

SOCIAL IMPLICATIONS OF THE INTERNET

Paul DiMaggio¹, Eszter Hargittai¹, W. Russell Neuman²,
and John P. Robinson³

¹*Department of Sociology, Princeton University, Princeton, New Jersey 08540;*
e-mail: dimaggio@princeton.edu, eszter@princeton.edu

²*Annenberg School for Communication, University of Pennsylvania, Philadelphia,*
Pennsylvania 19104; e-mail: rneuman@asc.upenn.edu

³*Department of Sociology, University of Maryland, College Park, Maryland;*
e-mail: robinson@bssl.umd.edu

Key Words World Wide Web, communications, media, technology

■ **Abstract** The Internet is a critically important research site for sociologists testing theories of technology diffusion and media effects, particularly because it is a medium uniquely capable of integrating modes of communication and forms of content. Current research tends to focus on the Internet's implications in five domains: 1) inequality (the "digital divide"); 2) community and social capital; 3) political participation; 4) organizations and other economic institutions; and 5) cultural participation and cultural diversity. A recurrent theme across domains is that the Internet tends to complement rather than displace existing media and patterns of behavior. Thus in each domain, utopian claims and dystopic warnings based on extrapolations from technical possibilities have given way to more nuanced and circumscribed understandings of how Internet use adapts to existing patterns, permits certain innovations, and reinforces particular kinds of change. Moreover, in each domain the ultimate social implications of this new technology depend on economic, legal, and policy decisions that are shaping the Internet as it becomes institutionalized. Sociologists need to study the Internet more actively and, particularly, to synthesize research findings on individual user behavior with macroscopic analyses of institutional and political-economic factors that constrain that behavior.

INTRODUCTION

By "Internet" we refer to the electronic network of networks that links people and information through computers and other digital devices allowing person-to-person communication and information retrieval. Although the late 1960s saw the inception of an ancestral network dedicated to scientific (and, after 1975, military) communication, the Internet did not emerge until 1982; it began its rapid ascent only in the early 1990s, when graphical interfaces became widely available and commercial interests were allowed to participate (Abbate 1999, Castells 2001).

Access to and use of the medium diffused widely and swiftly. The number of Americans online grew from 25 million in 1995 (when only 3% of Americans had ever used the Internet) (Pew Research Center for People and the Press 1995) to 83 million in 1999 (Intelli-Quest 1999), with 55 million Americans going online on a typical day in mid-2000 (Howard et al, forthcoming). The amount of information available on the World Wide Web has also risen exponentially, from fewer than 20,000 Web sites in 1995 (Prettejohn 1996) to over 10 million in 2000 (Netcraft 2000), representing over two billion Web pages, with as many as two million pages added daily (Lake 2000).

Our focus in this chapter is on the Internet's implications for social change. The Internet presents researchers with a moving target: Agre (1998a) describes it as "a meta-medium: a set of layered services that make it easy to construct new media with almost any properties one likes." We use Internet to refer both to technical infrastructure (public TCP/IP networks, other large-scale networks like AOL, and foundational protocols), and to uses to which this infrastructure is put (World Wide Web, electronic mail, online multiperson interactive spaces). We focus primarily on general, public uses. Among the topics we do not address systematically are the use of digital technologies for communication *within* formal organizations, the technology's potential contribution to the conduct of social-science research and scholarly communication, or the much broader topic of social antecedents and consequences of computerization.

Many observers allege that the Internet is changing society. Perhaps not surprisingly, given the novelty of the new digital media, there is little agreement about what those changes are. Our purpose here is to summarize research by social scientists about the Internet and to encourage more sociologists to contribute actively to such research. We believe that it is important for sociologists to address these issues for three reasons. First, the medium's rapid growth offers a once-in-a-lifetime opportunity for scholars to test theories of technology diffusion and media effects *during the early stages of a new medium's diffusion and institutionalization*. Second, the Internet is unique because it integrates both different modalities of communication (reciprocal interaction, broadcasting, individual reference-searching, group discussion, person/machine interaction) and different kinds of content (text, video, visual images, audio) in a single medium. This versatility renders plausible claims that the technology will be implicated in many kinds of social change, perhaps more deeply than television or radio. Finally, choices are being made—systems developed, money invested, laws passed, regulations promulgated—that will shape the system's technical and normative structure for decades to come. Many of these choices are based on behavioral assumptions about how people and the Internet interact. We believe such assumptions should represent more than guesswork.

THEORETICAL CONTEXT

Sociology's major theoretical traditions emphasize different aspects of electronic media. For Durkheimians, point-to-point communications media like telephones reinforce organic solidarity, while broadcast media like radio or television yield

powerful collective representations (Alexander 1988). Marxists focus upon exploitation of communications media to enhance elite control of both politics and production through cultural hegemony and enhanced surveillance (Schiller 1996, Davis et al 1997). Weberians attend to the ways in which point-to-point media advance rationalization by reducing limits of time and space, and broadcast media provide the elements of distinctive status cultures (Collins 1979).

Other traditions also offer perspectives on the digital media. Technological determinists suggest that structural features of new media induce social change by enabling new forms of communication and cultivating distinctive skills and sensibilities (McLuhan 1967, Eisenstein 1979). In the 1960s, students of social change suggested that in the face of new developments in communications technology, industrial society would yield to the "information society," with consequences in every institutional realm (Machlup 1962, Bell 1973). Critical theorists problematize the effects of technological change on political deliberation and the integrity of civil society (Habermas 1989, Calhoun 1998).

Daniel Bell (1977) appears to have been the first sociologist to write about the social impact of digital communications media themselves. Bell predicted that major social consequences would derive from two related developments: the invention of miniature electronic and optical circuits capable of speeding the flow of information through networks; and the impending integration of computer processing and telecommunications into what Harvard's Anthony Oettinger dubbed "communications" technology. Anticipating the democratization of electronic mail and telefaxing, as well as digital transmission of newspapers and magazines, Bell explored the policy dilemmas these changes would raise, calling "the social organization of the new 'communications' technology" the most central issue "for the postindustrial society" (1977:38).

More recently, Manuel Castells has argued that the world is entering an "information age" in which digital information technology "provides the material basis" for the "pervasive expansion" of what he calls "the networking form of organization" in every realm of social structure (1996:468). According to Castells, the Internet's integration of print, oral, and audiovisual modalities into a single system promises an impact on society comparable to that of the alphabet (p. 328), creating new forms of identity and inequality, submerging power in decentered flows, and establishing new forms of social organization.

The comprehensive visions of Bell and Castells, like the other theoretical traditions we have described, suggest a range of empirical questions one must answer to understand the Internet's influence upon society. From the Marxian and Weberian traditions come concerns about power and inequality in the access to the new technology. The Durkheimian perspective sensitizes us to the new media's impact on community and social capital. The work of Habermas and Calhoun leads us to ask how the Internet may alter the practice of politics. The Weberian tradition raises the question of the effect of Internet technology on bureaucracy and economic institutions. Critical theory raises important questions of how the Internet may affect the arts and entertainment media.

We address each of these five topics in turn, summarizing the results of research undertaken by social scientists and other investigators. In most of these areas, the research literature is limited, and many questions remain. But there is a pattern: Early writings projected utopian hopes onto the new technology, eliciting a dystopian response. Research on each topic yields two conclusions. First, the Internet's impact is more limited than either the utopian or dystopian visions suggest. Second, the nature of that impact will vary depending upon how economic actors, government regulation, and users collectively organize the evolving Internet technology.

MAJOR RESEARCH QUESTIONS

The Internet and Inequality: Opportunity or Reproduction?

Enthusiasts predicted that the Internet would reduce inequality by lowering the cost of information and thus enhancing the ability of low-income men and women to gain human capital, find and compete for good jobs, and otherwise enhance their life chances (Anderson et al 1995). By contrast, cyber-skeptics suggest that the greatest benefits will accrue to high-SES persons, who may use their resources to employ the Internet sooner and more productively than their less privileged peers, and that this tendency would be reinforced by better Internet connections and easier access to social support (DiMaggio & Hargittai 2001).

As in other areas, early research results suggest that the outcome is more complex than either of these predictions, and that the Internet's effects on inequality will depend on the social organization of its use. In this section, we examine research on individual-level inequality among users, as well as cross-national differences in Internet penetration and inequality in effective Internet access for content producers.

THE "DIGITAL DIVIDE" IN THE UNITED STATES Anderson et al (1995) were among the first to highlight the potential of inequality in Internet access to limit people's opportunities to find jobs, obtain education, access government information, participate in political dialog, and build networks of social support. By "digital divide," we refer to inequalities in access to the Internet, extent of use, knowledge of search strategies, quality of technical connections and social support, ability to evaluate the quality of information, and diversity of uses. Although some speculate that current intergroup differences will evaporate as the Internet diffuses (Compaine 2000), Schement (1999) points out that inequalities in access to information services (e.g. telephone, cable) tend to persist in contrast to the rapid diffusion of information goods (e.g. radio, television, VCRs) that reach near saturation relatively quickly. This is because the former require ongoing expenditures, whereas the latter are based on one-time purchases. For example, although 94% of all American households have telephones, this figure drops below 80% for the

low-income elderly and female-headed households below the poverty level (Schement 1996).

Because sociologists have conducted so little research on the digital divide, to chart the dimensions of inequality we must rely primarily on studies reporting bivariate statistics. Reports of the National Telecommunications and Information Administration (NTIA 1995, 1998, 1999, 2000) documented differences in Internet access favoring the college educated, the wealthy, whites, people under the age of 55 and, especially in earlier years, men and urban dwellers. (Moreover, less affluent and less well-educated users are more likely to become nonusers after trying it out [Katz & Aspden 1997].) Interestingly, despite the focus of early reports on income differences, the impact of educational attainment on Internet use is twice that of income after multivariate controls (Robinson et al 2000b). Research has also found that Internet non-users report as reasons for not going online that they are not computer users, they do not want their children to have Internet access, they lack time or interest, or they cannot afford it (Strover & Straubhaar 2000). There is some evidence that measures of access reflect resource control, whereas measures of intensity of use are driven more by demand. Thus teenagers are less likely to report Internet access than adults between the ages of 25 and 54 (NTIA 1998); but when homes have Internet access, teenagers are online much more than adults (Kraut et al 1996).

Patterns of inequality are likely to reflect such changing factors as public connection availability, private subscription price, services available, and the technology necessary to access them effectively, as well as the diffusion of knowledge and the evolution of informal technical-support networks. Therefore, it is crucial to examine change in inequality over time. Three surveys conducted between 1996 and 1998 found that the gap in access between whites and African Americans had increased over time (Hoffman et al 2000), but NTIA surveys (1998, 2000) found that divide diminishing between 1998 and 2000. Wilhelm (2000) reports that significant differences persist in Internet use among racial and ethnic groups, with socioeconomic status held constant, and he argues that access to telecommunications tools and lack of easy access to Spanish-language content explain lower usage rates among Hispanics. By contrast, broad evidence suggests that two gaps, the advantage of men over women and of the young over the old, have declined as the technology has diffused and become more user-friendly (Roper Starch 1998, Clemente 1998, Bimber 2000, NTIA 2000, Howard et al forthcoming). Other evidence suggests that late adopters have less formal education and lower incomes than earlier cohorts (Howard et al, forthcoming, Katz et al, forthcoming).

Several exemplary studies go beyond description to analysis. In a study notable for its use of multivariate analysis and multiple outcome measures, Bimber (2000) found that the gap between men and women in *access* to the Internet reflected male/female differences in income and other resources; but that women with access used the Internet less frequently than did otherwise similar men, a result he attributed to the fact that full-time employment had a significant effect on frequency of use for men, but not for women. In a study exemplary for tying

individual-level inequality to institutional arrangements, Strover (1999) compared dial-up Internet connectivity in four rural US counties, concluding that low levels of commercial investment in telecommunications infrastructure in sparsely populated areas limits use by generating less choice among service providers and higher connection fees.

Other research has focused on public settings that provide Internet access for persons unable to reach the Internet at home or work. A national survey of public libraries reported that urban libraries are almost three times as likely as rural libraries to offer high-speed Internet connections; and that because many urban libraries serve high-poverty areas, access to high-speed connections is relatively available to the urban poor (Bertot & McClure 1998). An evaluation of Internet access programs at two public libraries and two community centers indicated that effectiveness was a function of the extent to which staff were trained to assist Internet users and potential users found the atmosphere welcoming and nonthreatening (Lentz et al 2000). Research on schools, another key site for public access, indicates that the proportion of US public schools offering Internet access rose from 3% in 1994 to 63% in 1999 (US Department of Education 2000), but that training and support staffing necessary for teachers to incorporate the technology effectively in instructional plans has lagged behind (Bolt & Crawford 2000).

Much research and policy assumes that people can convert Internet access into other valued goods, services, and life outcomes. Researchers have not yet tested this premise for Internet access, but research on general computer use sustains its plausibility, while leaving much to be done. Krueger (1993) reported a substantial wage premium accruing to workers who use computers. Attewell & Battle (1999) found that home computer use was significantly related to students' test scores in mathematics and reading, with higher returns for boys, whites, and the well-to-do.

THE GLOBAL DIGITAL DIVIDE The number of Internet users globally skyrocketed from 16 million in 1995 to almost 360 million by mid-2000 (NUA 2000a). Despite this rapid diffusion, this number represents just 5% of the world's population. As is the case with other communications devices, access across countries is very uneven, with 97% of Internet host computers located in developed countries (ITU 1998). With respect to content, US producers dominate the Web, creating and hosting a large percentage of the most visited Web sites (OECD 1997) and so establishing English as the Internet's dominant language.

Studies of cross-national variation in levels of Internet connectivity and use are few. Most reports on global Internet diffusion present little more than descriptive statistics, emphasizing correlations with national wealth and education (ITU 1997, 1999, Paltridge & Ypsilanti 1997). Cross-national differences reflect differences in the availability of local-language programming, but not that alone. Hargittai (1996) called attention to institutional factors, reporting that in 1995 three quarters of highly developed countries, but only 10% of LDCs, had commercial access providers (an indicator of private-sector involvement and thus additional impetus for diffusion). Although data quality constrains generalization, the divide between

developed and less developed nations appears not to have lessened as the Internet has diffused.

Better data make it possible to analyze Internet diffusion in OECD countries in more detail. Using multivariate analyses of OECD nations, Hargittai (1999) demonstrated that national wealth and competition in the telecommunications sector (and regulatory environments fostering competition) were the strongest predictors of connectivity (see also Guillén & Suarez 2001).

Wilson (2000) distinguishes between “formal access” (physical availability) and “effective access” (affordable connectivity and diffusion of skills people need to benefit from the technology). In-depth case studies help develop this distinction. Rao et al (1999) suggest that lack of local content in native languages in South Asia discourages use. Based on a detailed review of statistics and case reports, Norris (2001) concludes that the Internet is reproducing cross-national inequalities in use of newspapers, telephones, radio, and television because diffusion largely depends on economic development and research and development investments that are unequally distributed across societies.

Yet a case study of Trinidad reports that by 1999 penetration was deep (approximately 30% of households had at least one regular user) and, while stratified by income, relatively broad. The authors attribute this both to Trinidad’s comparatively strong communications infrastructure and healthy economy, and equally important, to the premium placed on email by residents of an island nation that exports its most successful young people abroad (Miller & Slater 2000). Technologies shape themselves to the contours of local priorities and ways of life: Just as some less developed countries were vanguard adopters of sound cassettes and cell phones, some may embrace the Internet relatively quickly, especially as wireless transmission creates convergence between Internet and cell phone technologies.

INEQUALITY IN CONTENT PROVIDERS’ ACCESS TO ATTENTION Sociologists should be concerned not only with inequality in access to the Internet, but with inequality in access to the attention of those who use the Internet. By dramatically reducing the cost of the replication and distribution of information, the Internet has the potential to create arenas for more voices than any other previous communication medium by putting product dissemination within the reach of the individual.

Information abundance creates a new problem, however: attention scarcity (Goldhaber 1997). Content creators can only reach large audiences if online gatekeepers—Web services that categorize online information and provide links and search facilities to other sites—channel users to them (Hargittai 2000b). Yet Internet traffic is highly concentrated: 80% of site visits are to just .5% of Web sites (Waxman 2000a). As was the case with broadcast media, the growth and commercialization of the Internet has been accompanied by a commodification of attention. A rapidly evolving mosaic of search engines and point-of-entry sites compete for dominance (NUA 2000a), playing a pivotal role in channeling users’ attention toward some contents and away from others (Hargittai 2000b).

During the late 1990s, entrepreneurs developed comprehensive and strongly branded “portals”—Web sites containing search engines, category guides, and various shopping and information services—to match users and content. Such sites now account for one in four of the most visited destinations of the Web (Waxman 2000b). The search engines they feature are often biased in their identification and, especially, ranking of sites in response to user queries (Introna & Nissenbaum 2000). The effects of bias are compounded by the tendency of engine users to employ simple search terms and to satisfice by terminating searches at the first acceptable site. [A 1998 analysis of almost one billion queries on the Altavista search engine revealed that 77% of sessions included but one query and 85% of users viewed only the first screen of search results (Silverstein et al 1998)]. Thus, Web destinations that are displayed prominently on portal sites or ranked high by search engines are likely to monopolize the attention of all but the most sophisticated and committed Internet users. Understanding the processes by which such display opportunities and ranks are awarded is an important research task.

Research on inequality in access to and use of the Internet—among individual users, groups, organizations, countries, and content creators—should be an important priority for sociologists. At the individual level, the priority should be on using multivariate methods to explore the determinants of different measures of inequality: not just whether or not one has “access,” but inequality in location of access (home, work, public facilities); the quality of hardware, software, and connections; skill in using the technology; and access to social support networks. Because inequality reflects the technology’s organization, not inherent qualities, special priority should be placed on studies of how inequality is affected by such factors as government programs, industry structure and pricing policies, and approaches to the provision and organization of content.

Impact on Time Use and Community: Social Isolation or Social Capital Formation

Initial enthusiasts anticipated that the Internet would boost efficiency, making people more productive and enabling them to avoid unnecessary transportation by accomplishing online tasks like banking, shopping, library research, even socializing online. The results (less stress, more time, new online contacts) would make individuals more fulfilled and build social capital for society at large. More recently, two studies have suggested that the Internet may induce anomie and erode social capital by enabling users to retreat into an artificial world (Kraut et al 1998, Nie & Erbring 2000). In this section, we explore research on what Internet users do with their time, how the Internet affects their well-being, and how the Internet influences communities, both real and virtual.

TIME DISPLACEMENT Much of the debate over social capital is about whether the Internet attenuates users’ human relationships, or whether it serves to reinforce them. Experience with earlier communications technologies suggests that Internet

users may substitute time online for attention to functionally equivalent social and media activities (Weiss 1970). Thus, when television appeared in the United States, it had rapid impact on use of other media: Audiences abandoned their radio sets, movie theaters closed, and general-interest magazines stopped publishing fiction and eventually folded. Early studies documented reductions in time spent going to the movies, listening to radio, and reading fiction as television viewing time increased (Coffin 1954, Bogart 1956). Subsequent research replicated these results cross-nationally and also documented significant declines in out-of-home socializing, in-home conversation, housework, personal care activities, and even sleep (Robinson & Godby 1999).

If television, a unidirectional mass medium, displaced so many activities, then it stands to reason that the Internet, which permits interactive as well as one-way communication, might substitute for even more. Observers have expressed particular concern that Internet users may reduce the time devoted to off-line social interaction and spend less time with print media, as well as with television and other media (Nie & Erbring 2000).

The functional-equivalence model that described the effects of television thus far appears *not* to fit the experience of Internet users. Analyses of 1995 and 1998 national surveys by the Pew Center for the People and the Press, which asked respondents about activities “yesterday,” have found Internet use to be unrelated or positively associated with social interaction (Robinson et al 1997, 2000a). Moreover, analysis of 1997 data from the federal Survey of Public Participation in the Arts indicates that Internet users (with appropriate controls) read more literature, attended more arts events, went to more movies, and watched *and* played more sports than comparable nonusers (Robinson & Kestnbaum 1999). A more recent study based on 1998 Pew Center data indicates intriguing changes associated with the Internet’s diffusion: Among users who had been early adopters, Internet use was associated with *greater* use of print media. Among new Internet users, however, this relationship had disappeared (Robinson et al 2000b). No significant decline in TV viewing was found after demographic controls. Overall, then, these analyses provide scant support for time displacement due to functional equivalence with respect to other media. (See also Cole 2000, who found lower TV use among Internet users but slightly higher use of other media).

The situation with respect to social interaction is more complicated. Two well-publicized studies reported indications that Internet use substituted for other interactions. Kraut et al (1998), who used a rare longitudinal design to study 169 Pittsburgh-area families who were given computers and Internet connections over a two-year period, reported that higher levels of Internet use were “associated with declines in communication with family members, declines in social circles, and increased loneliness and depression.” The authors inferred that heavy users substituted interactions with weak ties on the Internet for time spent with close friends and relatives. Yet as the researchers followed their sample they discovered that, except for increased stress, negative psychological effects decayed to statistical insignificance and some positive outcomes emerged. They attribute these

changes to increases in experience and competence and, more speculatively, to the Internet's greater utility in the later period and to a change in sign of network externalities from negative to positive as more of these users' friends and family went online (Kraut et al forthcoming).

An innovative study that used special use-logging software to compare the online behavior of experienced and novice Web users reinforces the notion that the effect of Internet use may vary with user competence. Compared to experienced Internet users, the novices engaged in more aimless surfing, were less successful in finding information, and were more likely to report feeling a souring of affect over the course of their sessions. Their negative reactions reflected not the Internet experience per se but the frustration and sense of impotence of the inexperienced user without immediate access to social support (Neuman et al 1996).

Nie & Erbring (2000) surveyed four thousand Internet users online and asked how the Internet had changed their lives. Most reported no change, but heavier users reported declines in socializing, media use, shopping, and other activities. By contrast, analyses of national (off-line) sample surveys (from both 1995 and 1998) using more fine-grained activity measures indicate that Internet users are no less likely (with controls) to engage in social visiting or to call friends on the telephone. More recent surveys (online *and* off) have revealed that Internet users have *higher* levels of generalized trust and larger social networks than nonusers (Uslaner 1999, Robinson et al 2000b, Hampton & Wellman 2000, Cole 2000). Results from survey analyses also suggest that Internet use serves to complement rather than substitute for print media and offline socialization. Indeed, a detailed time diary study also found Internet users to be no less active media users or offline socializers than nonusers, though they did do less housework, devote less time to family care, and sleep less (Robinson et al 2000b).

COMMUNITY Wellman (2001) argues that the Internet has contributed to a shift from a group-based to a network-based society that is decoupling community and geographic propinquity, and thus requiring new understandings and operationalizations of the former. Consistent with this insight, Katz et al (forthcoming) report that Internet users visit friends more and talk with them by telephone more frequently, but that they also travel more and have fewer friends in their immediate neighborhoods.

To some extent, whether one views the Internet as corrosive to or supportive of community depends in part on how one evaluates the things people do with it. For example, Nie & Erbring (2000, p. 4) view moderate to heavy-users' self-reported substitution of email for telephone contact as part of their loss of "contact with their social environment." By contrast, Lin (2001) regards online communication, including email, as markedly expanding the stock of social capital.

Indeed, an increasing body of literature suggests that the Internet enhances social ties defined in many ways, often by reinforcing existing behavior patterns. A report on a national survey of users (Howard et al forthcoming) revealed that the Internet puts users in more frequent contact with families and friends, with

email being an important avenue of communication. This study also suggests that research on Internet use and social capital should distinguish among different types of Internet use: The Internet seems particularly unlikely to corrode the social capital of women, more of whom than men employ the medium as a complement to other channels of social interaction. Similarly, a longitudinal study by Kraut et al (forthcoming) found that Internet use increased interaction with family members and reported closeness to friends, especially for users whose perceived social-support networks were strong *before* they began using the Internet.

The Internet is unique among media in making it easy for people to assemble (at a distance) and communicate with many others at the same time in such settings as chat rooms or online discussion forums. "Online communities" come in very different shapes and sizes, ranging from virtual communities that connect geographically distant people with no prior acquaintance who share similar interests, to settings that facilitate interactions among friendship networks or family members, to community networks that focus on issues relevant to a geographically defined neighborhood (Smith & Kollock 1999, Wellman & Gulia 1999, Preece 2000). Research on "online community" should distinguish among these forms, lest results appear contradictory and confusing.

Early studies tended to focus on online role-playing games [e.g. multi-user dungeons or MUDs (Turkle 1995)] and newsgroups (Hauben & Hauben 1997). These were among the first online communities and are still popular research sites, in part because researchers can obtain full transcripts of discussions and events. Such "online ethnography" has provided useful insights into issues of identity formation (Paccagnella 1997) and the status and concerns of particular groups (e.g., Kolko et al 2000 on race in cyberspace). But as the technology matures, ever smaller percentages of Internet users participate in online games and newsgroups. Increasingly, researchers must follow users into newer kinds of online communities based on shared interests or (physical) community networks.

The number of case studies of online communities is large and growing. Participants value such online settings for making it easy (and inexpensive) to communicate across large distances, providing opportunities for participation by the homebound aged or infirm, and enabling people with minority interests or lifestyles to find companionship and counsel unavailable in their communities of residence (Etzioni & Etzioni 1997). Rheingold's (1993) classic study of an online community emphasized the capacity of online networks to provide their members with social support. And other researchers have noted that, compared to real-life social networks, online communities are more often based on participants' shared interests rather than shared demographic characteristics or mere propinquity (Wellman & Gulia 1999). Nonetheless, issues related to racial, gender, and sexual dynamics do permeate and complicate online interactions [e.g. requiring communities to establish norms for dealing with intimidating or offensive language (Lessig 1999, Silver 2000)].

Whereas some studies focus on "virtual" communities, others explore the impact of the Internet on geographic communities. An exemplary study of a highly wired residential community underscores the importance of examining online

interactions in the context of offline everyday life (Hampton & Wellman 2000). It revealed that Internet users maintain community ties through both computer-mediated communication and face-to-face interaction. Although they maintain more long-distance relationships than do non-Internet users, they communicate even more with their neighbors—and are acquainted with three times as many of their neighbors as are their unwired peers. A study of a similar community revealed that residents make much use of the Internet for “social-capital building activities,” but that individual-level community involvement and attachment increased only for residents who were already very active at the experiment’s inception (Kavanaugh & Patterson forthcoming). Similarly, a study of scholarly networks found that although the Internet helps maintain contact over long distances, most email contacts are between people who also interact face-to-face (Koku et al 2001). In other words, research suggests that the Internet sustains the bonds of community by complementing, not replacing, other channels of interaction.

SOCIAL CAPITAL Many scholars believe that the Internet facilitates the creation of social capital and other public goods by making information flow more efficiently through residential or professional communities (Lin 2001, Wellman 2001). Yet Putnam (2000) reports that, after demographic controls, Internet users are no different than non-users on measures of civic engagement. He notes, however, that it is premature to project this result onto future user cohorts, and he is agnostic about the Internet’s contribution to social capital at the community level. Putnam calls attention to the need to understand qualitative differences between mediated and face-to-face interaction and to explore a tension between the technology’s potential and the dangers of unequal access and “cyberbalkanization” (Putnam 2000:177; for an operationalization, see Van Alstyne & Brynjolfsson 1997).

Other studies indicate that, under some circumstances at least, Internet use may enhance social capital. In a longitudinal study of Pittsburgh residents, Kraut et al (forthcoming) found Internet use associated with greater participation in community activities and more trust (though less commitment to remaining in their community), with the positive effects greater for more extroverted participants. An analysis of online survey respondents from the United States, United Kingdom, Canada, and Australia found that increased Internet use tended to have a direct positive effect on social capital (operationalized as participation in community networks and activities) and a positive indirect effect (through social capital) on political participation (Gibson et al 2000).

There is much anecdotal evidence that the Internet provides significant benefits to people with unusual identities or concerns (e.g., rare medical conditions). But there is some evidence that “social capital” produced by less focused networks is rather thin. For example, a survey of users of Amsterdam’s “Digital City,” a multi-use space created to encourage Internet access and public-spirited interaction, found that, despite soaring membership figures, most users participated relatively infrequently and for recreational purposes (Van den Besselaar & Beckers 1998).

It has also been argued that the Internet builds social capital by enhancing the effectiveness of community-level voluntary associations, but little research evaluates this claim. The Internet has also been described as an inexpensive and effective means of organizing oppositional social movement. Lin (2001) describes the fascinating case of China's Falun Gong organization, which used the Internet to establish a powerful, hierarchical religious movement under the noses of an authoritarian regime. Whether similar movements will follow suit will depend on the success of states in monitoring and controlling such activities.

We draw five morals from the research to date. First, the Internet has no intrinsic effect on social interaction and civic participation. This nonfinding should challenge scholars to understand the circumstances under which different effects are produced, which will doubtless lead them to distinguish different profiles of Web use and different orientations of users. Second, Internet use tends to intensify already existing inclinations toward sociability or community involvement, rather than creating them *ab initio*. Third, we need to know more than we do about the qualitative character of online relationships. Fourth, we know that virtual communities exist in large number, but we know relatively little about their performance. Research on how virtual communities address problems of commitment and trust (like Kollock's [1999] innovative study of institutionalized reputation on E-Bay and Usenet barter sites) is necessary to understand the limits and possibilities of community online. Fifth, we need more systematic studies of how civic associations and social movements use the Internet, so that we can move beyond single cases to understanding the institutional conditions that encourage or discourage successful exploitation of this technology for collective ends.

Impact on Politics: Renewed Public Sphere or Electronic Battleground?

In the political domain we again find utopians and doomsayers at odds. Enthusiasts find early evidence of a re-engaged, more deliberative, more equitable political community (Browning 1996, Hill & Hughes 1998, Negroponte 1995). Skeptics foresee the re-emergence of an unresponsive commercial sphere dominated by the usual corporate players—but with an increased capacity to invade the privacy of individual citizens (Beniger 1996, Lessig 1999). Most research suggests that effects thus far have been mixed and modest.

Drawing conclusions at such early stages of technology diffusion before the emergence of stable norms is risky because it is difficult to disentangle: 1) the unique characteristics of early adopters from the characteristics of the medium in question; 2) the primitive limitations of the early Web from the technology's mature characteristics; and 3) the Web's explosive growth from other political trends (Rogers 1995, Bimber 1999). As with other topics, the literature about politics on the Internet has progressed through three stages: unjustifiable euphoria, abrupt and equally unjustifiable skepticism, and gradual realization that Web-based human interaction really does have unique and politically significant properties.

AN INFORMED PUBLIC Empirical research on mass political knowledge in industrial democracies, and particularly in the United States, has drawn heavily on the 'information cost' perspective of Downs (1957) and Schumpeter (1947) to explain why the public is so poorly informed. Because it takes time and energy to seek out, interpret, and remember political information, it may be rational to free-ride on the civic attentiveness of others. The political promise of the Internet is that it significantly lowers the behavioral costs of finding, storing, and communicating specific and personally relevant political information at convenient, timely intervals.

The literature reveals, however, that after controlling for education and political interest, there is little evidence of an effect of Internet use on political knowledge. Those who seek political information online are generally well informed to begin with, politically oriented, and heavy users of other media (Bimber 2000, Johnson & Kaye 1998). At present, the Internet supplements and complements rather than replaces traditional sources of political information (Pew 1998, 1999, Robinson et al 2000b). A June 2000 survey revealed that 33% of US adults (and 46% of those under thirty) go online for news at least once a week, compared to 20% in 1998, and 15% they say do so every day. About half say they seek out political news, fewer than report that they look for weather, technology, business, and sports news (Howard et al forthcoming). In some cases they access news not readily available through print or broadcast media, but often the Web is a supplementary medium through which conventional news organizations distribute information available through other means.

AN ENGAGED PUBLIC The economic and psychological dynamics of Web-based human communication, however, are potentially distinct enough from those of traditional print and broadcast news media that in time we may see evidence of an Internet effect. For example, news sites often provide interactive links that encourage users to "send a copy of this article to a friend or colleague." The capacity for horizontal interpersonal communication, to rebroadcast a news article with personal commentary, enhances the capacity for discussion, engagement, and the two-step flow that serves as the critical antidote to anomic mass communication (Kornhauser 1968). Evolving third-voice technologies would permit users to unilaterally convert every mass-medium Web site into an open public discussion (Dibbell 1999). Discussion groups on the Web at present lack the selective, highly edited character of letters to the editor and citizen op-eds. But though they may not achieve the ideal of deliberative discourse envisioned by Habermas (1981, Elster 1998), they would appear to be a step in that direction.

There is great concern about the political malaise and disengagement presumably reflected in low voter turnouts in US national elections. Will reduced costs of gathering political information produce higher voting rates? Probably not, due to the complex and tangled influences of multiple historical, cultural and economic trends, which render bivariate analyses of relationships between media use and electoral participation ill advised. Schudson (1998) points out that US

electoral participation rates were highest in the second half of the nineteenth century, when citizens were generally uninformed and uneducated, the media were limited and sensationalistic, and quality of public debate was largely undistinguished. Bimber (2000) argues that political impact derives less from the character of the medium than from the character of information and the day-to-day culture of its use. The successful Jesse Ventura candidacy in Minnesota is widely cited as an example of grass-roots Internet populism; but in that case the Net was primarily used to organize the already engaged, not to mobilize disaffected or uninterested voters (Stromer-Galley 2000). Online financial contributions and voting online by the already politically active may prove more significant in the long run (Mintz 2000).

POLITICAL POLARIZATION Perhaps the most central question for sociological analysis of changing technical structures of interpersonal and mass communication is the tension between forces of social integration and polarization (Neuman 2000). Many fear that the Internet will weaken the cultural center and “political commons” that network television and metropolitan newspapers provided (Neuman 1991, Hirsch 1978). Negroponte, for example, predicts that an artificially intelligent Web-based Daily Me will select news and information based on the predilections and prejudices of the individual cybertizen and further displace the cultural commons (Negroponte 1995).

Research on earlier media, however, indicates that individuals tend to be aware of the most popular cultural artifacts and to monitor the latest hot programs and motion pictures (Neuman 1991). Ideologically inclined individuals do choose to attend to media that reinforce their prejudices (e.g., conservatives listen to conservatively oriented radio talk shows), but expose themselves as well to opposing views (Freedman & Sears 1965, Frey 1986). The Net’s capacity for anonymous communication may heighten the level of extremist and hate speech in the early stages of diffusion. But institutions of self-regulation may emerge to constrain such expression in cyberspace, as they have in nonelectronic public forums (Lessig 1999).

DELIBERATIVE DEMOCRACY Web proponents may concede that historically apolitical social strata are unlikely to be mobilized overnight by Internet political content, and agree that there are few signs thus far that the Internet has increased political fragmentation and polarization. But they insist that the Internet will enhance the quality of political discussion and the viability, meaningfulness, and diversity of the public sphere by lowering the access barrier to meaningful public speech. No longer is it necessary to own a newspaper or television station to participate: The Web is a two-way medium, and every Internet receiver can be a publisher as well (Compaine & Gomery 2000, Todreas 1999). Such claims provide critics of commercial (and especially American) dominance of the mass media and the international flow of news and culture with a new focal point for inquiry (Bennett 1995, Bourdieu 1999, Garnham 1990, McChesney 1996, Schiller 1989).

Can the Web make a real difference? It is clear that the Internet significantly lowers entry barriers and other Downsian cost factors for participation in the electronic public sphere. Bimber finds that many of the distortions of group discussion resulting from dominant personalities and group dynamics are reproduced in cyberspace, but he concludes that virtual political space (notably Usenet-style threaded discussion groups) has its place as a significant supplement to, if not replacement for, the face-to-face discussions of Habermas' idealized nineteenth-century salon (Bimber 2000, Hill & Hughes 1998, Schneider 1996). Lowering the economic costs to initiate and sustain an accessible political voice—compare a teenager's bedroom-based Web site to the cost of sustaining a printed magazine or broadcasting facility—can lower access barriers for minority voices, as well.

Skeptics argue that the commercial incentives of advertising-based media may lead ultimately to an Internet culturally indistinguishable from modern commercial television (Davis 1998, Margolis & Resnick 1999, Rheingold 1993). This debate is particularly interesting in the case of Web-based political campaigning in the United States, where by 2000, most candidates had their own Web sites, many with detailed issue and policy information unavailable through traditional media (Schneider 2000b). Will such diverse sites attract sufficient traffic to sustain themselves? Or will dominant commercial portals like AOL or specialized startups like *voter.com* dominate attention, paying for access to the public sphere through political advertising? As of this writing the jury is out, but researchers are actively studying elite and mass behavior (Schneider 2000a).

THE POLITICS OF THE INTERNET A final note: It may be that the battle for control of the Net and for dominance in the electronic marketplace of ideas will prove to be the most fruitful arena for sociological inquiry. The tension between political ideals of openness and the strong economic incentives to sustain and protect scarcity and its corresponding economic return should sustain significant scholarship in this domain for years to come (Lessig 1999, Neuman et al 1998, Shapiro 1999).

Impact on Organizations: Flexible Networks or Panopticons?

Some management writers depict information technology as transforming organizations: replacing hierarchical bureaucracy with flat, networked structures in which local initiative supplants authoritative command; and replacing formal organizations themselves with "network organizations" in which agency is interstitial and strategy constantly renegotiated (Tapscott 1999). Others suggest that digital telecommunications may increase management control by permitting unprecedented degrees of surveillance (Zuboff 1989). In this section, we focus primarily on organizations' use of the public Internet, rather than on communications networks internal to the firm (the use of which is reviewed in Sproull & Kiesler 1991, Wellman et al 1996, and O'Mahoney & Barley 1999).

LIMITS ON INTERNET IMPACT Little research bears directly on these claims, and what there is finds limited effects for three reasons. First, authors who make the strongest claims often conflate different types of digital technology, including workplace applications, local area networks, and the Internet. The Internet is less central to some notable organizational trends (e.g., the shrinkage of middle management) than computerization of internal functions (Board on Science, Technology & Economic Policy 1999).

Second, many structural changes associated with the “networked firm” predate the rise of information technologies alleged to have caused them (Powell 2001, Castells 1996). Although some argue that the Internet causes large firms to devolve into loosely integrated production networks by reducing information and transaction costs (Brynjolfsson et al 1994), the move toward network organizations was under way before the Internet became popular. (The Internet, though not determinant, is important. Although network forms emerged in response to competitive environments, new information technologies contributed to their rapid development [Castells 1996].)

Third, technology’s effects reflect *not* its inherent potential, as futurists assume, but active choices that are shaped by technology owners’ perceived interests, existing organizational structures and routines, and by cultural norms (O’Mahoney & Barley 1999, Orlikowski & Iacono 2000). Many traditional firms heavily constrain use of email and the Internet, especially by clerical and service employees, and such firms often implement systems that facilitate surveillance rather than enabling flexible, decentralized interaction (Zuboff 1989, Wellman et al 1996, Frenkel et al 1999).

Telecommuting, once predicted to rise exponentially, is a good example. Of a national sample of 1050 workers interviewed in late 1999, 41% believed they could work effectively from home, but only 10% reported their employers provided that option (and 9% reported doing so at least once a week) (Heldritch Center 2000). Other evidence suggests that most employees use home Internet connections to supplement hours at the workplace, not to substitute for them (O’Mahony & Barley: 131).

WORK GROUP EFFECTS Research on work groups (much of it in laboratory settings) suggests that electronic communications influence interaction style and work flow. Use of electronic mail compared to telephones, for example, enables workers to control the pace of their response and thus facilitates multitasking. Digital conferencing may make employees less risk-averse and render group decision-making less predictable, more time-consuming, and more egalitarian (Sproull & Kiesler 1991, Wellman et al 1996). Whether such effects enhance organizational performance or will persist as the technologies evolve is uncertain, in part because they depend on details of system design and implementation (Sproull & Kiesler 1991, O’Mahony & Barley 1999). In vivo research suggests that formally egalitarian “network” structures may coexist with substantial hierarchy and centralization in patterns of communication (Ahuja & Carley 1998).

FIRM STRUCTURE EFFECTS There is little evidence that the Internet is reshaping organizational structures. O'Mahoney & Barley report that "whether information technologies further centralization or decentralization" varies depending on how managements uses them. The few empirical studies of the relationships between digital technology and organizational size, buy-or-sell decisions, and organizational boundaries are anecdotal or inconclusive (O'Mahoney & Barley 1999: 143–45). The Internet may induce change, but we will not know until researchers undertake large-sample studies that specify changes precisely, treat separately different kinds of information technology, and distinguish effects on different kinds of workers and different business functions.

Take, for example, technology's impact on interfirm networks. Most electronic networks complement, rather than substitute for, more intimate media. For many "network organizations" propinquity is crucial in breeding trust and rapport among participants, for example enabling companies in small-firm networks to share information and exchange specialized assets (Harrison 1994). Spatial agglomeration is also central to the success of biotechnology firms (and to venture capitalists who sustain them) (Powell 2001). The most thorough review of technology-transfer research emphasizes the role of "the mobility and activity of technically trained people" over that of impersonal networks (Board on Science, Technology & Economic Policy 1999). Digital telecommunications seem most important for routine transactions (e.g., inventory systems in which multiple firms share a data base) and for communication among knowledge workers accustomed to scientific norms of exchange (e.g., R&D), and least sufficient when interactions entail risk and require interpersonal judgment.

INDUSTRY SPECIFIC EFFECTS Studies of specific industries indicate that digital telecommunications can facilitate transformative change when market pressures require it and organizational resources and structures render it possible. For example, when fierce competition and deregulation provoked change and rising demand made it profitable, trucking firms used the Internet (with such other technologies as global positioning) to develop logistics capacity and reposition themselves as transportation-services companies (Nagarajan Bander & White 2000). Hospitals and medical practices have used the Internet to pool information across entities, enabling the emergence of the "integrated healthcare systems" that are transforming many regional healthcare markets (Scott et al 2000, Starr 1997). Other industries that have used Internet technology to effect significant change are banking and financial services (Rochlin 1997) and, with distance learning, higher education (Brown & Duguid 2000:25). In each case, firms adapted the technology to specific strategies, rather than yielding to general technological imperatives.

Thus, the Internet is implicated in profound changes in organizational structures, practices, and strategies. But the extent and nature of these changes—which business functions they restructure, which employees they affect—vary markedly by industry. And rather than causing change, digital technologies are ordinarily pressed into the service of developments to which managers are already

committed. The area is ripe for both organizational case studies that focus on the Internet's use in particular industries and organizational surveys that permit confident generalization.

The Internet is also implicated in organizational change in the public sector, where enthusiasts have hailed its potential for saving tax dollars, reducing red tape, and making government more responsive. In an empirically detailed and theoretically sophisticated study, Fountain (2001a,b) has demonstrated both the potential and impediments to its realization. Implementing digital technology saves governments money, but how much depends on network externalities. It reduces some aspects of bureaucratic rigidity but strengthens others by embedding them in code. It enhances the flow of information to citizens and enables government workers to cut through red tape, but in expanding the latter's discretion, it risks imposing new forms of inequality among citizens in their relations with the state (Fountain 2001a,b).

Impact on Culture: Bountiful Diversity, Hypersegmentation, or Massification?

Many sociologists feared that the original mass media (general-interest magazines, radio, and television) would inexorably "massify" taste, as profit-seeking firms produced only those homogeneous and banal programs or texts with the greatest audience appeal (Shils 1963). Since 1980, changes in consumer demand have combined with new media technologies to segment markets and differentiate cultural goods, enabling individuals and groups to individualize their media habits. As an "interconnected network of audio, video, and electronic text communication that will blur the distinction between interpersonal and mass communications and between public and private communications" (Neuman 1991, p. 12), the Internet seems designed to take these trends to their logical conclusion.

Not surprisingly, early observers viewed the new technology as profoundly liberating, opening up outlets for the creative energies of people of every taste and persuasion (Barlow 1996). Because posting information on the Web is so inexpensive, the technology's enthusiasts believed it would virtually eliminate barriers to entry in fields like music recording, book publishing, and even film-making. In this view, the Internet would democratize the flow of information, supplanting top-down dependence on traditional news and media organizations with bottom-up sharing among consumers themselves.

Such optimistic scenarios assume that the Internet's only impact is a direct one on costs (of cultural goods to consumers and of publication to producers). But a second, perhaps more important, effect of the Internet may be to induce the restructuring of the culture industries themselves. When goods are distributed on the Internet, they can be repackaged in many ways: newspapers, for example, can be disassembled, their parts distributed separately; recorded music can come with more textual documentation than will fit in a CD jewel box. New distribution systems may also alter the size distribution of firms within industries, the

relative power of gatekeepers and artists, and the nature of competitive strategies. The Web's earliest cultural impact has been in the music industry, where it has reinforced existing trends toward deconcentration, product differentiation, and the multiplication of market channels (Dowd 2000, Caves 2000).

Some observers suggest that economic imperatives will keep the Internet from realizing its technical potential as a font of cultural abundance (Neuman 1991, Castells 1996). True, barriers to entry are formally lower; but savage competition for users' limited attention may erect new barriers based on investments in marketing and production. The major media producers are developing the Internet commercially after the model of earlier media (albeit with more interactivity), with the expectation that Internet content, broadcast entertainment, and news will soon enter homes through a single system (Castells 1996, but see Owen 1999).

A third position holds that corporate power will overwhelm the Web's liberating potential by radically accelerating long-term trends toward narrower market segmentation and more fine-grained product customization. In this view, Web sites' ability to use "cookies" to track users' browsing habits provides an unprecedented opportunity for targeting appeals. Marketers will divide the public into countless market segments and bombard them with messages that reinforce dispositions and tastes their previous browsing-and-buying patterns have revealed, engendering isolation and myopia (Turow 1997.)

We have little purchase on which perspective is right for two reasons. First, aside from industry reports that many users have robust appetites for free music and sexual images, we know little about cultural practice on the Web. To be sure, the Web offers a remarkable smorgasbord of free cultural products and services. But we know little about who uses them, due to the lack of scholarly research on the extent to which, and ways in which, Internet users listen to music, visit museum sites, or read literature online. Nor do social scientists know to what extent culture consumers use the Web to cultivate existing tastes or, instead, to explore unfamiliar genres.

Second, we cannot yet tell to what extent (and how) media firms will be able to wring profits from Web-based entertainment. They will develop the Web as mass medium only if consumer demand for entertainment suffices to justify large investments (Castells 1996:365). Tendencies toward cultural fragmentation may be repelled by cultural omnivores: well-educated consumers with eclectic tastes for many (finely differentiated) genres (Peterson & Kern 1996). Government will influence the outcome through legislation and court rulings (e.g., the Napster injunction) that define intellectual property rights.

The Internet's cultural effects may vary among user groups. Because marketers are most interested in reaching people who consume the most, their "fragmenting" efforts may focus on the well-to-do; but such users, especially when they are highly schooled, are the ones most likely to use sophisticated search strategies, so their online behavior may be less easily affected. Castells (1996:371) predicts a Web "populated by two essentially distinct populations, the *interacting and*

the interacted,” the first using the medium’s full capacity, the latter limited to a “restricted number of prepackaged choices.”

THE EVOLVING INTERNET

Research on technological change teaches us that the relationship between technology and society is never unidirectional. Rather technologies are often developed in response to the agendas of powerful social actors. Initially, they shape themselves to the contours of custom; ultimately, they follow paths selected through struggles among groups seeking to turn technologies to their own interests (McGuire & Granovetter 1998).

We see this malleability in the history of the telephone, which was created as a business tool (and even a broadcasting device), but which became an instrument of sociable interaction (Fischer 1992). We see it especially in the history of radio, which emerged as an interactive medium tailored to the needs of military communication, grew into a point-to-point communications device linking amateur enthusiasts, developed into a commercial broadcast system beaming a standardized mass culture across national societies, and finally, under the impact of television’s competition, transformed itself into a finely differentiated medium specializing in broadcasting musical genres to narrowly defined subcultural market segments (Douglas 1988, Hargittai 2000a, Owen 1999).

If anything, the Internet is even more pliant because it combines point-to-point and broadcast capability within a single network (Robinson et al 2000b, Wellman 2001). It can be a telephone: literally, or through email, chat rooms, and other forms of real-time communication between individuals. It can serve as a library: specialized Web sites “narrowcast” information to users interested enough to use search engines to find them. It can act as a soapbox for individuals expressing themselves to e-lists and discussion forums. Or it can operate as a conventional mass medium: Internet Service Providers like AOL and services like RealMedia let providers broadcast information to huge user publics simultaneously. Precisely because *it can be all of these things at once*—because it affords users choices among multiple *modes of appropriation* that coexist at any given time—the Internet is unprecedentedly malleable. This malleability raises the stakes for actors who wish to shape its evolution (Hargittai 2000b).

The findings of individual-level research on Internet use reflect the technology as it has emerged, not patterns intrinsic to the medium itself. Economic competition and public policies will shape the extent to which the Internet develops as point-to-point communicator, library, or mass medium; and this, in turn, will alter the incentives and opportunities for different kinds of individuals to use it. Thus, the social impact of the Internet depends on the impact of society on what the Internet becomes. It follows that sociologists should be studying carefully the organization of the Internet field, as well as the manner in which different ways of organizing

content shape patterns of use, because such research holds the key to anticipating and understanding the Internet's effects.

Sociologists have been largely remiss in meeting this challenge. A useful exception is Aldrich's (1999:312) analysis of the Web from the standpoint of community, in which he distinguishes among governance structures (regulators and informal consortia), commercial users, service providers to those users, browser developers, and other "infrastructural populations" (hardware and software firms, ISPs, search engines, and portal sites) that occupy niches in the Web's ecology. Owen (1999: ch. 11) presents a useful overview of the Internet industry from an economics perspective, with a particularly thorough treatment of the underlying technology and of the firms that maintain the network and offer connection services. A small but interesting literature explores the Internet's emergent structure through analysis of the network created by the hyperlinks that Web sites send to one another (Zook forthcoming). Early studies using huge data sets were able to map sites onto coherent topical clusters (Larson 1996) and also reported high levels of integration, with most sites reachable from most others at a path distance of four or less (Jackson 1997).

The Internet's future, and thus its social impact, will be influenced by the resolution of three crucial policy issues. The first, establishing equality in Internet access, is necessary to ensure that less well-to-do or technically sophisticated citizens are not excluded from the political, economic, and social opportunities that the Internet increasingly provides. As our discussion of empirical work on this issue demonstrates, a sociological perspective calls attention to the need to go beyond the conventional focus on access *per se* to explore inequality in the combination of technical and social resources required for effective participation (DiMaggio & Hargittai 2001).

The second, establishing meaningful and enforceable norms of privacy for Internet users, involves the quest for balance between the functionality that people and businesses seek from the Internet and the sacrifice of access to personal information that the technology currently requires people to offer in exchange (Lessig 1999). Sociological research on the beliefs and practices of Internet users, online vendors, and service providers is necessary to inform policy deliberations in this area.

The third, defining rules governing intellectual property for a world in which copying and transmitting cultural works is essentially costless, entails the search for a balance between incentives necessary to motivate creative workers and the interest of society in maximizing access to works of the mind (Computer Science and Telecommunications Board 2000). Currently the pendulum has swung far in the direction of the companies that control rights to intellectual property, with implications not just for music-loving teenagers but for social scientists eager to access formerly public data bases as well (Lessig 1999). Sociologists can contribute to this debate by testing behavioral assumptions about motivations of creative workers and the requirements of markets sufficient to sustain production of intellectual goods.

Lessig (1999) makes a valuable distinction among three ways that states and private interests can regulate communications media: law, norms, and code. The Internet, he argues, is distinctive in that code—the details of the programs that facilitate the exchange of messages and information—is a particularly powerful source of social control, with direct regulation relatively less effective. His work calls attention to the importance of studying aspects of the technology that remain invisible to most observers (and of the need for sociologists studying the Web to acquire sufficient technical expertise to address these questions.).

CONCLUSION

Sociology has been slow to take advantage of the unique opportunity to study the emergence of a potentially transformative technology in situ. Too much of the basic research has been undertaken by nonacademic survey organizations, yielding theoretically unmotivated description at best, and technically flawed and/or proprietarily-held data at worst. (Fortunately, this is changing with such new data-collection efforts as the 2000 General Social Survey's topical module on Internet use, and with increased accessibility of data, much of which is now available on the statistically interactive web site www.webuse.umd.edu.) The relatively few sociologists who study the Internet have focused disproportionately on virtual communities, a worthy topic, but not the only one. And in that area, as well as in research on the Internet's impact on inequality, politics, organizations, and culture, we need to develop explanatory models that distinguish between different modes of Internet use and that tie behavior directly to social and institutional context.

Research has suffered, as well, from a disproportionate emphasis on individuals, implicitly treating the nature of the Internet itself as fixed. This is regrettable because this protean technology's character and effects will reflect the outcome of ongoing struggles among powerful economic and political actors. Yet few sociologists have examined the Internet's institutional structure, industrial organization, or political economy. Some sociologists *are* doing important work; but unless their numbers grow, a magnificent opportunity to build and test theories of social and technical change may go unexploited.

If sociology needs the Internet as a laboratory, policy makers need sociology to illuminate the collective choices that will shape the Internet's future. As Philip Agre (1998b:19) has written, discussions of the Internet are often informed less by positive knowledge than by "the cultural system of myths and ideas that our society projects onto the technology." Social science remains the best hope for substituting knowledge for myth and informing public discourse about current conditions and policy alternatives.

ACKNOWLEDGMENTS

We are grateful to Phil Agre, Philip Howard, and Barry Wellman for wise and helpful comments on earlier drafts, and we take full responsibility for persistent defects

and limitations. Research support to the authors from the National Science Foundation (grants SBR9710662, SES9819907, and IIS0086143), the Russell Sage Foundation, the Markle Foundation, and the Pew Charitable Trusts is gratefully acknowledged.

Visit the Annual Reviews home page at www.AnnualReviews.org

LITERATURE CITED

- Abbate J. 1999. *Inventing the Internet*. Cambridge, MA: MIT Press
- Agre P. 1998a. *The Internet and public discourse*. *First Monday* 3. http://www.firstmonday.dk/issues/issue3_3/agre/index.html.
- Agre P. 1998b. Presentation in *Proceeding of a Congressional Breakfast Seminar on Information Technology and Social Change*, pp. 14–19. Washington, DC: Consortium of Soc. Sci. Assoc.
- Ahuja MK, Carley KM. 1998. Network structure in virtual organizations. *J. Computer-Mediated Commun.* <http://www.ascusc.org/jcmc/vol3/issue4/ahuja.html>
- Aldrich H. 1999. *Organizations Evolving*. Beverly Hills, CA: Sage
- Alexander JC, ed. 1988. *Durkheimian Sociology: Cultural Studies*. New York: Columbia Univ. Press
- Anderson RH, Bikson TK, Law SA, Mitchell BM. 1995. *Universal Access to E-Mail—Feasibility and Societal Implications*. Santa Monica, CA: RAND
- Attewell P, Battle J. 1999. Home computers and school performance. *Info. Soc.* 15:1–10
- Barlow JP. 1996. *A Declaration of the Independence of Cyberspace*. <http://www.eff.org/~barlow/Declaration-Final.html>
- Bell D. 1973. *The Coming of Post-Industrial Society: A Venture in Social Forecasting*. New York: Basic
- Bell D. 1977 [1980]. Teletext and technology: new networks of knowledge and information in postindustrial society. In *The Winding Passage: Essays and Sociological Journeys, 1960-1980*, ed. D Bell, pp. 34–65. New York: Basic
- Beniger JR. 1996. Who shall control cyberspace? In *Communication and Cyberspace: Social Interaction in an Electronic Environment*, ed. L Srate, R Jacobson, SB Gibson, pp. 49–58. Cresskill, NJ: Hampton
- Bennett WL. 1995. *News: The Politics of Illusion*. New York: Longman. 3rd ed.
- Bertot JC, McClure CR. 1998. *The 1998 National Survey of U.S. Public Library Outlet Internet Connectivity: Final Report*. Washington, DC: Am. Library Assoc. Natl. Com. on Libraries & Info. Sci.
- Bimber B. 1998. The Internet and political transformation: populism, community and accelerated pluralism. *Polity* 31:133–60
- Bimber B. 1999. The Internet and citizen communication with government: Does the medium matter. *Polit. Commun.* 16:409–28
- Bimber B. 2000a. The gender gap on the Internet. *Soc. Sci. Q.* 81:868–76
- Bimber B. 2000b. The study of information technology and civic engagement. *Polit. Commun.* 17: In press
- Bimber B. 2001. Information and civic engagement in America: The search for political effects of the Internet. *Polit. Res. Q.*
- Board on Science, Technology and Economic Policy. National Research Council. 1999. *Securing America's Industrial Strength*. Washington, DC: Natl. Acad. Press
- Bogart L. 1956. *The Age of Television: A Study of Viewing Habits and the Impact of Television on American Life*. New York: Ungar
- Bolt D, Crawford R. 2000. *Digital Divide: Computers and Our Children's Future*. New York: TV Books

- Bourdieu P. 1999. *On Television*. New York: New Press
- Brown JS, Duguid P. 2000. *The Social Life of Information*. Boston: Harvard Bus. School Press
- Browning G. 1996. *Electronic Democracy: Using the Internet to Influence American Politics*. Wilton CT: Pemberton
- Brynjolfsson E, Malone T, Gurbaxani V, Kamblil A. 1994. Does information technology lead to smaller firms? *Mgmt. Sci.* 40:1628–44
- Calhoun C. 1998. Community without propinquity revisited: communication technology and the transformation of the urban public sphere. *Soc. Inquiry* 68:373–97
- Castells M. 1996. *The Rise of the Network Society*. Vol. 1 of *The Information Age: Economy, Society and Culture*. Oxford, UK: Blackwell's
- Castells M. 2001. *Internet Galaxy: Reflections on the Internet, Business and Society*. New York: Oxford Univ. Press. Forthcoming
- Caves R. 2000. *Creative Industries: Contracts Between Art and Commerce*. Cambridge: Harvard Univ. Press
- Clemente PC. 1998. *State of the Net: The New Frontier*. New York: McGraw Hill
- Coffin T. 1955. Television's impact on society. *Am. Psychol.* 10:630–41
- Cole J. 2000. *Surveying the Digital Future*. Los Angeles: UCLA Ctr. Telecommun. Policy (www.ccp.ucla.edu)
- Collins R. 1979. *The Credential Society*. New York: Academic
- Compaine B. 2000. *Re-examining the digital divide*. Pap. pres. 28th Annual Telecommun. Policy Res. Conf., Arlington, VA
- Compaine B, Gomery D, eds. 2000. *Who Owns the Media? Competition and Concentration in the Mass Media Industry*. Mahwah, NJ: Erlbaum
- Computer Science and Telecommunications Board, National Research Council. 2000. *The Digital Dilemma: Intellectual Property in the Information Age*. Washington, DC: Natl. Acad. Press
- Davis J, Hirschl T, Stack M, eds. 1997. *Cutting Edge: Technology, Information Capitalism, and Social Revolution*. New York: Verso
- Davis R. 1998. *The Web of Politics: The Internet's Impact on the American Political System*. New York: Oxford Univ. Press
- Dibbell J. 1999. Let third voice be heard. *Intellectual Capital* (August 19). <http://www.intellectualcapital.com/issues/issue282/item-6125.asp>
- DiMaggio P, Hargittai E. 2001. From the 'Digital Divide' to digital inequality: studying Internet use as penetration increases. Work. Pap, Ctr. for Arts Cult. Policy Stud., Princeton Univ.
- Douglas S. 1987. *Inventing American Broadcasting, 1899–1922*. Baltimore: Johns Hopkins Univ. Press
- Dowd T. 2001. Musical diversity and the mainstream recording market, 1955–1990. *Rassegna Italiana di Sociol.* Forthcoming
- Downs A. 1957. *An Economic Theory of Democracy*. New York: Harper & Row
- Eisenstein EL. 1979. *The Printing Press as an Agent of Change*. Cambridge Univ. Press
- Elster J. ed. 1998. *Deliberative Democracy*. New York: Cambridge Univ. Press
- Etzioni A, Etzioni O. 1997. Communities: virtual vs. real. *Science* 277:295
- Fischer C. 1992. *America Calling: A Social History of the Telephone to 1940*. Berkeley: Univ. Calif. Press
- Fountain JE. 2001a. The economic impact of the Internet on the government sector. In *The Economic Payoff from the Internet Revolution*, Rep. Brookings Task Force on the Internet. Washington, DC: Brookings Inst.
- Fountain JE. 2001b. *Building the Virtual State: Information Technology and Institutional Change*. Washington, DC: Brookings Inst.
- Freedman JL, Sears D. 1965. Selective exposure. In *Advances in Experimental Social Psychology*, ed. L Berkowitz, 2:58–98. Orlando: Academic Press
- Frenkel SJ, Korczynski M, Shire KA, Tam M. 1999. *On the Front Line: Organization of Work in the Information Economy*. Ithaca, NY: Cornell Univ. Press

- Frey D. 1986. Recent research on selective exposure to information. *Adv. Exp. Soc. Psychol.* 19:41–80
- Garnham N. 1990. *Capitalism and Communication: Global Culture and the Economics of Information*. Newbury Park, CA: Sage
- Gibson RK, Howard PEN, Ward S. 2000. Social capital, Internet connectedness and political participation: A four-country study. Pap. pres. 2000 Int. Polit. Sci. Assoc. Meet., Quebec, Canada
- Guillén M, Suarez S. 2001. Developing the Internet: entrepreneurship and public policy in Ireland, Singapore, Argentina and Spain. *Telecommun. Policy* 25
- Goldhaber MH. 1997. The attention economy and the Net. *First Monday*
- Habermas J. 1981. *The Theory of Communicative Action*, Vol. 1. *Reason and the Rationalization of Society*. Boston: Beacon
- Habermas J. 1989. *The Structural Transformation of the Public Sphere*. Cambridge MA: MIT Press
- Hampton K, Wellman B. 2000. Examining community in the digital neighborhood: early results from Canada's wired suburb. In *Digital Cities: Experiences, Technologies and Future Perspectives*, ed. T Ishida, K Isbister, pp. 475–92. Heidelberg, Germany: Springer-Verlag
- Hargittai E. 1996. *Holes in the Net: The Internet and International Stratification*. Senior Honors Thesis. Smith College. (<http://cs.smith.edu/~hargitta/Thesis>)
- Hargittai E. 1999. Weaving the Western Web: Explaining difference in Internet connectivity among OECD countries. *Telecommun. Policy* 23:701–18
- Hargittai E. 2000a. Radio's lessons for the Internet. *Commun. ACM* 43:50–57
- Hargittai E. 2000b. Open portals or closed gates? Channeling content on the World Wide Web. *Poetics*. 27:233–53
- Harrison B. 1994. *Lean and Mean: The Changing Landscape of Corporate Power in the Age of Flexibility*. New York: Basic
- Hauben M, Hauben R. 1997. *Netizens: On the History and Impact of Usenet and the Internet*. Los Alamitos, CA: IEEE Computer Soc. Press
- Heldritch Center for Workforce Development (Rutgers Univ.) and Center for Survey Research and Analysis (Univ. Conn.). 2000. *Nothing but Net: American Workers and the Information Economy*. New Brunswick NJ: Heldritch Ctr.
- Hill KA, Hughes JE. 1998. *Cyberpolitics: Citizen Activism in the Age of the Internet*. Lanham, MD: Rowman & Littlefield
- Hirsch PM. 1978. Television as a national medium: Its cultural and political role in American society. In *Handbook of Urban Life*, ed. David Street, pp. 389–427. San Francisco: Jossey-Bass
- Hoffman DL, Novak TP, Schlosser A. 2000. The evolution of the Digital Divide: How gaps in Internet access may impact electronic commerce. *J. Computer-Mediated Commun.* 5 March.
- Howard PEN, Rainie L, Jones S. 2001. Days and nights on the Internet: the impact of a diffusing technology. Special issue of *Am. Behav. Sci.* ed. B Wellman, C Haythornthwaite. Forthcoming
- Intelli-Quest. 1999. Intelliquest study shows 83 million U.S. Internet users and 56 million online shoppers. Press release, April 19. <http://www.intelliquest.com/press/release78.asp>
- ITU (International Telecommunications Union) 1997. *Challenges to the Network: Telecoms and the Internet*. Geneva: ITU Press
- ITU. 1998. *World Telecommunication Development Report*. Geneva: ITU Press
- ITU. 1999. *Challenges to the Network: Internet for Development 1999*. Geneva: ITU Press
- Introna L, Nissenbaum H. 2000. Shaping the Web: Why the politics of search engines matters. *Info. Soc.* 16
- Jackson M. 1997. Assessing the communication structure of the World Wide Web. *J. Computer-Mediated Commun.* 3. <http://www.ascusc.org/jcmc/vol3/issue1/jackson.html>
- Johnson TJ, Kaye BK. 1998. A vehicle for engagement or a haven for the disaffected?

- Internet use, political alienation and voter participation, In *Engaging the Public: How Government and the Media Can Reinvo-gate American Democracy*, ed. TJ Johnson, CE Hays, SP Hays. New York: Rowman & Littlefield
- Katz JE, Aspden P. 1997. Motives, hurdles and dropouts. *Commun. ACM* 40:97–102
- Katz JE, Rice R, Aspden P. 2001. The Internet, 1995–2000: Access, civic involvement and social interaction. Special issue of *Am. Behav. Sci.* ed. B Wellman, C Haythorn-Waite.
- Kavanaugh AL, Patterson SJ. 2001. The impact of community computer networks on social capital and community involvement. Special issue of *Am. Behav. Sci.*, ed. B Wellman, C Haythornthwaite. Forthcoming
- Koku E, Nazer N, Wellman B. 2001. International scholarly networks. *Am. Behav. Sci.* Forthcoming.
- Kolko BE, Nakamura L, Rodman GB. 2000. *Race in Cyberspace*. New York: Routledge
- Kollock P. 1999. The production of trust in on-line markets. *Adv. Group Processes* 16:99–123
- Kornhauser W. 1968. Mass society. In *The Encyclopedia of the Social Sciences*, ed. D. Sills. New York: Free Press/Macmillan
- Kraut R, Scherlis W, Mukhopadhyay T, Manning J, Kiesler S. 1996. The HomeNet field trial of residential Internet services. *Commun. ACM* 39:55–63
- Kraut R, Patterson M, Lundmark V, Kiesler S, Mukophadhyay T, Scherlis W. 1998. Internet paradox: A social technology that reduces social involvement and psychological well-being? *Am. Psychol.* 53:1011–31
- Kraut R, Kiesler S, Boneva B, Cummings J, Helgeson V. 2001. Internet paradox revisited. *J. Soc. Issues*. Forthcoming
- Krueger AB. 1993. How computers have changed the wage structure: evidence from micro data. *Q. J. Econ.* 108:33–60
- Lake D. 2000. The Web: growing by 2 million pages a day. *Indust. Standard* Feb 28
- Larson R. 1996. Bibliometrics of the World Wide Web: an exploratory analysis of the intellectual structure of Cyberspace. Ray R. Larson. In *ASIS '96 Proceedings of the 59th ASIS Annu. Mtg.*, ed. S Hardin. Baltimore, MD, Oct 21–24, 1996. Medford, NJ: Info. Today. <http://sherlock.berkeley.edu/asis96/asis96.html>
- Lentz B, Straubhaar J, LaPastina A, Main S, Taylor J. 2000. *Structuring access: the role of public access centers in the "Digital Divide."* Pap. pres. Annu. Meet. Int. Commun. Assoc., Acapulco, June.
- Lessig L. 1999. *Code and Other Laws of Cyberspace*. New York: Basic
- Lin N. 2001. *Social Capital: A Theory of Social Structure and Action*. New York: Cambridge Univ. Press
- Machlup F. 1962. *The Production and Distribution of Knowledge in the United States*. Princeton, NJ: Princeton Univ. Press
- Margolis M, Resnick D. 1999. *Taming the Cyber-Revolution: How Money and Politics Domsticate the Web*. Thousand Oaks, Calif: Sage
- McChesney RW. 1996. The Internet and U.S. communication policy-making in historical and critical perspective. *J. Commun.* 46:98–124
- McGuire P, Granovetter M. 1998. *Business and bias in public policy formation: the National Civic Federation and the social construction of electric utility regulation, 1905–1907*. Pap. pres. meet. Am. Sociol. Assoc., San Francisco
- McLuhan M. 1967. *Understanding Media: The Extensions of Man*. New York: McGraw Hill
- Miller D, Slater D. 2000. *The Internet: An Ethnographic Approach*. New York: Berg
- Mintz J. 2000. McCain camp enjoys a big Net advantage. *Washington Post*. Feb 9
- Nagarajan A, Bander JL, White CC. 2000. Trucking. In *U.S. Industry in 2000: Studies in Competitive Performance*, ed. Board on Sci., Technol. Econ. Policy, Natl. Res. Coun., pp. 123–53. Washington, DC: Natl. Acad. Press
- NTIA (National Telecommunications and Information Administration). 1995. *Falling Through the Net: A Survey of the 'Have Nots'*

- in *Rural and Urban America*. Washington, DC: US Dep. Commerce
- NTIA. 1998. *Falling Through the Net II: New Data on the Digital Divide*. Washington, DC: US Dep. Commerce
- NTIA. 1999. *Falling Through the Net III: Defining the Digital Divide*. Washington, DC: US Dep. Commerce
- NTIA. 2000. *Falling through the Net: Toward Digital Inclusion*. Washington, DC: US Dep. Commerce
- Negroponte N. 1995. *Being Digital*. New York: Knopf
- Netcraft. 2000. *The Netcraft Web Server Survey*. Online document available at <http://www.netcraft.com/survey/> (last accessed Aug. 25, 2000)
- Neuman WR. 1991. *The Future of the Mass Audience*. New York: Cambridge Univ. Press
- Neuman WR. 2000. The impact of the new media: fragmentation, stratification and political evolution. In *Mediated Politics: Communication in the Future of Democracy*, ed. WL Bennett, RM Entman. New York: Cambridge Univ. Press
- Neuman WR, McKnight LW, Solomon RJ. 1998. *The Gordian Knot: Political Gridlock on the Information Highway*. Cambridge: MIT Press
- Neuman WR, O'Donnell SR, Schneider SM. 1996. The Web's next wave: a field study of Internet diffusion and use patterns. Ms., MIT Media Lab.
- Nie NH, Ebring L. 2000. *Internet and Society: A Preliminary Report*. Stanford, CA; Inst. for Quant. Stud. Soc.
- Norris P. 2001. *Digital Divide? Civic Engagement, Information Poverty and the Internet in Democratic Societies*. New York: Cambridge Univ. Press
- NUA. 2000a. How many online? *NUA Internet Surveys*. Online document available at http://www.nua.ie/surveys/how_many_online_world.html
- NUA. 2000b. February 14. Portals draw lion's share of audiences. *NUA Internet Surveys*. http://www.nua.ie/surveys/?f=VS&art_id=905355592&rel=true
- O'Mahony S, Barley SR. 1999. Do digital telecommunications affect work and organization? The state of our knowledge. *Res. Org. Behav.* 21:125–61
- OECD. 1997. *Webcasting and Convergence: Policy Implications*. Paris: OECD. (http://www.oecd.org/dsti/sti/it/cm/prod/e_97-221.htm)
- Orlikowski WJ, Iacono CS. 2000. The truth is not out there: an enacted view of the 'digital economy.' In *Understanding the Digital Economy: Data, Tools, and Research*, ed. E Brynjolfsson, B Kahin, pp. 352–80. Cambridge, MA: MIT Press
- Owen BM. 1999. *The Internet Challenge to Television*. Cambridge: Harvard Univ. Press
- Paccagnella L. 1997. Getting the seats of your pants dirty: strategies for ethnographic research on virtual communities. *J. Computer-Mediated Commun.* <http://www.ascusc.org/jcmc/vol3/issue1/paccagnella.html>
- Paltridge S, Ypsilanti D. 1997. A bright outlook for communications. *OECD Observer*. 205:19–22
- Peterson RA, Kern RM. 1996. Changing high-brow taste: from snob to omnivore. *Am. Sociol. Rev.* 61:900–7
- Pew Center for the People and the Press. 1995. *Technology in the American household*. Washington, DC <http://www.people-press.org/tech.htm>
- Pew Center for the People and the Press. 1998. *Internet news takes off*. <http://www.people-press.org/med98rpt.htm>
- Pew Center for the People and the Press. 1999. *The Internet news audience goes ordinary*. January. Washington DC, Pew Res. Ctr. for People & Press
- Powell WW. 2001. The capitalist firm in the 21st century: emerging patterns. In *The 21st Century Firm: Changing Economic Organization in International Perspective*, ed. P. DiMaggio. Princeton, NJ: Princeton Univ. Press
- Preece J. 2000. *On-line Communities: Designing Usability and Supporting Sociability*. New York: Wiley
- Pretejohn M. 1996. *The first year: August*

- 1995–August 1996. Netcraft. <http://www.net-craft.com/survey/year1.html>
- Putnam RD. 2000. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster
- Rao M, Rashid I, Rizvi H, Subba R. 2000. *Online content in South Asia*. South Asia Networks Organisation. Online document <http://www.sasianet.org/onlinecont.html> last accessed August 26
- Rheingold H. 1993. *The Virtual Community: Homesteading on the Electronic Frontier*. Reading, MA: Addison-Wesley
- Robinson JP, Barth K, Kohut A. 1997. Personal computers, mass media, and use of time. *Soc. Sci. Computer Rev.* 15:65–82
- Robinson JP, Kestnbaum M. 1999. The personal computer, culture and other uses of free time. *Soc. Sci. Computer Rev.* Summer: 209–216
- Robinson JP, Godbey G. 1999. *Time for Life*. State College, PA: Penn State Univ. Press. 2nd ed.
- Robinson JP, Kestnbaum M, Neustadt A, Alvarez A. 2000. *IT, the Internet, and time displacement*. Pap. pres. Annu. Meet. Am. Assoc. Pub. Opin. Res, Portland, OR, May 2000
- Rochlin GI. 1997. *Trapped in the Net: The Unanticipated Consequences of Computerization*. Princeton: Princeton Univ. Press
- Rogers EM. 1995. *Diffusion of Innovations*, New York: Free Press. 4th ed.
- Roper Starch Worldwide Inc. 1998. *America Online Roper Starch Cyberstudy 1998*. New York
- Sandvig C. 2000. *The information apologue: play and Internet access in the children's library*. Pap. pres. Int. Commun. Assoc. Annu. Meet., Acapulco, Mexico. June 1–5
- Schement J. 1996. *Beyond Universal Service: Characteristics of Americans without Telephones, 1980–1993*. Commun. Policy Work. Pap. No. 1. Washington, DC: Benton Found.
- Schement J. 1999. Of gaps by which democracy we measure. *Info. Impacts*. Dec.
- Schiller HI. 1989. *Culture, Inc.: The Corporate Takeover of Public Expression*. New York: Oxford Univ. Press
- Schiller H. 1996. *Information Inequality: The Deepening Social Crisis in America*. New York: Routledge
- Schneider SM. 1996. Creating a democratic public sphere through political discussion: a case study of abortion conversation on the Internet. *Soc. Sci. Computer Rev.* 14:373–93
- Schneider SM. 2000a. *Political portals and democracy: threats and promises*. May. netelection.org/commentary/2000015.php3
- Schneider SM. 2000b. *The dot-not candidates*. July. netelection.org/commentary/2000023.php3
- Schudson M. 1998. *The Good Citizen: A History of American Civic Life*. New York: Free Press
- Schumpeter JA. 1947. *Capitalism, Socialism and Democracy*. New York: Harper & Row
- Scott WR, Ruef M, Mendel P, Caronna CA. 2000. *Institutional Change and Organizations: Transformation of a Healthcare Field*. Chicago: Univ. Chicago Press.
- Shapiro AL. 1999. *The Control Revolution: How the Internet is Putting Individuals in Charge and Changing the World We Know*. New York: Century Found.
- Shils E. 1963. The theory of mass society. In *American as a Mass Society*, ed. P Olson, pp. 30–50. Glencoe, IL: Free Press
- Silver D. 2000. Margins in the wires: looking for race, gender and sexuality in the Blacksburg Electronic Village. In *Race in Cyberspace*, ed. BE Kolko, L Nakamura, GB Rodman. New York: Routledge
- Silverstein C, Henzinger M, Marais H, Moricz M. 1998. Analysis of a very large AltaVista query log. *SRC Tech. Note* 1998-014. Oct 26
- Smith M, Kollock P, eds. 1999. *Communities in Cyberspace*. London: Routledge
- Sproull LS, Kiesler SB. 1991. *Connections: New Ways of Working in the Networked Organization*. Boston: MIT Press
- Starr P. 1997. Smart technology, stunted policy: developing health information networks. *Health Affairs* 15:91–105
- Stoll C. 1995. *Silicon Snake Oil: Second Thoughts on the Information Highway*. New York: Doubleday

- Stromer-Galley J. 2000. Online interaction and why candidates avoid it. *J. Commun.* 50. In press
- Strover S. 1999. *Rural Internet Connectivity*. Rural Policy Res. Inst. Rep. P99-13. <http://www.rupri.org/pubs/archive/reports/P99-13/>
- Strover S, Straubhaar J. 2000. *E-Government Services and Computer and Internet Use in Texas. A Report from the Telecommunications and Information Policy Institute*. Austin, TX. http://www.utexas.edu/research/tipi/reports/dir_final2.htm
- Tapscott D. 1999. Introduction. *Creating Value in the Network Economy*, ed. D. Tapscott, pp. vii-xxvi. Boston: Harvard Bus. School Press
- Todreas TM. 1999. *Value Creation and Branding in Television's Digital Age*. Westport CT: Quorum
- Turkle S. 1995. *Life on the Screen: Identity in the Age of the Internet*. New York: Simon & Schuster
- Turow J. 1997. *Breaking Up America: Advertisers and the New Media World*. Chicago: Univ. Chicago Press
- US Dep. Education. 2000. Internet access in U.S. public schools and classrooms: 1994-1999. Stats in Brief. Nat. Ctr. Educ. Stat. Feb
- Uslaner E. 2001. The Internet and social capital. *Proc. ACM*. Forthcoming
- Van Alstyne M, Brynjolfsson E. 1997. *Global village or cyberbalkans*. <http://web.mit.edu/marshall/www/papers/CyberBalkans.pdf>.
- Van den Besselaar P, Beckers D. 1998. Demographics and sociographics of the "Digital City." In *Community Computing and Support Systems Social Interaction in Networked Communities*, ed. T Ishida. Heidelberg: Springer. <http://www.swi.psy.uva.nl/usr/beckers/publications/kyoto.html>
- Waxman J. 2000a. *The Old 80/20 Rule Take One on the Jaw. Internet Trends Report 1999 Review*. San Francisco: Alexa Res.
- Waxman J. 2000b. *Leading the Pack. . . Internet Trends Report 1999 Review*. San Francisco: Alexa Res.
- Weber M. 1968 [1924]. *Economy and Society*, ed. G Roth, C Wittich. New York: Bedminster
- Weiss R. 1970. Effects of mass media of communication. In *Handbook of Social Psychology*, ed. G Lindzey, E Aronson, 5:77-195. Reading, MA: Addison-Wesley.
- Wellman B. 2001. Physical place and cyber-place: Changing portals and the rise of networked individualism. *Int. J. Urban Regional Res.* Forthcoming
- Wellman B, Salaff J, Dimitrova D, Garton L, Gulia M, Haythornwaite C. 1996. Computer networks as social networks: collaborative work, telework, and virtual community. *Annu. Rev. Sociol.* 22:213-38
- Wellman B, Gulia M. 1999. Net surfers don't ride alone: virtual community as community. In *Networks in the Global Village*, ed. Barry Wellman, pp. 331-67. Boulder, CO: Westview
- Wilhelm A. 2000. *Democracy in the Digital Age*. New York: Routledge
- Wilson EJ. 2000. *Closing the Digital Divide: An Initial Review. Briefing the President*. Washington, DC: Internet Policy Inst. May. <http://www.internetpolicy.org/briefing/ErnestWilson0700.html>
- Zook M. 2001. Old hierarchies or new networks of centrality? The global geography of the Internet content market. *Am. Behav. Sci.* 44: Forthcoming
- Zuboff S. 1988. *In the Age of the Smart Machine: The Future of Work and Power*. New York: Basic