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"Smart Cities" Meet "Anchor Institutions": The Case for Broadband and the Public Library

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"SMART CITIES" MEET "ANCHOR INSTITUTIONS": THE CASE OF BROADBAND AND THE PUBLIC LIBRARY

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INTRODUCTION

The concepts "smart city" and "anchor institution"—both popular in policy circles—intersect at broadband infrastructure in ways that highlight the importance of civil society institutions to digital networks. Given the close alignment of broadband and smart city policy goals, the centrality of connectivity to the smart city vision, and the importance of anchor institutions to broadband, it is surprising that the smart cities discourse does not engage more directly with the role of anchor institutions. The use case of public libraries shows how anchor institutions can extend connectivity and the benefits of robust broadband. More broadly, there are lessons here about the meaning

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of "public-private partnerships," often at the heart of smart city plans,[1] and the virtues of strengthening the public side of that relationship.

Buzz around smart cities has been building as policymakers seek to harness information technology to improve the delivery of city services and the welfare of urban residents.[2] Whether the focus is on the Internet of Things[3] or the delivery of educational services, strong telecommunications infrastructure is a necessary component. Enter the concept of the "anchor institution" (e.g., university, library, hospital).[4] The idea that these institutions are necessary partners in urban development has been circulating in the planning literature for decades.[5] However, it was not until 2009 that the term made its first appearance in United States law, and this was in the context of broadband policy.[6] The public policy goals that anchor institutions are supposed to advance in the broadband context almost perfectly coincide with smart city goals: networking individuals and entities in ways that optimize the flow of information for social and economic advancement.[7]

We see from the broadband experience that, in the provision of network capacity, the roles of the private and public sectors—and

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1. *See, e.g.*, Alberto Vanolo, *Smartmentality: The Smart City as Disciplinary Strategy*, 51 URB. STUD. 883 (2014) (describing the centrality of public-private partnership to the smart city vision and implementation).

2. *See generally* HAFEDH CHOURABI ET AL., UNDERSTANDING SMART CITIES: AN INTEGRATIVE FRAMEWORK 45 HAW. INT'L CONF. ON SYS. SCI. 2289 (2012) (describing and synthesizing various conceptions of the smart city); Nils Walravens & Pieter Ballon, *Platform Business Models for Smart Cities: From Control and Value to Governance and Public Value*, IEEE COMM. MAG., June 2013, at 72 (discussing role of mobile technologies in addressing urban problems).

3. *See* MIKE KUNIAVSKY, SMART THINGS: UBIQUITOUS COMPUTING USER EXPERIENCE DESIGN 3, 79 (2010) (tracing the term Internet of Things to researchers at MIT in 1999, and using it to describe the present "era of computation and data communication embedded in, and distributed through, our entire environment"); *see also* E. Casey Lide, *Balancing the Benefits and Privacy Concerns of Municipal Broadband Applications*, 11 N.Y.U. J. LEGIS. & PUB. POL'Y 467, 472 (describing the Internet of Things as built on radio transceivers embedded in various everyday items, allowing new object-to-object and object-to-person communication).

4. *See* discussion *infra* Part I.B.

5. *See* David J. Maurrasse & Jaclyn B. Bliss, *Comprehensive Approaches to Urban Development: Gentrification, Community, and Business in Harlem, New York,* 1 NW. J. L. & SOC. POL'Y 127, 217–18 (2006) (discussing anchor institutions such as corporations, universities, and banks partnering with urban communities to advance economic and urban development).

6. *See* 47 U.S.C. § 1305(g)(3) (2012).

7. *See infra* notes 38–47 and accompanying text.

civil society institutions that fall somewhere in between—are varied and contested. Sometimes, the public entity is nothing more than a customer of a commercial vendor. Sometimes, cities have found that they must enter into partnerships with commercial providers or deploy digital infrastructure themselves.[8]

Where cities choose to leverage the contributions of anchor institutions for better broadband service, it is usually because of a misalignment of commercial and public interests. The market is under-supplying connectivity. More than twenty states have passed laws to prohibit cities (and public anchor institutions) from being active in this way, forcing them to rely entirely on commercial providers.[9] Questions about the role of public institutions in the provision of broadband infrastructure may forecast other smart city struggles around the appropriate roles of public and private entities in meeting basic public needs.

The achievement of smart city and broadband policy goals in ways that are inclusive, democratic, and otherwise in the public interest will require the meaningful involvement of civil society institutions outside of the state and the market. These institutions will have to share in, and contribute to, the intelligence that connectivity enables. The successes and failures thus far of broadband policy to engage anchor institutions may be precursors of smart city threats and promises. This Article explores these issues in four parts. Part I describes the smart city and anchor institution concepts. Part II identifies broadband policy goals and market gaps in their fulfillment. Part III shows how anchor institutions and libraries in particular are important partners in reaching broadband infrastructure goals. Part IV then concludes with some observations for smart city initiatives in general.

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8. *See generally* LAURA FORLANO ET AL., NEW AM. FOUND., FROM THE DIGITAL DIVIDE TO DIGITAL EXCELLENCE: GLOBAL PRACTICES TO AID DEVELOPMENT OF MUNICIPAL AND COMMUNITY WIRELESS NETWORKS IN THE UNITED STATES (2011), http://oti.newamerica.net/sites/newamerica.net/files/policydocs/NAF%20Municipal%20and%20Community%20Wireless%20Report.pdf (showing municipal investments in broadband can produce more affordable wireless broadband connectivity and more efficient provision of public services); U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-409, TELECOMMUNICATIONS: PROJECTS AND POLICIES RELATED TO DEPLOYING BROADBAND IN UNSERVED AND UNDERSERVED AREAS (2014), *available at* http://www.gao.gov/assets/670/662711.pdf (discussing successes and failures of various public efforts at improving broadband).

9. *See* Olivier Sylvain, *Broadband Localism*, 73 OHIO ST. L.J. 795, 798 (2012) (identifying states that have curtailed or forbidden municipal provision of broadband services).

I. THE CONCEPTS

A. The Smart City

The term "smart city" has no clear definition, as the topics for this symposium issue demonstrate.[10] A Google (U.S.) search most closely associates the term with the IBM-branded "smarter cities" initiative to produce data management systems for the delivery of city services, from police work to trash collection.[11] The term frequently refers to the use of ubiquitous sensors within urban infrastructure to generate data about usage patterns and service needs.[12] It is also an umbrella term for more sector-specific notions of "smart growth," tools like the "smart grid," and many other "smart" innovations for urban prosperity and livability.[13] Smart city initiatives cover the waterfront, from civic engagement, sustainability, and transportation to education, telecommunications, and health services.[14]

In Europe, the "smart city" has quasi-official status, with the European Parliament ranking cities in twenty-eight nations based on performance in governance, human flourishing, livability, mobility, economy, and environment.[15] The United Kingdom has created a

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10. *See generally* Symposium, *Smart Law for Smart Cities: Regulation, Technology, and the Future of Cities*, 41 FORDHAM URB. L.J. 1317 (2014).

11. *See Smarter Cities*, IBM, http://www.ibm.com/smarterplanet/us/en/smarter_cities/overview/ (last visited October 26, 2014) (discussing the ways in which technology can transform city management and service delivery).

12. RUTHBEA YESNER CLARKE, IDC GOV'T INSIGHTS, SMART CITIES AND THE INTERNET OF EVERYTHING: THE FOUNDATION FOR DELIVERING NEXT-GENERATION CITIZEN SERVICES (2013), https://www.cisco.com/web/strategy/docs/scc/ioe_citizen_svcs_white_paper_idc_2013.pdf (discussing the benefits and characteristics of the emergence of "smart cities").

13. CHOURABI ET AL., *supra* note 2; (describing and synthesizing various conceptions of the smart city); *see also*, Walravens & Ballon, *supra* note 2.

14. *See, e.g.*, Taewoo Nam & Theresa A. Pardo, *Conceptualizing Smart City with Dimensions of Technology, People, and Institutions*, 12 INT'L CONF. ON DIGITAL GOV'T RES. 282 (2011), http://www.ctg.albany.edu/publications/journals/dgo_2011_smartcity/dgo_2011_smartcity.pdf (discussing the components of a successful smart city and the various roles of technology, institutions, and people); *Defining Smart Cities*, *Digital Agenda for Europe*, EUR. COMMISSION (May 31, 2013), http://ec.europa.eu/digital-agenda/en/content/defining-smart-cities (defining smart cities to include sustainability, economic development, and a high quality of life).

15. *See* Mapping Smart Cities in the EU, EUR. PARL. DOC. PE 507.480 (2014) [hereinafter EU Mapping], *available at* http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507480/IPOL-ITRE_ET(2014)507480_EN.pdf; *Communication from the Commission: Smart Cities and Communities—European Innovation Partnership*, at 2, COM (2012) 4701 final (Oct. 7, 2012), http://ec.europa.eu/energy/technology/initiatives/doc/2012_4701_smart_cities_en.pdf

national smart cities office to promote the synthesis of "hard infrastructure, social capital including local skills and community institutions, and (digital) technologies to fuel sustainable economic development and provide an attractive environment for all."[16]

Although imprecise, these conceptions of the smart city all share two features: they emphasize public-private partnerships,[17] and they place information and communications technologies (ICT) at the core of smart urban operation.[18] The smart city seeks "to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership."[19] In the ideal smart city, robust Internet connectivity and big data analytics support the delivery of

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(seeking to "catalyse progress in areas where energy production, distribution and use; mobility and transport; and [ICT] are intimately linked and offer new interdisciplinary opportunities to improve services while reducing energy and resource consumption and greenhouse gas . . . and other polluting emissions"). *See generally* Mark Scott, *Old World, New Tech: Europe Remains Ahead of US in Creating Smart Cities*, N.Y. TIMES, Apr. 21, 2014, http://www.nytimes.com/2014/04/22/business/energy-environment/europe-remains-ahead-of-us-in-creating-smart-cities.html?_r=0 (describing public-private partnerships in European cities to improve energy, water, and public transport usage).

16. DEPARTMENT FOR BUSINESS INNOVATION AND SKILLS, SMART CITIES: BACKGROUND PAPER, 2013, at 7 (U.K.), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/246019/bis-13-1209-smart-cities-background-paper-digital.pdf (describing the concept of a "Smart City" where the use of technology encourages citizens to take a more active role in the community).

17. *See* CLARKE, *supra* note 12, at 1 (discussing "Smart City" leaders using public-private partnerships to "invest in scalable projects, smart regulation to connect city laws to new digital realities, and innovation clusters to create jobs and vibrant economies").

18. *See, e.g.*, Robert G. Hollands, *Will the Real Smart City Please Stand Up?*, 12 CITY: ANALYSIS URB. TRENDS CULTURE THEORY POL'Y ACTION 303, 307 (2008) (identifying ICT's as the most important component in smart city conceptions); Leonidas Anthopoulos & Panos Fitsilis, *From* D*igital to Ubiquitous Cities: Defining a Common Architecture for Urban Development*, 6 INT'L CONF. ON INTELLIGENT ENV'TS 301, 302 (2010) ("The 'Smart City' refers to a city where the ICT strengthen the freedom of speech and the accessibility to public information and to public services."); Rosabeth Moss Kanter & Stanley S. Litow, *Informed and Interconnected: A Manifesto for Smarter Cities* 3 (Harvard Bus. Sch. Gen. Mgmt. Unit, Working Paper No. 09-141, 2009), *available at* http://www.hbs.edu/faculty/Publication%20Files/09-141.pdf (discussing how the use of ICT in cities can "create sustainable solutions that reduce costs, focus resources on those items high on the public agenda, forge connections among organizations and agencies with similar goals or dealing with pieces of the same puzzle, and turn a city into a human life-enhancing community"); EU Mapping, *supra* note 15 ("[A] Smart City is quintessentially enabled by the use of technologies (especially ICT) to improve competitiveness and ensure a more sustainable future by symbiotic linkage of networks of people, businesses, technologies, infrastructures, consumption, energy and spaces.").

19. EU Mapping, *supra* note 15 at 9.

services and the creation of opportunity, enabling residents to live in more sustainable, productive, healthy, and civically engaged ways.[20]

Given the centrality of communications networks, smart city policy necessarily implicates telecommunications policy. How will telecommunications infrastructure support universal connectivity and the Internet of Things? Over what networks will the ubiquitous sensors communicate data and to whom? Who will have access to the services that advanced networks make possible, and who will be the service providers? [21] Cities are experimenting with different interventions. The city of Lafayette, Louisiana developed a municipally owned fiber-to-the-home network which gives residents, school and hospitals better and cheaper network access.[22] In progress is New York City's very different plan to turn old payphones into fiber-connected highspeed broadband hotspots.[23] What these plans

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20. *See, e.g.*, ANTHONY TOWNSEND, SMART CITIES: BIG DATA, CIVIC HACKERS, AND THE QUEST FOR A NEW UTOPIA (2013) (discussing how technology has shaped the planning and design of cities); Emmanouil Tranos & Drew Gertner, *Smart Networked Cities?* 25 Innovation: The European Journal of Social Science Research 175, 176–77 (2012) ("Smart cities are mostly related to the philosophy and the applications of ICT—both as digital infrastructure and ICT usage . . . . Digital network infrastructure is used as a means to improve economic and political efficiency and at the same time to enable social, cultural and urban development."); Kanter & Litow, *supra* note 18, at 2 ("A smarter city infuses information into its physical infrastructure to improve conveniences, facilitate mobility, add efficiencies, conserve energy, improve the quality of air and water, identify problems and fix them quickly, recover rapidly from disasters, collect data to make better decisions and deploy resources effectively, and share data to enable collaboration across entities and domains."); CHOURABI ET AL., *supra* note 2 (describing and synthesizing various conceptions of the smart city).

21. *See generally Pillar IV: Fast and Ultra-Fast Internet Access, Digital Agenda for Europe*, EUR. COMMISSION, *available at* http://ec.europa.eu/digital-agenda/en/our-goals/pillar-iv-fast-and-ultra-fast-internet-access (last visited Oct. 26, 2014) (establishing the connection between broadband policy and smart cities is explicit in Europe's Digital Agenda for 2020); FCC, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN 7–13 (2010), *available at* http://download.broadband.gov/plan/national-broadband-plan.pdf (explaining that the roughly equivalent U.S. Broadband Plan does not use the term "smart city," but it frames the purpose of broadband connectivity in terms of smart city goals, including better health services, civic engagement, and education).

22. *See* RUTHBEA YESNER CLARKE, IDC GOV'T INSIGHTS, SMART CITIES INVEST IN BROADBAND AND INNOVATIVE TECHNOLOGIES: DRIVING ECONOMIC GROWTH AND REVITALIZATION EFFORTS 12–19 (2014), *available at* http://media.mhfi.com/documents/MHFIGI_Smart_Cities_Invest_in_Broadband.pdf (discussing Lafayette's development of the Lafayette Utility System whose broadband service has spurred economic and job growth).

23. Sam Gustin, *New York City's Plan to Turn Pay Phones Into Wi-Fi Hot Spots*, TIME (May 1, 2014), http://time.com/84854/new-york-city-pay-phone-wireless-network/.

realize is that broadband connectivity—fast and capacious—is essential infrastructure for business, technical, and creative innovation, and equally crucial for educational, health, and civic applications. It is this connectivity that supports the applications and services that make cities intelligent.

B. The Anchor Institution

City offices, utilities, and commercial vendors all play central parts in smart city policy.[24] Community institutions have been less visible in the literature and policy proposals. The theory and practice of "anchor institutions" is helpful in addressing this gap. Over the past decade, policymakers and academics have developed the concept of the "anchor institution" as a locus of community renewal and advancement.[25] The term encompasses educational and health care institutions, libraries, museums, and other public-spirited institutions that are embedded in a community.[26]

According to a literature survey conducted by scholars working on a foundation-funded "anchor institution initiative," the term has its origins in the urban renewal movements of the 1960's and 1970's, when universities and hospitals assumed greater service responsibilities in their communities.[27] Henry Louis Taylor, Jr. and Gavin Luter trace the first significant use of the term itself to the 2001 Aspen Institution Roundtable on Comprehensive Community Initiatives, which defined a community's "fixed assets" as anchor institutions.[28] From there, the term started to appear in urban development literature, usually referring to "Eds and Meds" that

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24. *See, e.g.*, CLARKE *supra* note 12; ROBERT PUENTES & ADIE TOMER, BROOKINGS INST., GETTING SMARTER ABOUT SMART CITIES (2014), *available at* http://www.brookings.edu/~/media/research/files/papers/2014/04/smart%20cities/bmpp_smartcities.pdf (discussing the promise and practice of smart cities from around the world and need for "strong networks of leaders [from the public and private sectors] to drive smart city policies and investments"); *Defining Smart Cities*, *supra* note 14; *Smarter Cities*, *supra* note 11.

25. HENRY LOUIS TAYLOR, JR. & GAVIN LUTER, ANCHOR INST. TASK FORCE, ANCHOR INSTITUTIONS: AN INTERPRETIVE REVIEW ESSAY 2 (2013), *available at* http://www.margainc.com/files_images/general/Literature_Review_2013.pdf (examining the history and current state of anchor institutions and their role in creating a "better, more democratic, equitable just society").

26. *Id.*

27. *Id.*

28. *See id.* at 3.

could be expected to invest in and hire from their communities.[29] Others have used the term to include purely private entities that are fixed in a community, such as sports enterprises.[30]

The focus on local anchor institutions as generators of economic vitality is, in some sense, a response to the efficient global flow of capital and the recognition that this flow can erode community resources, leaving localities under-nourished. Anchor institutions, if properly incentivized and supported, can hold the ground and build opportunity. According to one report, "non-market, place-based institutions are . . . key 'anchors' of place, for by their practices, they 'root' or otherwise 'moor' the people of the urban in place."[31]

The term "anchor institution" entered United States law in the 2009 stimulus funding package.[32] As part of this package, Congress established the Broadband Technology Opportunities Program (BTOP), which authorized the National Telecommunications and Information Administration (NTIA) to make grants to "ensure access to broadband service by anchor institutions."[33] The NTIA subsequently defined anchor institutions as "schools, libraries, medical and healthcare providers, public safety entities, community

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29. *See, e.g.*, Maurrasse & Bliss, *supra* note 5 (describing higher education as "anchored institutions, which cannot simply get up and move" and may serve as partners in economic and community development).

30. *See* Eugénie L. Birch, *Downtown in the "New American City"*, 626 ANNALS AM. ACAD. POL. & SOC. SCI. 134, 149 (2009) (defining anchor institutions to include "universities; hospitals; and entertainment including arts, culture, and sports").

31. Eugénie L. Birch et al., *Universities as Anchor Institutions*, 17 J. HIGHER EDU. OUTREACH & ENGAGEMENT 7, 8 (2013); *see also* Ira Harkavy et al., Penn Inst. for Urban Research, *Anchor Institutions as Partners in Building Successful Communities and Local Economies*, *in* RETOOLING HUD FOR A CATALYTIC FEDERAL GOVERNMENT: A REPORT TO SECRETARY SHAUN DONOVAN 147 (2009), *available at* http://community-wealth.org/sites/clone.community-wealth.org/files/downloads/chapter-harkavy-et-al.pdf (encouraging the use of anchor institutions (e.g., higher education and academic medical centers) in partnership with Federal, state and local governments to help advance urban revitalization).

32. *See* American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115, 128. All funds were obligated prior to the end of fiscal year 2010 and the National Telecommunications and Information Administration required that projects should be completed within three years of receiving an award. Broadband Initiatives Program, 74 Fed. Reg. 33,104 (July 9, 2009). NTIA grants were made for public computing centers and sustainable broadband adoption projects that funded access to broadband, computer equipment, and job training. *See id.*

33. 47 U.S.C. § 1305(g)(3) (2012).

colleges and other institutions of higher education, and other community support organizations and entities."[34]

From the stimulus legislation, the term began to make its way through federal telecommunications policy more generally. The National Broadband Plan emphasized the role of anchor institutions in improving the nation's broadband infrastructure.[35] Additionally, the FCC's reform of its Universal Service Fund—the fund used to subsidize access to telecommunications for the underserved—came to focus on anchor institutions. Telecommunications subsidies for schools and libraries were not new. The federal E-Rate program was started in 1996 to subsidize schools' and libraries' ongoing telecommunications expenses.[36] But in 2010, the FCC began to identify these institutions as "anchors," important to meeting universal service goals: "[s]chools and libraries can serve as anchor institutions for their communities, and certain areas may depend on these anchor institutions to achieve the goal of affordable access to broadband of at least [one] gigabit per second in every community in the country."[37]

Use of the anchor institution concept allowed policymakers to see that merely subsidizing the purchase of telecommunications services from commercial vendors would not solve the broadband connectivity problem. Instead, policy had to address the structural shortfalls in anchor institutions—equipment, infrastructure, and training.[38] The

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34. State Broadband Data and Development Grant Program, Notice of Funds Availability, 74 Fed. Reg. 32,545, 32,547 (July 8, 2009), *available at* http://www.ntia.doc.gov/files/ntia/publications/fr_broadbandmappingnofa_090708.pdf.

35. *See* FCC, *supra* note 21, at 10, 20, 111, 136, 152–155, 176, 239, 271, 343, and 345.

36. *See* 47 U.S.C. § 254 (2012); 47 C.F.R. §§ 54.500–.523 (2014); *see also* Letter from the Urban Libraries Council to the FCC (May 21, 2014), *available at* http://www.urbanlibraries.org/filebin/pdfs/ULC_FCC_Letter_-_REVISED_052714.pdf (discussing public libraries having received approximately $60–70 million a year in E-Rate funding since it began in 1996).

37. Schools and Libraries Universal Service Support Mechanism, Sixth Report and Order, 25 FCC Rcd. 18762, ¶ 1 (2010), (citing FCC, *supra* note 21, at 26) ("Goal No. 4: Every American community should have affordable access to at least 1 gigabit per second broadband service to anchor institutions such as schools, hospitals and government buildings."); *see* Connect America Fund et al., Report and Order and Further Notice of Proposed Rulemaking ¶ 3 (Nov. 18, 2011) ("Community anchor institutions, including schools and libraries, cannot achieve their critical purposes without access to robust broadband. Broadband-enabled jobs are critical to our nation's economic recovery and long-term economic health, particularly in small towns, rural and insular areas, and Tribal lands.").

38. *See* Schools and Libraries Universal Service Support Mechanism, Sixth Report and Order, 25 FCC Rcd. 18762, ¶ 1 (2010); Lauren H. Mandel et al.,

anchor institution concept enabled policy to turn toward infrastructure support, thereby allowing schools and libraries to participate in supplying connectivity when the market does not.

II. BROADBAND CONNECTIVITY AND THE MARKET GAP

It is the policy of the United States to encourage broadband deployment.[39] Policymakers characterize broadband Internet access as "essential basic infrastructure."[40] In Europe too, the goal is to achieve substantially upgraded broadband service known as "next generation access" (NGA) networks, which transmit significantly more data than do existing cable broadband and DSL service—usually somewhere between one hundred megabits per second (Mbps) and one gigabit per second (Gbps).[41] While mobile broadband makes NGA more attainable, existing and proximate deployments will not match the performance of fiber optic cable and

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Broadband for Public Libraries: Importance, Issues, and Research Needs, 27 GOV'T INFO. Q. 280, 283 (2010).

39. *See* 47 U.S.C. § 1302 (2012); *see also* Verizon v. F.C.C., 740 F.3d 623, 628 (D.C. Cir. 2014) (acknowledging the statutory authority of the FCC to encourage broadband deployment); Accelerating Broadband Infrastructure Deployment, Exec. Order No. 13,616, 77 Fed. Reg. 36,903 (June 14, 2012) ("Broadband access is essential to the Nation's global competitiveness in the 21st century, driving job creation, promoting innovation, and expanding markets for American businesses . . . . [T]oo many areas still lack adequate access to this crucial resource."); Connect America Fund, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663 (2011) (announcing comprehensive reform to the universal service system "to ensure that robust, affordable voice and broadband service, both fixed and mobile, are available to Americans throughout the nation").

40. WILLIAM LEHR, ANCHOR INSTITUTIONS HELP SECURE BROADBAND'S PROMISE 2 (2012), *available at* http://www.shlb.org/ckfinder/userfiles/files/Anchor%20Institutions%20Help%20Secure%20Broadband's%20Promise%20-%20Lehr%20-%20April%202012.pdf.

41. *See, e.g.*, Inquiry Considering the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act, Eighth Broadband Progress Report, 27 FCC Rcd. 10,342, 10,385 ¶ 93 (2012) [hereinafter Eighth Broadband Progress Report], *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0827/FCC-12-90A1.pdf (anticipating that as consumers demand higher broadband speeds, providers will "offer these next generation services"); EUROPEAN COMM'N, THE BROADBAND STATE AID RULES EXPLAINED: AN EGUIDE FOR DECISION MAKERS 3 (2014), *available at* http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=5355 ("NGA networks currently comprise fibre-based access networks (e.g., FTTB, FTTH, FTTC/VDSL), advanced upgraded cable networks (HFC/DOCSIS 3.0), and certain advanced wireless access networks.").

other fixed networks.[42] Moreover, however robust mobile broadband becomes, mobile networks depend on fixed lines to deliver traffic to the Internet backbone.[43] Therefore, when we talk about NGA broadband deployment, we are necessarily talking about fiber and other wired infrastructure as an essential piece of the solution.

In the United States, the FCC's National Broadband Plan set out goals for the broadband speeds and ubiquity deemed necessary for economic and social advancement.[44] These goals are similar to those set out by the European Union in its Digital Agenda.[45] The goals established in the National Broadband Plan are: (1) that the entire population should have fixed broadband options; (2) that most people should adopt broadband; and (3) that a large portion of adopters should have NGA connectivity (100 Mbps–1 Gbps).[46] With respect to anchor institutions, the National Broadband Plan set a goal of "affordable access of at least [one Gbps] . . . broadband service to anchor institutions such as schools, hospitals and government buildings."[47] Libraries themselves have embraced the gigabit

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42. *See* PHILIP M. NAPOLI & JONATHAN A. OBAR, NEW AM. FOUND., MOBILE LEAPFROGGING AND DIGITAL DIVIDE POLICY: ASSESSING THE LIMITATIONS OF MOBILE INTERNET ACCESS (2013), *available at* http://oti.newamerica.net/sites/newamerica.net/files/policydocs/MobileLeapfrogging_Final.pdf (noting that mobile smartphones are not yet acting as the functional equivalent as personal computers); *see also* Marion Walton & Jonathan Donner, *Public Access, Private Mobile: The Interplay of Shared Access and the Mobile Internet for Teenagers in Cape Town* 6 (2012), *available at* https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/20956/Public%20access%20private%20mobile%20final.pdf?sequence=1 ("Among low-income users, free use (such as that in a library) supports more resource-intensive goals (storage space, time, bandwidth) and stable media production, while paid use (such as via a phone) supports time-sensitive goals, various forms of inter-personal communication, and low-bandwidth media use.").

43. Martin Cave & Keiko Hatta, *Transforming Telecommunications Technologies—Policy and Regulation*, 25 OXFORD REV. ECON. POL'Y 488, 491 (2009); Eli Noam, *Let Them Eat Cellphones: Why Mobile Wireless Is No Solution for Broadband*, 1 J. INFO. POL'Y 470, 475 (2011), *available at* http://jip.vmhost.psu.edu/ojs/index.php/jip/article/viewFile/64/43

44. *See* FCC, *supra* note 21. The FCC set a goal of 100 Mbps broadband speeds for 100 million households by 2020. *Id.*

45. The European Union in its Digital Agenda has set a goal for Next Generation Access that targets speeds of 30 Mbps by the year 2020 for all and 100 Mbps or more for 50% of households. *A Digital Agenda for Europe*, COM (2010) 245 final (May, 19, 2010); *see also A Digital Agenda for Europe: Driving European Growth Digitally*, COM (2012) 784 final (Dec., 18, 2012); *Pillar IV: Fast and Ultra-Fast Internet Access*, *supra* note 21.

46. *See* FCC, *supra* note 21, at XIV.

47. *See id.* at 10. *See also* ConnectED: President Obama's Plan for Connecting All Schools to the Digital Age, 2013, p. 2, *available at* http://www.whitehouse.gov/sites/default/files/docs/connected_fact_sheet.pdf (announcing executive action to

connectivity goal, which they say is necessary to provide full service to all of the wireless devices used on premises, in addition to other purposes.[48]

As of now, those goals remain distant aspirations. A significant portion of households in the United States are without broadband, either because of adoption or supply shortfalls.[49] Nationwide, approximately one-third of households do not have broadband access at home.[50] Moreover, the speeds available to most do not approach NGA quality—the speeds deemed necessary for future applications and innovations.[51]

The situation at libraries, even after recent upgrades, is also sub-optimal. According to the American Library Association, more than 65% of libraries do not have enough public computers to meet demand, and 41% offer inadequate Internet connection speeds.[52] A recent survey by the Urban Libraries Council of thirty-three major U.S. libraries shows that not one had gigabit connectivity, and that relevant WiFi speeds are inferior to WiFi speeds in the average home.[53] Another survey reports somewhat better results, with 3% of

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work with private sector and FCC in connecting ninety-nine percent off all American K–12 students to high-speed broadband networks with speeds of no less than 100 Mbps and with a target of 1 Gbps by 2018).

48. Comments of the Urban Libraries Council before the FCC in the Matter of Modernizing E-Rate Program for Schools and Libraries (April 7, 2014), *available at* http://www.urbanlibraries.org/filebin/pdfs/ULC_Filing_FCC_040714.pdf.

49 Eighth Broadband Progress Report, *supra* note 41 (noting that more than thirty percent of American households do not subscribe to fixed broadband).

50. KATHRYN ZICKUHR & AARON SMITH, PEW RESEARCH CTR., HOME BROADBAND 2013 1–6 (2013), *available at* http://www.pewinternet.org/files/old-media//Files/Reports/2013/PIP_Broadband%202013_082613.pdf.

51. According to Akamai, fewer than 20% of broadband subscribers have speeds of more than 10 Mbps. RICHARD BENNETT ET AL., INFO. TECH. & INNOVATION FOUND., THE WHOLE PICTURE: WHERE AMERICA'S BROADBAND NETWORKS REALLY STAND 18 (2013), *available at* http://www2.itif.org/2013-whole-picture-america-broadband-networks.pdf.

52. AM. LIBRARY ASS'N, U.S. PUBLIC LIBRARIES AND E-GOVERNMENT SERVICES, *available at* http://www.ala.org/research/sites/ala.org.research/files/content/initiatives/plftas/issuesbriefs/IssuesBrief-Egov.pdf (last visited Oct. 26. 2014); *see also Hearing on the Nat'l Broadband Plan and Promoting Broadband Adoption Before the Subcomm. on Commc'ns, Tech. & the Internet of the H. Comm. on Energy & Com.*, 111th Cong. 39 (2010) (statement of Rivkah Sass, Director, Sacramento Pub. Library Sys.) (describing pre-BTOP data showing that "more than 80 percent of libraries enforce time limits on computer use and 45 percent of libraries enforce time limits ranging from 31 to 60 minutes").

53. *Libraries and Broadband: Urgency and Impact, Before the Inst. of Museum and Library Servs.* (2014) (statement of Reed Hundt, former Chariman, FCC), *available at* http://www.imls.gov/assets/1/AssetManager/

urban and 5% of suburban public libraries having one gigabit connectivity.[54]

Critics of the broadband status quo argue that there is insufficient competition in the commercial broadband market to spur the necessary infrastructure investment, especially given the high capital costs of broadband deployment.[55] Another explanation is that there is insufficient demand for NGA networks. The National Broadband Plan focused heavily on the dearth of demand for broadband in households that lack digital literacy skills, resources for broadband, or appreciation for the benefits that broadband brings.[56] That there may be both insufficient demand and insufficient supply is also possible on the theory that supply necessarily precedes, and then generates, demand when it comes to Internet innovation. This theory undergirds open Internet policies preserving the availability of Internet platforms for content providers in order to push the bounds of consumer demand, which then drive better broadband and greater innovation.[57] Essentially, there must be a platform for innovation to spur demand for its fruits.[58]

Hearing%20Transcript%20Closing.pdf ("[T]he Urban Libraries Council did a survey of 33 major libraries in the United States, more than 100 different buildings, [showing] that not one single one has 1 gigabit per second connectivity to the buildings, and when you pull out a handheld device and measure the wi-fi at 4:00pm, in every single one of the major libraries (these are the biggest libraries in the United States), the wi-fi connectivity is inferior to what it is in the suburbs of the Unites States in homes.").

54. JOHN CARL BERTOT ET AL., INFO. POL'Y & ACCESS CTR., 2013 DIGITAL INCLUSION SURVEY: SURVEY FINDINGS AND RESULTS (2014), *available at* http://digitalinclusion.umd.edu/sites/default/files/uploads/2013DigitalInclusionNationalReport.pdf; *see also* CAMBRIDGE STRATEGIC MGMT. GRP., CONNECTIONS, CAPACITY, COMMUNITY: EXPLORING POTENTIAL BENEFITS OF RESEARCH AND EDUCATION NETWORKS FOR PUBLIC LIBRARIES 6 (2011), *available at* http://www.library.state.ak.us/pdf/anc/owl/CCCRENetworkPaper21Feb11.pdf (predicting that BTOP funds would connect about 33% of all public libraries to fiber); JUSTIN GRIMES ET AL., INFO. POL'Y & ACCESS CTR., PUBLIC LIBRARIES AND THE NATIONAL BROADBAND MAP: FINDINGS AND RECOMMENDATIONS 15 (2012), *available at* http://ipac.umd.edu/Files/CAI_NBM_final_15May2012.pdf (explaining that at least eleven public libraries have one gigabit per second or greater connectivity).

55. *See, e.g.*, SUSAN P. CRAWFORD, CAPTIVE AUDIENCE: THE TELECOM INDUSTRY AND MONOPOLY POWER IN THE NEW GILDED AGE (2013). Others counter that the market is meeting demand for broadband. *See, e.g.*, Christopher S. Yoo, *Technological Determinism and Its Discontents*, 127 HARV. L. REV. 914, 915–16 (2014) (book review).

56. *See* FCC, *supra* note 21, at 165–90.

57. *See, e.g.*, Verizon v. F.C.C., 740 F.3d 623, 634 (D.C. Cir. 2014) (accepting the argument that open networks preserve "the 'virtuous circle of innovation' that had

Acting on this theory in a few cities, Google has entered the market to supply fiber-to-the-home with demand-pushing gigabit connectivity.[59] Gigabit rollout substantially brings down broadband prices for those households served and markedly increases capacity. But Google will only go to areas that promise a sufficiently dense subscriber-base, which are usually relatively high-income areas.[60] In other words, it's willing to build in advance of demonstrated demand, but only so far in advance. This strategy, eminently reasonable from a commercial standpoint, creates "fiberhoods"—neighborhoods that are far better served than others even in the same city.[61] There have been some piecemeal regulatory interventions to deal with these potential inequities.[62]

Many cities, not banking on Google's entry and unhappy with the scope and speed of existing broadband connectivity, have taken

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long driven the growth of the Internet" by "spur[ring] investment and development by edge providers, which leads to increased end-user demand for broadband access, which leads to increased investment in broadband network infrastructure and technologies, which in turn leads to further innovation and development by edge providers").

58. *See* Robert D. Atkinson & Daniel D. Castro, *A National Technology Agenda for the New Administration*, 11 YALE J. L. & TECH. 190, 202–03 (2009) ("A national broadband policy would encourage both supply and demand. On the supply side, government incentives could be crafted to spur additional investment in broadband networks, both to upgrade existing networks and improve access in underserved areas. On the demand side, a national broadband policy could increase access to personal computers, improve digital literacy, increase the use of the Internet in education, and spur the development of innovative e-government applications requiring high-speed Internet access.").

59. *See* Holly Trogdon, *Lessons from Google Fiber: Why Coordinated Cost Reductions to Infrastructure Access Are Necessary to Achieve Universal Broadband Deployment*, 66 FED. COMM. L.J. 103, 110 (2013) (describing Google Fiber initiative).

60. Jon Brodkin, *Fed Up with Slow and Pricey Internet, Cities Start Demanding Gigabit Fiber*, ARS TECHNICA (Nov. 22, 2013, 8:30 AM), http://arstechnica.com/business/2013/11/fed-up-with-slow-and-pricey-internet-cities-start-demanding-gigabit-fiber/.

61. Scott Canon, *Within Its Fiberhoods, Google Rules the Roost, Survey Finds*, KAN. CITY STAR, May 6, 2014, http://www.kansascity.com/news/business/technology/article351210/Within-its-fiberhoods-Google-rules-the-roost-survey-finds.html.

62. For example, Comcast agreed to serve approximately 2.5 million low income households with high-speed Internet access service for less than $10 per month as a condition of its merger with NBCUniversal. Memorandum Order and Opinion in the Matter of Applications of Comcast Corp., Gen. Elec. Co. & NBC Universal, Inc. For Consent to Assign Licenses and Transfer Control of Licenses, 266 FCC Rcd. 4238, 4242 (Jan. 20, 2011), *available at* https://apps.fcc.gov/edocs_public/attachmatch/FCC-11-4A1.pdf.

matters into their own hands.[63] Using a variety of models, they have invested in building new fiber infrastructure, usually with the goals of reducing costs and improving service.[64] The city may lease out fiber to commercial providers, or it may operate networks itself.[65] There are many different models of university-driven projects and broad-based consortia of nonprofit institutions.[66] At the heart of these models is usually some form of public-private partnership that deploys public infrastructure in coordination with private service providers. Anchor institutions may be both beneficiaries of the

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63. *See* CLARKE, *supra* note 22 (discussing the success of Lafayette, Louisiana, in implementing a municipally-owned fiber optic network).

64. *See* SUSAN CRAWFORD ET AL., BERKMAN CENTER FOR INTERNET & SOCIETY, COMMUNITY FIBER IN WASHINGTON, D.C., SEATTLE, WA, AND SAN FRANCISCO, CA: DEVELOPMENTS AND LESSONS LEARNED (2014), *available at* http://ssrn.com/abstract=2439429; FORLANO ET AL., *supra* note 8; ERIC LAMPLAND & CHRISTOPHER MITCHELL, INST. FOR LOC. SELF-RELIANCE, SANTA MONICA CITY NET: AN INCREMENTAL APPROACH TO BUILDING A FIBER OPTIC NETWORK (2014), *available at* http://www.ilsr.org/wp-content/uploads/2014/03/santa-monica-city-net-fiber-2014-2.pdf; U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-203, TELECOMMUNICATIONS: FEDERAL BROADBAND DEPLOYMENT PROGRAMS AND SMALL BUSINESS (2014), *available at* http://www.gao.gov/assets/670/660734.pdf.

65. *See* Eric Null, *Municipal Broadband: History's Guide*, 9 I/S: J.L. & POL'Y FOR INFO. SOC'Y 21, 35 (2013) (discussing five case studies of municipal broadband).

66. *See, e.g.*, GIG.U, http://www.gig-u.org (last visited Oct. 25, 2014); INTERNET2, http://www.internet2.edu (last visited Oct. 25, 2014). Gig.U is a collection of research institutions partnering with their communities to develop the next generation of internet applications. *See* GIG.U, http://www.gig-u.org. The goal of Gig.U is to "accelerate the deployment of world-leading, next generation networks in the United States in a way that provides an opportunity to lead in the next generation of ultra high speed network services and applications." *Our Mission*, Gig.U, http://www.gig-u.org/aboutus/our-mission. Internet2 is a collection of leaders in research, academia, industry and government who create and collaborate via innovative technologies. *See About Us*, INTERNET2, http://www.internet2.edu/about-us. Internet2 proposes a comprehensive network giving approximately 121,000 community anchors access to a dedicated 100–200 Gbps nationwide fiber backbone. *See University Corporation for Advanced Internet Development*, BROADBAND USA, http://www2.ntia.doc.gov/grantee/university-corporation-for-advanced-internet-development (last visited Oct. 25, 2014).

service as customers,[67] and also partners in extending their connectivity out into the community.[68]

Some cities have succeeded, like Santa Monica, California, where the city supplies service to anchor institutions and leases dark fiber to local businesses and ISPs.[69] Other cities have failed due to cost overruns and administrative problems.[70] Whether the investments are ultimately worthwhile or sustainable is an open question. What is clear, however, is that these interventions in general have produced faster, cheaper, and more ubiquitous broadband.[71]

What is good for consumers may not be as good for commercial providers, who face competition with nonprofit or public consortia that supply superior connectivity for less. The private sector has responded to this threat by lobbying fiercely against public involvement in broadband provision. Nearly half of all the States have adopted legislation to slow or stop cities from participating in broadband-buildout, which will be addressed below.[72] This conflict

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67. *See, e.g.*, Masha Zager, *Santa Monica City Net: How to Grow a Network*, BROADBAND COMMUNITIES MAG., May/June 2011, at 44, http://www.bbcmag.com/2011mags/mayjune11/BBC_MayJun11_SantaMonica.pdf (explaining that the city, local college, and school district save a combined $500,000 annually on their telecommunications service budgets by self-provisioning broadband). *See also* FORLANO ET AL., *supra* note 8 at 26 (providing many other examples of savings from municipal networks).

68. The Maryland state library system provides Internet access for government offices and public schools. *See Services*, SAILOR, http://www.sailor.lib.md.us/services (last visited Oct. 25, 2014).

69. *See, e.g.*, FORLANO ET AL., *supra* note 8, at 32.

70. *See* John Stephenson, *Government Broadband Buildout Needs More Oversight*, HEARTLANDER MAG. (2011), http://news.heartland.org/newspaper-article/government-broadband-buildout-needs-more-oversight (discussing how the cities of Davidson and Mooresville, N.C. regretted the purchase of the bankrupt Adelphia cable system because of the high costs of operating a municipal broadband network); Kuper Jones, *For Taxpayers, Broadband 'Utopia' Anything But*, FORBES, (July 1, 2014, 3:30 AM), http://www.forbes.com/sites/realspin/2014/07/01/for-taxpayers-broadband-utopia-anything-but/ (discussing the failure of municipal broadband projects across the country, such as the Utah Telecommunication Open Infrastructure Agency which accrued more than $500 million in debt and is considering selling its broadband infrastructure).

71. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 8, at 13 ("[F]ederally funded and municipal networks most often had the highest advertised top speed when compared with top speeds offered by [other] networks in the same community, and networks in nearby comparison communities.").

72. Municipal efforts to expand broadband opportunities have been stymied in twenty jurisdictions where states have, to varying degrees, prohibited their municipal subdivisions from interfering in the market. *See* John Blevins, *Death of the Revolution: The Legal War on Competitive Broadband Technologies,* 12 YALE J.L. & TECH. 85 (2009*)*; Sylvain, *supra* note 9, at 798 (identifying states that, as of that

over the proper role of municipalities and anchor institutions in the provision of broadband service is now central to telecommunications policy debates.[73]

Municipal interest in providing or helping others to provide broadband is an expression of dissatisfaction with current service and, sometimes, of optimism that public assets can be more effectively leveraged.

III. THE PUBLIC LIBRARY AND BROADBAND

The anchor institution can help to fill broadband market gaps, whether as part of a municipal network or in its absence. Public libraries in particular, as historic public gateways to information, are evolving as participants in the broadband ecosystem.[74]

There are approximately 16,500 public library outlets in the United States, located in virtually every community.[75] According to a 2013 Pew Internet study, 26% of Americans aged sixteen and older report using public library computers or WiFi connections.[76] Nationwide, 62% of all public libraries say that they are the only provider of free

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date, had curtailed or forbidden municipal provision of broadband services). The FCC is considering taking action to preempt these state regulations. *See* Tom Wheeler, Chairman, FCC, *Removing Barriers to Competitive Community Broadband*, FCC BLOG (June 10, 2014, 4:17 PM), http://www.fcc.gov/blog/removing-barriers-competitive-community-broadband (stating that it is in the "best interests of consumers and competition that the FCC exercises its power to preempt state laws that ban or restrict competition from community broadband").

73. *See, e.g.*, Comments of New America Foundation's Open Technology Institute and Education Policy Program, in the Matter of Modernizing the E-rate Program for Schools and Libraries (Sept. 16, 2013), *available at* http://newamerica.net/sites/newamerica.net/files/profiles/attachments/NAF_E-Rate_Comments.pdf (providing an example of Martin County, Florida, that realized significant savings by building its own fiber network rather than leasing lines from Comcast and arguing for policy that allows E-Rate subsidies to be used for fiber network investments rather than merely for recurring costs of telecommunications services).

74. *See, e.g.*, Broadband Technology Opportunities Program, 75 Fed. Reg. 3792 (Jan. 22, 2010) ("Much like the interstate highways that link together the nation's roads and streets, [libraries and other "Middle Mile" institutions] play a critical role in the healthy functioning of the nation's broadband infrastructure and are a necessary foundation for the ultimate provision of affordable end-user broadband services in unserved and underserved communities.").

75. EVERETT HENDERSON ET AL., INST. OF MUSEUM & LIBRARY SERVS., PUBLIC LIBRARIES SURVEY: FISCAL YEAR 2007 (2009), *available at* https://harvester.census.gov/imls/pubs/Publications/fy2007_pls_report.pdf.

76. KATHRYN ZICKUHR ET AL., PEW INTERNET PROJECT, LIBRARY SERVICES IN THE DIGITAL AGE (2013), *available at* http://libraries.pewinternet.org/2013/01/22/library-services/.

Internet access in their communities.[77] In Philadelphia, for example, more than 40% of households lack broadband internet access, making many dependent on the library as the region's largest provider of free access.[78] Even for those who otherwise have broadband access, libraries provide a third space for connection and educational advancement. For example, the majority of public school students use libraries for schoolwork.[79] Research shows that high-speed public library Internet access produces positive informational spillovers, especially in urban communities.[80]

Despite the natural affinity between the library's mission and broadband policy goals, urban libraries failed in their bids for BTOP funding in the first round of federal stimulus grants for broadband infrastructure.[81] This is because the BTOP grantmaking was focused on "unserved" areas and most urban libraries are proximate to broadband infrastructure.[82] That they serve millions of unserved or underserved *individuals* was irrelevant.[83]

This failure of libraries in the first round of BTOP funding was a turning point for libraries and for the articulation of the role of anchor institutions in broadband (and smart city) policy. The American Library Association urged regulators to revamp the grant-making criteria to account for the centrality of broadband access

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77. Judy Hoffman et al., *Libraries Connect Communities: Public Library Funding & Technology Access Study 2011–2012*, AM. LIBRARIES MAG. 19 (June 2012), http://www.ala.org/research/sites/ala.org.research/files/content/initiatives/plftas/2011_2012/plftas12_technology%20landscape.pdf.

78. Comments by the Free Library of Philadelphia Related to E-Rate Modernization (April 7, 2014), *available at* http://apps.fcc.gov/ecfs/document/view?id=7521097427.

79. Tom Wheeler, Chariman, FCC, Remarks at the Library of Congress on National Digital Learning Day (Feb. 5, 2014), *available at* https://apps.fcc.gov/edocs_public/attachmatch/DOC-325447A1.pdf.

80. Anton Bekkerman & Gregory Gilpin, *High-Speed Internet Growth and the Demand for Locally Accessible Information Content*, 77 J. URB. ECON. 1 (2013) (showing empirical evidence of complementary growth in Internet access and the use of public library resources, suggesting that Internet access increases the value of information and overall information demand).

81. *See* LENNARD G. KRUGER, CONG. RESEARCH SERV., DISTRIBUTION OF BROADBAND STIMULUS GRANTS AND LOANS: APPLICATIONS AND AWARDS 3 (2011), *available at* http://www.ipmall.info/hosted_resources/crs/R41164_010411.pdf (describing how, in the second round of funding, "BTOP reoriented its infrastructure program towards . . . middle mile projects serving anchor institutions such as community colleges, libraries, hospitals, universities, and public safety institutions"); *see also supra* notes 71–76.

82. *See* KRUGER, *supra* note 81, at 4.

83. *See id.* at 1.

within public libraries in urban areas.[84] More precise community-level mapping of resource deficiencies and need can paint a very different picture than mapping that covers larger population areas.[85] As is often the case with smart cities initiatives, how you map a community will influence where resources are deployed. Libraries were instrumental in moving the federal agencies to adopt a more fine-grained approach to community mapping that accounted for the variability of populations within small areas.[86] Allies in the technology[87] and philanthropic[88] sectors supported pleas for increased funding to libraries. The libraries' supporters also impressed upon the FCC the importance of aiming for higher speeds at these institutions, well beyond what was considered adequate for households at the time.[89] Congress got on board, too.[90]

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84. Letter from Emily Sheketoff, Exec. Dir., Am. Library Ass'n, to Larry Strickling, Assistant Sec'y of Commerce, Nat'l Telecomm. & Info. Admin. (July 23, 2009), *available at* http://www.ntia.doc.gov/broadbandgrants/correspondence/20090723AmericanLibraryAssoc.pdf; *see also* Comments of the American Library Association Regarding the American Recovery and Reinvestment Act of 2009 Broadband Initiatives (April 13, 2009), *available at* http://www.ntia.doc.gov/broadbandgrants/comments/7AA6.pdf.

85. *See, e.g.*, Nancy S. Hardt et al., *Neighborhood-Level Hot Spot Maps to Inform Delivery of Primary Care and Allocation of Social Resources*, PERMANENTE J., Winter 2013, at 4 (showing how density maps of health and social indicators highlight the location of disparity and need at neighborhood level).

86. *See* Broadband Technology Opportunities Program, 75 Fed Reg. 3792, 3798–99 (Jan. 22, 2010). BTOP also supported the development of the National Broadband Map, http://broadbandmap.gov/, which launched in 2011.

87. Comments of AT&T Inc. before the NTIA, In the matter of American Recovery and Reinvestment Act of 2009 Broadband Initiatives (April 13, 2009), *available at* http://www.ntia.doc.gov/legacy/broadbandgrants/comments/7B31.pdf; Consolidated Comments of Microsoft Corp. before the NTIA in the matter of the American Recovery and Reinvestment Act of 2009 Broadband Initiatives (April 13, 2009), *available at* http://www.ntia.doc.gov/legacy/broadbandgrants/comments/78A.pdf.

88. Comments of the Bill & Melinda Gates Foundation before the NTIA in the Matter of Implementation of the Broadband Technology Opportunities Program (2009), *available at* http://www.ntia.doc.gov/broadbandgrants/comments/7358.pdf.

89. Comments of Comcast Corp. before the FCC in the Matter of Modernizing the E-Rate Program for Schools and Libraries (Sept. 16, 2009), *available at* https://prodnet.www.neca.org/publicationsdocs/wwpdf/91713comcast.pdf; Comments of Microsoft Corp. before the FCC in the Matter of a National Broadband Plan for Our Future (June 8, 2009), *available at* http://apps.fcc.gov/ecfs/comment/view?id=5515364559.

90. *House Dems urge BTOP to be Friendlier to 'Anchor Institutions'*, 75 TELECOMM. REP. 46 (2009) (reporting on Sept. 17, 2009 letter to NTIA Administrator Lawrence Strickling from Reps. Matsui, Eshoo, and Markey asking that future rounds of funding under BTOP "have a specific category and standards that recognize the unique needs of community anchor institutions" and asking that

A. Anchoring Broadband Within Libraries

The story of libraries and broadband has two components. The first concerns the role that public libraries play as the broadband provider of last resort within their walls for residents who do not otherwise have access even to slower broadband speeds. This access becomes a lifeline for the many who are at the edges of digital life, fostering civic and economic engagement, skills training, and job advancement.[91] The access also helps to build a case for broadband adoption and innovation that is often undervalued in underserved communities.[92] The second part of the story has to do with the library's role as a hub for broadband service that extends outwards through the community. At this point, libraries rarely serve this role because their broadband facilities are too limited.[93] In the future, smart deployment of libraries' physical facilities and service orientation could spur private investment and leverage public assets in broadband connectivity.

Starting with the issue of digital inclusion, approximately one-third of all households do not have broadband access at home.[94] Of course mobile broadband and WiFi hotspots provide other sources of access, but only for those with smartphones or laptops, and only with the support of fixed networks to carry the traffic.[95] As the only source of free broadband access in most communities, libraries figure centrally in a more inclusive Internet ecosystem.

With BTOP and other stimulus programs, libraries had the chance to obtain federal funding to upgrade broadband facilities, purchase

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rules adopt a definition of broadband for these institutions in the range of one hundred megabits per second to one gigabit per second, or higher); John Eggerton, *Dems Push High-Speed for Anchor Institutions: Want National Broadband Plan to Include Service to Libraries, Schools, Health Facilities*, BROADCASTING & CABLE (Sept. 21, 2009), http://www.broadcastingcable.com/article/354720-Dems_Push_High_Speed_For_Anchor_Institutions.php (suggesting that libraries need 100 Mbps–1 Gbps connectivity).

91. *See generally* FCC, *supra* note 21, at 165–90.

92. *Id.*

93. Email from Larra Clark, Am. Library Ass'n., to Ellen P. Goodman, Professor, Rutgers Univ. Sch. of Law (July 23, 2014) (on file with author).

94. ZICKUHR & SMITH, *supra* note 50.

95. *See, e.g.*, Scott J. Scott Marcus & John Burns, *Study on the Impact of Traffic Off-Loading and Related Technological Trends on the Demand for Wireless Broadband Spectrum* (2013), *available at* http://bookshop.europa.eu/is-bin/INTERSHOP.enfinity/WFS/EU-Bookshop-Site/en_GB/-/EUR/ViewPublication-Start?PublicationKey=KK0113239 (showing how most mobile broadband traffic is actually off-loaded onto wired networks via WiFi hotspots).

computers, and support other IT resources.[96] This opportunity to support broadband capital expenditures focused libraries on their role in the emerging knowledge economy and as critical nodes in the networked community. What began to take shape through this process was a techno-centric vision of libraries as essential digital connectors. Libraries emphasized their role in helping the jobless find employment,[97] in supporting "makers" labs for entrepreneurs to experiment in innovation,[98] in supporting digital literacy and other training programs,[99] and in advancing e-Government and citizen engagement.[100]

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96. As of March 2014, BTOP grantees had connected nearly 25,000 anchor institutions. NAT'L TELECOMMS. & INFO. ADMIN., U.S. DEP'T OF COMMERCE, BROADBAND TECHNOLOGY OPPORTUNITIES PROGRAM (BTOP) QUARTERLY PROGRAM STATUS REPORT 2 (2014), *available at* http://www.ntia.doc.gov/files/ntia/publications/ntia_btop_21st_qtrly_report.pdf. This is in addition to more than $200 million awarded in matching grants to establish or upgrade public computer centers (PCCs) throughout the United States. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, tit. II, 123 Stat. 115, 127 ("not less than $200,000,000 shall be available for competitive grants for expanding public computer center capacity, including at community colleges and public libraries.").

97. *See e.g.*, AM. LIBRARY ASS'N, U.S. PUBLIC LIBRARIES AND THE BROADBAND TECHNOLOGY OPPORTUNITIES PROGRAM 2 (2013), *available at* http://www.districtdispatch.org/wp-content/uploads/2013/02/ALA_BTOP_Report.pdf (describing Alabama public libraries, which "are being used by local companies and agencies to hold employee training, and by state agencies to hold job-counseling sessions. In many cases the library serves as the de facto job training, career and workforce development center"); SAMANTHA BECKER ET AL., OPPORTUNITY FOR ALL: HOW LIBRARY POLICIES AND PRACTICES IMPACT PUBLIC INTERNET ACCESS 9 (2011), *available at* http://www.imls.gov/assets/1/AssetManager/OppForAll2.pdf (noting that 30 million public library patrons use libraries for employment services every year); Hoffman et al., *supra* note 77*;* ZICKUHR ET AL., *supra* note 76, at 45–46.

98. *See, e.g.*, *Investing in Chicago*, CHI. PUB. LIBR. FOUND., http://www.cplfoundation.org/site/PageServer?pagename=invest_growing_communities_innovationlab_co (last visited Oct. 25, 2014) (describing Chicago Public Library's Maker Lab which supports 3-D printing and other services for entrepreneurs); *see also* Angela Siefer, *What Good is a Gig?*, DISTRICT DISPATCH (Mar. 25, 2014), http://www.districtdispatch.org/2014/03/good-gig/ (describing several libraries' use of gigabit connectivity for digital innovation in communities, including Chattanooga Public Library which hosts "'civic laboratory, makerspace and hackerspace'" home for 3D printers, video conferencing, 3D file sharing, and portal for local open government data).

99. More than 90% of public libraries offer some type of formal or informal technology training. Hoffman et al., *supra* note 77, at 25. A growing percentage of public libraries offers formal technology training classes (44.3%, up from 38% in 2010–2011). *Id.* Nearly two-thirds of urban libraries (63.2%) offer this type of training. *Id.*

100. Paul T. Jaeger & John Carlo Bertot, *E-government education in public libraries: New service roles and expanding social responsibilities,* 50 J. EDUC. LIBR. &

Libraries and other anchor institutions received a large share of the total $7 billion in BTOP funds, with approximately $4 billion going to improve service for more than 2211 community anchor institutions.[101] Nearly 39% of public libraries reportedly received a BTOP (or related Broadband Investment Program) grant either directly or indirectly.[102] Still, 65.4% of libraries report having insufficient public access Internet workstations to meet patrons' needs at least during some part of a typical day.[103] That number in urban areas rises to 87% of libraries.[104]

The libraries' narrative has been refined and amplified recently in their bid to remake the E-rate program, which provides federal funding for recurring public school and library telecommunications expenses.[105] Now, when libraries talk about their role in providing broadband services, it is in the expansive terms of the smart city movement. They may not refer specifically to smart cities—indeed they rarely do—but they use smart city language in talking up the potential of ICT-enabled networks to improve services and lives. For example, an American Library Association representative recently testified at a federal hearing on broadband and libraries that, "[e]nsuring libraries have sufficient advanced broadband capacity is essential for completing education, and jump-starting employment and entrepreneurship . . . [and for fostering] community engagement and individual empowerment."[106] Broadband connectivity is useful not just for its own sake, but to be "leveraged" by libraries "to enhance and improve the lives of people in the communities they serve."[107]

INFO. SCI. 39 (2009); Lauren H. Mandel et al., *Broadband for Public Libraries: Importance, Issues, and Research Needs*, 27 GOV'T INFO. Q., 280, 282–83 (2010).

101. *See* Eighth Broadband Progress Report, *supra* note 41, at 10,385 ¶ 15.

102. Hoffman et al., *supra* note 77, at 16 ("The highest percentage of received awards is for public computer centers (39.7%), followed by sustainable broadband (12.1%) and middle mile applications (10.1%).").

103. *Id.* at 20.

104. *Id.* at 21.

105. Press Release, Am. Libraries Ass'n, ALA Calls for Leap Forward in E-rate Goals; Streamlined Program (Sept. 18, 2013), http://www.ala.org/news/press-releases/2013/09/ala-calls-leap-forward-e-rate-goals-streamlined-program.

106. Larra Clark, Director, Program on Networks, Am. Library Ass'n Office for Info. Tech. Policy, Remarks at the Inst. of Museum & Library Servs. Public Hearing titled Libraries and Broadband: Urgency and Impact (April 17, 2014), *available at* http://www.imls.gov/assets/1/AssetManager/Larra%20Clark.pdf.

107. URBAN LIBRARIES COUNCIL, MODERNIZING THE E-RATE PROGRAM TO SUPPORT THE PUBLIC LIBRARY ROLE IN LIFELONG LEARNING 2 (2014), *available at* http://www.urbanlibraries.org/filebin/pdfs/E-rate_White_Paper.pdf.

B. Libraries as Hubs

The second element of the libraries' broadband story concerns their role in municipal or public consortia as network hubs, contributing to alternative and reduced-cost infrastructure for ultrafast or next generation broadband.[108] In this role, as in the role of provider of last resort, the library demonstrates the utility of civil society institutions in smart city networks. They have managed to mitigate some of the inequitable tendencies of technological diffusion and provide important institutional counterweights to private power over critical ICT resources.

The basic idea is this: once libraries have access to fiber or other high-speed broadband connectivity, they can share this asset with other institutions and businesses.[109] This kind of shared infrastructure then provides an alternative to purely commercial infrastructure, thereby driving costs down and improving service.[110]

One mechanism by which libraries can become hubs is by contributing to what is known as "middle mile" infrastructure.[111] Middle mile infrastructure provides a link from the Internet backbone to the last mile networks of local providers (such as cable or phone companies) that provide broadband service to end users.[112] Anchor institutions are developing middle mile networks often through Research & Education Network consortia (including universities,

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108. LEHR, *supra* note 40, at 12 ("Our libraries and cultural institutions need broadband to support their missions and service offerings, and to expand access to the growing volume of local and remote digital and digital-only content.").

109. Mandel et al., *supra* note 100, at 283 ("[P]ublic libraries can serve as distributed hubs for improved internet access in their communities. When public libraries gain access to higher connectivity speeds and greater bandwidth, that access also has been brought into the community where last-mile connections can expand this high-speed internet into private homes and businesses.").

110. *See generally* David P. Reed et al., *Technologies and Policies to Connect the Next Five Billion*, 29 BERKELEY TECH. L. J. (forthcoming 2014) (manuscript at 13), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2378684 ("[A] public policy framework that encourages or even rewards a shared infrastructure development strategy among infrastructure players is desirable.").

111. Broadband Technology Opportunities Program, 75 Fed. Reg. 3792, 3794 (Jan. 22, 2010) ("Middle Mile projects [are] defined as any broadband infrastructure project that does not predominantly provide broadband service to end users or to end-user devices and that may include interoffice transport, backhaul, Internet connectivity, or special access."); *see also* Marijke Visser & Mary Alice Ball, *The Middle Mile: The Role of the Public Library in Ensuring Access to Broadband,* 29 INFO. TECH. LIBR. 187 (2010) (discussing the role of public libraries as the metaphorical middle mile which connects the public to broadband communication).

112. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 8, at 11 & n.17.

colleges, and hospitals, as well as libraries).[113] These networks, known as RENs, are something like "the state highways of the Internet, providing high capacity routes or 'middle mile' connections to major locations . . . , relying on national networks for long-distance connections and local 'last mile' connections to reach smaller communities and buildings within a community."[114]

Even libraries without direct access to fiber can enjoy cheaper and faster broadband if they are networked with fiber-enabled anchor institutions as part of a REN, thereby decreasing the distance from the library to fiber.[115]

There are other advantages of RENs. Anchor institutions tend to have broadband usage patterns that are "bursty," meaning that they sporadically exceed data allowances.[116] Whereas commercial networks charge heavily for data overages, noncommercial networks will often accommodate excessive data use for free because they have been engineered with additional headroom to allow for occasional excessive data use.[117] RENs confer other benefits related to demand aggregation. Anchor institutions networked through the middle mile can get better deals on the services they purchase from commercial providers.[118] They are also able to spread the costs of technical support and training.[119]

Networked anchor institutions place healthy competitive pressure on commercial suppliers to maintain and upgrade service levels.[120] To the extent that anchor institutions can obtain connectivity from their own shared infrastructure, they have a competitive alternative to commercial services.[121] Beyond the self-provisioning of service,

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113. CAMBRIDGE STRATEGIC MGMT. GRP., *supra* note 54, at 1 ("Originally developed to connect campus research centers with high capacity internet and computing services, Research and Education networks have expanded over time, offering non-commercial services to K–12 education, libraries and other community institutions.").

114. *Id.* at 3.

115. *See Id.*

116. *Id.*

117. *Id.*

118. Id.

119. *Id.*

120. *See* HAROLD FELD ET AL., CONNECTING THE PUBLIC: THE TRUTH ABOUT MUNICIPAL BROADBAND 9–11 (2005), *available at* http://www.freepress.net/sites/default/files/fp-legacy/mb_white_paper.pdf.

121. Comments of New America Foundation's Open Technology Institute and Education Policy Program, *supra* note 73 (providing the example of Martin County,

networked anchor institutions can contribute to the construction of municipal area networks. As William Lehr has described, the role of the anchor institution in broadband rollout includes providing real estate for the siting of wireless towers.[122] Indeed, as wireless becomes more central to the broadband landscape, community anchor institutions and municipalities may have to play larger parts in multiplying wireless cells and increasing wireless capacity.[123]

Ultimately, some combination of fiber and densely sited wireless base stations will provide the ubiquitous broadband connectivity of the smart city.[124] It is for this reason that libraries are participating in early experiments to roll out "Super-WiFi"—higher speed unlicensed wireless access in the spectrum once allocated to broadcasting.[125] Early applications in rural areas have brought wireless broadband connectivity to the underserved. People gather in the parking lot of a library in Paonia, Colorado, for example, to use its WiFi signal.[126] Recently, the library gained access to TV spectrum to share its wireless broadband with the town's main street and park, making it possible not only to serve individual demand, but to function as a de facto radio broadcaster streaming Internet radio featuring local bands.[127]

Public libraries and other anchor institutions have succeeded in making the case that they democratize the benefits of digital connectivity by serving those who enter their facilities. There is

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Florida that realized significant savings by building its own fiber network rather than leasing lines from Comcast).

122. LEHR, *supra* note 40, at 16 ("Commercial-grade structures and related infrastructure (power, heating, access, and security) make such institutions logical nodes for terminating second mile infrastructures.").

123. William Lehr et al., *Wireless is Changing the Policy Calculus for Municipal Broadband*, 23 GOV'T INFO. Q. 435, 446 (2006), *available at* http://www.researchgate.net/publication/222563043_Wireless_is_changing_the_policy_calculus_for_municipal_broadband/file/9fcfd505a425c30a9f.pdf (predicting that the importance of local government participation in ICT infrastructure would increase with wireless proliferation).

124. Reed et al., *supra* note 110 (manuscript at 28–29).

125. *See* Colin Wood, *Super Wi-Fi Pilot Hits Libraries Around the Country*, GOV'T TECH., Sept. 13, 2013, http://www.govtech.com/network/Super-Wi-Fi-Pilot-Hits-Libraries-Around-the-Country.html (describing pilot programs to exploit new wireless connectivity in and around public libraries); *see also Libraries WhiteSpace Pilot*, GIGABIT LIBR. NETWORK, http://giglibraries.net/page-1628969 (last visited Oct. 25, 2014).

126. Letter from Larra Clark, Director, Am. Library Ass'n, to Tom Wheeler, Chairman, FCC, (April 11, 2014), *available at* http://apps.fcc.gov/ecfs/document/view?id=7521098079.

127. *Id.*

another case to be made that, with the proper policy interventions and incentives for cooperation, these institutions can leverage their physical infrastructure to extend connectivity beyond their walls.

IV. SMART CITIES AND CIVIL SOCIETY INSTITUTIONS

The broadband experience shows that markets alone cannot be expected to deliver ICT services to maximize the intelligence of the network as a whole. There are two concerns here. One is distributional—so far, the market has not delivered on the promise of next generation broadband access for all.[128] A second concern is about control. Having a diversity of communications nodes—different kinds of actors with different sets of incentives and answerable to diverse stakeholders—has long been thought to be beneficial for democracy.[129] That is why media pluralism policy extends beyond the requirements of antitrust law in the United States and Europe.[130]

Civil society anchor institutions like libraries, sitting between the market and the state (or at least the State),[131] may be able to respond to both of these concerns by diffusing and augmenting city "smarts."[132] Their particular capacities and public service missions give them an important role to play as digital connectors, both within their walls and as hubs in public networks. In the United States, federal government subsidy and investment programs acknowledge the centrality of these institutions in advancing broadband and smart city goals.[133]

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128. *See generally*, C. Edwin Baker, Media Concentration and Democracy: Why Ownership Matters (2006).

129. *Id.*

130. *See generally* MEDIA DIVERSITY AND LOCALISM: MEANING AND METRICS (Philip M. Napoli ed., 2007).

131. American public libraries exhibit a range of governance structures. *See* STEPHEN OWENS & CARREL KINDEL, NAT'L CTR. FOR EDUC. STATISTICS, PUBLIC LIBRARY STRUCTURE AND ORGANIZATION IN THE UNITED STATES (1996), *available at* http://www.imls.gov/assets/1/News/PublicLibraryStructureOrg_3-1996.pdf (describing the legal structure and organization of each state's public library system). Most are creatures of city or state government, but some, like the New York Public Library, are constituted as independent nonprofits. *General Fact Sheet 2011*, N.Y. PUB. LIBR., http://www.nypl.org/sites/default/files/Facts__Figures_v2_0.pdf.

132. *See* Visser & Ball, *supra* note 111, 191–94 (discussing public libraries' role in providing broadband access to the public and its increasing role as the middle mile connecting the public to the Internet).

133. *See, e.g.*, Community Broadband Act of 2005, S. 1294, 109th Cong. (2005) (attempting to remove state-imposed barriers to municipalities' ability to roll out broadband).

At the same time, state laws that limit anchor institutions' ability to participate in public networks depress their contributions to broadband connectivity. This is not to say that excessive state involvement in broadband rollout is a good thing. The European Union has established fairly clear rules for when "state-aid" in broadband deployment (which would also apply to other smart initiatives) is excessive. In short, the state can only fund and otherwise support alternative infrastructure when there has been a market failure.[134] A similar approach in the United States would be an advance.

The gains to be had from empowering anchor institutions in broadband and other smart city initiatives are economic and democratic. The "digital inclusion" goals of broadband policy are to increase affordable access to technology and connectivity, digital literacy, the nondiscriminatory availability of content and applications, and educational uses of technology.[135] In the smart cities context, there are additional goals such as ensuring that all communities are visible to digital mapping efforts, reducing selection bias in databases and algorithmic design, and designing service delivery systems that are sufficiently inclusive.[136] Those who worry about digital inclusion want to prevent the digital world from replicating or even exaggerating analog patterns of privilege and opportunity, thereby failing to capitalize on the democratic dividends of "smart" ICT deployment.[137]

Concern over who controls and enjoys the benefits of technological advance has always marked utopian urban aspirations.[138] Throughout

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134. VIRGIN MEDIA LTD., RESPONSE TO THE EU GUIDELINES FOR THE APPLICATION OF STATE AID RULES IN RELATION TO THE RAPID DEPLOYMENT OF BROADBAND NETWORKS (2012), *available at* http://ec.europa.eu/competition/consultations/2012_broadband_guidelines/virgin_media_en.pdf.

135. INST. OF MUSEUM & LIBRARY SERVS., BUILDING DIGITAL COMMUNITIES: GETTING STARTED (2012), *available at* http://www.imls.gov/assets/1/workflow_staging/AssetManager/2141.pdf; *see also* FCC, *supra* note 21, at 127–90.

136. *See, e.g.*, Teresa Mastrangelo, *Smart Cities Require a Smart Approach to Technology,* ADVA OPTICAL TECHNICALLY SPEAKING BLOG, (Mar. 11, 2013), http://blog.advaoptical.com/smart-cities-require-a-smart-approach-to-technology/ (discussing how cities need to improve in connecting city infrastructure to individuals, combining data from multiple sources, and delivering real-time information).

137. *See, e.g.*, ANTHONY G. WILHELM, DIGITAL NATION: TOWARD AN INCLUSIVE INFORMATION SOCIETY (2004).

138. *See, e.g.*, James Carey & John J. Quirk, "The Mythos of Electronic Revolution" *in* COMMUNICATION AS CULTURE: ESSAYS ON MEDIA AND SOCIETY 113–41 (1989); LEO MARX, THE MACHINE IN THE GARDEN: TECHNOLOGY AND THE PASTORAL IDEAL IN AMERICA (1964); LEWIS MUMFORD, THE STORY OF UTOPIAS

the Twentieth Century, critics worried that technology-based innovations in urban design would exacerbate inequalities, concentrate power, and weaken social ties.[139] Lewis Mumford was an early critic of utopian planning who ignored the realities of lived communities.[140] More recently, the sociologist Manuel Castells has warned that a city organized around information-processing presents a risk of an "urban system socially and spatially polarized between high value-making groups and functions on the one hand and devalued social groups and downgraded spaces on the other hand." [141]

The smart city is susceptible to the same kinds of critique. Indeed, academics have criticized the centrality of commercial interests in the implementation of smart city solutions, with vendors like IBM at the forefront of the smart city movement.[142] They have argued that smart cities require intelligence at the community and social level.[143] IBM does not disagree. In a co-authored paper, an IBM smart city evangelist himself cautions that a smart city depends upon a smarter community that "strengthens human bonds and services—communication, relationships, health, education, economic opportunity, timely assistance for those in need, disaster preparedness and relief, quality of neighborhoods, quality of life (sports, arts, entertainment), and the ability to create and maintain jobs."[144]

(1922) (discussing the relationship between utopias and urban planning); HOWARD P. SEGAL, TECHNOLOGICAL UTOPIANISM IN AMERICAN CULTURE (1985).

139. *See, e.g.*, Robert C. Ellickson, *Monitoring the Mayor: Will the New Information Technologies Make Local Officials More Responsible*?, 32 URB. LAW. 391, 392 (2000) (arguing that information technologies could negatively affect urban areas by increasing power of special interests, distracting citizens from local affairs, and eroding local social capital).

140. MUMFORD, *supra* note 138.

141. Manuel Castells, *The Informational City is a Dual City: Can It Be Reversed?*, *in* HIGH TECHNOLOGY AND LOW-INCOME COMMUNITIES: PROSPECTS FOR THE POSITIVE USE OF ADVANCED INFORMATION TECHNOLOGY 25–42 (Donald A. Schön et al. eds., 1999); *see also* STEVE GRAHAM & SIMON MARVIN, SPLINTERING URBANISM: NETWORKED INFRASTRUCTURES TECHNOLOGICAL MOBILITIES AND THE URBAN CONDITION (2001) (observing that private technology deployment in cities has led to urban fragmentation and marginalized spaces).

142. *See, e.g.*, ADAM GREENFIELD, AGAINST THE SMART CITY (2013) (criticizing the smart cities movement for excessive reliance on the several IT corporations that are shaping the public-private partnerships at the heart of the networked city).

143. Hollands, supra note 18, at 315. Hollands argues for "progressive smart cities" that start with the human capital side of the promise of networks. *Id.* at 314.

144. Rosabeth Moss Kanter & Stanley S. Litow, *Informed and Interconnected: A Manifesto for Smarter Cities* 2 (Harvard Bus. Sch. Working Paper, 09-141, 2009), *available at* http://www.hbs.edu/faculty/Publication%20Files/09-141.pdf.

CONCLUSION

There is no blueprint for a "smart city." The International Telecommunications Union (ITU) has identified approximately one hundred smart city definitions, each with its own formulation of how to leverage technology to improve urban life, and what improvement might look like.[145] The ITU's study produced this word cloud, illustrating the centrality of communications, information, and interconnectedness to many definitions.[146]

For the most part, consideration of how to connect citizens with each other and with information has focused on the market and the state. But the state and the market leave gaps, which civil society institutions anchored in communities can help fill by connecting citizens through telecommunications infrastructure that is robust, affordable, and ubiquitous. The development of communications policies for anchor institutions has recognized that these institutions—schools, libraries, health centers—improve connectivity. This connectivity enables more fundamental changes in employment, education, health care services, and so on. Civil society institutions have a critical role to play in the diffusion of telecommunications infrastructure—and its productive use in society. We need more inquiry into how these institutions can help to achieve the full range of smart city goals in ways that empower citizens. At the same time, in communications policy, the contributions and requirements of

145. FOCUS GRP. ON SMART SUSTAINABLE CITIES, INT'L TELECOMM. UNION, SMART SUSTAINABLE CITIES: AN ANALYSIS OF DEFINITIONS 13 (2014), *available at* http://t.co/3ybS4nOR2P.

146. *Id.* at 16.

anchor institutions—not least, public libraries—should be understood in the broader context of these smart city goals.