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Broadband Adoption
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Introduction:
Defining and Measuring Meaningful Broadband Adoption

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Debates about broadband adoption have gained a new urgency in the United States alongside concerns about the flagging economy and decreased global rankings in high-speed connectivity. Broadband adoption—the process of connecting approximately 100 million U.S. residents who are not online (FCC, 2012a; Horrigan & FCC, 2010)—has become a cause of anxiety and a call to action among policy makers in recent years.[2] The United States currently leads in technology innovation, producing many of the world's most recognized companies, including Google, YouTube, Facebook, and Twitter, all of which rely on high-speed, always-on broadband connectivity. Yet, in many communities, major swaths of the population remain off the digital grid and unable to partake in broadband's many benefits. In the Detroit, Baltimore, and Philadelphia metropolitan areas, at least a third of all residents cannot or do not go online using a residential fixed broadband connection (Fenton, 2012).

Many current solutions proposing to bridge the digital divide in the above cities and elsewhere in the United States have been based on a limited set of assumptions. Solutions focus on demographic predictors of low adoption, the mechanics of access (e.g., "if-we-build-it-they-will-come" strategies), and

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[2] The lack of improvement between the years 2010 and 2012 has fueled additional critical commentary during the latest season of electoral politics. See Offitzer (2012), Plumer (2012), and Republican National Committee (2012).

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models of economic and community development. Programs such as the Federal Communications Commission–led Connect2Compete (2012) and various components of the agency's Universal Service Fund program (FCC, 2012b) base much of their approaches on a traditional service-delivery model: identify needy populations and enable them with affordable home broadband subscriptions to reap positive and immediate gains. The introduction of affordable home connectivity in underserved areas—or so the story goes—will lead target populations to adopt, and adoption will result in rewarding outcomes, such as gainful employment, healthier lifestyles, increased political and civic participation, and, in turn, greater efficacy for communities as well as higher profits for the digital economy.

Unfortunately, the existing collection of public, public-private, and private regulatory solutions—and the broader mainstream discourse of "what works" in digital inclusion—tend to overlook the social dimensions of broadband adoption, including how social factors interact with specific technological solutions or economic remedies. By contrast, a more nuanced, pragmatic analysis of digital inclusion takes into account the social contexts and histories of the communities targeted by access policies, thereby elucidating the economic and technological complexities of access policy. Without attention to these factors, especially the set of social support factors that intersects with efforts to bridge the digital divide, broadband policies become less effective and risk becoming well-intentioned experiments that fail to meet their goals.

A nuanced, pragmatic approach to the study and evaluation of digital inclusion thus requires that practitioners and researchers working in the field consider individual- and community-level social factors shaping broadband adoption, not simply cost-benefit analyses or technological requirements. The approach also involves examination of community-defined criteria for broadband adoption alongside indicators set by policy makers or Internet service providers. Finally, a nuanced, pragmatic approach requires that we look at collective processes and practices that assist nonadopters in becoming comfortable with broadband technologies and discovering their relevance to everyday life.

We call this approach to digital inclusion research the *study of meaningful broadband adoption*, by which we mean the systematic observation and analysis of the social layer of broadband access. This social layer depends upon an individual's interaction with his or her community, which in turn helps shape the degree of relevance of broadband technologies to his or her life. The social context may determine levels of comfort and satisfaction as well as the context for use of broadband technologies, including place of access (home, public or community institution, work) and modality (wireless or wired).

Thus, when we talk about *meaningful broadband adoption*, we imply an ecology of support—institutions, organizations, and even informal groups that serve to welcome new users into broadband worlds; share social norms, practices, and processes related to using these technologies; and help policy targets make sense of and exercise control over how broadband enters users' lives. Meaningful broadband adoption thus refers to a range of broadband-related activities and experiences that target populations and their supporters construct, and often define, for themselves. We also imply a rigorous research agenda that explores a range of outcome variables as well as a range of independent variables.

The subject of broadband adoption, seen through this lens, moves away from several common themes circulating in public conversation about digital inclusion and the digital divide. Most importantly, the framework moves away from officially sanctioned definitions of broadband adoption, such as that conveyed by the National Telecommunications and Information Administration (NTIA). Since receiving

$7.2 billion as part of the American Reinvestment and Recovery Act of 2009, the NTIA has focused on stimulating—and measuring—impacts of federal digital inclusion funding based on the increase of home high-speed Internet subscription rates. When soliciting applications, the NTIA's Broadband Technology Opportunities Program (BTOP) asked applicants to articulate a "proven demand stimulation strategy" and advised them to "demonstrate a sustainable increase in demand for and subscribership to broadband services" (NTIA, 2009, p. 33114). The perspective of this special section, however, challenges the conventional metric of broadband success—home subscription—and instead embraces a spectrum of adoption that considers what communities can and care to act upon when introduced to broadband technologies and broadband infrastructure.[3]

Meaningful broadband adoption also moves away from moral frameworks that evaluate the uses of digital technology or that suggest that some forms of adoption are "good" and others decidedly "bad." For example, recent debate over technology funding to chronically underserved communities categorizes social media use as "wasteful." A study by the Henry J. Kaiser Family Foundation (2010) found that young, low-income, usually persons of color, effectively make use of support systems to go online, but that once there, these youth do not engage in educational and other similar types of online activities.[4] According to this logic, digital divide programs that connect to Facebook or social networking sites detract kids and teens from more meaningful uses of the Internet, such as doing homework. Unfortunately, this view of broadband adoption neglects to consider the perspective of the individuals or their needs for social fellowship, networking, and other useful skills that can emerge from the use of social media. By contrast, a research framework focused on meaningful broadband adoption seeks to understand the relevance of different broadband activities within their social context, not as evaluated according to external values.

A framework focused on meaningful broadband adoption is not necessarily brand new. The idea that technology adoption depends upon important social dynamics processes draws on a past body of scholarship similarly intoned. Recently, a participant observation study by Eubanks (2011) revealed that although poor working women were targeted by digital inclusion services, they did not feel "excluded" from advanced digital technologies given the ubiquity and surveillant capacities of computers in workplace and social services settings. Rather than learn basic computer and Internet skills, the women expressed a desire to dictate how technologies intersected with their everyday lives. Adoption in this context meant community control. Related to this notion, a study by Dailey et al. (2010) examined the role of intermediary institutions, such as libraries, neighborhood organizations, and other community anchor institutions, in integrating the benefits of broadband to individuals' and groups' daily routines. According to the authors, policy makers' focus on residential access may overlook important ways that public or community broadband service delivery empowers users as compared to using a slow connection and an old computer in the home.

During digital divide debates in the late 1990s and early 2000s, sociologists and communication scholars broached the question of social practices that assist in the process of broadband adoption. Commenting on the lack of attention to social dynamics in access policies, Mansell (2002) argued that a computer and a connection to the Internet is meaningless to a person if she does not have the

[3] The language of "can and care" references a theory of pragmatism developed by U.S. philosopher Richard Rorty (Rorty & Mendieta, 2006).

[4] See also Richtel (2012).

competence to take advantage of their benefits. "Once connected, there are no grounds for simply assuming that citizens will be empowered to conduct their social lives in meaningful ways" (Mansell, 2002, p. 409). Looking in-depth at social processes related to Internet adoption, DiMaggio, Hargittai, Celeste, and Shafer (2001) investigated the importance of peers in the efforts to bridge the digital divide, drawing attention to group processes that interact with broadband adoption. Meanwhile, Selwyn (2004) shed light on factors such as the context or location of technology use (in the home, at school, in public, or on the go) and technical features of multiple technologies (computer, personal digital assistant, mobile phone, digital television, and so forth) that affect the nature of broadband use.

Even before debates over the digital divide began, Rogers (1995) provided a foundation for thinking about interpersonal processes connected to the adoption of technology writ large. With a primary focus on technologies related to agriculture and medicine, Rogers drew from reigning social theories of information and uncertainty formation to cultivate a new paradigm in technology diffusion. He argued that institutions such as mass media, as well as opinion leaders communicating through mass media, play a critical role in convincing the least likely group to adopt a particular technology: "laggards" (Rogers, 1995, pp. 265–266). With an emphasis on opinion leaders and mass media institutions, Rogers highlighted the role of a social system or set of interrelated units engaged in joint problem solving to accomplish a common goal of spreading technological innovations and increasing adoption of new technologies among all members of society.

To update and inform ongoing evolution of these scholarly traditions, as well as the policy initiatives that are shaped by them, the New America Foundation's Open Technology Institute organized an April 2012 symposium, "Defining and Measuring Meaningful Broadband Adoption" (New America Foundation, 2011). The workshop featured a group of more than thirty researchers, practitioners, and policy makers discussing methods for establishing more effective broadband policy frameworks. About half of the participants presented novel research representing an interdisciplinary set of interests around broadband adoption. Participants reviewed challenges in defining broadband adoption and its effects, addressed issues of reliability and validity, and presented innovative methods for studying adoption. Though programs like the BTOP remained a focus, participants engaged in the larger task of imaging new possibilities for assessing—and shaping—future policy models for increasing broadband adoption (New America Foundation, 2012).

The articles presented in this special section reflect the ideas of the workshop and the broader goal of exploring meaningful broadband adoption. Challenging policy makers' tendency to associate outcomes of broadband expansion directives to traditional service-delivery expectations, this collection of articles suggests several tools and frameworks to develop more appropriate, evidence-based evaluation and measurement strategies: the Broadband Intensity Index, the Broadband Readiness Index, and a Social Cognitive Theory of Innovation Adoption, among others. Each is derived from an admixture of qualitative, quantitative, and mixed-methods evidence, including case studies, regression analysis, and Internet traffic analysis.

Although the articles featured here do not represent a consensus on how to move forward with bringing the benefits of broadband to U.S. communities in need, we do hope they collectively stimulate new questions and new thinking that public conversation about the digital divide often misses. The scholarship here dispenses with easy policy solutions and reductive reasoning about causes of broadband

adoption and nonadoption; most of the articles point to the need for the community of practice committed to digital inclusion to think more broadly and more critically than what current policy prescriptions consider adequate for demonstration of success. To this end, we also hope the articles in this special section foreground the role of research in highlighting nuance and complexity involved with tackling a tricky policy problem—especially at the level of policy implementation. Together these articles represent a toolbox to be debated, refined, and built upon by practitioners, researchers, and policy makers.

The articles in this special section question what counts when determining causes of adoption as well as who gets to determine what counts in broadband adoption. "Measuring Sustainable Broadband Adoption: An Innovative Approach to Understanding Broadband Adoption and Use" re-envisions classic diffusion-of-innovations theory in the form of a sociocognitive framework in order to suggest concrete steps toward increasing adoption rates. Rather than rely on the usual policy framework of demographic predictors for low adoption, the article extends previous research conducted among rural populations to an urban setting and examines the link between adoption outcomes and measures of self-efficacy (e.g., individuals' confidence in their capabilities to exercise control over life events), observational and enactive learning (learning by watching and by doing), and prior experience with technology. The authors argue that despite correlations with individuals' decisions to adopt broadband, "demography is not destiny" (LaRose et al., this special section). The promotion of broadband adoption in the inner-city context must stress self-efficacy and confidence-building online experiences.

Referring also to confidence measures, "Toward an Inclusive Measure of Broadband Adoption" argues that a one-size-fits-all approach to understanding and measuring adoption should be replaced by more nuanced metrics. The reasons people fail to adopt depend on more complex factors than simply lack of access. Through examples of BTOP-funded Older Adults Technology Services and the Comcast-sponsored Internet Essentials program, the article shows that each new user group faces a unique set of barriers that affect the quality and nature of their broadband experience. Inspired by the Consumer Confidence Index, the authors propose combining quantitative adoption data with experiential or qualitative data to create a Broadband Intensity metric. The qualitative component ensures that broadband measurement accounts for perceived value and use of broadband by specific user populations (Davidson, Santorelli, & Kamber, this special section).

"Free Library Hot Spots: Redefining Broadband Adoption in Philadelphia's Low-Income Communities" touches as well upon multiple causes of broadband adoption. The article takes an in-depth look at broadband adoption services and connectivity provided by a partnership of community anchor institutions and details the importance of a sense of comfort (i.e., safety, trust, support, and respect) in implementation strategies. This case study shows that in the Hot Spots digital literacy program, intermediaries such as trainers who assist program participants aboard mobile Web facilities are of central importance. The author suggests that these social factors should be considered in efforts to promote sustainable broadband adoption and that context and location as well as support systems and networks of affinity determine levels of comfort and thus of meaningful adoption (Rhinesmith, this special section).

This article also highlights another theme found in other contributions to this special section: the idea that home broadband use may be only one goal among several. Public spaces for broadband use continue to be essential, because they are sites for community interaction as well as sources of support and training. Meanwhile, "Measuring Digital Citizenship: Mobile Access and Broadband" provides an

alternate perspective and examines modalities of access by comparing home broadband with mobile-only access in relation to larger goals of full participation in online society. Surveying residents of Chicago, the article finds that mobile-only users display less Internet skill and engagement in political or economic activities online than home broadband users. The geographical location of users—their neighborhood context—also interacts with individuals' ability to benefit from broadband access. The authors conclude that not all places and modes of access are the same: mobile-only access does not offer an adequate solution to communication inequalities online (Mossberger, Tolbert, & Hamilton, this special section).

The one study focused outside the U.S. context, "The Bandwidth Divide: Obstacles to Efficient Broadband Adoption in Rural Sub-Saharan Africa," brings to light a slightly different problem with policy makers' focus on home subscription. Examining wireless Internet usage in three rural villages in South Africa, the article relies on analysis of Internet traffic and structured and unstructured interviews to diagnose network congestion, network usage, and levels of satisfaction among Internet users. Assessment of broadband adoption includes a range of metrics instead of have and have-not categories of home adoption. The authors argue that measures that elucidate the relevance of online content to local users, location of access, infrastructure, and cost considerations provide a comprehensive understanding to the barriers to and opportunities for improved broadband adoption (Pejovic et al., this special section).

Finally, focusing on both what counts and who gets to determine what counts as broadband adoption, the article "Practical Approaches and Proposed Strategies for Measuring Selected Aspects of Community-Based Broadband Deployment and Use" argues that metrics set by national policy makers fail to outline clear definitions and clear implementation processes for broadband adoption and neglect local needs and practices. The mismatch between federal-level metrics, implementation plans, and local context creates confusion among community anchor institutions about both program goals and measurement. As an alternative, the authors propose a Broadband Readiness Index that assesses the preparedness of a community anchor institution to adopt and utilize broadband and designate a community-centered process for local officials to execute broadband deployments (Community-Based Broadband Planning, Adoption, and Deployment model). To avoid confusion in planning and implementation processes, local community anchor institutions and municipalities also require more power in choosing broadband providers and setting the terms of service for high-speed Internet service (Carmichael, McClure, Mandel, & Mardis, this special section).

In summary, although the stakes of broadband adoption are high and its consequences profoundly impactful for unserved and underserved populations, the paths toward successful implementation of adoption policies remain complex social processes that demand new forms of assessment and evaluation. This collection of articles represents an attempt to draw out the more nuanced and often pragmatic factors shaping broadband adoption by elucidating such elements of relevance factors, social support systems, and community-centered processes that accompany the introduction of broadband technologies. Future progress on bridging the digital divide will require deeper consensus within scholarly, practitioner, broadband provider, and policy-making communities around the use of qualitative and quantitative measures as well as the prioritization of location and modalities of access. For now, the research here provides a compelling start to reimagining what ought to count and who ought to determine what counts as meaningful broadband adoption.

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