

Universal Service for a Globally Competitive America

By
Jorge Reina Schement
John B. Horrigan
Anamarcia Lacayo

To found a great empire for the sole purpose of raising up a people of customers, may at first sight appear a project fit only for a nation of shopkeepers. It is, however, a project altogether unfit for a nation of shopkeepers; but extremely fit for a nation whose government is influenced by shopkeepers.

--Adam Smith¹

Competing in a Global Information Age

Adam Smith's great empire of the 18th century has become the global economy of the 21st; for, in a world increasingly sculpted by the production and distribution of information, 21st century nations now compete, not on the power of their navies as they did in Smith's day, but on the influence of their information infrastructures.² The global network that channels tides of electronic transactions, stimulates enterprises organized as intercontinental matrices, and empowers individuals, ultimately pits nations in a heat for competitive advantage. Indeed, the 21st century may well witness a realignment of the economic powers of the 20th; which, if it occurs, will ensue from endeavors where individuals access the means of communicating and retrieving information. Thus the paradox of the information age—the actions of individuals, personally motivated to communicate idiosyncratic messages and posting content to websites, will determine America's place on the stage of the 21st century. The price of entry will be broadband.

It is the premise of this paper that the United States should adopt broadband as the universal service standard for its national information infrastructure—the

¹ Smith, A. (1776/1902). An inquiry into the nature and causes of the wealth of nations. New York, American Home Library, vol. II, bk. IV, ch. 7, pt. 3.

² Adam Smith's great empire, on which the sun never set, supported itself on a vast network of sea lanes protected by the British Navy. Its modern counterpart, the Internet, substitutes agreements and protocols for British frigates.

nation's system of telecommunications. Derived from Section 254 of the Telecommunications Act of 1996, which embraces an evolving standard of Universal Service, Universal Broadband Access constitutes a new generation of Universal Service policy beyond that construed in the 20th century as plain old telephone service (POTS).³ As the contours of a global information economy take form, as citizens participate in public discourse by inventing new uses for information technologies, and as individuals meet personal needs by sharing information, access to a broadband connection becomes the threshold that separates prosperity from stagnation, inclusion from isolation. A universally accessible, nation-wide, broadband network should, therefore, offer reasonable access to all Americans, contribute to expanded opportunities for economic participation, facilitate public discourse, as well as promote quality of life; and, in so doing, confer a global competitive advantage to the United States. And if it does so, Universal Broadband Access will promote domestic social justice and global competitiveness.⁴

Five Reasons to Promote a Policy of Broadband Universal Service

In its simplest terms, universal service policy promises everyone the opportunity to connect with and utilize the nation's information infrastructure; yet, if it is to enable a world-class economy and quality of life, Universal Service must do more. As a public commitment, Universal Service must promise access to the most advanced information infrastructure in the world. Anything short of that undermines the competitive advantage of individuals, firms, and ultimately the nation. Accordingly, if Universal Service is to deliver its promise amidst tides of economic and technological change, then it must offer each and everyone the opportunity to exploit the network's economic, political, and personal resources.

³ SEC. 254. UNIVERSAL SERVICE. (1) IN GENERAL- Universal service is an evolving level of telecommunications services. Telecommunications Act of 1996, Title II, Sec. 254, (c) (1). Universal access and Universal Service can almost be considered synonyms, In policy discourse authors and speakers sometimes interchange them in the same sentence. If this continues, then an older and useful distinction will be lost. Until recently, users commonly spoke of "universal access" to mean the availability of connectedness for all; thus, universal access might denote the distribution of the railroad network or the ease with which a person might receive telephone service. "Universal Service," in turn, denoted a policy to achieve universal access in a specific medium; for example, the long-term commitment to the provision of free mass education, and the financing system to support it. In this paper, we try to adhere to that older usage.

⁴ Between access and service. In policy discourse, participants distinguish between the concepts of *universal access*, and *universal service*. Typically, *universal access* refers to the availability of a given service, such as Internet or telephone. *Universal service* typically refers to the policy or group of policies that ensures access. Confusion arises because the two terms have become synonyms in popular discourse, and even in some policy discourses. In this paper, we hold to their specific denotative meanings.

1. Economic Participation—Opportunity

Americans built their economy on a succession of network infrastructures.⁵ An early 19th century web of canals and traces opened new territories beyond the Appalachians; thereby, integrating the economies of new states with those of the original thirteen.⁶ Even so, the limitations of that web—narrow canals, waterlogged trails—throttled economic growth. Then came the railroads with a broadband solution and the first national information infrastructure. The new railroad network burst the constraints of the old infrastructure, overcame geography, bore enormous loads, and moved goods and information in such vast quantities that eastern manufacturers assembled the first truly national markets. Nor did its empowerment stop there, for hundreds of millions of Americans also rode the rails of that network to their own economic futures.⁷

Like railroads, telecommunications networks distribute economic goods and services, plus add value to transactions, since information may itself be a distinct product, or input to other products and services. Similarly, if economic actors are to participate fully, they must have the opportunity to avail themselves of information with which they may consume, produce, and innovate. In other words, the value of all networks stems from the number of participants; for, as the number of network members increases, so too does the network's functionality and potential value to those already on the network—the more the

⁵ “A succession of navigable waters forms a kind of chain round its borders, as if to bind it together; while the most noble rivers in the world, running at convenient distances, present them with highways for the easy communication of friendly aids, and the mutual transportation and exchange of their various commodities.” John Jay (October 31, 1787) “Concerning Dangers from Foreign Force and Influence,” FEDERALIST No. 2, in Hamilton, A., et al. (1982). Federalist Papers. New York, Bantam Books.

⁶ *Trace* is an early 19th century term for a path or track capable of supporting wagons. Most famously, the Natchez Trace stretched 400 miles from Nashville, Tennessee, to Natchez, Mississippi, linking the Cumberland, Tennessee, and Mississippi rivers, in order to open the lower Mississippi valley to American trade and settlement. The word *trace* derives from the Latin *tractus* via Old French *trace* (noun). See, Onions, C. T., Ed. (1966). The Oxford dictionary of English etymology. Oxford, UK, Clarendon Press.

⁷ See, for example, Anderson, Denise, and Schement, Jorge Reina (1995) “Information infrastructure and development in the USA: The role of government,” Industrial and Corporate Change. Vol. 4, No. 4, 727-735. Chandler, A. D. J. (1977). The visible hand: The managerial revolution in American business. Cambridge, MA, Harvard University Press. Du Boff, R. B. (1980). “Business Demand and the development of the telegraph in the United States, 1844-1860.” The Business History Review 54(4): 459-479.

merrier. Conversely, without effective access, a person is less likely to contribute to the pool of positive effects generated from multiple interactions on the network.⁸ Consequently, for small businesses and individuals, access to the telecommunications network offers the opportunity to participate more fully in an economy driven by the production and distribution of information. Broadband, with its capacity to multiply the traffic, intensifies that potential.

2. Public Participation—Civic Culture

Universal Service also addresses the promise of democratic discourse. That is, Democracy requires an informed and involved citizenry; yet this is possible only if its citizens have access to information about their government and the opportunity to participate in political discourse. There are, then, two dimensions to the ideal of political participation -- reception and distribution. On the reception side, citizens are better able to make informed contributions when they have heard a variety of opinions, especially when they have heard their favored opinions challenged in the marketplace of ideas. On the distribution side, citizens benefit when individuals are able to communicate and to engage in political dialogue beyond the confines of their immediate communities. Only then, can democratic discourse transcend the walls of localness and the stifling of popular debate that occurs when only elites have access to the national channels of communication. Indeed, the American concept of democracy comes embedded with a communication orientation; consequently, the pledge of equal access is not only logical, but also necessary to the conduct of a free and open society.⁹ Emerson's classic explanation captures this tension.

⁸ Capello, R. (1994). Spatial economic analysis of telecommunications network externalities. New York, Ashgate Publishing. Cohendet, P., G. Umghauer, et al., Eds. (1999). Economics of networks: Interaction and behaviors. New York, Springer-Verlag. Katz, M. L. and C. Shapiro (1985). "Network externalities, competition and compatibility." American Economic Review 75(3): 424-440. Varian, Hal (2000) "Versioning Information Goods." In Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property, B. Kahin and H. Varian eds. Cambridge: MIT Press.

⁹ "Let it be remarked, in the third place, that the intercourse throughout the Union will be facilitated by new improvements. Roads will everywhere be shortened, and kept in better order; accommodations for travelers will be multiplied and meliorated; an interior navigation on our eastern side will be opened throughout, or nearly throughout, the whole extent of the thirteen States. The communication between the Western and Atlantic districts, and between different parts of each, will be rendered more and more easy by those numerous canals with which the beneficence of nature has intersected our country, and which art finds it so little difficult to connect and complete." James Madison (November 30, 1787) "Objections to the Proposed Constitution From Extent of Territory Answered," FEDERALIST No. 14, in Hamilton, A., et al. (1982). Federalist Papers. New York, Bantam Books.

“The crucial point, however, is not that freedom of expression is politically useful, but that it is indispensable to the operation of a democratic form of government. Once one accepts the premise of the Declaration of Independence -- that governments derive ‘their just power from the consent of the governed’ -- it follows that the governed must, in order to exercise their right to consent, have full freedom of expression both in forming individual judgments and in forming the common judgment.” --Thomas I. Emerson¹⁰

In the 21st century, however, access and participation depend on the diffusion of an Internet infrastructure, which, in turn, poses challenges for institutions at the core of the promise. Schools, where most Americans begin their civic education, must have high bandwidth access to the network. Public libraries, the people’s portals, face enormous demands from patrons who lack Internet connectivity in the home and must connect to a broadband network. For, in theory, a democracy thrives when it calls forth an informed and involved citizenry. And, therein lies the condition to the promise; if citizens are to accomplish this feat, then telecommunications policies must guarantee full access to the nation’s information infrastructure.

3. Social Participation—Community

Communication creates society. After all, humans define themselves not in isolation but through contact with others. Accordingly, a nation’s telecommunications network is one of its most basic structures. Potentially, the range of information provided by any basic telecommunications infrastructure is infinite, ranging from the routine to the exceptional. To search for information on autism, to place a follow-up call for a job interview, to view a presidential debate, or hear one’s grandchild in California from New Jersey, all generate value to the user, but they also strengthen society by rewarding participation; and, in return, encourage further participation. Essentially, participation in a network that saves lives, creates jobs, and gives every citizen the chance to pursue the full spectrum of life, builds social capital with value far beyond the individual. And, the antithesis rings true as well; existing beyond the reach of the network lowers one’s opportunities, resulting in isolation, alienation, and even hostility. Clearly, the network forms an essential structure for overcoming social fragmentation; and, consequently, for enabling community. Thus, if Americans want to encourage the sense of shared values and mutual interdependence that comes from social interaction, then universal service policy should stress maximum

¹⁰ Thomas I. Emerson, *Toward a General Theory of the First Amendment*, 72 *Yale Law Journal* 877,883 (April, 1963).

access to the network; for, in an information society, the network holds us together.¹¹

From Corrective to Catalyst

Political, economic, and social participation form the foundation processes of a vigorous democracy, while the promise of inclusion to all confers the stamp of authenticity. The idea of universal service is rooted in a response to the challenge of the Constitution and the challenge of colonial geography, so that the post road mandated in the Constitution, the railroads, and Rural Free Delivery, can be seen as practical solutions to the ideals of participatory democracy as well as overcoming the obstacles of a narrow north-south geographical axis without natural pathways. In the 20th century, this mix of realities found expression in the Communications Act of 1934 as a corrective to finalize the diffusion of a telephone network already half a century old. Yet, any policy with the goal of universal access finds itself tested at the margins; after all, it's easy to point to participation by society's favored members and declare "all's right with the world."¹² In the case of traditional universal service policy, the persistence of 7 million U.S. households (7%) without telephones flags the outer limit of success. Accordingly, a corrective commitment to push for higher telephone penetration also constitutes a commitment to social justice.

That vision of universal service, rooted in a Depression era spectre, now finds itself challenged by the new reality of a 21st century, global, information economy—ironically, an economy made in the U.S.A. Throughout the 19th and 20th centuries, Americans sowed the seeds of a material culture based on the production and consumption of information, by exploiting the exchange of information goods and services in the marketplace. They devised information applications to control the growth and spread of firms; and, in so doing, invented the multinational corporation and modern management. Swelling demand drew

¹¹ For a discourse on the relationship between community and democracy, see Putnam, R. D. (2000). Bowling alone: The collapse and revival of American community. New York, Simon & Schuster. For an analysis of the failure of universal service policy for those at the margins of society, see, Schement, J. R. (1995). "Beyond universal service: Characteristics of Americans without telephones, 1980-1993." Telecommunications Policy 19(6): 477-485. Schement, J. R. (1998). Telephone penetration at the margins: An analysis of the period following the breakup of AT&T, 1984-1994. Progress in communication sciences, volume xv: Advances in Telecommunications. H. Sawhney and G. A. Barnett. Stamford, CN, Ablex: 187-215.

¹² "God's in his Heaven-All's right with the world!" Pippa's song from Robert Browning's, *Pippa Passes*, published in 1841 as the first volume of his *Bells and Pomegranates* series. Pippa is a young innocent girl living at the crime-ridden margins of Victorian society.

millions into the information work force. And, beginning with isolated tinkers, a vast R&D establishment introduced technologies that wove telecommunications networks with interconnections so dense they have yet to be fully mapped.¹³

In the 21st century, the success of that material culture can be measured in the number of countries that have embraced broadband telecommunications networks as a basis for their economic strategies.¹⁴ That is, while a social contract emphasizing participation may be explicit or implied, these new universal service policies aim to advance a country's position as a global economic competitor. In those countries with the highest broadband penetration, broadband policies depart from the notion of universal service as a corrective for an already established network; instead, they embrace the idea of a ubiquitous network as the driver of an information, or support, economy. From this perspective, universal service offers two additional advantages not considered in its 20th century manifestation.

4. Creative Participation—Innovation

Traditional justifications for information infrastructure investments stem from the benefits of network externalities. That is, the value of joining a telephone network goes up as more people subscribe to the network; which, in turn, encourages even more subscribers.¹⁵ Understood as such for one hundred years, the larger the network the larger the dividend to the subscribers. Recently, however, this “static” view of network externalities has come in for reconsideration as a result, in part, of the success of Internet sites where subscribers also contribute content. On these sites, increasing the number of members contributes to an increase in the number of interactions, which, in turn, results in the creation of new content. New content attracts attention to the site, enlisting more new members, who create more new content (i.e., innovations); and, thereby, generate “dynamic” externalities. Furthermore, these “arenas of innovation” both depend on and

¹³ Beniger, J. R. (1986). The control revolution. Cambridge, MA, Harvard University Press. Buckland, M. K. (1991). "Information as thing." Journal of the American Society for Information Science 42(5): 351-360. Castells, M. (2000). The rise of the network society. Malden, MA, Blackwell. Chandler, A. D. J. (1977). The visible hand: The managerial revolution in american business. Cambridge, MA, Harvard University Press. Schement, J. R. and T. Curtis (1997). Tendencies and tensions of the information age. New Brunswick, NJ, Transaction.

¹⁴ This sentence needs an OECD citation from a recent report that ranks broadband penetration among nations.

¹⁵ Capello, R. (1994). Spatial economic analysis of telecommunications network externalities. New York, Ashgate Publishing. Cohendet, P., G. Umghauer, et al., Eds. (1999). Economics of networks: Interaction and behaviors. New York, Springer-Verlag. Varian, Hal (2000) “Versioning Information Goods.” In Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property, B. Kahin and H. Varian eds. Cambridge: MIT Press.

stimulate “soft infrastructures” that enable participation. Services that facilitate payment, authentication, evaluation, encryption, privacy, and searching, encourage individuals to participate and contribute their ideas.¹⁶ This ferment in the crucible that is the Internet generates value above and beyond the value derived from the network’s scale. Still, for it to do so, one basic condition must be present—broadband.

5. Global Participation—Competitiveness

An appreciation for the dynamism inherent in the Internet’s arenas of innovation transcends the corrective frame for understanding universal service. Without necessarily abandoning the social contract at its root, the catalyst of innovation reframes universal service from obligation to opportunity. And, it is in this reframing that universal service emerges as an instrument for promoting global competitiveness; indeed, for those countries seeking a major role in the world’s economy, broadband deployment has become the price of entry. Nor has this lesson been lost on the most competitive; those countries holding the top five places in broadband penetration per household—Korea, Japan, Iceland, Finland, Netherlands—have each pursued aggressive goal-directed, public policies. By contrast, the United States, ranked near the top in 2000 but with a weak universal service policy, now finds itself spotted twelfth in penetration per household, and fifteenth in penetration per capita.¹⁷ Ironically, at a time when we have gained a new appreciation for the benefits of network externalities and universal service, Asian and European countries have achieved far greater successes in deploying their broadband infrastructures. That said, to reduce the state of access to a series of rankings seems more appropriate to media coverage of the Olympics than it does to an effort to assess the challenge

¹⁶ Bar, F. and A. M. Riis (2000). “Tapping user-driven innovation: A new rationale for universal service.” The Information Society **16**: 99–108. Sawhney, H. & Lee, S. (2005). Arenas of innovation: Understanding new configurational potentialities of communication technologies. *Media, Culture & Society*, 27(3), 391-414. Jayakar, K. and H. Sawhney (2006). Universal access in the information economy: Tracking policy innovations abroad. Benton Foundation Universal Service Project. J. R. Schement. Washington DC, Benton Foundation: 12.

¹⁷ Correa, D. K. (2007). Assessing broadband in America: OECD and ITIF broadband rankings. Washington DC, The Information Technology and Innovation Foundation: 10. (April 2007) OECD Directorate for Science, Technology, and Industry, “Broadband Statistics to December 2006”: www.oecd.org/sti/ict/broadband. (April 2006) OECD Directorate for Science, Technology, and Industry, “Multiple Play: Pricing and Policy Trends”: www.oecd.org/dataoecd/47/32/36546318.pdf. (April 2006) OECD Directorate for Science, Technology, and Industry, “Multiple Play: Pricing and Policy Trends”: www.oecd.org/dataoecd/47/32/36546318.pdf.

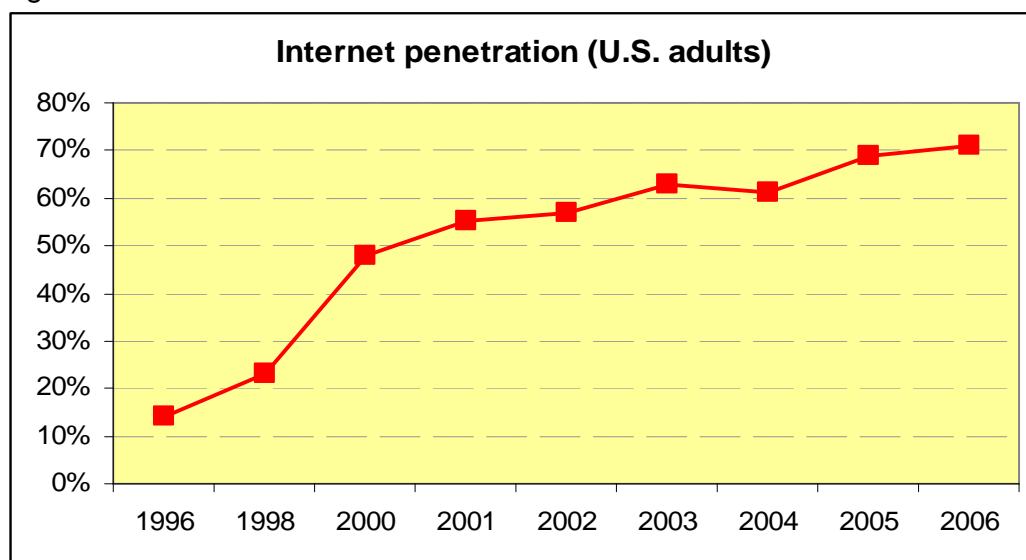
confronting the goal of universal access. To get below the surface requires an understanding of who is connected and who is not.

Where Americans Stand in Access to, and Use of, Broadband

Trends in Internet and home broadband adoption

Americans have a history of intense flirtations with household information technologies. In the 1920s, they jumped on the radio-box craze.¹⁸ They entered the 1950s with fewer than 10% of households owning a television set, but exited the decade with TV ownership at nearly 90%.¹⁹ Yet, by any standard, adoption of Internet service and broadband-in-the-home has been fast in the United States. Internet use among adults—irrespective of connection speed or point of access—rose from 14% in 1996 to just over 70% by the end of 2006. Although the trend line shows some leveling in 2003 and 2004, general Internet adoption has been on a steady upward path.

Figure 1



¹⁸ Radio set ownership stood at 10% of households in 1925, and rose to 82% by 1940, on the eve of the U.S. entry into World war II when radio set production fell to a minimum. Series H 878-893, R 93-105, R 1-12 (1975). Historical statistics of the united states, colonial times to 1970 Washington DC: GPO.

¹⁹ Cross, G. (2000). An all-consuming century: Why commercialism won in modern America. New York, Columbia University Press. Schement, J. R. (1999). "Three for society: Households and media in the creation of 21st century communities." Center: Architecture and Design in America 11: 75-86. Steiner, G. A. (1963). The people look at television: A study of audience attitudes. New York, Knopf.

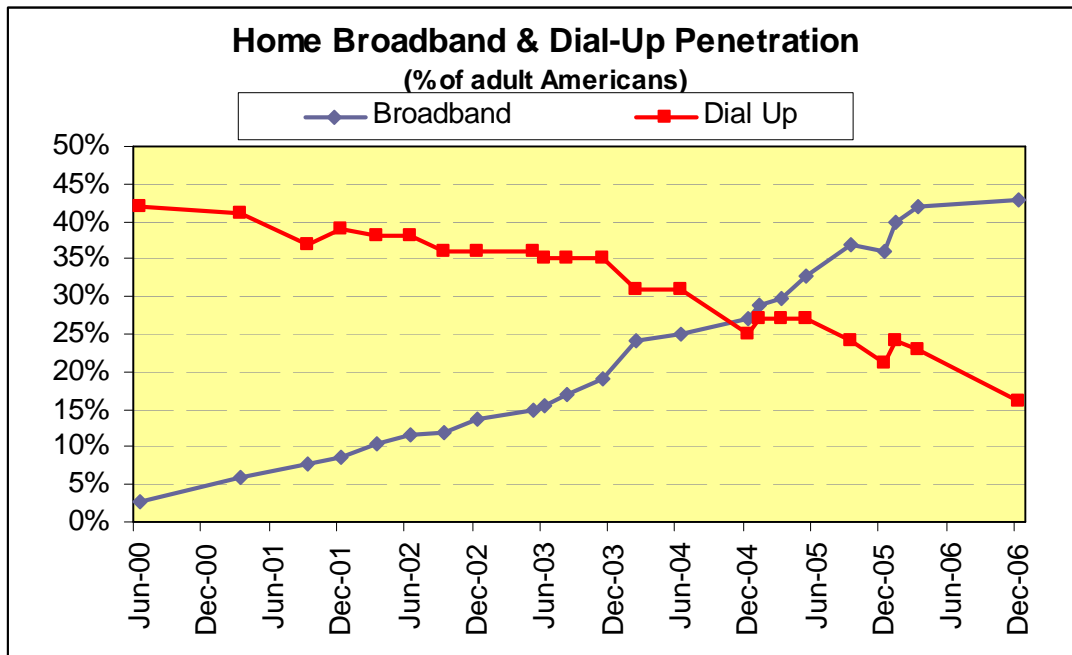
[Citation needed for this graph. Does this graph illustrate penetration in terms of individual access? Or, does it illustrate penetration by household?]

In June 2000, the Pew Internet Project first asked American adults (age 18 and older) how they connect to the Internet from home (either dial-up or broadband). Since then, penetration of high-speed, home, Internet connections has increased by a factor of sixteen. Whereas, 5 million Americans (<5%) had high-speed connections at home in June 2000, by May 2005, approximately 66 million Americans had high-speed connections at home.²⁰ By the end of 2006, 43% of adults reported high-speed connections at home – more than 80 million people, or about three-quarters of those who go online in the home.²¹

Figure 2

²⁰ We recognize that the physics of electromagnetic energy preclude variations in speed; that is, all electromagnetic waves travel at the speed of light (286,000 miles per second). However, the term “high-speed” has entered common usage to differentiate “high-speed” broadband Internet access from “low-speed” dial up Internet access. It is with that connotation that we use the term, “high-speed,” in this paper.

²¹ These figures are compiled from national random digit dial surveys conducted by the Pew Internet & American Life Project. More information about the Project and data can be found at www.pewinternet.org.



Home broadband adoption has proceeded at a rapid pace, especially when compared to the adoption of other consumer electronic technologies. Bauer et.al. (2002) date the beginning of widespread cable modem availability to 1995 and digital subscriber line (DSL) service to 1997. Taking 1996 as a starting point, it took a bit more than five years for broadband to reach 10% of the population, a rate comparable to personal computers (4 years), and compact disc players (4.5 years), but faster than cell phones (8 years), and video cassette recorders (10 years). Color TV took 12 years to reach 10% of the population.²²

²² For analyses addressing the fast uptake of broadband, see Horrigan, 2002b and Odlyzko, 2003.

Figure3

Adoption Time for New Consumer Technologies		
	Years to reach 10% adoption	Years to reach 50% adoption
Video Cassette Recorder	10	14
Compact Disc Player	4.5	10.5
Color TV	12	18
Cell Phones	8	15
Personal Computer	4	18

Source: Federal Communications Commission, presentation of Robert Pepper "Policies for Broadband Migration," April 2002.

Yet, a rapid path to 50% adoption, often thought of as the tipping-point, is not a foregone conclusion. So, though quick to reach 10% adoption, it took the personal computer 18 years to reach 50%. And, although relatively slow to hit 10% penetration, both the VCR and color TV sprinted to the 50% mark, because they enhanced an existing home technology; and, thus, built on an established base of users. Broadband Internet bears similar characteristics, building on a base of users with home Internet access and personal computers. In the early part of this decade, Pew Internet and American Life Project surveys showed that about 80% of Internet users had home access with the remaining 20% having access elsewhere. By 2006, about 90% of people who were classified as Internet users used the Internet from home; about 5% had access only at work. Plus 5% from another place (e.g., a library). Broadband adoption figures presented above are for access at home.²³ Consequently, it is not unreasonable to project that half of all Americans will have broadband at home by sometime in 2008.

New Media and Old Media Co-Existing in a New Era

Does the Internet replace, or displace, older media? Popular discourses often promote the notion that information acquired on the Internet replaces information acquired from traditional media; thereby, menacing, even killing, these older media. In this view, democracy as we know it stands threatened by the desertion of citizens to the tumultuous world of unrestrained blogs.²⁴ In reality, however,

²³ A note on interpreting the data: general Internet adoption data captures use from anywhere, that is, a respondent is asked whether he or she is an Internet user, and respondents can (and do) answer "yes" to that question if they do not use the Internet at home.

²⁴ [we need citation of exemplars of this argument.]

there is cause for optimism. The following tables address news-gathering behaviors, illustrating the continued importance of traditional media alongside Internet news gathering.

Figure 4

Getting news on the typical day (% of all in each group who say they get news from specific source 'yesterday')				
	All respondents	Non-Internet users	Dial-up at home	Broadband at home
Local TV	59%	57%	65%	57%
National TV	47	43	50	49
Radio	44	34	52	49
Local paper	38	37	41	38
Internet	23	--	26	43
National paper	12	8	12	17
Average number of sources	2.22	1.80	2.45	2.52
Number of cases	3,011	1,080	633	1,014
Source: Pew Internet Project December 2005 survey.				

Nevertheless, among home broadband users, the Internet plays a prominent role in news consumption – especially so for broadband users under age 36. For young people with a home high-speed connection, a segment of the population traditionally disinterested in news, the Internet draws them to news consumption, rivaling television as a news source on an average day.

Figure 5

Getting News on the Typical Day: Comparing Age Groups and Connection Speed						
<i>(% of all in each group who say they get news from specific source 'yesterday')</i>						
	Under age 36		Between 36 & 50		Over age 50	
	Broadband	Dial-up	Broadband	Dial-up	Broadband	Dial-up
Local TV	51%	54%	60	72	61	71
National TV	40	35	49	52	62	61
Radio	41	43	53	57	57	54
Local paper	28	27	41	40	52	55
Internet	46	21	40	30	43	26
National paper	17	2	12	10	23	21
Number of cases	307	141	360	215	347	265

Source: Pew Internet Project December 2005 survey.

Though people who use the Internet for news tend to visit sites belonging to mainstream media, one-third of home broadband users also visit sites of international news organizations, news blogs (e.g., the Drudge Report), and alternative news sites (e.g., Slate or Salon). That is, in addition to the convenience of news from an “always on” broadband connection, a home high-speed connection opens users to a diversity of news sources and points-of-view.

Figure 6

	Have cable or satellite TV	Watch local TV news (typical day)	Watch national TV news (typical day)	Read a local daily newspaper (typical day)	Get any news online (typical day)	Average number of news sources consulted (typical day)
All	85%	59%	47%	38%	23%	1.8
Home broadband users	92%	57%	49%	38%	43%	3.2
Whites	86%	60%	49%	40%	24%	1.9
Blacks	83%	60%	42%	25%	16%	1.4
18-29	82%	48%	30%	23%	28%	2.3
30-49	87%	60%	46%	35%	27%	2.3
50-64	87%	68%	59%	46%	22%	1.7
65+	83%	60%	52%	48%	9%	0.6
under \$30k	77%	53%	39%	33%	13%	1.1
\$30-50K	84%	63%	48%	36%	24%	1.8
\$50-75K	90%	64%	52%	41%	31%	2.5
> \$75K	93%	63%	53%	45%	38%	2.9
LT HS	81%	47%	32%	25%	6%	0.6
HS Grad	84%	61%	45%	35%	14%	1.3
Some college	88%	62%	51%	38%	28%	2.2
College +	87%	61%	53%	46%	39%	2.8

For those concerned over the prospects for democratic discourse, Internet use clearly changes the old media equations; nevertheless, it also points to greater engagement in the political debates of our times, especially among those groups, like youth, historically less involved with traditional media

Gaps in Broadband Adoption

The tables below provide data on adoption over time among demographic sub-groups. For Internet and home broadband adoption, the clearest differences emerge along three dimensions:

- **Income:** Respondents who report a household income less than \$30,000 per year are consistently below the average Internet penetration rate for

all adults. Looking across the six years of data, the “under \$30K” group generally has two-thirds the average Internet penetration rate and, starting in 2002, about half the home broadband penetration rate. Lower penetration rates compound the disadvantages of low income by putting beyond reach the dynamic externalities conferred on broadband users. In Pew Internet random digit dial telephone samples, about one-quarter of adult Americans report having household incomes below \$30,000 annually.

- **Education:** Having attended at least some college establishes a clear dividing line. About half of the adult population has attended or graduated from college, while the other half has a high school diploma or less. At the end of 2006, just more than 50% of those with high school diplomas or less used the Internet, compared to nearly 90% of those who have attended college or have a college degree. In figures 6, 7, 8, 9, and 10, the most striking contrasts in access and use result from differences in education.
- **Age:** Retirement-age Americans, that is, those over 65, are least likely to be online, registering less than half the Internet penetration rate of the general population, and one-third of broadband penetration. Online access falls off most sharply for Americans over 70, who may not have been in the workforce when Internet adoption entered the mainstream. About one-half of those in the 65-69 age group use the Internet; among Americans age 70 and older about one-quarter say they use the Internet. Given the migration of essential government information to the Internet, it would appear that the isolation of old age receives an added reinforcement for those without Internet access.
- **Race and Ethnicity:**
 - **African Americans:** One part of this story has to do with the diminishing Internet adoption gap between white Americans and African Americans. Although nine percentage points separate whites and blacks in the 2006 data, being an African American is no longer a significant statistical predictor of online access. In other words, the lower adoption rate for African Americans is due to that population’s lower levels of educational attainment and income, not due to (unspecified) factors involving race.
 - **Hispanics:** These tables do not present data for Hispanics, because the Pew Internet Project has traditionally conducted surveys in English. As a result, the surveys miss that substantial portion of the Hispanic population in the United States who either do not speak English, or do not speak it well enough to participate in telephone surveys. A forthcoming report to be issued jointly by the Pew Hispanic Center and the Pew Internet and American Life

Project, gave respondents the option of taking the survey in English or Spanish. From a 2006 sample that includes Hispanics for whom Spanish is their main language (and that came to 48% of the sample), 56% of all Hispanics are Internet users, with 29% having high-speed connections at home.

Figure 7

Trends in Internet adoption, 2000-2006							
	2000	2001	2002	2003	2004	2005	2006
All	48%	55%	57%	63%	61%	69%	71%
Whites	50%	57%	59%	65%	63%	71%	72%
Blacks	36%	39%	45%	56%	54%	55%	63%
18-29	65%	75%	72%	83%	75%	82%	87%
30-49	58%	64%	67%	73%	69%	80%	82%
50-64	41%	50%	55%	59%	60%	68%	70%
65+	13%	16%	20%	26%	26%	28%	31%
under \$30k	31%	34%	36%	43%	44%	50%	51%
\$30-50K	52%	61%	62%	67%	66%	74%	77%
\$50-75K	67%	78%	80%	81%	80%	86%	85%
> \$75K	78%	87%	85%	89%	83%	91%	92%
LT HS	17%	19%	19%	28%	26%	37%	40%
HS Grad	35	42	46	52	52	60	64
Some college	63	72	74	78	76	80	83
College +	75	83	80	87	85	91	92

Figure 8

Trends in home broadband adoption, 2000-2006							
	2000	2001	2002	2003	2004	2005	2006
All	3%	9%	12%	19%	26%	36%	43%
Whites	3%	9%	13%	20%	27%	39%	44%
Blacks	1%	4%	5%	13%	16%	24%	33%
18-29	6%	12%	17%	28%	36%	46%	54%
30-49	4%	11%	14%	25%	32%	45%	52%
50-64	2%	5%	11%	14%	22%	34%	39%
65+	0%	2%	3%	4%	7%	11%	14%
under \$30k	0%	3%	5%	9%	13%	20%	22%
\$30-50K	1%	7%	12%	16%	25%	30%	42%
\$50-75K	3%	10%	16%	25%	33%	50%	51%
> \$75K	4%	23%	27%	41%	54%	64%	72%
LT HS	0%	3%	3%	9%	8%	14%	17
HS Grad	1	4	7	12	16	27	31
Some college	2	11	15	25	31	44	52
College +	3	17	23	31	42	55	66

Evaluating gaps

In a medium that offers so much, gaps matter. However, as Horrigan (2006) documents in his work with the Pew Internet Project, it is what people do with their access that creates consequences for those on line, as well as for those unconnected.

1. **The Internet reduces uncertainty for users in important contexts.** The availability of online health and medical information is perhaps the best example of how online information helps in the face of uncertainty. Many health or medical problems, in addition to being problems in themselves, can be exacerbated by the uncertainty they evoke. Online information can help in this regard in at least two ways. First, the availability of information on the Internet gives people the ability to learn more about a problem at their own pace and to ask more informed questions of health care providers during face-to-face appointments. Second, the Internet lets people connect with others facing similar medical problems; and, thereby, offer a source of comfort, as well as information on new treatment options.

- 2. The Internet as an information utility encourages civic engagement.**
People increasingly turn to the Internet for news about politics and to find out what is going on with their state, local, or federal governments. One-third of Americans got some news and information online about the 2006 mid-term election and twice as many said they relied on the Internet as their main source of campaign news in 2006 as compared to the 2002 mid-term election. Links to greater voting rates are hard to pin down, but the mix of political information online exerts a growing force on political discourse.
- 3. The Internet and social capital.** The Internet enables the utilization and maintenance of social networks. Boase, Horrigan, Wellman, and Rainie (2006) examined: the size and composition of Americans' social networks; what technology they use to contact them; and, the role of social networks in decision-making regarding matters of personal finance, job training, plus job searches. The majority of Internet users reported email as the preferred tool for the cultivation of social capital, not just for sharing everyday goings-on among family and friends, but also for getting advice or sharing important news.
- 4. Internet users shape cyberspace through user-generated content.**
For many people with high speed Internet at home, the Internet becomes a platform for sharing something of themselves with the world. Whether it involves keeping an online diary with a blog, posting comments to other blogs or new sites, or posting photos or videos, 44% of people with high-speed connections at home upload user-generated content to the Internet.²⁵ In doing so, these users generate new ideas, thereby shaping the nature of online content available for everyone. They prove that users engage the Internet for considerably more than passive information consumption. People may come to this online commons as consumers; but, once engaged, they begin to shape it.

²⁵ The 44% of home broadband users who have posted "user generated content" to the internet have done at least one of the following things: created their own blog, participate, created or worked on their own webpage, participated in group blogs or webpages, posted comments to a newsgroup, shared a personal creation (like artwork, stories, or videos), or taken online content and remixed it into an artistic creation of their own.

Figure 9

	Download video	Health search	Get news/info about election campaign	Visit state, local, federal government website	User generated content	Take a class for credit	Take a class for enjoyment
All	14%	56%	31%	45%	27%	8%	8%
Home broadband users	26%	86%	53%	72%	44%	14%	15%
Whites	13%	57%	33%	47%	27%	8%	8%
Blacks	15%	46%	23%	36%	22%	8%	9%
18-29	30%	67%	39%	47%	45%	14%	11%
30-49	15%	67%	37%	59%	31%	12%	10%
50-64	8%	54%	28%	45%	21%	4%	9%
65+	3%	21%	13%	14%	6%	1%	2%
under \$30k	12%	38%	16%	31%	18%	6%	7%
\$30-50K	14%	57%	32%	50%	28%	8%	11%
\$50-75K	17%	74%	35%	55%	29%	11%	8%
> \$75K	19%	79%	54%	69%	41%	11%	15%
LT HS	11%	23%	11%	18%	11%	1%	4%
HS Grad	11%	42%	18%	31%	19%	3%	7%
Some college	17%	65%	34%	54%	34%	12%	11%
College +	17%	81%	57%	72%	39%	13%	10%

American Competitiveness in an Emerging Global Information Order

Is there a digital divide? The power of income and education is evident in the data presented here. So too is the potential of broadband Internet access to enable upward mobility, further underscoring the importance of universal service policy. Even so, the roots of this issue go back to the early 1990s and the realization in policy circles that, after 120 years of deployment and 60 years of Universal Service policy, 7% of households did not have a telephone—a penetration level that remains the same today.²⁶ As personal computers became more visible (22% of households in 1992), the debate quickly drew a line between those with, and without, PCs.²⁷ By the mid 1990s, Internet household penetration reached 15% (Figure 1), and the debate refocused on Internet access. Half way through this decade, broadband policies and penetration in other countries drew attention to lagging penetration in the United States. Indeed, each turn in this cycle has expanded our understanding of the importance of access to information at every level of society, from the quotidian to the global.

However one evaluates the gaps in broadband uptake and the social consequences of not having a home high-speed connection, the United States faces three challenges going forward.

- **Availability in rural America:** There is no publicly available data that maps broadband infrastructure for the nation. But a Pew Internet survey from 2004 shows that rural Americans are twice as likely to report that they can't get a broadband connection where they live. This is one reason rural broadband adoption lagged behind the rest of America by a 25% to 45% margin in 2006 (Figure 10).
- **Network bandwidth:** There is also little reliable data on this issue, but it is widely thought that the bandwidth of (mostly) cable or digital subscriber line home high-speed networks is far slower in the United States than in some Asian and European countries (Copps, 2006).
- **International standing:** Notwithstanding fast uptake, by many measures, the United States trails other countries in home broadband adoption. According to the International Telecommunications Union, the United

²⁶ Total U.S., 93.4% telephone household penetration. Belinfante, A. (2007, May). Telephone subscribership in the United States, Federal Communications Commission, Wireline Competition Bureau, Industry Analysis and Technology Division.

²⁷ U.S. Census Bureau, Current Population Survey, October 1993.

States ranks 16th in broadband penetration in 2005 (when measured by subscribers per 100 residents). The 2006 standing fell from 13th the year before, and it was only in 2001 that the U.S. ranked fourth in broadband penetration among OECD countries.

Figure 10

	Home broadband users	Home dial-up users	Internet users	General population (all respondents)
Gender				
Male	52%	47%	50%	48%
Female	48	53	50	52
Age				
18-29	26%	19	24	20
30-49	47	43	45	39
50-64	22	26	24	24
65+	5	11	7	17
Ethnicity				
White (not Hispanic)	73	74	74	73
Black (not Hispanic)	8	9	9	11
Hispanic (English speaking)	10	11	11	10
Education				
Less than HS	5	9	7	13
HS grad	28	36	32	37
Some college	26	28	26	23
College +	41	27	34	27
Household income				
Under \$30K	12	21	17	24
\$30K-50K	21	24	22	20
\$50K-\$75K	16	19	16	14
Over \$75K	36	18	28	22
No answer	15	19	17	20
Community				
Urban	30	27	29	28
Suburban	58	48	54	53
Rural	11	25	16	19
Source: Pew Internet & American Life Project April 2006 Survey. N=4,001; margin of error is $\pm 2\%$ for the entire sample For internet users, n=2,822; margin of error is $\pm 2\%$ for this group. For home broadband users, n=1,562; margin of error is $\pm 3\%$ for this group. For home dial-up users, n=933; margin of error is $\pm 3.5\%$ for this group.				

This paper began with an acknowledgment that an international order is emerging out of the diffusion of a global broadband Internet. The old industrial economy that rode the track of the railroads and the wires of the telegraph has been transformed into an economy that thrives on websites and high bandwidth Internet trunk lines. At the same time, the democracy of mass media and one-way communications is in the process of absorbing the shock of blogs and Internet journalism. As yet, what role America will play in each of these arenas remains unclear. What is clear is that broadband Internet will be the great enterprise of the 21st century where successful participation as an economic and political actor will depend on the deployment of broadband Internet access to America's households.