## Introduction

> Most movements that are self-described as radical are highly urbanistic, or nationalistic, or oriented to obsolete class structures, or to central bureaucratic planning. The changes that we can see on the horizon are much more drastic than that. . . . People who think about social change in traditional political terms cannot begin to imagine the changes that lie ahead.
>
> - Ithiel de Sola Pool[1]

This book is an early alert about the next (global, video) stage of the Internet. It is intended for visionaries and for people who might be interested to support them. It reflects work, during the past decade, to help leading institutions evaluate, and begin to realize, the benefits of new communication technologies.

The development of strategies and projects to make the best societal (and global) use of these emerging capabilities has barely begun. Yet today, 500 million people (out of six billion) worldwide, most of them outside North America, have home access to the Internet.[2] And the next generation of global fiber optic Internet

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[1]Ithiel de Sola Pool, "Four Unnatural Institutions and the Road Ahead (1983)," in *Politics in Wired Nations: Selected Writings of Ithiel de Sola Pool*, ed. Lloyd S. Etheredge (New Brunswick, NJ: Transaction Publishers, 1998), 237.

[2] NielsenNetRatings, *Nielsen/Netratings Reports a Record Half Billion People Worldwide Now Have Home Internet Access* (March 6) (NielsenNetRatings, 2002 [cited March 10 2002]).

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backbones (fast, and with staggering capacity) has arrived quickly and now enables us to transmit all of the books in the Library of Congress to India before breakfast. During the next decade, with a light touch of leadership, many people and institutions can add a new dimension of power to world politics and do more to create a better world than at any time in history.

This book is an overview of:

A.) <u>The Internet s Next Stage</u> - the broadband (global, video) stage of the Internet that is beginning to arrive and the faster ultraband stage by the end of the decade.[3] (Recently, there was a boom-and-bust cycle of new dot-com startups; and speculators lost money in the shake-out, fall of stock prices and bankruptcies.[4] However, such

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John W. Wright, ed., *The New York Times Almanac 2002* (New York: Penguin, 2001) 808.

[3] I will use a reliable two-way 2 to 6+ megabits/second (Mbps) as a definition of broadband, since it provides enough capacity for good video links. for a range of definitions, see: National Science and Telecommunications Board, *Broadband: Bringing Home the Bits* (Washington, DC: National Research Council, 2002) 62-81.

[4] John Cassidy, *Dot.Con: The Greatest Story Ever Sold* (New York: Harper Collins, 2002).. The dot-com bubble burst at about the right time for a rational assessment: 40+ % of American households were online, yet the hyped and competitive advantages of  New Economy  dot-com startups were not materializing; and, in many cases, had not yet produced profitability. As well, the business models of many sites depended upon advertising revenue: the click-thru rate of Internet advertising was dropping sharply: it was 8% in 1998, but apparently because banner ads were a novelty; it dropped

cycles are common in the introduction of new technology into market systems and do not affect underlying forces of change. The current downturn in media attention notwithstanding, a new level of Internet services is arriving, created by a confluence of new, high-capacity, and affordable technologies: a great deal is about to happen quickly.)

B.) <u>A New Dimension of Power in World Politics</u>. This book also is about a new world of democracies and a new dimension of power in international relations. Traditionally, international relations have been conducted by governments through diplomatic practices based on the court protocols of absolute monarchs at the time of the Congress of Vienna (1815). But a new world of democracies and open societies, when combined with the new technologies and leadership, adds a new dimension that increases power. There are opportunities for progress on a global scale that would have been beyond the imagining of statesmen of earlier generations. Many institutions and individuals, not just governments, can move agendas.

C.) <u>A New (Potential) Dimension of Citizenship</u> that can improve democratic problem-solving and the performance of state and local government;

D. <u>New Sources of Funds and Support</u> for online projects that can benefit people in all countries.

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to about 0.5% in 2000 (and to 0.25% in 2001): Stuart Elliott, "Banners' Ineffectiveness Stalls an up-and-Coming Rival to TV," *The New York Times*, December 11 2000.
Vanessa O'Connell, "Looking Beyond Banners to Revive Web Advertising," *Wall Street Journal*, February 26 2001.

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E. <u>Mixed Blessings</u>, that we also should anticipate.  History shows that changes in communication technologies unleash more powerful forces than people initially realize. For example, while new communication technologies can accelerate cooperation, but they also can accelerate political conflict. If we can strengthen mechanisms for cooperation, democracy, and progressive politics, we will have used our lead-time wisely.

## I. <u>The Plan of the Book</u>

I have divided the book into two parts:

A. <u>Part I: Trends</u>

Part I draws lessons from history to forecast the likely impacts of new communications technologies if the market economy determines the future and everybody else goes along for the ride. If we do nothing outside the role of being consumers, much of this future will be beneficial (e.g., better home entertainment) although less beneficial than if we organize additional, visionary uses.

Today s Internet is primarily used to send email and read Web pages. But the next story is the new broadband (video) upgrade of the Internet  that will take the world of nine-to-five organizations and home users to new levels. It also includes the extraordinary growth of global communications capacity (e.g., new intercontinental fiber optic cables and satellites) that will make local and global Internet video connections about equal in price and good quality.

The evolving technology also changes the authorship and control of communications. For-profit companies have laid more than 100 million miles of new high-speed backbones to support future

domestic and global applications. They expect to sell new broadband capacities at monthly fees for home entertainment, providing hundreds of television channels to consumers. However, the new Internet backbones can be used by anybody with an Internet connection; and the pipelines to organizations and homes can run in both directions. The desktop PC will emerge as, de facto, an Internet television broadcast device, that can be used by individuals or organizations to create occasional programs, mini-channels, or 24x7 television channels with a national and (potential) global reach. [However, it should be noted, that the new technical capacity to reach national and/or global audiences does not guarantee viewers.]

However, there also will be a range of mixed blessings (chapter three). For example, until true broadband (2 - 6+ Mbps) capabilities arrive, Americans will be subject to the extraordinary attention tax of a loosely-regulated television industry. Today ABC, NBC, and CBS impose about a 30% tax on the viewers of their most popular shows during prime time, to be a captive audience for advertisers. (The average non-program tax rate for all shows averages 22% - 24% on leading broadcast and cable channels.)[5]

Of greater concern is that expanded competition also has shifted national and local evening news on television toward sensationalism, scandal, superficiality, and sound bites; and the endless recycling of simple ideological ideas on loud, policy-argument television. The shift is worrisome if we want to rely upon television news for public discussion and problem-solving in democracies, and perceive that there may be serious issues to be

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[5] Louis Chunovic, "TV Clutter Reaches All-Time High," *Electronic Media*, March 11 2002.

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discussed or problems to be solved. We also will face a future in which a similar competition-induced deterioration in foreign countries may add tensions to international relations and reduce the modest current capacity for sustained public discussions.

One important conclusion from Part I is that the new technologies are (to use the term of the social scientist Ithiel de Sola Pool) technologies of freedom that will create a wider horizon of open-ended options for many individuals and institutions. The passive spectator s question What Will Happen? merits a companion question, What Can We Accomplish?

Another conclusion is that thinking about the future as an Information Age or Information Society is too narrow. New communications technologies have a delayed - but more powerful - impact as they are used to organize and reorganize the world - creating new relationships for individuals and organizations, and new movements and identities. The printing press - to take one example - started an earlier information age. It also turned the criticisms of the unknown Martin Luther in a remote German province into the Reformation, which ignited the Counter-Reformation, set Europe ablaze, and left millions of people dead. And it supported new forces that eventually ended the divine right of kings and brought democratic governments to the modern world.[6]

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[6] Benson Bobrick, *Wide as the Waters: The Story of the English Bible and the Revolution It Inspired* (New York: Simon and Schuster, 2001) 12. As Bobrick notes, the English vernacular Bible was intended to strengthen the authority of the English monarchy against the Pope; its long-term effects were different than intended.

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The new age of the global, video Internet will be an age of new organization and reorganization, and an acceleration of politics. The results may not always be pro-American or increased support for American foreign policy. After the terrorist bombings on 9/11/2001, US government officials blamed the state-controlled media in the Arab Middle East for programming that was anti-American, anti-Israeli, and pro-Islamic fundamentalist, but it was a self-deceptive idea: As we will see (chapter six) during the Palestinian <u>Intifada</u> of late 2001 and early 2002 the less regulated Arab news media were even more critical of Arab governments for their ineffectiveness in pressuring America and Israel, more pro-Palestinian, and they brought the Palestinian uprising to the Arab world with live television and more graphically.

B. <u>Part II - Five Projects That Can Change the World</u>

Part II builds upon the discussion of the predictable future that will be created by technology, by commercial markets, and their likely social and political effects. It outlines five types of projects to illustrate how - with fresh thinking, vision, and a light touch of leadership - the new technologies also can shape a better future. Planning, beginning now, can meet-up with the new global capabilities on the road ahead.

These five projects should be seen as drafts that can be improved upon and refined by the perspectives, knowledge, and experience that a wider audience can bring to the creative process. (As Eric Raymond of the Open Source software movement has written,  Given a large enough . . . co-developer base, almost every problem will be characterized quickly and the fix obvious to someone. )[7] They include:

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[7] Eric S. Raymond, *The Cathedral and the Bazaar: Musings on*

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      1.) Global CSPANs to help government and NGO professionals, scientists, and others with an engaged interest in international cooperation, to linkup;

      2.) A global purchasing cooperative and startup package for undeveloped countries that will purchase (at a steep discount) capacity on the new generation of low- and mid-earth-orbit (LEO and MEO) satellites. Within the next few years it will be possible (for example) to connect (with wireless links, as appropriate) public schools in the 120 poorest countries for science education; and to bring all of the world s medical information to every clinic, even in the most remote areas.

      3.) A project that develops a new dimension of citizenship in the US; supports state and local governments; improves thinking; and that will bypass the (predictable) superficiality of local and national television news and policy argument television.

      4.) A consumer-oriented Health Channel (and on-line video archives) that will combine current broadcast media and the emerging Internet. It will provide the best, latest, and detailed health information, when they need it, to every American. And accelerate new movements for health quality and patient safety.

      5.) A new world of global cooperatives and large-scale collaboration systems to share on-line resources and accelerate progress. The proposal also identifies new sources of funding for global Internet initiatives, and it gives examples of projects that can accelerate scientific innovation in all fields, including those (e.g.,

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*Linux and Open Source by an Accidental Revolutionary*, Revised and expanded ed. (Sebastopol, CA: O'Reilly and Associates, 2001) 30.

renewable energy) that address urgent global issues and support sustainable development; strengthen inter-cultural communications, the creative and performing arts and education; and secure other benefits of international cooperation.

Happily, as we will see, it will be unnecessary to use the traditional categories of politics and ideologies and argue about whether government or the private sector, or nonprofit institutions, or individuals should play the leading role in such projects to change the world. Anybody who wants to begin the organizing can do it. Financing will be needed, but (added to the investments in new infrastructure already made by the private sector) changing the world no longer requires the vast resources commanded only by governments or the largest corporations. The people who can change the world will not necessarily be American. The new global video Internet will be like the telephone systems of the world: once built, it can be used by anybody. The key is leadership.

## II. Setting the Stage: A Brief History

In setting the stage for the chapters that follow, it will be helpful to review where we stand: Now, the computer and the Internet have arrived. The pace of adoption was rapid. In 1994 only 30,000 people had Internet links. By 1998 there were about 50 million regular Internet users in the United States. (Earlier communication technologies required much longer to achieve an equivalent adoption: 10 years for cable television; 13 years for television; and 38 years for radio.)[8] Today, 55% of American households (175

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[8] Wright, ed., *The New York Times Almanac 2002* 806-07.

million people) have a computer and access to the Internet.[9] Libraries and public schools also moved quickly: more than 80% of US public libraries went on-line by 1998, and 90% of public schools (elementary and secondary). Today, Internet links at local libraries and public schools are almost universal.[10] The Fortune 500 companies have Web sites. The rapid growth has occurred despite the fact that the personal computer is the most complex piece of technology in most American homes or on corporate desktops.

The rest of the world also is recognizing a good idea. The digital revolution and the Internet are no longer primarily an American phenomenon. As I mentioned earlier, there are basic Internet connections to almost all countries; and there were about 500 million users worldwide (from a population of six billion) at the beginning of 2002, of which about 60% were outside North America.[11]

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[9] Nua Internet Surveys, *Internet Growth Slows in US* (Online) (Nielsen/'Netratings, March 28 2002 [cited April 6 2002]). For current data see the Pew Internet and American Life Project, www.pewinternet.org/datadump.

[10] U. S. Census Bureau, *Statistical Abstract of the United States: 1999*, 119 ed. (Washington, DC: Government Printing Office, 1999) 208.
U. S. Census Bureau, *Statistical Abstract of the United States: 2001*, 121 ed. (Austin, TX: Hoover's Business Press, 2002) 155, 718.

[11] 400 million: Wright, ed., *The New York Times Almanac 2002* 807. 500 million is from Nielsen/NetRatings: NielsenNetRatings, *Nielsen/Netratings Reports a Record Half Billion People Worldwide Now Have Home Internet Access* ([cited ).. Nielsen data show usage rates in Hong Kong were the highest (90%), followed by Singapore

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There is an unexpected dimension to this international story, which should reshape our thinking. While this book draws upon history, in at least one important respect, history is <u>not</u> repeating itself.

Based on historical experience, we might expect new technologies to begin in separate geographic locations, and then expand to become national, and eventually global, in a distant future. After the demonstration of the first working telephone (1876) the construction of telephone networks began within large urban centers; then the urban centers of the East and West Coasts began to be connected in the late 1880s; and only after forty years (in 1915) were the transcontinental long distance lines connected.[12] The early construction of roads was primarily local; only in the 1950s did the nation s major interstate highway system begin construction.

But the past is an inaccurate guide. Readers may be surprised to learn that the high-speed, high-capacity, long-distance ( Big Hop ) global backbones are already completed. The slow, underdeveloped part of the new high-capacity global communications system is the final mile, or local loop, to individual televisions and desktop PCs.

This revolutionary change in global communications network capacities began in the late 1990s with a breakthrough in the

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(89%), and Sweden (87%). For current data: www.nielsen-netratings.com

[12] Michael Totty, "Yesterday's Choices," *Wall Street Journal*, September 10 2001.

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technology for fiber optic cable, which provides the high speed backbones to carry digital information.[13] Previously, one color of laser was switched on and off to transmit sequences of 0's and 1's along each filament; the new technology upgraded capacity so that, today, about 160 different colors can use each filament simultaneously.[14] Venture capitalists moved quickly: more than 100 million miles of the new fiber optic cable, at an investment of $35+ billion, was laid in two years. By comparison with the earlier capacity of undersea cables and communications satellites, the new upgrade is a tidal wave: just one of the new transoceanic cables exceeds the capacity of all of the communications satellites launched since the 1960s.[15] About 95% - 98% of the world s new communications capacity is unused by current applications and

[13] Jeff Hecht, *City of Light: The Story of Fiber Optics*, *Sloan Technology Series* (New York: Oxford University Press, 1999).

[14] International Engineering Consortium, *Hybrid/Fiber Coax (HFC) and Dense Wavelength Division Multiplexing (DWDM) Networks* [Electronic] (IEC: Online Educational Web ProForum Tutorial, 2002 [cited February 21 2002]); available from www.iec.org/online/tutorials/hfc_dwdm/index.html; http://www.iec.org/online/tutorials/hfc_dwdm/index.html. Note that Lucent s results suggest the possibility of expansion to 1,000 wavelengths per fiber. As this book goes to press in the summer of 2002, the latest capacity available commercially is 280 wavelengths/fiber, 10 Gbps/wavelength, and a 2,000 mile transmission before an impulse needs to be regenerated (v. 300 miles in 1995): Gary Rivlin, "The Madness of King George," *Wired*, July 2002, 116.

[15] George Gilder, *Telecosm: How Infinite Bandwidth Will Revolutionize Our World* (New York: Free Press, 2000) 102.

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awaiting the last mile connections and new uses.[16]

   Table I-1 shows the growth of global communications capacity:
one result of this new capacity is that wholesale prices have been
falling 50%-60%/year.[17]


Table I-1
World Submarine Cable Capacity, By Inter-Continent Link
(Figures in Gbps - billions of bits/second)[18]

| Region Potential* | 2000 | 2003 | Max.[19] |
|---|---|---|---|
| North America - Europe | 547 | 5,648 | 12,322 |

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[16] Simon Romero, "Shrinking Future of Fiber Optics Loses
Glimmer," *The New York Times*, June 18 2001.

[17] Telegeography Inc., *Submarine Bandwidth 2002:
International Bandwidth Supply and Demand* (Washington, DC:
Telegeography, Inc., 2002).
Telegeography Inc., *Telegeography 2002* (Washington, DC:
Telegeography Inc., 2002).

[18] Mark Durham, "Fiber's New Wave," *Wired*, October 2001, 77.
~add Telegeography original citation.

[19] The new undersea fiber optic cables use the DWDM
technology and currently can be upgraded to this capacity.

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| | | | |
|---|---|---|---|
| Americas | 291 | 3,696 | 8,756 |
| Asia - North America | 244 | 5,117 | 16,904 |
| Intra-Asia | 15 | 8,438 | 20,220 |
| Europe - Africa - Asia | 51 | 75 | 131 |
| TOTAL | 1,148 | 22,975 | 58,333 |

These new terabit (trillions of bits/second) transoceanic capacities also are linked to new private land-based backbones that, in Western Europe for example, provide another order of magnitude of capacity, in the petabit/second range. The capacity is far beyond any requirements of text:  In 1980 it would have taken 661 years to transmit the books in the Library of Congress from Washington to Los Angeles. In 1990 (with a 56K modem) it would have taken about 113 years. On the new terabit/second Internet backbones we can transmit all of the books in the Library of Congress to India before breakfast - actually within 15 seconds; This statistic would be even more impressive if the Library of Congress had any substantial part of its collection online to send, an example of the institutional lag to which this book is addressed.) [20]

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[20] The estimates are approximate and reflect increases in transmission capacity. Sources differ in the assumptions by which the Library of Congress holdings are converted to a digital equivalent. Usually an estimate is based on printed books alone and

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Nor - while a great deal must be done - are rural areas of the Third World excluded: In 2002, direct-link satellite projects in India will use improving satellite technology to add 83,000 telecenters and Internet kiosks and more than 100,000 village telephone connections.[21] Sub-Saharan Africa has become the first continent to leapfrog a century of now-unnecessary investment in copper wire technology: cellular telephones outnumber wireline telephones, and the next generation of cellular telephones can provide Internet links.[22]

And these new global Internet capabilities are not - like the era of

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transmission (uncompressed) as ASCII text files (rather than page images). If you use 18 million volumes, 350 pages/volume, and 2,000 characters (bytes)/page at 8 bits/byte, the estimate is about 108 trillion (tera) bits. The new $250 million India-Singapore fiber optic cable began service in April 2002 with a capacity of 8.4 Tbps: PR Newswire, "Bharti and Singtel Celebrate Completion of I2i Cable Network," *FT.com*, April 11 2002. But today, citing a single transmission rate (that begins with the 9600 baud modem of 1980) is becoming somewhat artificial: earlier, there was one telephone line or Internet backbone; today there are parallel public and private networks and the transmission could go much faster than along the one network whose (new) capacity a press release is describing. The Library of Congress s Office of Public Relations (personal communications) declines to make any official estimates.

[21] Richard Morin and Claudia Deane, "The Ideas Industry," *Washington Post*, January 1 2002. Estimate by Jonathan Lash at the World Resources Institute.

[22] Mark Turner, "The Call of Africa Grows Louder," *Financial Times*, August 21 2001.

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mass communications - one way, outbound, from America. One of the important messages of this book is that people do not have to be American to change the world.

Table I-2 illustrates another change beyond the water s edge, the start of the upgrade of the global Internet from its text-based beginning. Today, more than 4,250 radio stations from 143 countries are on-line live, and available worldwide, over the Internet.[23] The last mile broadband capacity of most US home users is still too limited for Internet television but the number of television stations, operating live, was 500 + from 75 countries in early 2002.

Table I-2

Radio/TV Stations, Live on the Internet (February 2002)

| Africa | Mali (1) | Antigua (2) |
|---|---|---|
| Algeria (5) | Mauritius (3) | Argentina (105/4) |
| Angola (2) | Morocco (2/1) | Aruba (4/1) |
| Benin (1) | Mozambique (1) | Bahamas (2) |
| Burkina Faso (1) | Namibia (1) | Barbados (3) |
| Cameroon (1) | Reunion (4/1) | Belize (1) |
| Cape Verde (1) | Rwanda (1) | Bolivia (3/1) |
| Djibouti (0/1) | Senegal (4/1) | Brazil (69/11) |
| Egypt (1/1) | Somalia (2) | Canada (270/7) |
| Gabon (2) | South Africa (10/1) | Chile (25/3) |
| Ghana (1) | Tunisia (1/1) | Columbia (17) |
| Ivory coast (1) | Zimbabwe (2) | Costa Rica (10/4) |
| Kenya (2) | | Cuba (5/1) |
| Madagascar (1) | Americas | Dominican R. (7) |

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[23] Audio on demand archiving is growing, for example from National Public Radio (www.npr.org) in the United States and the BBC (www.bbc.co.uk/radio). See: David Bowen, "Surfing the Wavebands," *Financial Times*, March 8 2002.

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Ecuador (23/3)
El Salvador (12/1)
Fr. Guiana (2)
Grenada (1)
Guadeloupe (2)
Guyana (1)
Haiti (7)
Honduras (5)
Jamaica (3)
Martinique (3)
Mexico (40/6)
Neth. Antilles (2)
Nicaragua (1)
Panama (18/1)
Paraguay (9)
Peru (12/3)
Puerto Rico (11/2)
Saint Lucia (1)
St. Kitts/Nevis (2)
St. Pierre/
Miquelon(1)
Suriname (1)
Trinidad/Tobago
 (5)
U. S. (1696/72)
Uruguay (8/1)
Venezuela (15/3)

Asia & Middle East
Afghanistan (2)
Bahrain (0/1)
Brunei (5)
China (16/6)
Cyprus (10)
Hong Kong (13)
India (6/4)
Indonesia (4)
Iran (1/3)
Iraq (1/1)
Israel (22/1)
Japan (16/1)
Jordan (1/1)
Korea (21/8)
Kyrgyztan (1)

Kuwait (4)
Lebanon (13/1)
Malaysia (1/1)
Nepal (1)
Oman (1/1)
Pakistan (1/1)
Palestinia (2/1)
Philippines (9)
Qatar (0/1)
Saudi Arabia (1/1)
Singapore (20)
Sri Lanka (2)
Taiwan (7/1)
Thailand (13/3)
Turkey (17)
Un. Ar. Emirates (7)
Vietnam (1/1)

Europe
Albania (2/1)
 Andorra (2/1)
Armenia (4)
Austria (23/1)
Azerbaijan (3/1)
Belarus (1)
Belgium (49/8)
Bosnia (7/1)
Bulgaria (7/3)
Croatia (16/2)
Cyprus (12/2)
Czech (39/3)
Denmark (20/2)
Estonia (8)
Finland (1)
France (359/205)
Georgia (0/1)
Germany (133/19)
Greece (62/6)
Hungary (24/4)
Iceland (11)
Ireland (27/1)
Italy (60/15))
Latvia (7)
Lithuania (8)

Luxembourg (15/2)
Macedonia (13)
Malta (5/1)
Moldova (2)
Monaco (3)
Netherlands (76/3)
Norway (33/1)
Poland (52/1)
Portugal (41/1)
Romania (15/3)
Russia (32/8)
Slovakia (11/1)
Slovenia (16/2)
Spain (55/12)
Sweden (30/1)
Switzerland (45/4)
Turkey (17/5)
Ukraine (3/2)
U. K. (146/11)
Vatican (4/2)
Yugoslavia (13)

Oceania
American Samoa
 (1)
Australia (45/2)
Fr. Polynesia (4)
New Calidonia (2)
New Zealand (16)
Wallis and Futuma
 (1)

Source:
www.comfm.com
February, 2002

Figures are
approximate. Excludes
private Webcams &
Internet only.

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A. <u>How to Read This Book</u>

This book is intended for visionaries and their potential supporters. For example: Board members and officers of nonprofit institutions - foundations and professional societies; philanthropists; Webmasters who want to help their institutions think about opportunities to increase their effectiveness; young people who have used the Internet and are looking for interesting and worthwhile projects; public officials who would like to see more civic engagement and effective problem-solving in their states and communities; scientists and medical researchers (and others who want to accelerate projects with people in other countries); leaders of government agencies and international organizations who want to strengthen the global political process and increase resources for the Third World; supporters of the current Public Broadcast System, and leaders of cultural and educational institutions who are interested in new technology and financing to increase their effectiveness.

The list of visionaries also can include for-profit entrepreneurs: For example, media companies interested in new business and the new global range of audiences. And the telecommunication and computer industries who want to jump-start the move to Internet broadband by a new universe of exciting applications.

The book also is intended for a wider audience of readers who are interested in the future.

Chapters 1 - 4 and the Introduction to Part II will be of interest to general readers. They discuss the trends in technology, rules of forecasting, likely blessings (and mixed blessings), developments that are interesting to watch, and the new dimension of power in international relations whose potential is unknown but that may

prove to be extraordinary. This section also will be of interest to readers (including students) who want an introduction to lessons from history and social science that can help us to think about social change and policy.

Chapters 5-9 discuss new types of projects. Each chapter begins with a brief introduction to the topic. Next, there is a specific proposal and an outline of benefits. Then, a series of questions and answers provide greater detail. A reader can readily skim the chapter, read the proposal, and glance at the questions to decide how much detail is of interest. Chapter nine may be of special interest to leaders of globalizing industries and creative advertising agencies that serve these companies.

B. Technical Evolution and Terminology

A word about terminology: We are accustomed to assign different electronic communication devices to different categories. The desktop PC connects to the Internet; the telephone is a different technology; so are radios, cable television, and walk-around devices like cellular telephones and Palm Pilots. Videoconferencing - for companies that use it - typically requires its own separate rooms and technical staff. In the near future, while these devices may remain physically separate, they all will share a similar digital technology. They can interconnect when desired. (Your desktop computer can come with a telephone and be a device to watch (or send!) television; your television can display Web pages; the technology is already arriving to listen to music and access the Internet on your next-generation cellular telephone, etc.) And thus, all devices will become part of the inclusive Internet of the future, and when I discuss the Internet, it is the potential of this inclusive Internet that I will be addressing.

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## Acknowledgments

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psychology working group in Washington, D.C. organized by Jerrold Post; to Radio Canada International for an opportunity to present these ideas to a meeting of international public broadcasters; to the MIT Communications Research Program; to a faculty planning seminar on human rights strategy at Columbia University and a related conference at the University of Bologna. (The paper for the Columbia seminar is forthcoming in a volume edited by Dr. George Andreopoulos.)[24]

Bobrick, Benson. *Wide as the Waters: The Story of the English Bible*

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[24] Lloyd S. Etheredge, "The Internet and World Politics: Unleashing a Potential for Human Rights," in *Concepts and Strategies in International Human Rights*, ed. George J. Andreopoulos (New York: Peter Lang Publishing, 2002).

*and the Revolution It Inspired*. New York: Simon and Schuster, 2001.

Bowen, David. "Surfing the Wavebands." *Financial Times*, March 8 2002, 9.

Cassidy, John. *Dot.Con: The Greatest Story Ever Sold*. New York: Harper Collins, 2002.

Chunovic, Louis. "TV Clutter Reaches All-Time High." *Electronic Media*, March 11 2002, 1, 29.

Durham, Mark. "Fiber's New Wave." *Wired*, October 2001, 77.

Elliott, Stuart. "Banners' Ineffectiveness Stalls an up-and-Coming Rival to TV." *The New York Times*, December 11 2000, C4.

Etheredge, Lloyd S. "The Internet and World Politics: Unleashing a Potential for Human Rights." In *Concepts and Strategies in International Human Rights*, edited by George J. Andreopoulos, ~xx-~xx. New York: Peter Lang Publishing, 2002.

Gilder, George. *Telecosm: How Infinite Bandwidth Will Revolutionize Our World*. New York: Free Press, 2000.

Hecht, Jeff. *City of Light: The Story of Fiber Optics*, *Sloan Technology Series*. New York: Oxford University Press, 1999.

International Engineering Consortium. *Hybrid/Fiber Coax (HFC) and Dense Wavelength Division Multiplexing (DWDM) Networks* [Electronic]. IEC: Online Educational Web ProForum Tutorial, 2002 [cited February 21 2002]. Available from www.iec.org/online/tutorials/hfc_dwdm/index.html; http://www.iec.org/online/tutorials/hfc_dwdm/index.html.

Morin, Richard, and Claudia Deane. "The Ideas Industry." *Washington Post*, January 1 2002, A19.

National Science and Telecommunications Board. *Broadband: Bringing Home the Bits*. Washington, DC: National Research Council, 2002.

NielsenNetRatings. *Nielsen/Netratings Reports a Record Half Billion People Worldwide Now Have Home Internet Access* (March 6)

NielsenNetRatings, 2002 [cited March 10 2002].

Nua Internet Surveys. *Internet Growth Slows in US* (Online) Nielsen/'Netratings, March 28 2002 [cited April 6 2002].

O'Connell, Vanessa. "Looking Beyond Banners to Revive Web Advertising." *Wall Street Journal*, February 26 2001, B1,B11.

Pool, Ithiel de Sola. "Four Unnatural Institutions and the Road Ahead (1983)." In *Politics in Wired Nations: Selected Writings of Ithiel de Sola Pool*, edited by Lloyd S. Etheredge, 227-37. New Brunswick, NJ: Transaction Publishers, 1998.

PR Newswire. "Bharti and Singtel Celebrate Completion of I2i Cable Network." *FT.com*, April 11 2002.

Raymond, Eric S. *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*. Revised and expanded ed. Sebastopol, CA: O'Reilly and Associates, 2001.

Rivlin, Gary. "The Madness of King George." *Wired*, July 2002, 112-17, 49-51.

Romero, Simon. "Shrinking Future of Fiber Optics Loses Glimmer." *The New York Times*, June 18 2001, Online-www.nytimes.com.

Telegeography Inc. *Submarine Bandwidth 2002: International Bandwidth Supply and Demand*. Washington, DC: Telegeography, Inc., 2002.

———. *Telegeography 2002*. Washington, DC: Telegeography Inc., 2002.

Totty, Michael. "Yesterday's Choices." *Wall Street Journal*, September 10 2001, R4.

Turner, Mark. "The Call of Africa Grows Louder." *Financial Times*, August 21 2001, 9.

U. S. Census Bureau. *Statistical Abstract of the United States: 1999*. 119 ed. Washington, DC: Government Printing Office, 1999.

———. *Statistical Abstract of the United States: 2001*. 121 ed. Austin, TX: Hoover's Business Press, 2002.

Wright, John W., ed. *The New York Times Almanac 2002*. New York:

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Penguin, 2001.