just adding it to a single building

⁶¹ FREE LIBR. OF PHILA., <https://libwww.freelibrary.org/techmobile/>
[<https://perma.cc/GDU8-68NS>].

but to an entire community and potentially an entire town. Policy-makers need to recognize libraries as engines of economic growth and digital equity; likewise, funding and regulations need to reflect that reality.

VI. CONCLUSION

Libraries can be digital powerhouses. They can spur innovation, collaboration, and creation. They connect people to a world of knowledge and tools. They provide equal access and foster digital equity for the communities that need it the most. In short, they are a civic necessity that can play an important role in promoting democracy and economic growth.

But libraries cannot complete this transformation without affordable, high-speed broadband connections. Internet-based technologies can make libraries stronger by providing them with new tools to serve their communities. Libraries are on-ramps to the world of digital content, but that on-ramp requires a high-speed broadband connection.