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CHAPTER 10. Social Ties: Networking Together

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 20. A review of Ito's own work and that of other scholars of Japanese techno-youth culture is Mizuko Ito, "Mobile Phones, Japanese Youth, and the Re-Placement of Social Contact," forthcoming in *Mobile Communications: Re-negotiation of the Social Sphere*, ed., Rich Ling and P. Pedersen (New York: Springer, 2005).
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 22. James W. Carey, *Communication as Culture: Essays on Media and Society* (Boston: Uxwin Hyman, 1989).
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PART III. Policies of Freedom at a Moment of Transformation

1. For a review of the literature and a substantial contribution to it, see James Boyle, "The Second Enclosure Movement and the Construction of the Public Domain," *Law and Contemporary Problems* 66 (Winter-Spring 2003): 33-74.
2. Early versions in the legal literature of the skepticism regarding the growth of exclusive rights were Ralph Brown's work on trademarks, Benjamin Kaplan's caution over the gathering storm that would become the Copyright Act of 1976, and Stephen Breyer's work questioning the economic necessity of copyright in many industries. Until, and including the 1980s, these remained, for the most part, rare voices—joined in the 1980s by David Lange's poetic exhortation for the public domain; Pamela

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Samuelson's systematic critique of the application of copyright to computer programs, long before anyone was paying attention, Jessica Litman's early work on the political economy of copyright legislation and the systematic refusal to recognize the public domain as such; and William Fisher's theoretical exploration of fair use. The 1990s saw a significant growth of academic questioning of enclosure; Samuelson continued to press the question of copyright in software and digital materials; Litman added a steady stream of prescient observations as to where the digital copyright was going and how it was going wrong; Peter Jaszi attacked the notion of the romantic author; Ray Patterson developed a user-centric view of copyright; Diane Zimmerman revitalized the debate over the conflict between copyright and the first amendment; James Boyle introduced erudite criticism of the theoretical coherence of the relentless drive to proprietarization; Niva Elkin-Koren explored copyright and democracy; Keith Aoki questioned trademark, patents, and global trade systems; Julie Cohen early explored technical protection systems and privacy; and Elsen Moglen began mercilessly to apply the insights of free software to hack at the foundations of intellectual property apologetics. Rebecca Fiesenberg, and more recently, Arti Rai, questioned the wisdom of patents on research tools to biomedical innovation. In this decade, William Fisher, Larry Lessig, Litman, and Siva Vaidhyanathan have each described the various forms that the enclosure movement has taken and exposed its many limitations. Lessig and Vaidhyanathan, in particular, have begun to explore the relations between the institutional battles and the freedom in the networked environment.

CHAPTER 11. The Battle Over the Institutional Ecology of the Digital Environment

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2. Itziel de Sola-Pool, *Technologies of Freedom* (Cambridge, MA: Belknap Press, 1983), 91-100.
3. *Bridgeport Music, Inc. v. Dimerium Films*, 2004 U.S. App. LEXIS 26827.
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6. Jonathan Krim, "AOL Blocks Spammers' Web Sites," *Washington Post*, March 20,

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- 2004, p. A01; also available at <http://www.washingtonpost.com/ac2/wp-dyn?page=article&contentId=A9449-2004Mar19¬Found=true>.
7. FCC Report on High Speed Services, December 2003 (Appendix to Fourth 706 Report NOI).
 8. 216 F.3d 871 (9th Cir. 2000).
 9. *National Cable and Telecommunications Association v. Brand X Internet Services* (decided June 27, 2005).
 10. *Turner Broad. Sys. v. FCC*, 512 U.S. 622 (1994) and *Turner Broad. Sys. v. FCC*, 510 U.S. 180 (1997).
 11. *Chesapeake & Potomac Tel. Co. v. United States*, 42 F.3d 181 (4th Cir. 1994); *Comcast Cablevision of Broward County, Inc. v. Broward County*, 124 F. Supp. 2d 685, 698 (D. Fla., 2000).
 12. The locus classicus of the economists' critique was Ronald Coase, "The Federal Communications Commission," *Journal of Law and Economics* 2 (1959): 1. The best worked-out version of how these property rights would look remains Arthur S. De Vany et al., "A Property System for Market Allocation of the Electromagnetic Spectrum: A Legal-Economic-Engineering Study," *Stanford Law Review* 21 (1969): 1499.
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 14. *Nixon v. Missouri Municipal League*, 541 U.S. 125 (2004).
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 16. *Felen v. Recording Indus. Assoc. of America Inc.*, No. CV-01-2669 (D.N.J.), June 26, 2001).
 17. *Metro-Goldwyn-Mayer v. Grokster, Ltd.* (decided June 27, 2005).
 18. See Felix Oberholzer and Koleman Strumpf, "The Effect of File Sharing on Record Sales" (working paper), http://www.unc.edu/cigar/papers/FileSharing_March2004.pdf.
 19. Mary Madden and Amanda Lenhart, "Music Downloading, File-Sharing, and Copyright" (Pew, July 2003), http://www.pewinternet.org/pdfs/PIP_Copyright_Memo.pdf.
 20. Lee Rainie and Mary Madden, "The State of Music Downloading and File-Sharing Online" (Pew, April 2004), http://www.pewinternet.org/pdfs/PIP_FileSharing_April_04.pdf.
 21. See 111 E.Supp.2d at 310, fn. 69-70; *PBS Frontline* report, <http://www.pbs.org/wgbh/pages/frontline/shows/hollywood/business/windows.html>.
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 25. Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity* (New York: Penguin Press, 2004).
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Forum on Communications and Society Co-Chairman Marc Nathanson

Marc B. Nathanson

Marc Nathanson is Chairman of Mapleton Investments and Mapleton Communications. The latter owns and operates 27 radio stations in the Western United States. Nathanson is a 34-year veteran of the communications industry and was elected a Cable TV Pioneer in 1982.

He founded Falcon Cable TV in 1975 and built it into one of the nations largest multiple system operators serving over one million subscribers in 800 communities in the United States. He also founded Falcon International, which was involved in cable TV and satellite joint ventures in the United Kingdom, Mexico, Brazil, India, the Philippines and France. In November 1999, Falcon was sold to Charter Communications, which is the third largest cable TV operator in the world. Nathanson is Vice-Chairman and on the Board of Charter. Prior to Falcon, Nathanson was Vice President of Marketing and Programming of the then largest MSO (Teleprompter Corp.) and was previously an executive with Warner Cable and Cypress Communications.

Nathanson has received numerous awards and honors for his role in helping to develop the cable TV industry in the United States. In 1986, he was honored with the National Cable Television Association (NCTA) prestigious Vanguard Award for his outstanding leadership. In 1999, he received the Joel A. Berger Award from Cable Positive, which is the AIDS support organization of the cable/entertainment industry.

In 1977 and 1999, he chaired the cable industry's National Convention and is a past President of the California Cable Association and co-founder of C-TAM (Cable TV Administrative and Marketing Association). For many years, he was on the Board and Executive Committee of the National Cable TV Association.

Nathanson was named "Entrepreneur of the Year" in 1994 by Inc. Magazine. Besides telecommunications, Nathanson has been long active in civic and international affairs.

Nathanson served seven years as a Presidentially appointed and Senate confirmed member of the United States Broadcasting Board of Governors (BBG). The BBG oversees all U.S. non-military international communications, including Voice of America, Radio Free Europe/Radio Liberty, WorldNet, Radio/TV Marti and Radio Free Asia. He served as Chairman of the BBG under President Clinton and President Bush from 1998 until September of 2002.

In 1997, President Clinton appointed him to the Albanian American Enterprise Fund and has served on a number of government boards in the State of California. He was recently appointed as a public member of a 14-person State of California Anti-Terrorism Task Force (CATIC) and is Chairman of the Homeland Security Advisory Council for Region One (Los Angeles & Orange Counties). Nathanson is also on the Board of National Democratic Institute (NDI) for International Affairs, which is chaired by Madeleine Albright.

He is Chairman of the Board of UCLA's Center for Communications Policy and on the Boards of UCLA's Anderson School of Management and USC's Annenberg School for Communication. He is also a board member of the Skirball Cultural Center, UCLA Foundation, Layalina Productions, Inc., L.A. Philharmonic and various corporations, including Falcon WaterFree Technology, Shelter Venture Fund, Firststream in Paris and Bay Area Tire Recycling. In 2002 and 2003, Nathanson co-chaired with former FCC Chairman, Reed Hundt, The Aspen Institute Forum on Communications and Society.

Marc Nathanson holds a BA from the University of Denver and a MA in Political Science from the University of California Santa Barbara (UCSB), where he was a National Science Foundation Fellow. Nathanson is a member of the Council on Foreign Relations, World Affairs Council and Pacific Council in International Policy. He was also active in the Young Presidents Organization and co-founded The Entrepreneurs Club, a group of 24 leaders of cable television companies. He is married to Jane Nathanson, a practicing therapist. They have three children: Nicole (who is married to Alex Swiger); Adam and David.

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The Wealth of Networks: How Social Production Transforms Markets and Freedom

PEER PRODUCTION OF INFORMATION, KNOWLEDGE, AND CULTURE GENERALLY

Free software is, without a doubt, the most visible instance of peer production at the turn of the twenty-first century. It is by no means, however, the only instance. Ubiquitous computer communications networks are bringing about a dramatic change in the scope, scale, and efficacy of peer production throughout the information and cultural production system. As computers become cheaper and as network connections become faster, cheaper, and ubiquitous, we are seeing the phenomenon of peer production of information scale to much larger sizes, performing more complex tasks than were possible in the past for nonprofessional production. To make this phenomenon more tangible, I describe a number of such enterprises, organized to demonstrate the feasibility of this approach throughout the information production and exchange chain. While it is possible to break an act of communication into finer-grained subcomponents, largely we see three distinct functions involved in the process. First, there is an initial utterance of a humanly meaningful statement. Writing an article or drawing a picture, whether done by a professional or an amateur, whether high quality or low, is such an action. Second, there is a separate function of mapping the initial utterances on a knowledge map. In particular, an utterance must be understood as "relevant" in some sense, and "credible." Relevance is a subjective question of mapping an utterance on the conceptual map of a given user seeking information for a particular purpose defined by that individual. Credibility is a question of quality by some objective measure that the individual adopts as appropriate for purposes of evaluating a given utterance. The distinction between the two is somewhat artificial, however, because very often the utility of a piece of information will depend on a combined valuation of its credibility and relevance. I therefore refer to "relevance/ accreditation" as a single function for purposes of this discussion, keeping in mind that the two are complementary and not entirely separable functions that an individual requires as part of being able to use utterances that others have uttered in putting together the user's understanding of the world. Finally, there is the function of distribution, or how one takes an utterance produced by one person and distributes it to other people who find it credible and relevant. In the mass-media world, these functions were often, though by no means always, integrated. NBC news produced the utterances,

*of research/under
foundations*

gave them credibility by clearing them on the evening news, and distributed them simultaneously. What the Internet is permitting is much greater disaggregation of these functions.

Encyclopedic and almanac-type information emerges on the Web out of the coordinate but entirely independent action of millions of users. This type of information also provides the focus on one of the most successful collaborative enterprises that has developed in the first five years of the twenty-first century, *Wikipedia*. *Wikipedia* was founded by an Internet entrepreneur, Jimmy Wales. Wales had earlier tried to organize an encyclopedia named Nupedia, which was built on a traditional production model, but whose outputs were to be released freely: its contributors were to be PhDs, using a formal, peer-reviewed process. That project appears to have failed to generate a sufficient number of high-quality contributions, but its outputs were used in *Wikipedia* as the seeds for a radically new form of encyclopedia writing. Founded in January 2001, *Wikipedia* combines three core characteristics: First, it uses a collaborative authorship tool, Wiki. This platform enables anyone, including anonymous passersby, to edit almost any page in the entire project. It stores all versions, makes changes easily visible, and enables anyone to revert a document to any prior version as well as to add changes, small and large. All contributions and changes are rendered transparent by the software and database. Second, it is a self-conscious effort at creating an encyclopedia—governed first and foremost by a collective informal undertaking to strive for a neutral point of view, within the limits of substantial self-awareness as to the difficulties of such an enterprise. An effort to represent sympathetically all views on a subject, rather than to achieve objectivity, is the core operative characteristic of this effort. Third, all the content generated by this collaboration is released under the GNU Free Documentation License, an adaptation of the GNU GPL to texts.

The shift in strategy toward an open, peer-produced model proved enormously successful. The site saw tremendous growth both in the number of contributors, including the number of active and very active contributors, and in the number of articles included in the encyclopedia (table 3.1). Most of the early growth was in English, but more recently there has been an increase in the number of articles in many other languages: most notably in German (more than 200,000 articles), Japanese (more than 120,000 articles), and French (about 100,000), but also in another five languages that have between 40,000 and 70,000 articles each, another eleven languages with 10,000 to 40,000 articles each, and thirty-five languages with between 1,000 and 10,000 articles each.

The first systematic study of the quality of *Wikipedia* articles was published as this book was going to press. The journal *Nature* compared 42 science articles from *Wikipedia* to the gold standard of the *Encyclopedia Britannica*, and concluded that “the difference in accuracy was not particularly great.” On November 15, 2004, Robert McHenry, a former editor in chief of the *Encyclopedia Britannica*, published an article criticizing *Wikipedia* as “The Faith-Based Encyclopedia.” As an example, McHenry mocked the *Wikipedia* article on Alexander Hamilton. He noted that Hamilton biographers have a problem fixing his birth year—whether it is 1755 or 1757. *Wikipedia* glossed over this error, fixing the date at 1755. McHenry then went on to criticize the way the dates were treated throughout the article, using it as an anchor to his general claim: *Wikipedia* is unreliable because it is not professionally produced. What McHenry did not note was that the other major online encyclopedias—like *Columbia* or *Encarta*—similarly failed to deal with the ambiguity surrounding Hamilton’s birth date. Only the *Britannica* did. However, McHenry’s critique triggered the *Wikipedia* distributed correction mechanism. Within hours of the publication of McHenry’s Web article, the reference was corrected. The following few days saw intensive cleanup efforts to conform all references in the biography to the newly corrected version. Within a week or so, *Wikipedia* had a correct, reasonably clean version. It now stood alone with the *Encyclopedia Britannica* as a source of accurate basic encyclopedic information. In coming to curse it, McHenry found himself blessing *Wikipedia*. He had demonstrated precisely the correction mechanism that makes *Wikipedia*, in the long term, a robust model of reasonably reliable information.

Table 3.1: Contributors to *Wikipedia*, January 2001–June 2005

	Jan. 2001	Jan. 2002	Jan. 2003	Jan. 2004	July 2004	June 2005
Contributors*	10	472	2,188	9,653	25,011	48,721
Active contributors**	9	212	846	3,228	8,442	16,945
Very active contributors***	0	31	190	692	1,637	3,016
No. of English language articles	25	16,000	101,000	190,000	320,000	630,000
No. of articles, all languages	25	19,000	138,000	409,000	862,000	1,600,000

* Contributed at least ten times; ** at least 5 times in last month; *** more than 100 times in last month.

Perhaps the most interesting characteristic about *Wikipedia* is the self-conscious social-norms-based dedication to objective writing. Unlike some of the other projects that I describe in this chapter, *Wikipedia* does not include elaborate software-controlled access and editing capabilities. It is generally

open for anyone to edit the materials, delete another's change, debate the desirable contents, survey archives for prior changes, and so forth. It depends on self-conscious use of open discourse, usually aimed at consensus. While there is the possibility that a user will call for a vote of the participants on any given definition, such calls can, and usually are, ignored by the community unless a sufficiently large number of users have decided that debate has been exhausted. While the system operators and server host—Wales—have the practical power to block users who are systematically disruptive, this power seems to be used rarely. The project relies instead on social norms to secure the dedication of project participants to objective writing. So, while not entirely anarchic, the project is nonetheless substantially more social, human, and intensively discourse- and trust-based than the other major projects described here.

Relevance/Accreditation

How are we to know that the content produced by widely dispersed individuals is not sheer gobbledygook? Can relevance and accreditation itself be produced on a peer-production model? One type of answer is provided by looking at commercial businesses that successfully break off precisely the “accreditation and relevance” piece of their product, and rely on peer production to perform that function. Amazon and Google are probably the two most prominent examples of this strategy.

Amazon uses a mix of mechanisms to get in front of their buyers of books and other products that the users are likely to purchase. A number of these mechanisms produce relevance and accreditation by harnessing the users themselves. At the simplest level, the recommendation “customers who bought items you recently viewed also bought these items” is a mechanical means of extracting judgments of relevance and accreditation from the actions of many individuals, who produce the datum of relevance as byproduct of making their own purchasing decisions. Amazon also allows users to create topical lists and track other users as their “friends and favorites.” Amazon, like many consumer sites today, also provides users with the ability to rate books they buy, generating a peer-produced rating by averaging the ratings. More fundamentally, the core innovation of Google, widely recognized as the most efficient general search engine during the first half of the 2000s, was to introduce peer-based judgments of relevance. Like other search engines at the time, Google used a text-based algorithm to retrieve a given universe of Web pages initially. Its major innovation was its PageRank algorithm, which harnesses peer production of ranking.

Value-Added Distribution

Finally, when we speak of information or cultural goods that exist (content has been produced) and are made usable through some relevance and accreditation mechanisms, there remains the question of distribution. To some extent, this is a nonissue on the Internet. Distribution is cheap. All one needs is a server and large pipes connecting one's server to the world. Nonetheless, this segment of the publication process has also provided us with important examples of peer production, including one of its earliest examples—Project Gutenberg.

Project Gutenberg entails hundreds of volunteers who scan in and correct books so that they are freely available in digital form. It has amassed more than 13,000 books, and makes the collection available to everyone for free. The vast majority of the “e-texts” offered are public domain materials. The site itself presents the e-texts in ASCII format, the lowest technical common denominator, but does not discourage volunteers from offering the e-texts in markup languages. It contains a search engine that allows a reader to search for typical fields such as subject, author, and title. Project Gutenberg volunteers can select any book that is in the public domain to transform into an e-text. The volunteer submits a copy of the title page of the book to Michael Hart—who founded the project—for copyright research. The volunteer is notified to proceed if the book passes the copyright clearance. The decision on which book to convert to e-text is left up to the volunteer, subject to copyright limitations. Typically, a volunteer converts a book to ASCII format using OCR (optical character recognition) and proofreads it one time in order to screen it for major errors. He or she then passes the ASCII file to a volunteer proofreader. This exchange is orchestrated with very little supervision. The volunteers use a Listserv mailing list and a bulletin board to initiate and supervise the exchange. In addition, books are labeled with a version number indicating how many times they have been proofed. The site encourages volunteers to select a book that has a low number and proof it. The Project Gutenberg proofing process is simple. Proofreaders (aside from the first pass) are not expected to have access to the book, but merely review the e-text for self-evident errors.

Cable Report?

Sharing of Processing, Storage, and Communications Platforms

All the examples of peer production that we have seen up to this point have been examples where individuals pool their time, experience, wisdom, and creativity to form new information, knowledge, and cultural goods. As we look around the Internet, however, we find that users also cooperate in

similar loosely affiliated groups, without market signals or managerial commands, to build supercomputers and massive data storage and retrieval systems. In their radical decentralization and reliance on social relations and motivations, these sharing practices are similar to peer production of information, knowledge, and culture. They differ in one important aspect: Users are not sharing their innate and acquired human capabilities, and, unlike information, their inputs and outputs are not public goods. The participants are, instead, sharing material goods that they privately own, mostly personal computers and their components. They produce economic, not public, goods—computation, storage, and communications capacity.

As of the middle of 2004, the fastest supercomputer in the world was SETI@home. It ran about 75 percent faster than the supercomputer that was then formally known as “the fastest supercomputer in the world”: the IBM Blue Gene/L. And yet, there was and is no single SETI@home computer.

Like distributed computing projects, peer-to-peer file-sharing networks are an excellent example of a highly efficient system for storing and accessing data in a computer network. These networks of sharing are much less “mysterious,” in terms of understanding the human motivation behind participation. Nevertheless, they provide important lessons about the extent to which large-scale collaboration among strangers or loosely affiliated users can provide effective communications platforms. For fairly obvious reasons, we usually think of peer-to-peer networks, beginning with Napster, as a “problem.” This is because they were initially overwhelmingly used to perform an act that, by the analysis of almost any legal scholar, was copyright infringement. To a significant extent, they are still used in this form. There were, and continue to be, many arguments about whether the acts of the firms that provided peer-to-peer software were responsible for the violations. However, there has been little argument that anyone who allows thousands of other users to make copies of his or her music files is violating copyright—hence the public interpretation of the creation of peer-to-peer networks as primarily a problem. From the narrow perspective of the law of copyright or of the business model of the recording industry and Hollywood, this may be an appropriate focus. From the perspective of diagnosing what is happening to our social and economic structure, the fact that the files traded on these networks were mostly music in the first few years of this technology’s implementation is little more than a distraction.

What is truly unique about peer-to-peer networks as a signal of what is to come is the fact that with ridiculously low financial investment, a few

teenagers and twenty-something-year-olds were able to write software and protocols that allowed tens of millions of computer users around the world to cooperate in producing the most efficient and robust file storage and retrieval system in the world. No major investment was necessary in creating a server farm to store and make available the vast quantities of data represented by the media files. The users' computers are themselves the "server farm." No massive investment in dedicated distribution channels made of high-quality fiber optics was necessary. The standard Internet connections of users, with some very intelligent file transfer protocols, sufficed. Architecture oriented toward enabling users to cooperate with each other in storage, search, retrieval, and delivery of files was all that was necessary to build a content distribution network that dwarfed anything that existed before.

*apps reside/
float on
infrastructure
which does
req capital*

Again, there is nothing mysterious about why users participate in peer-to-peer networks. They want music; they can get it from these networks for free; so they participate. The broader point to take from looking at peer-to-peer file-sharing networks, however, is the sheer effectiveness of large-scale collaboration among individuals once they possess, under their individual control, the physical capital necessary to make their cooperation effective. These systems are not "subsidized," in the sense that they do not pay the full marginal cost of their service. Remember, music, like all information, is a nonrival public good whose marginal cost, once produced, is zero. Moreover, digital files are not "taken" from one place in order to be played in the other. They are replicated wherever they are wanted, and thereby made more ubiquitous, not scarce. The only actual social cost involved at the time of the transmission is the storage capacity, communications capacity, and processing capacity necessary to store, catalog, search, retrieve, and transfer the information necessary to replicate the files from where copies reside to where more copies are desired. As with any nonrival good, if Jane is willing to spend the actual social costs involved in replicating the music file that already exists and that Jack possesses, then it is efficient that she do so without paying the creator a dime. It may throw a monkey wrench into the particular way in which our society has chosen to pay musicians and recording executives. This, as we saw in chapter 2, trades off efficiency for longer-term incentive effects for the recording industry. However, it is efficient within the normal meaning of the term in economics in a way that it would not have been had Jane and Jack used subsidized computers or network connections.

In addition to computation and storage, the last major element of computer communications networks is connectivity. Here, too, perhaps more dramatically than in either of the two other functionalities, we have seen the development of sharing-based techniques. The most direct transfer of the design characteristics of peer-to-peer networks to communications has been

the successful development of Skype—an Internet telephony utility that allows the owners of computers to have voice conversations with each other over the Internet for free, and to dial into the public telephone network for a fee. As of this writing, Skype is already used by more than two million users at any given moment in time. They use a FastTrack-like architecture to share their computing and communications resources to create a global telephone system running on top of the Internet. It was created, and is run by, the developers of KaZaa.

Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, (Yale University Press: New Haven, 2006): 2-7. Available online: http://www.benkler.org/Benkler_Wealth_Of_Networks_Chapter_1.pdf.

The Wealth of Networks How Social Production Transforms Markets and Freedom

Chapter 1 Introduction: A Moment of Opportunity and Challenge

Information, knowledge, and culture are central to human freedom and human development. How they are produced and exchanged in our society critically affects the way we see the state of the world as it is and might be; who decides these questions; and how we, as societies and polities, come to understand what can and ought to be done. For more than 150 years, modern complex democracies have depended in large measure on an industrial information economy for these basic functions. In the past decade and a half, we have begun to see a radical change in the organization of information production. Enabled by technological change, we are beginning to see a series of economic, social, and cultural adaptations that make possible a radical transformation of how we make the information environment we occupy as autonomous individuals, citizens, and members of cultural and social groups. It seems passé today to speak of “the Internet revolution.” In some academic circles, it is positively naïve. But it should not be. The change brought about by the networked information environment is deep. It is structural. It goes to the very foundations of how liberal markets and liberal democracies have coevolved for almost two centuries.

A series of changes in the technologies, economic organization, and social practices of production in this environment has created new opportunities for how we make and exchange information, knowledge, and culture. These changes have increased the role of nonmarket and nonproprietary production, both by individuals alone and by cooperative efforts in a wide range of loosely or tightly woven collaborations. These newly emerging practices have seen remarkable success in areas as diverse as software development and investigative reporting, avant-garde video and multiplayer online games. Together, they hint at the emergence of a new information environment, one in which individuals are free to take a more active role than was possible in the industrial information economy of the twentieth century. This new freedom holds great practical promise: as a dimension of individual freedom; as a platform for better democratic participation; as a medium to foster a more critical and self-reflective culture; and, in an increasingly information-dependent global economy, as a mechanism to achieve improvements in human development everywhere.

The rise of greater scope for individual and cooperative nonmarket production of information and culture, however, threatens the incumbents of the industrial information economy. At the beginning of the twenty-first century, we find ourselves in the midst of a battle over the institutional ecology of the digital environment. A wide range of laws and institutions—from broad areas like telecommunications, copyright, or international trade regulation, to minutiae like the rules for registering domain names or whether digital television receivers will be required by law to recognize a particular code—are being tugged and warped in efforts to tilt the playing field toward one way of doing things or the other. How these battles turn out over the next decade or so will likely have a significant effect on how we come to know what is going on in the world we occupy, and to what extent and in what forms we will be able—as autonomous individuals, as citizens, and as participants in cultures and communities—to affect how we and others see the world as it is and as it might be.

THE EMERGENCE OF THE NETWORKED INFORMATION ECONOMY

The most advanced economies in the world today have made two parallel shifts that, paradoxically, make possible a significant attenuation of the limitations that market-based production places on the pursuit of the political values central to liberal societies. The first move, in the making for more than a century, is to an economy centered on information (financial services, accounting, software, science) and cultural (films, music) production, and the manipulation of symbols (from making sneakers to branding them and manufacturing the cultural significance of the Swoosh). The second is the move to a communications environment built on cheap processors with high computation capabilities, interconnected in a pervasive network—the phenomenon we associate with the Internet. It is this second shift that allows for an increasing role for non-market production in the information and cultural production sector, organized in a radically more decentralized pattern than was true of this sector in the twentieth century. The first shift means that these new patterns of production—non-market and radically decentralized—will emerge, if permitted, at the core, rather than the periphery of the most advanced economies. It promises to enable social production and exchange to play a much larger role, alongside property- and market-based production, than they ever have in modern democracies.

*processors
why
Deutsche*

The first part of this book is dedicated to establishing a number of basic economic observations. Its overarching claim is that we are seeing the emergence of a new stage in the information economy, which I call the “networked information economy.” It is displacing the industrial information economy that typified information production from about the second half of the nineteenth century and throughout the twentieth century. What characterizes the networked information economy is that decentralized individual

action—specifically, new and important cooperative and coordinate action carried out through radically distributed, non-market mechanisms that do not depend on proprietary strategies—plays a much greater role than it did, or could have, in the industrial information economy. The catalyst for this change is the happenstance of the fabrication technology of computation, and its ripple effects throughout the technologies of communication and storage. The declining price of computation, communication, and storage have, as a practical matter, placed the material means of information and cultural production in the hands of a significant fraction of the world's population—on the order of a billion people around the globe. The core distinguishing feature of communications, information, and cultural production since the mid-nineteenth century was that effective communication spanning the ever-larger societies and geographies that came to make up the relevant political and economic units of the day required ever-larger investments of physical capital. Large-circulation mechanical presses, the telegraph system, powerful radio and later television transmitters, cable and satellite, and the mainframe computer became necessary to make information and communicate it on scales that went beyond the very local. Wanting to communicate with others was not a sufficient condition to being able to do so.

or vice versa?
↳ switch from free
computation
What made
switch free?

As a result, information and cultural production took on, over the course of this period, a more industrial model than the economics of information itself would have required. The rise of the networked, computer-mediated communications environment has changed this basic fact. The material requirements for effective information production and communication are now owned by numbers of individuals several orders of magnitude larger than the number of owners of the basic means of information production and exchange a mere two decades ago.

The removal of the physical constraints on effective information production has made human creativity and the economics of information itself the core structuring facts in the new networked information economy. These have quite different characteristics than coal, steel, and manual human labor, which characterized the industrial economy and structured our basic thinking about economic production for the past century. They lead to three observations about the emerging information production system. First, nonproprietary strategies have always been more important in information production than they were in the production of steel or automobiles, even when the economics of communication weighed in favor of industrial models.

+ analog

Education, arts and sciences, political debate, and theological disputation have always been much more importantly infused with non-market motivations and actors than, say, the automobile industry. As the material barrier that ultimately nonetheless drove much of our information environment to be funneled through the proprietary, market-based strategies is removed, these basic non-market, nonproprietary, motivations and organizational forms

should in principle become even more important to the information production system.

Second, we have in fact seen the rise of non-market production to much greater importance. Individuals can reach and inform or edify millions around the world. Such a reach was simply unavailable to diversely motivated individuals before, unless they funneled their efforts through either market organizations or philanthropically or state-funded efforts. The fact that every such effort is available to anyone connected to the network, from anywhere, has led to the emergence of coordinate effects, where the aggregate effect of individual action, even when it is not self-consciously cooperative, produces the coordinate effect of a new and rich information environment. One needs only to run a Google search on any subject of interest to see how the “information good” that is the response to one’s query is produced by the coordinate effects of the uncoordinated actions of a wide and diverse range of individuals and organizations acting on a wide range of motivations—both market and non-market, state-based and non-state.

Third, and likely most radical, new, and difficult for observers to believe, is the rise of effective, large-scale cooperative efforts—peer production of information, knowledge, and culture. These are typified by the emergence of free and open-source software. We are beginning to see the expansion of this model not only to our core software platforms, but beyond them into every domain of information and cultural production—and this book visits these in many different domains—from peer production of encyclopedias, to news and commentary, to immersive entertainment.

It is easy to miss these changes. They run against the grain of some of our most basic Economics 101 intuitions, intuitions honed in the industrial economy at a time when the only serious alternative seen was state Communism—an alternative almost universally considered unattractive today. The undeniable economic success of free software has prompted some leading-edge economists to try to understand why many thousands of loosely networked free software developers can compete with Microsoft at its own game and produce a massive operating system—GNU/Linux. That growing literature, consistent with its own goals, has focused on software and the particulars of the free and open-source software development communities, although Eric von Hippel’s notion of “user-driven innovation” has begun to expand that focus to thinking about how individual need and creativity drive innovation at the individual level, and its diffusion through networks of likeminded individuals. The political implications of free software have been central to the free software movement and its founder, Richard Stallman, and were developed provocatively and with great insight by Eben Moglen. Free software is but one salient example of a much broader phenomenon. Why can fifty thousand volunteers successfully coauthor *Wikipedia*, the most serious online alternative to the *Encyclopedia Britannica*, and then turn

around and give it away for free? Why do 4.5 million volunteers contribute their leftover computer cycles to create the most powerful supercomputer on Earth, SETI@Home? Without a broadly accepted analytic model to explain these phenomena, we tend to treat them as curiosities, perhaps transient fads, possibly of significance in one market segment or another. We should try instead to see them for what they are: a new mode of production emerging in the middle of the most advanced economies in the world—those that are the most fully computer networked and for which information goods and services have come to occupy the highest-valued roles.

Human beings are, and always have been, diversely motivated beings. We act instrumentally, but also non-instrumentally. We act for material gain, but also for psychological well-being and gratification, and for social connectedness. There is nothing new or earth-shattering about this, except perhaps to some economists. In the industrial economy in general, and the industrial information economy as well, most opportunities to make things that were valuable and important to many people were constrained by the physical capital requirements of making them. From the steam engine to the assembly line, from the double-rotary printing press to the communications satellite, the capital constraints on action were such that simply wanting to do something was rarely a sufficient condition to enable one to do it. Financing the necessary physical capital, in turn, oriented the necessarily capital-intensive projects toward a production and organizational strategy that could justify the investments. In market economies, that meant orienting toward market production. In state-run economies, that meant orienting production toward the goals of the state bureaucracy. In either case, the practical individual freedom to cooperate with others in making things of value was limited by the extent of the capital requirements of production.

*beginning of way
down, not
more up!*

In the networked information economy, the physical capital required for production is broadly distributed throughout society. Personal computers and network connections are ubiquitous. This does not mean that they cannot be used for markets, or that individuals cease to seek market opportunities. It does mean, however, that whenever someone, somewhere, among the billion connected human beings, and ultimately among all those who will be connected, wants to make something that requires human creativity, a computer, and a network connection, he or she can do so—alone, or in cooperation with others. He or she already has the capital capacity necessary to do so; if not alone, then at least in cooperation with other individuals acting for complementary reasons. The result is that a good deal more that human beings value can now be done by individuals, who interact with each other socially, as human beings and as social beings, rather than as market actors through the price system. Sometimes, under conditions I specify in some detail, these non-market collaborations can be better at motivating effort and can allow creative people to work on information projects more efficiently than would traditional market mechanisms and corporations. The

*community
improvement,
local & world
charities,
boosterism
entrepreneurship
hobbies*

Product
result is a flourishing non-market sector of information, knowledge, and cultural production, based in the networked environment, and applied to anything that the many individuals connected to it can imagine. Its outputs, in turn, are not treated as exclusive property. They are instead subject to an increasingly robust ethic of open sharing, open for all others to build on, extend, and make their own.

Because the presence and importance of non-market production has become so counterintuitive to people living in market-based economies at the end of the twentieth century, part I of this volume is fairly detailed and technical; overcoming what we intuitively “know” requires disciplined analysis. Readers who are not inclined toward economic analysis should at least read the introduction to part I, the segments entitled “When Information Production Meets the Computer Network” and “Diversity of Strategies in our Current Production System” in chapter 2, and the case studies in chapter 3. These should provide enough of an intuitive feel for what I mean by the diversity of production strategies for information and the emergence of non-market individual and cooperative production, to serve as the basis for the more normatively oriented parts of the book. Readers who are genuinely skeptical of the possibility that non-market production is sustainable and effective, and in many cases is an efficient strategy for information, knowledge, and cultural production, should take the time to read part I in its entirety. The emergence of precisely this possibility and practice lies at the very heart of my claims about the ways in which liberal commitments are translated into lived experiences in the networked environment, and forms the factual foundation of the political-theoretical and the institutional-legal discussion that occupies the remainder of the book.

Andreas Kluth, "Among the Audience," *The Economist*, April 20, 2006.

Available online: http://www.economist.com/surveys/displaystory.cfm?story_id=6794156.

Among the audience

Apr 20th 2006

From *The Economist* print edition

The era of mass media is giving way to one of personal and participatory media, says Andreas Kluth. That will profoundly change both the media industry and society as a whole

THE next big thing in 1448 was a technology called "movable type", invented for commercial use by Johannes Gutenberg, a goldsmith from Mainz (although the Chinese had thought of it first). The clever idea was to cast individual letters (type) and then compose (move) these to make up printable pages. This promised to disrupt the mainstream media of the day—the work of monks who were manually transcribing texts or carving entire pages into wood blocks for printing. By 1455 Mr Gutenberg, having lined up venture capital from a rich compatriot, Johannes Fust, was churning out bibles and soon also papal indulgences (slips of paper that rich people bought to reduce their time in purgatory). The start-up had momentum, but its costs ran out of control and Mr Gutenberg defaulted. Mr Fust foreclosed, and a little bubble popped.

Even so, within decades movable type spread across Europe, turbo-charging an information age called the Renaissance. Martin Luther, irked by those indulgences, used printing presses to produce bibles and other texts in German. Others followed suit, and vernaculars rose as Latin declined, preparing Europe for nation-states. Religious and aristocratic elites first tried to stop, then control, then co-opt the new medium. In the centuries that followed, social and legal systems adjusted (with copyright laws, for instance) and books, newspapers and magazines began to circulate widely. The age of mass media had arrived. Two more technological breakthroughs—radio and television—brought it to its zenith, which it probably reached around 1958, when most adult Americans simultaneously turned on their television sets to watch "I Love Lucy".

Second incarnation

In 2001, five-and-a-half centuries after Mr Gutenberg's first bible, "Movable Type" was invented again. Ben and Mena Trott, high-school sweethearts who became husband and wife, had been laid off during the dotcom bust and found themselves in San Francisco with ample spare time. Ms Trott started blogging—ie, posting to her online journal, Dollarshort—about "stupid little anecdotes from my childhood". For reasons that elude

her, Dollarshort became very popular, and the Trotts decided to build a better “blogging tool”, which they called Movable Type. “Likening it to the printing press seemed like a natural thing because it was clearly revolutionary; it was not meant to be arrogant or grandiose,” says Ms Trott to the approving nod of Mr Trott, who is extremely shy and rarely talks. Movable Type is now the software of choice for celebrity bloggers.

These two incarnations of movable type make convenient (and very approximate) historical book-ends. They bracket the era of mass media that is familiar to everybody today. The second Movable Type, however, also marks the beginning of a very gradual transition to a new era, which might be called the age of personal or participatory media. This culture is already familiar to teenagers and twenty-somethings, especially in rich countries. Most older people, if they are aware of the transition at all, find it puzzling.

Calling it the “internet era” is not helpful. By way of infrastructure, full-scale participatory media presume not so much the availability of the (decades-old) internet as of widespread, “always-on”, broadband access to it. So far, this exists only in South Korea, Hong Kong and Japan, whereas America and other large media markets are several years behind. Indeed, even today's broadband infrastructure was built for the previous era, not the coming one. Almost everywhere, download speeds (from the internet to the user) are many times faster than upload speeds (from user to network). This is because the corporate giants that built these pipes assumed that the internet would simply be another distribution pipe for themselves or their partners in the media industry. Even today, they can barely conceive of a scenario in which users might put as much into the network as they take out.

The age of participation

Exactly this, however, is starting to happen. Last November, the Pew Internet & American Life Project found that 57% of American teenagers create content for the internet—from text to pictures, music and video. In this new-media culture, says Paul Saffo, a director at the Institute for the Future in California, people no longer passively “consume” media (and thus advertising, its main revenue source) but actively participate in them, which usually means creating content, in whatever form and on whatever scale. This does not have to mean that “people write their own newspaper”, says Jeremy Zawodny, a prominent blogger and software engineer at Yahoo!, an internet portal. “It could be as simple as rating the restaurants they went to or the movie they saw,” or as sophisticated as shooting a home video.

This has profound implications for traditional business models in the media industry, which are based on aggregating large passive audiences and holding them captive during advertising interruptions. In the new-media era, audiences will occasionally be large, but often small, and usually tiny. Instead of a few large capital-rich media giants competing with one another for these audiences, it will be small firms and individuals competing or, more often, collaborating. Some will be making money from the content they create; others will not and will not mind, because they have other motives. “People creating stuff to build their own reputations” are at one end of this spectrum, says Philip Evans at

active channel - switchers

*cable nets continuing
all, person networks
audience-aggregator model
at some point, fragmentation
becomes radical.*

Boston Consulting Group, and one-man superbrands such as Steven Spielberg at the other.

As with the media revolution of 1448, the wider implications for society will become visible gradually over a period of decades. With participatory media, the boundaries between audiences and creators become blurred and often invisible. In the words of David Sifry, the founder of Technorati, a search engine for blogs, one-to-many “lectures” (ie, from media companies to their audiences) are transformed into “conversations” among “the people formerly known as the audience”. This changes the tone of public discussions. The mainstream media, says David Weinberger, a blogger, author and fellow at Harvard University's Berkman Centre, “don't get how subversive it is to take institutions and turn them into conversations”. That is because institutions are closed, assume a hierarchy and have trouble admitting fallibility, he says, whereas conversations are open-ended, assume equality and eagerly concede fallibility.

Today's media revolution, like others before it, is announcing itself with a new and strange vocabulary. In the early 20th century, Charles Prestwich Scott, the editor, publisher and owner of the *Manchester Guardian* (and thus part of his era's mainstream media), was aghast at the word “television”, which to him was “half Greek, half Latin: no good can come of it.” Mr Scott's equivalents today confront even stranger neologisms. Merriam-Webster, a publisher of dictionaries, had “blog” as its word of the year in 2004, and the New Oxford American Dictionary picked “podcast” in 2005. “Wikis”, “vlogs”, “metaverses” and “folksonomies” may be next.

Word count

“These words! The inability of the English language to express these new things is distressing,” says Barry Diller, 64, who fits the description “media mogul”. Over the decades, Mr Diller has run two big Hollywood film studios and launched America's fourth broadcast-television network, FOX Broadcasting. More recently, he has made a valiant effort to get his mind around the internet, with mixed results, and is now the boss of IAC/InterActiveCorp, a conglomerate with about 60 online brands. Mr Diller concedes that “all of the distribution methods get thrown up in the air, and how they land is, well, still up in the air.” Yet Mr Diller is confident that participation can never be a proper basis for the media industry. “Self-publishing by someone of average talent is not very interesting,” he says. “Talent is the new limited resource.”

“What an ignoramus!” says Jerry Michalski, with some exasperation. He advises companies on the uses of new media tools. “Look around and there's tons of great stuff from rank amateurs,” he says. “Diller is assuming that there's a finite amount of talent and that he can corner it. He's completely wrong.” Not everything in the “blogosphere” is poetry, not every audio “podcast” is a symphony, not every video “vlog” would do well at Sundance, and not every entry on Wikipedia, the free and collaborative online encyclopedia, is 100% correct, concedes Mr Michalski. But exactly the same could be said about newspapers, radio, television and the Encyclopaedia Britannica.

Paul Limberg
Dino Sanga
McFay
Rosa Parrot

What is new is that young people today, and most people in future, will be happy to decide for themselves what is credible or worthwhile and what is not. They will have plenty of help. Sometimes they will rely on human editors of their choosing; at other times they will rely on collective intelligence in the form of new filtering and collaboration technologies that are now being developed. "The old media model was: there is one source of truth. The new media model is: there are multiple sources of truth, and we will sort it out," says Joe Kraus, the founder of JotSpot, which makes software for wikis.

The obvious benefit of this media revolution will be what Mr Saffo of the Institute for the Future calls a "Cambrian explosion" of creativity: a flowering of expressive diversity on the scale of the eponymous proliferation of biological species 530m years ago. "We are entering an age of cultural richness and abundant choice that we've never seen before in history. Peer production is the most powerful industrial force of our time," says Chris Anderson, editor of *Wired* magazine and author of a forthcoming book called "The Long Tail", about which more later. (Mr Anderson used to work for *The Economist*.)

At the same time, adds Mr Saffo, "revolutions tend to suck for ordinary people." Indeed, many people in the traditional media are pessimistic about the rise of a participatory culture, either because they believe it threatens the business model that they have grown used to, or because they feel it threatens public discourse, civility and even democracy.

This survey will examine the main kinds of new media and their likely long-term effects both on media companies and on society at large. In so doing, it will be careful to heed a warning from Harvard's Mr Weinberger: "The mainstream media are in a good position to get things wrong." The observer, after all, is part of the observation—a product of institutional media values even if he tries to apply the new rules of conversation. This points to the very heart of the coming era of participatory media. It must be understood, says Mr Weinberger, "not as a publishing phenomenon but a social phenomenon".

Charles Firestone and Marc Nathanson, "Making diplomacy modern," *The Denver Post*, February 26, 2006. Available online: http://www.denverpost.com/portlet/article/html/fragments/print_article.jsp?article=3544800.

Making diplomacy modern

By Charles Firestone and Marc Nathanson

Recent tensions between the Arab world and the United States raise again the issue of the effectiveness of American public diplomacy. Karen Hughes has brought new life and attention to this function of the State Department, and Condoleezza Rice's transformation of the department appears headed in the right direction. But these are basically just throat clearings for what needs to happen.

"Public diplomacy" has been used to describe so many different programs relating to improving America's standing in the world that the phrase is becoming trite. But its importance is greater than ever.

At one level, the United States needs the cooperation of the people of other countries in order to achieve our own interests, however defined, whether it is the war on terrorism, economic prosperity or success in international negotiations. At a higher level, though, Americans have always championed our core values abroad, including economic opportunity, democracy and equality.

There are certain strategies that apply to each approach. The first goal requires quick and specific responses to stories aimed at the populations of other countries, and will most readily be delivered on the mainstream media of radio, television, satellite and newsprint. We need our high officials to appear on al-Jazeera more, not suggest bombing it.

Furthermore, most American public diplomacy initiatives in the past few years have unsuccessfully tried to sell America's interests and values for the short term, using an advertising analogy. For whatever reason, these approaches have not proved successful. America is as unpopular in the Arab region as it has ever been.

Innovative media efforts such as short-form programs and call-in shows on the government's Radio Sawa are improvements over the past, and Sawa has become very popular with Arab youth. But, as an Aspen Institute forum recently concluded, the U.S. needs to employ additional efforts to appear on indigenous media and interact with international audiences.

Looking further ahead, promoting American values requires a set of narratives aimed at the youth of the world. These are delivered over a wider variety of media, and include interpersonal cultural exchanges, international forums and training programs.

The Western movie narrative, where America is the cowboy in the white hat called in to help those in distress, shoots the gun out of the bad guy's hand (only after the other draws

first), and leaves before the saved get to say thank you, may be a story of the past. New narratives will need to emerge, showing this country as a trustworthy partner, a listener and a helper. Our nation's tsunami and earthquake relief responses, which highlight this new approach, were probably the most successful public diplomacy efforts by this country in the last few years - with dramatic improvements in our public standing in Indonesia, for example.

Even so, rapid changes in the communications media require a bold new approach to public diplomacy for the longer term: a move from using "push" mass media techniques to embracing the "pull" interactive media.

With broadband Internet becoming a multimedia platform, audiences are changing from being passive viewers of push technologies like broadcasting and newspapers to becoming active seekers of the information and entertainment that they're willing to pull from the vast array of different opinions on the net. This transformation is rapidly changing mass media industries and the way that individuals shop, work, play and relate to their broader communities.

The United States rightfully defended openness and freedom of expression on the Internet at the World Summit on the Information Society. By holding to those values, the Internet can remain an instrument of individual empowerment. And it is these same values that should frame American public diplomacy for the long range.

America must get ahead of the curve in its messages and narratives to young people around the world. Today, the medium really is the message. The messages are self development and personal empowerment, values inherent in the new world of pull communications.

As the United States under Karen Hughes rethinks its future public diplomacy strategies, it should encourage connection of the world's people to interactive media, not only to hear America's message, but to interact with Americans. The United States has to stop lecturing and start listening.

We are living in an interactive world, where individuals learn to pull for their entertainment, information and news using everything from the web to cellphones, from reading blogs to sending instant messages.

Being able to do that ^{"pull"} is inherent in a free society. U.S. public diplomacy should encourage future generations to seek all messages and judge for themselves which ones are relevant to their future peace and prosperity. We are confident America's values will prevail.

*Need consistent
def of "America"
+ promote access to that content
+ promote content consistent w/ that def*

Liberty TV

By Kenneth Y. Tomlinson

In recent weeks, we've heard a great deal in Washington about how we ought to be broadcasting to Iran. But it might be instructive to examine what U.S. international broadcasting is *already* doing.

Very recently, on a Persian-language satellite television broadcast from the United States, the people of Iran learned that Iran's oldest and largest student organization, Tahkim Vahdat, urged the government to suspend uranium enrichment and to cooperate with the international community by restricting nuclear development, to peaceful uses. The group called the government's behavior "irrational and confrontational." Needless to say none of this appeared in Iran's government-controlled media; few rulers on earth exercise the degree of censorship enforced by the Iranian government.

Another program featured the story of Hossein Derakhshan, once jailed in Iran for starting an Internet blog. Upon his release, he managed to get to Canada where he now runs the most popular blog—in Iran.

Or consider this exchange that occurred on our nightly Persian-language news and current affairs program on the Voice of America.

Moderator, Ms. Setareh Derakhshesh: "Our guests today are Mr. Bijan Kian, a businessman associated with the American Council on Foreign Relations, and Dr. Abbas Maleki of Sharif University in Tehran, who is currently a Harvard Research Fellow in the United States. Dr. Maleki, how do you see the possibility of direct negotiations between Washington and Tehran on Iran's nuclear policies?"

Dr. Maleki: "From the beginning, direct talks have been part of Iran's agenda. From Iran's point of view, the nuclear issue is not a real problem. This is part of the overall process of development which is going on in all parts of our society, like nanotechnology, biotechnology, IT and so on . . ."

Mr. Kian: "It is amazing to hear about such claims as progress in nanotechnology in a country where there is widespread unemployment, poverty, drug addiction, prostitution, so many women's issues and, finally, political repression

and coercion. The real dispute is not between our two countries. It is between the Iranian people and the government of the Islamic Republic . . ."

Dr. Maleki: "Well! Using polemic language and slogans talking about political coercion is very easy. Even in the U.S., that technologically speaking is the most advanced country in the world, you still have poverty everywhere, unem-

Free debate—brought to Iran via the satellite dish.

ployment and so on. Tehran is so much cleaner than New York. You can go and check the trash-ridden streets of New York. Go and have a look at poor people there. . . . Just look at the war in Iraq and Afghanistan and now this atmosphere of war the U.S. government is creating about Iran . . ."

Ms. Derakhshesh: "Dr. Maleki: The majority of the people in Iran live under the poverty line—and Iran's prisons are filled with political prisoners . . ."

Dr. Maleki: "Excuse me! You are the moderator yet you are passing a wild judgment."

Ms. Derakhshesh: "This is not my personal opinion, sir . . ."

Dr. Maleki: "Whose facts are these, where did you get them—that there are political prisoners in Iran?"

Ms. Derakhshesh: "These are facts reported by credible international human rights organizations."

Mr. Kian: "Whenever we talk about what is really going on in Iran, what we say will be branded as slogans by supporters by the regime. I have to emphasize that the American government is not in favor of war with Iran. Just look at what has been said by President Bush and his secretary of state."

* * *

In VOA and Radio Free Europe/Radio Liberty, the U.S. has a model illustrating how broadcasting news and information (i.e., the truth) can lead to the liberation of a people.

That certainly occurred in the former Soviet Union and Eastern Europe. Recognizing that

fact, the U.S. Broadcasting Board of Governors moved to increase television and radio to Iran long before the current crisis in that country. In early 2003 we launched Farda, a round-the-clock, youth-oriented radio service to Iran. A few months later we began broadcasting daily Persian news and current affairs satellite television.

The television launch may have been modest—\$1.9 million for 30 minutes daily with repeats. But we have come to recognize that satellite television is to the future what shortwave radio was to the past.

That daily program today is an hour (with repeats), and by September, thanks to better than \$9 million from the Bush administration and Congress, we will be broadcasting four original television hours—with news, debates and call-in shows—daily. Funds in a supplemental now before Congress could increase these broadcasts even more—and strengthen our coverage.

Small satellite dishes are proliferating in Iran and there are strong indications that VOA's nightly programming is becoming a staple for large numbers of Iranians. Telephone polling (which tends to undercount audiences living under repressive regimes) show that better than one-in-five adult television viewers say they regularly watch VOA's satellite television programs.

As was the case with RFE/RL and VOA in the Cold War, it is important that our broadcasts are provocative—and credible. Intense journalistic supervision is critical to achieving this goal. Truth does not lie half way between the views of Washington and Tehran. But talk and debate programs give Iranians a taste of freedom—and enlightenment.

Ultimately, the future of Iran rests with the people of Iran. Just as in the Cold War when the people ultimately prevailed over their oppressors, it will be the people of Iran who will deliver their country from the tyrants who rule them now. To paraphrase Winston Churchill, we can give them the tools—information the mullahs don't want them to hear and debate challenging the lies of mullah-sympathizers—and the people of Iran can finish the job.

Mr. Tomlinson is chairman of the Broadcasting Board of Governors, which oversees U.S. international broadcasting.

Chapter 12 Conclusion: The Stakes of Information Law and Policy

Complex modern societies have developed in the context of mass media and industrial information economy. Our theories of growth and innovation assume that industrial models of innovation are dominant. Our theories about how effective communications in complex societies are achieved center on market-based, proprietary models, with a professional commercial core and a dispersed, relatively passive periphery. Our conceptions of human agency, collective deliberation, and common culture in these societies are embedded in the experience and practice of capital-intensive information and cultural production practices that emphasize proprietary, market-based models and starkly separate production from consumption. Our institutional frameworks reflect these conceptual models of information production and exchange, and have come, over the past few years, to enforce these conceptions as practiced reality, even when they need not be.

This book began with four economic observations. First, the baseline conception that proprietary strategies are dominant in our information production system is overstated. The education system,

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from kindergarten to doctoral programs, is thoroughly infused with nonproprietary motivations, social relations, and organizational forms. The arts and sciences are replete with voluntarism and actions oriented primarily toward social-psychological motivations rather than market appropriation. Political and theological discourses are thoroughly based in nonmarket forms and motivations. Perhaps most surprisingly, even industrial research and development, while market oriented, is in most industries not based on proprietary claims of exclusion, but on improved efficiencies and customer relations that can be captured and that drive innovation, without need for proprietary strategies of appropriation. Despite the continued importance of nonproprietary production in information as a practical matter, the conceptual nuance required to acknowledge its importance ran against the grain of the increasingly dominant thesis that property and markets are the roots of all growth and productivity. Partly as a result of the ideological and military conflict with Communism, partly as a result of the theoretical elegance of a simple and tractable solution, policy makers and their advisers came to believe toward the end of the twentieth century that property in information and innovation was like property in wristwatches and automobiles. The more clearly you defined and enforced it, and the closer it was to perfect exclusive rights, the more production you would get. The rising dominance of this conceptual model combined with the rent-seeking lobbying of industrial-model producers to underwrite a fairly rapid and substantial tipping of the institutional ecology of innovation and information production in favor of proprietary models. The U.S. patent system was overhauled in the early 1980s, in ways that strengthened and broadened the reach and scope of exclusivity. Copyright was vastly expanded in the mid-1970s, and again in the latter 1990s. Trademark was vastly expanded in the 1990s. Other associated rights were created and strengthened throughout these years.

The second economic point is that these expansions of rights operate, as a practical matter, as a tax on nonproprietary models of production in favor of the proprietary models. It makes access to information resources more expensive for all, while improving appropriability only for some. Introducing software patents, for example, may help some of the participants in the one-third of the software industry that depends on sales of finished software items. But it clearly raises the costs without increasing benefits for the two-thirds of the industry that is service based and relational. As a practical matter, the substantial increases in the scope and reach of exclusive rights have adversely affected the operating conditions of nonproprietary producers.

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Universities have begun to seek patents and pay royalties, impeding the sharing of information that typified past practice. Businesses that do not actually rely on asserting patents for their business model have found themselves amassing large patent portfolios at great expense, simply to fend off the threat of suit by others who would try to hold them up. Older documentary films, like *Eyes on the Prize*, have been hidden from public view for years, because of the cost and complexity of clearing the rights to every piece of footage or trademark that happens to have been captured by the camera. New documentaries require substantially greater funding than would have been necessary to pay for their creation, because of the costs of clearing newly expanded rights.

The third economic observation is that the basic technologies of information processing, storage, and communication have made nonproprietary models more attractive and effective than was ever before possible. Ubiquitous low-cost processors, storage media, and networked connectivity have made it practically feasible for individuals, alone and in cooperation with others, to create and exchange information, knowledge, and culture in patterns of social reciprocity, redistribution, and sharing, rather than proprietary, market-based production. The basic material capital requirements of information production are now in the hands of a billion people around the globe who are connected to each other more or less seamlessly. These material conditions have given individuals a new practical freedom of action. If a person or group wishes to start an information-production project for any reason, that group or person need not raise significant funds to acquire the necessary capital. In the past, the necessity to obtain funds constrained information producers to find a market-based model to sustain the investment, or to obtain government funding. The funding requirements, in turn, subordinated the producers either to the demands of markets, in particular to mass-market appeal, or to the agendas of state bureaucracies. The networked information environment has permitted the emergence to much greater significance of the nonmarket sector, the nonprofit sector, and, most radically, of individuals.

The fourth and final economic observation describes and analyzes the rise of peer production. This cluster of phenomena, from free and open-source software to *Wikipedia* and *SETI@Home*, presents a stark challenge to conventional thinking about the economics of information production. Indeed, it challenges the economic understanding of the relative roles of market-based and nonmarket production more generally. It is important to see these

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phenomena not as exceptions, quirks, or ephemeral fads, but as indications of a fundamental fact about transactional forms and their relationship to the technological conditions of production. It is a mistake to think that we have only two basic free transactional forms—property-based markets and hierarchically organized firms. We have three, and the third is social sharing and exchange. It is a widespread phenomenon—we live and practice it every day with our household members, coworkers, and neighbors. We coproduce and exchange economic goods and services. But we do not count these in the economic census. Worse, we do not count them in our institutional design. I suggest that the reason social production has been shunted to the peripheries of the advanced economies is that the core economic activities of the economies of steel and coal required large capital investments. These left markets, firms, or state-run enterprises dominant. As the first stage of the information economy emerged, existing information and human creativity—each a “good” with fundamentally different economic characteristics than coal or steel—became important inputs. The organization of production nevertheless followed an industrial model, because information production and exchange itself still required high capital costs—a mechanical printing press, a broadcast station, or later, an IBM mainframe. The current networked stage of the information economy emerged when the barrier of high capital costs was removed. The total capital cost of communication and creation did not necessarily decline. Capital investment, however, became widely distributed in small dollops, owned by individuals connected in a network. We came to a stage where the core economic activities of the most advanced economies—the production and processing of information—could be achieved by pooling physical capital owned by widely dispersed individuals and groups, who have purchased the capital means for personal, household, and small-business use. Then, human creativity and existing information were left as the main remaining core inputs. Something new and radically different started to happen. People began to apply behaviors they practice in their living rooms or in the elevator—“Here, let me lend you a hand,” or “What did you think of last night’s speech?”—to production problems that had, throughout the twentieth century, been solved on the model of Ford and General Motors. The rise of peer production is neither mysterious nor fickle when viewed through this lens. It is as rational and efficient given the objectives and material conditions of information production at the turn of the twenty-first century as the assembly line was for the conditions at the turn of the twentieth. The pooling of human creativity and of

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computation, communication, and storage enables nonmarket motivations and relations to play a much larger role in the production of the information environment than it has been able to for at least decades, perhaps for as long as a century and a half.

A genuine shift in the way we produce the information environment that we occupy as individual agents, as citizens, as culturally embedded creatures, and as social beings goes to the core of our basic liberal commitments. Information and communications are core elements of autonomy and of public political discourse and decision making. Communication is the basic unit of social existence. Culture and knowledge, broadly conceived, form the basic frame of reference through which we come to understand ourselves and others in the world. For any liberal political theory—any theory that begins with a focus on individuals and their freedom to be the authors of their own lives in connection with others—the basic questions of how individuals and communities come to know and evaluate are central to the project of characterizing the normative value of institutional, social, and political systems. Independently, in the context of an information- and innovation-centric economy, the basic components of human development also depend on how we produce information and innovation, and how we disseminate its implementations. The emergence of a substantial role for nonproprietary production offers discrete strategies to improve human development around the globe. Productivity in the information economy can be sustained without the kinds of exclusivity that have made it difficult for knowledge, information, and their beneficial implementations to diffuse beyond the circles of the wealthiest nations and social groups. We can provide a detailed and specific account of why the emergence of nonmarket, nonproprietary production to a more significant role than it had in the industrial information economy could offer improvements in the domains of both freedom and justice, without sacrificing—indeed, while improving—productivity.

From the perspective of individual autonomy, the emergence of the networked information economy offers a series of identifiable improvements in how we perceive the world around us, the extent to which we can affect our perceptions of the world, the range of actions open to us and their possible outcomes, and the range of cooperative enterprises we can seek to enter to pursue our choices. It allows us to do more for and by ourselves. It allows us to form loose associations with others who are interested in a particular outcome they share with us, allowing us to provide and explore many more

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diverse avenues of learning and speaking than we could achieve by ourselves or in association solely with others who share long-term strong ties. By creating sources of information and communication facilities that no one owns or exclusively controls, the networked information economy removes some of the most basic opportunities for manipulation of those who depend on information and communication by the owners of the basic means of communications and the producers of the core cultural forms. It does not eliminate the possibility that one person will try to act upon another as object. But it removes the structural constraints that make it impossible to communicate at all without being subject to such action by others.

From the perspective of democratic discourse and a participatory republic, the networked information economy offers a genuine reorganization of the public sphere. Except in the very early stages of a small number of today's democracies, modern democracies have largely developed in the context of mass media as the core of their public spheres. A systematic and broad literature has explored the basic limitations of commercial mass media as the core of the public sphere, as well as its advantages. The emergence of a networked public sphere is attenuating, or even solving, the most basic failings of the mass-mediated public sphere. It attenuates the power of the commercial mass-media owners and those who can pay them. It provides an avenue for substantially more diverse and politically mobilized communication than was feasible in a commercial mass media with a small number of speakers and a vast number of passive recipients. The views of many more individuals and communities can be heard. Perhaps most interestingly, the phenomenon of peer production is now finding its way into the public sphere. It is allowing loosely affiliated individuals across the network to fulfill some of the basic and central functions of the mass media. We are seeing the rise of nonmarket, distributed, and collaborative investigative journalism, critical commentary, and platforms for political mobilization and organization. We are seeing the rise of collaborative filtering and accreditation, which allows individuals engaged in public discourse to be their own source of deciding whom to trust and whose words to question.

A common critique of claims that the Internet improves democracy and autonomy is centered on information overload and fragmentation. What we have seen emerging in the networked environment is a combination of self-conscious peer-production efforts and emergent properties of large systems of human beings that have avoided this unhappy fate. We have seen the adoption of a number of practices that have made for a reasonably navigable

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and coherent information environment without re-creating the mass-media model. There are organized nonmarket projects for producing filtering and accreditation, ranging from the Open Directory Project to mailing lists to like-minded people, like MoveOn.org. There is a widespread cultural practice of mutual pointing and linking: a culture of "Here, see for yourself, I think this is interesting." The basic model of observing the judgments of others as to what is interesting and valuable, coupled with exercising one's own judgment about who shares one's interests and whose judgment seems to be sound has created a pattern of linking and usage of the Web and the Internet that is substantially more ordered than a cacophonous free-for-all, and less hierarchically organized and controlled by few than was the mass-media environment. It turns out that we are not intellectual lemmings. Given freedom to participate in making our own information environment, we neither descend into Babel, nor do we replicate the hierarchies of the mass-mediated public spheres to avoid it.

The concepts of culture and society occupy more tenuous positions in liberal theory than autonomy and democracy. As a consequence, mapping the effects of the changes in information production and exchange on these domains as aspects of liberal societies is more complex. As to culture, the minimum that we can say is that the networked information environment is rendering culture more transparent. We all "occupy" culture; our perceptions, views, and structures of comprehension are all always embedded in culture. And yet there are degrees to which this fact can be rendered more or less opaque to us as inhabitants of a culture. In the networked information environment, as individuals and groups use their newfound autonomy to engage in personal and collective expression through existing cultural forms, these forms become more transparent—both through practice and through critical examination. The mass-media television culture encouraged passive consumption of polished, finished goods. The emergence of what might be thought of as a newly invigorated folk culture—created by and among individuals and groups, rather than by professionals for passive consumption—provides both a wider set of cultural forms and practices and a better-educated or better-practiced community of "readers" of culture. From the perspective of a liberal theory unwilling simply to ignore the fact that culture structures meaning, personal values, and political conceptions, the emergence of a more transparent and participatory cultural production system is a clear improvement over the commercial, professional mass culture of the twentieth century. In the domain of social relations, the degree of autonomy and the

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loose associations made possible by the Internet, which play such an important role in the gains for autonomy, democracy, and a critical culture, have raised substantial concerns about how the networked environment will contribute to a further erosion of community and solidarity. As with the Babel objection, however, it appears that we are not using the Internet further to fragment our social lives. The Internet is beginning to replace twentieth-century remote media—television and telephone. The new patterns of use that we are observing as a result of this partial displacement suggest that much of network use focuses on enhancing and deepening existing real-world relations, as well as adding new online relations. Some of the time that used to be devoted to passive reception of standardized finished goods through a television is now reoriented toward communicating and making together with others, in both tightly and loosely knit social relations. Moreover, the basic experience of treating others, including strangers, as potential partners in cooperation contributes to a thickening of the sense of possible social bonds beyond merely co-consumers of standardized products. Peer production can provide a new domain of reasonably thick connection with remote others.

The same capabilities to make information and knowledge, to innovate, and to communicate that lie at the core of the gains in freedom in liberal societies also underlie the primary advances I suggest are possible in terms of justice and human development. From the perspective of a liberal conception of justice, the possibility that more of the basic requirements of human welfare and the capabilities necessary to be a productive, self-reliant individual are available outside of the market insulates access to these basic requirements and capabilities from the happenstance of wealth distribution. From a more substantive perspective, information and innovation are central components of all aspects of a rich meaning of human development. Information and innovation are central to human health—in the production and use of both food and medicines. They are central to human learning and the development of the knowledge any individual needs to make life richer. And they are, and have for more than fifty years been known to be, central to growth of material welfare. Along all three of these dimensions, the emergence of a substantial sector of nonmarket production that is not based on exclusivity and does not require exclusion to feed its own engine contributes to global human development. The same economic characteristics that make exclusive rights in information a tool that imposes barriers to access in advanced economies make these rights a form of tax on technological latecom-

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ers. What most poor and middle-income countries lack is not human creativity, but access to the basic tools of innovation. The cost of the material requirements of innovation and information production is declining rapidly in many domains, as more can be done with ever-cheaper computers and communications systems. But exclusive rights in existing innovation tools and information resources remain a significant barrier to innovation, education, and the use of information-embedded tools and goods in low- and middle-income countries. As new strategies for the production of information and knowledge are making their outputs available freely for use and continuing innovation by everyone everywhere, the networked information economy can begin to contribute significantly to improvements in human development. We already see free software and free and open Internet standards playing that role in information technology sectors. We are beginning to see it take form in academic publishing, raw information, and educational materials, like multilingual encyclopedias, around the globe. More tentatively, we are beginning to see open commons-based innovation models and peer production emerge in areas of agricultural research and bioagricultural innovation, as well as, even more tentatively, in the area of biomedical research. These are still very early examples of what can be produced by the networked information economy, and how it can contribute, even if only to a limited extent, to the capacity of people around the globe to live a long and healthy, well-educated, and materially adequate life.

If the networked information economy is indeed a significant inflection point for modern societies along all these dimensions, it is so because it upsets the dominance of proprietary, market-based production in the sphere of the production of knowledge, information, and culture. This upset is hardly uncontroversial. It will likely result in significant redistribution of wealth, and no less importantly, power, from previously dominant firms and business models to a mixture of individuals and social groups on the one hand, and on the other hand businesses that reshape their business models to take advantage of, and build tools and platforms for, the newly productive social relations. As a practical matter, the major economic and social changes described here are not deterministically preordained by the internal logic of technological progress. What we see instead is that the happenstance of the fabrication technology of computation, in particular, as well as storage and communications, has created technological conditions conducive to a significant realignment of our information production and exchange system. The actual structure of the markets, technologies, and social practices that

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have been destabilized by the introduction of computer-communications networks is now the subject of a large-scale and diffuse institutional battle.

We are seeing significant battles over the organization and legal capabilities of the physical components of the digitally networked environment. Will all broadband infrastructures be privately owned? If so, how wide a margin of control will owners have to prefer some messages over others? Will we, to the contrary, permit open wireless networks to emerge as an infrastructure of first and last resort, owned by its users and exclusively controlled by no one? The drives to greater private ownership in wired infrastructure, and the push by Hollywood and the recording industry to require digital devices mechanically to comply with exclusivity-respecting standards are driving the technical and organizational design toward a closed environment that would be more conducive to proprietary strategies. Open wireless networks and the present business model of the large and successful device companies—particularly, personal computers—to use open standards push in the opposite direction. End-user equipment companies are mostly focused on making their products as valuable as possible to their users, and are therefore oriented toward offering general-purpose platforms that can be deployed by their owners as they choose. These then become equally available for market-oriented as for social behaviors, for proprietary consumption as for productive sharing.

At the logical layer, the ethic of open standards in the technical community, the emergence of the free software movement and its apolitical cousin, open source development practices, on the one hand, and the anti-authoritarian drives behind encryption hacking and some of the peer-to-peer technologies, on the other hand, are pushing toward an open logical layer available for all to use. The efforts of the content industries to make the Internet manageable—most visibly, the DMCA and the continued dominance of Microsoft over the desktop, and the willingness of courts and legislatures to try to stamp out copyright-defeating technologies even when these obviously have significant benefits to users who have no interest in copying the latest song in order not to pay for the CD—are the primary sources of institutional constraint on the freedom to use the logical resources necessary to communicate in the network.

At the content layer—the universe of existing information, knowledge, and culture—we are observing a fairly systematic trend in law, but a growing countertrend in society. In law, we see a continual tightening of the control that the owners of exclusive rights are given. Copyrights are longer, apply

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to more uses, and are interpreted as reaching into every corner of valuable use. Trademarks are stronger and more aggressive. Patents have expanded to new domains and are given greater leeway. All these changes are skewing the institutional ecology in favor of business models and production practices that are based on exclusive proprietary claims; they are lobbied for by firms that collect large rents if these laws are expanded, followed, and enforced. Social trends in the past few years, however, are pushing in the opposite direction. These are precisely the trends of networked information economy, of nonmarket production, of an increased ethic of sharing, and an increased ambition to participate in communities of practice that produce vast quantities of information, knowledge, and culture for free use, sharing, and follow-on creation by others.

The political and judicial pressures to form an institutional ecology that is decidedly tilted in favor of proprietary business models are running head-on into the emerging social practices described throughout this book. To flourish, a networked information economy rich in social production practices requires a core common infrastructure, a set of resources necessary for information production and exchange that are open for all to use. This requires physical, logical, and content resources from which to make new statements, encode them for communication, and then render and receive them. At present, these resources are available through a mixture of legal and illegal, planned and unplanned sources. Some aspects come from the happenstance of the trajectories of very different industries that have operated under very different regulatory frameworks: telecommunications, personal computers, software, Internet connectivity, public- and private-sector information, and cultural publication. Some come from more or less widespread adoption of practices of questionable legality or outright illegality. Peer-to-peer file sharing includes many instances of outright illegality practiced by tens of millions of Internet users. But simple uses of quotations, clips, and mix-and-match creative practices that may, or, increasingly, may not, fall into the narrowing category of fair use are also priming the pump of nonmarket production. At the same time, we are seeing an ever-more self-conscious adoption of commons-based practices as a modality of information production and exchange. Free software, Creative Commons, the Public Library of Science, the new guidelines of the National Institutes of Health (NIH) on free publication of papers, new open archiving practices, librarian movements, and many other communities of practice are developing what was a contingent fact into a self-conscious social movement. As

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the domain of existing information and culture comes to be occupied by information and knowledge produced within these free sharing movements and licensed on the model of open-licensing techniques, the problem of the conflict with the proprietary domain will recede. Twentieth-century materials will continue to be a point of friction, but a sufficient quotient of twenty-first-century materials seem now to be increasingly available from sources that are happy to share them with future users and creators. If this social-cultural trend continues over time, access to content resources will present an ever-lower barrier to nonmarket production.

The relationship of institutional ecology to social practice is a complex one. It is hard to predict at this point whether a successful sustained effort on the part of the industrial information economy producers will succeed in flipping even more of the institutional toggles in favor of proprietary production. There is already a more significant social movement than existed in the 1990s in the United States, in Europe, and around the world that is resisting current efforts to further enclose the information environment. This social movement is getting support from large and wealthy industrial players who have reoriented their business model to become the platforms, tool-makers, and service providers for and alongside the emerging nonmarket sector. IBM, Hewlett Packard, and Cisco, for example, might stand shoulder to shoulder with a nongovernment organization (NGO) like Public Knowledge in an effort to block legislation that would require personal computers to comply with standards set by Hollywood for copy protection. When Hollywood sued Grokster, the file-sharing company, and asked the Supreme Court to expand contributory liability of the makers of technologies that are used to infringe copyrights, it found itself arrayed against amicus briefs filed by Intel, the Consumer Electronics Association, and Verizon, SBC, AT&T, MCI, and Sun Microsystems, alongside briefs from the Free Software Foundation, and the Consumer Federation of America, Consumers Union, and Public Knowledge.

Even if laws that favor enclosure do pass in one, or even many jurisdictions, it is not entirely clear that law can unilaterally turn back a trend that combines powerful technological, social, and economic drivers. We have seen even in the area of peer-to-peer networks, where the arguments of the incumbents seemed the most morally compelling and where their legal successes have been the most complete, that stemming the tide of change is difficult—perhaps impossible. Bits are a part of a flow in the networked information environment, and trying to legislate that fact away in order to

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preserve a business model that sells particular collections of bits as discrete, finished goods may simply prove to be impossible. Nonetheless, legal constraints significantly shape the parameters of what companies and individuals decide to market and use. It is not hard to imagine that, were Napster seen as legal, it would have by now encompassed a much larger portion of the population of Internet users than the number of users who actually now use file-sharing networks. Whether the same moderate levels of success in shaping behavior can be replicated in areas where the claims of the incumbents are much more tenuous, as a matter of both policy and moral claims—such as in the legal protection of anticircumvention devices or the contraction of fair use—is an even harder question. The object of a discussion of the institutional ecology of the networked environment is, in any event, not prognostication. It is to provide a moral framework within which to understand the many and diverse policy battles we have seen over the past decade, and which undoubtedly will continue into the coming decade, that I have written this book.

We are in the midst of a quite basic transformation in how we perceive the world around us, and how we act, alone and in concert with others, to shape our own understanding of the world we occupy and that of others with whom we share it. Patterns of social practice, long suppressed as economic activities in the context of industrial economy, have now emerged to greater importance than they have had in a century and a half. With them, they bring the possibility of genuine gains in the very core of liberal commitments, in both advanced economies and around the globe. The rise of commons-based information production, of individuals and loose associations producing information in nonproprietary forms, presents a genuine discontinuity from the industrial information economy of the twentieth century. It brings with it great promise, and great uncertainty. We have early intimations as to how market-based enterprises can adjust to make room for this newly emerging phenomenon -- IBM's adoption of open source, Second Life's adoption of user-created immersive entertainment, or Open Source Technology Group's development of a platform for Slashdot. We also have very clear examples of businesses that have decided to fight the new changes by using every trick in the book, and some, like injecting corrupt files into peer-to-peer networks, that are decidedly not in the book. Law and regulation form one important domain in which these battles over the shape of our emerging information production system are fought. As we observe these battles; as we participate in them as individuals choosing how to behave and

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what to believe, as citizens, lobbyists, lawyers, or activists; as we act out these legal battles as legislators, judges, or treaty negotiators, it is important that we understand the normative stakes of what we are doing.

We have an opportunity to change the way we create and exchange information, knowledge, and culture. By doing so, we can make the twenty-first century one that offers individuals greater autonomy, political communities greater democracy, and societies greater opportunities for cultural self-reflection and human connection. We can remove some of the transactional barriers to material opportunity, and improve the state of human development everywhere. Perhaps these changes will be the foundation of a true transformation toward more liberal and egalitarian societies. Perhaps they will merely improve, in well-defined but smaller ways, human life along each of these dimensions. That alone is more than enough to justify an embrace of the networked information economy by anyone who values human welfare, development, and freedom.

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Notes

CHAPTER 1. Introduction: A Moment of Opportunity and Challenge

1. Barry Wellman et al., "The Social Affordances of the Internet for Networked Individualism," *JCMC* 8, no. 3 (April 2003).
2. Langdon Winner, ed., "Do Artifacts Have Politics?" in *The Whale and The Reactor: A Search for Limits in an Age of High Technology* (Chicago: University of Chicago Press, 1986), 19–39.
3. Harold Innis, *The Bias of Communication* (Toronto: University of Toronto Press, 1951). Innis too is often lumped with McLuhan and Walter Ong as a technological determinist. His work was, however, one of a political economist, and he emphasized the relationship between technology and economic and social organization, much more than the deterministic operation of technology on human cognition and capability.
4. Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999).
5. Manuel Castells, *The Rise of Networked Society* (Cambridge, MA, and Oxford: Blackwell Publishers, 1996).

PART I. The Networked Information Economy

1. Elizabeth Eisenstein, *Printing Press as an Agent of Change* (Cambridge: Cambridge University Press, 1979).

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CHAPTER 2. Some Basic Economics of Information Production and Innovation

1. The full statement was: "[A]ny information obtained, say a new method of production, should, from the welfare point of view, be available free of charge (apart from the costs of transmitting information). This insures optimal utilization of the information but of course provides no incentive for investment in research. In a free enterprise economy, inventive activity is supported by using the invention to create property rights, precisely to the extent that it is successful, there is an underutilization of information." Kenneth Arrow, "Economic Welfare and the Allocation of Resources for Invention," in *Rate and Direction of Inventive Activity: Economic and Social Factors*, ed. Richard R. Nelson (Princeton, NJ: Princeton University Press, 1962), 646–647.
2. Suzanne Scotchmer, "Standing on the Shoulders of Giants: Cumulative Research and the Patent Law," *Journal of Economic Perspectives* 5 (1991): 29–41.
3. *Eldred v. Ashcroft*, 537 U.S. 186 (2003).
4. Adam Jaffe, "The U.S. Patent System in Transition: Policy Innovation and the Innovation Process," *Research Policy* 29 (2000): 511.
5. Josh Lerner, "Patent Protection and Innovation Over 150 Years" (working paper no. 8927, National Bureau of Economic Research, Cambridge, MA, 2002).
6. At most, a "hot news" exception on the model of *International News Service v. Associated Press*, 248 U.S. 215 (1918), might be required. Even that, however, would only be applicable to online editions that are for pay. In paper, habits of reading, a credentialed version of the original paper, and first-to-market advantages of even a few hours would be enough. Online, where the first-to-market advantage could shrink to seconds, "hot news" protection may be worthwhile. However, almost all papers are available for free and rely solely on advertising. The benefits of reading a copied version are, at that point, practically insignificant to the reader.
7. Wesley Cohen, R. Nelson, and J. Walsh, "Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)" (working paper no. 7532, National Bureau Economic Research, Cambridge, MA, 2000); Richard Levin et al., "Appropriating the Returns from Industrial Research and Development," *Brookings Papers on Economic Activity* 3 (1987): 783; Mansfield et al., "Imitation Costs and Patents: An Empirical Study," *The Economic Journal* 91 (1981): 907.
8. In the 2002 Economic Census, compare NAICS categories 5415 (computer systems and related services) to NAICS 5112 (software publishing). Between the 1997 Economic Census and the 2002 census, this ratio remained stable, at about 36 percent in 1997 and 37 percent in 2002. See 2002 Economic Census, "Industry Series, Information, Software Publishers, and Computer Systems, Design and Related Services" (Washington, DC: U.S. Census Bureau, 2004).
9. Levin et al., "Appropriating the Returns," 794–796 (secretary, lead time, and learning-curve advantages regarded as more effective than patents by most firms). See also F.M. Scherer, "Learning by Doing and International Trade in Semiconductors" (faculty research working paper series R94-11, John F. Kennedy School of Government, Harvard University, Cambridge, MA, 1994), an empirical study of semiconductor industry suggesting that for industries with steep learning curves, investment in information production is driven by advantages of being first down the learning curve.

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rather than the expectation of legal rights of exclusion. The absorption effect is described in Wesley M. Cohen and Daniel A. Levinthal, "Innovation and Learning: The Two Faces of R&D," *The Economic Journal* 99 (1989): 569-596. The collaboration effect was initially described in Richard R. Nelson, "The Simple Economics of Basic Scientific Research," *Journal of Political Economy* 67 (June 1959): 297-306. The most extensive work over the past fifteen years, and the source of the term of learning networks, has been from Woolly Powell on knowledge and learning networks. Identifying the role of markets made concentrated by the limited ability to use information, rather than through exclusive rights, was made in F. M. Scherer, "Nordhaus's Theory of Optimal Patent Life: A Geometric Reinterpretation," *American Economic Review* 62 (1972): 422-427.

10. Eric von Hippel, *Democratizing Innovation* (Cambridge, MA: MIT Press, 2005).
11. Eben Moglen, "Anarchism Triumphant: Free Software and the Death of Copyright," *First Monday* (1999), http://www.firstmonday.dk/issues/issue4_8/moglen/.

CHAPTER 3. Peer Production and Sharing

1. For an excellent history of the free software movement and of open-source development, see Glyn Moody, *Rebel Code: Inside Linux and the Open Source Revolution* (New York: Perseus Publishing, 2001).
2. Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press, 1990).
3. Josh Lerner and Jean Tirole, "The Scope of Open Source Licensing" (Harvard NOM working paper no. 02-42, table 1, Cambridge, MA, 2002). The figure is computed out of the data reported in this paper for the number of free software development projects that Lerner and Tirole identify as having "restrictive" or "very restrictive" licenses.
4. Netcraft, April 2004 Web Server Survey, http://news.netcraft.com/archives/web_server_survey.html.
5. Clickworkers Results: Crazer Marking Activity, July 3, 2001, <http://clickworkers.arc.nasa.gov/documents/crazer-marking.pdf>.
6. B. Kanefsky, N. G. Barlow, and V. C. Gulick, *Can Distributed Volunteers Accomplish Massive Data Analysis Tasks?* <http://www.clickworkers.arc.nasa.gov/documents/labstact.pdf>.
7. J. Giles, "Special Report: Internet Encyclopedias Go Head to Head," *Nature*, December 14, 2005, available at <http://www.nature.com/news/2005/051212/full/438900a.html>.
8. <http://www.uscentralstation.com/111504A.html>.
9. Yochai Benkler, "Coase's Penguin, or Linux and the Nature of the Firm," *Yale Law Journal* 112 (2001): 369.
10. IBM Collaborative User Experience Research Group, *History Flows: Results* (2003), <http://www.research.ibm.com/history/results.htm>.
11. For the full argument, see Yochai Benkler, "Some Economics of Wireless Communications," *Harvard Journal of Law and Technology* 16 (2002): 25; and Yochai Benkler, "Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment," *Harvard Journal of Law and Technology* 11 (1998): 287. For an excellent

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overview of the intellectual history of this debate and a contribution to the institutional design necessary to make space for this change, see Kevin Werbach, "Super-commons: Towards a Unified Theory of Wireless Communication," *Texas Law Review* 81 (2004): 863. The policy implications of computationally intensive radios using wide bands were first raised by George Gilder in "The New Rule of the Wireless," *Forbes ASAP*, March 29, 1993, and Paul Baran, "Visions of the 21st Century Communications: Is the Shortage of Radio Spectrum for Broadband Networks of the Future a Self-Made Problem?" (keynote talk transcript, 8th Annual Conference on Next Generation Networks, Washington, DC, November 9, 1994). Both statements focused on the potential abundance of spectrum, and how it renders "spectrum management" obsolete. Eli Noam was the first to point out that, even if one did not buy the idea that computationally intensive radios eliminated scarcity, they still rendered spectrum property rights obsolete, and enabled instead a fluid, dynamic, real-time market in spectrum clearance rights. See Eli Noam, "Taking the Next Step Beyond Spectrum Auctions: Open Spectrum Access," *Institute of Electrical and Electronics Engineers Communications Magazine* 33, no. 12 (1993): 66-73; later elaborated in Eli Noam, "Spectrum Auction: Yesterday's Heresy, Today's Orthodoxy, Tomorrow's Anachronism. Taking the Next Step to Open Spectrum Access," *Journal of Law and Economics* 41 (1998): 765, 778-780. The argument that equipment markets based on a spectrum commons, or free access to frequencies, could replace the role planned for markets in spectrum property rights with computationally intensive equipment and sophisticated network sharing protocols, and would likely be more efficient even assuming that scarcity persists, was made in Benkler, "Overcoming Agoraphobia." Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999) and Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World* (New York: Random House, 2001) developed a rationale based on the innovation dynamic in support of the economic value of open wireless networks. David Reed, "Comments for FCC Spectrum Task Force on Spectrum Policy," filed with the Federal Communications Commission July 10, 2002, crystallized the technical underpinnings and limitations of the idea that spectrum can be regarded as property.

11. See Benkler, "Some Economics," 44-47. The term "cooperation gain" was developed by Reed to describe a somewhat broader concept than "diversity gain" is in multiuser information theory.
12. *Spectrum Policy Task Force Report to the Commission* (Federal Communications Commission, Washington, DC, 2002); Michael K. Powell, "Broadband Migration III: New Directions in Wireless Policy" (Remarks at the Silicon Flatiron Telecommunications Program, University of Colorado at Boulder, October 30, 2002).

CHAPTER 4. The Economics of Social Production

1. Richard M. Titmuss, *The Gift Relationship: From Human Blood to Social Policy* (New York: Vintage Books, 1971), 94.
2. Kenneth J. Arrow, "Gifts and Exchanges," *Philosophy & Public Affairs* 1 (1972): 343.

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3. Bruno S. Frey, *Not Just for the Money: An Economic Theory of Personal Motivation* (Brookfield, VT: Edward Elgar, 1997); Bruno S. Frey, *Inspiring Economics: Human Motivation in Political Economy* (Northampton, MA: Edward Elgar, 2001), 52-77. An excellent survey of this literature is Bruno S. Frey and Reto Jegen, "Motivation Crowding Theory," *Journal of Economic Surveys* 15, no. 5 (2001): 589. For a crystallization of the underlying psychological theory, see Edward L. Deci and Richard M. Ryan, *Intrinsic Motivation and Self-Determination in Human Behavior* (New York: Plenum, 1985).
4. Roland Bénabou and Jean Tirole, "Self-Confidence and Social Interactions" (working paper no. 758, National Bureau of Economic Research, Cambridge, MA, March 2000).
5. Truman E. Bewley, "A Depressed Labor Market as Explained by Participants," *American Economic Review (Papers and Proceedings)* 85 (1995): 250, provides survey data about managers' beliefs about the effects of incentive contracts; Margit Osterloh and Bruno S. Frey, "Motivation, Knowledge Transfer, and Organizational Form," *Organization Science* 11 (2000): 538, provides evidence that employees with tacit knowledge communicate it to coworkers more efficiently without extrinsic motivations, with the appropriate social motivations, than when money is offered for "teaching" their knowledge; Bruno S. Frey and Felix Oberholzer-Gee, "The Cost of Price Incentives: An Empirical Analysis of Motivation Crowding-Out," *American Economic Review* 87 (1997): 746; and Howard Kunreuther and Douglas Easterling, "Are Risk-Benefit Tradeoffs Possible in Siting Hazardous Facilities?" *American Economic Review (Papers and Proceedings)* 80 (1990): 252-286, describe empirical studies where communities became less willing to accept undesirable public facilities (Not in My Back Yard or NIMBY) when offered compensation, relative to when the arguments made were policy based on the common good; Uri Gneezy and Aldo Rustichini, "A Fine Is a Price," *Journal of Legal Studies* 29 (2000): 1, found that introducing a fine for tardy pickup of kindergarten kids increased, rather than decreased, the tardiness of parents, and once the sense of social obligation was lost to the sense that it was "merely" a transaction, the parents continued to be late at pickup, even after the fine was removed.
6. James S. Coleman, "Social Capital in the Creation of Human Capital," *American Journal of Sociology* 94, supplement (1988): S95, S108. For important early contributions to this literature, see Mark Granovetter, "The Strength of Weak Ties," *American Journal of Sociology* 78 (1973): 1360; Mark Granovetter, *Economic Action and Social Structure: The Problem of Embeddedness* (Cambridge, MA: Harvard University Press, 1973); Yoram Rosenfeld, "The E-Connection: Families, Friends and Firms and the Organization of Exchange," *Population and Development Review* 6 (1980): 1.
7. Nan Lin, *Social Capital: A Theory of Social Structure and Action* (New York: Cambridge University Press, 2001), 150-151.
8. Steve Weber, *The Success of Open Source* (Cambridge, MA: Harvard University Press, 2004).
9. Maurice Goddiert, *The Enigma of the Gift*, trans. Nora Scott (Chicago: University of Chicago Press, 1999), 5.
10. Goddiert, *The Enigma*, 106.

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11. In the legal literature, Robert Ellickson, *Order Without Law: How Neighbors Settle Disputes* (Cambridge, MA: Harvard University Press, 1991), is the locus classicus for showing how social norms can substitute for law. For a bibliography of the social norms literature outside of law, see Richard H. McAdams, "The Origin, Development, and Regulation of Norms," *Michigan Law Review* 96 (1997): 3380, 3392. Early contributions were: Edna Ullman-Margalit, *The Emergence of Norms* (Oxford: Clarendon Press, 1977); James Coleman, "Norms as Social Capital," in *Economic Imperialism: The Economic Approach Applied Outside the Field of Economics*, ed. Peter Betsworth and Gerard Radnisky (New York: Paragon House Publishers, 1987), 131-155; Sally F. Merry, "Rethinking Gossip and Scandal," in *Toward a Theory of Social Control, Fundamentals*, ed. Donald Black (New York: Academic Press, 1984).
12. On policing, see Robert C. Ellickson, "Controlling Chronic Misconduct in City Spaces: Of Panhandlers, Skid Rows, and Public-Space Zoning," *Yale Law Journal* 105 (1996): 1165, 1194-1202; and Dan M. Kahan, "Between Economics and Sociology: The New Path of Deterrence," *Michigan Law Review* 95 (1997): 2477.
13. An early and broad claim in the name of commons in resources for communication and transportation, as well as human community building—like roads, canals, or social-gathering places—is Carol Rose, "The Comedy of the Commons: Custom, Commerce, and Inherently Public Property," *University Chicago Law Review* 53 (1986): 721. Condensing around the work of Elinor Ostrom, a more narrowly defined literature developed over the course of the 1990s: Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (New York: Cambridge University Press, 1990). Another seminal study was James M. Acheson, *The Laborer Gang of Maine* (New Hampshire: University Press of New England, 1988). A brief intellectual history of the study of common resource pools and common property regimes can be found in Charlotte Hess and Elinor Ostrom, "Ideas, Artifacts, Facilities, and Content: Information as a Common-Pool Resource," *Law & Contemporary Problems* 66 (2003): 111.

CHAPTER 5. Individual Freedom: Autonomy, Information, and Law

1. Robert Post, "Mickeljohn's Mistake: Individual Autonomy and the Reform of Public Discourse," *University of Colorado Law Review* 64 (1991): 1109, 1130-1132.
2. This conception of property was first introduced and developed systematically by Robert Lee Hale in the 1920s and 1930s, and was more recently integrated with contemporary postmodern critiques of power by Duncan Kennedy, *Sex, Dressing, Law: Essays on the Power and Politics of Cultural Identity* (Cambridge, MA: Harvard University Press, 1991).
3. White Paper, "Controlling Your Network, A Must for Cable Operators" (1999), <http://www.sptech.org/cont/openaccess/cicor.html>.
4. Data are all based on FCC Report on High Speed Services, Appendix to Fourth 206 Report NOI (Washington, DC: Federal Communications Commission, December 2003).

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