Eight Imperatives

for Leaders in a Networked World

Imperative 7:

Use IT to Promote Equal Opportunity and Healthy Communities

The Harvard Policy Group
on Network-Enabled Services and Government
John F. Kennedy School of Government

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Overview

"The time is ripe for public leaders to engage information technology issues more deeply, directly, and successfully."

PREFACE

As we proceed further into the new millennium, everyone from futurists to the general public has observed that information technologies are changing our patterns of social, commercial, and political interactions. These changes raise profound opportunities and threats for people everywhere. It is a revolutionary period, with many issues not yet fully understood, let alone resolved.

Until recently our public leaders—including elected and appointed officials and their overseers in all branches of government—have too often ignored technology issues or have delegated them to others. The conventional wisdom has been that technology is either not very important, or requires technical expertise rather than leadership, or is simply too risky for leaders to get personally involved.

These views are changing, however. Due primarily to the astonishing growth of the Internet and e-commerce, technology is now widely acknowledged as a critical force in shaping the future. The need for skillful and committed leadership has become obvious.

But the risks are still there.

As a result, public leaders—often under enormous and competing pressures—remain uncertain about how to successfully engage technology-related issues.

In response to these developments, Harvard University's John F. Kennedy School of Government assembled a group of distinguished public leaders to explore what was being learned about computer networking and its impacts on the roles and responsibilities of government.

The Harvard Policy Group on Network-Enabled Services and Government (HPG) includes legislative and executive leaders, private-sector and public-sector leaders, technology managers and general managers, and public officials from federal, state, and local governments in the United States and Canada. Having worked over a three-year period, the HPG concludes that the time is ripe for public leaders to engage information technology issues more deeply, directly, and successfully. To improve the quality of engagement, the HPG has developed a set of eight leadership imperatives for this critical period. Each of the individual imperatives addresses a significant leadership responsibility and is the subject of a separate paper (for a list of the papers, see the back page). Taken together, the HPG papers provide a framework to guide those who seek to develop successful leadership strategies in a networked world.

The report you are reading explains and elaborates imperative #7: *Use IT to Promote Equal Opportunity and Healthy Communities.* After reviewing trends over the past several decades toward less equality and less cohesive communities, it suggests a series of steps to better understand and counter these developments. Leaders need to aggressively explore how networking can be used to support both physical and virtual communities.

The HPG was made possible through a partnership among the Kennedy School of Government, American Management Systems, Cisco Systems, EDS, IBM's Institute for Electronic Government, the MITRE Corporation, and Unisys. The views in these papers are those of the individual members of the HPG and not the institutional views of their home organizations or project sponsors. However, it would have been impossible for the group to learn and to produce what it has without the opportunity provided by this partnership to meet together and to share insights over an extended period of time.

We sincerely hope that these papers will prove helpful to public and private-sector leaders and to the public at large.

THE HARVARD POLICY GROUP ON NETWORK-ENABLED SERVICES AND GOVERNMENT
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While the gap between rich and poor narrowed considerably through the first two-thirds of the 20th century, it has grown consistently since then. In the United States, between 1979 and 1997 (the most recent year for which we have data) the average after-tax income of the wealthiest 1% rose by $414,000, the income of the middle fifth increased $3,400, and that of the bottom 20% decreased by $100.[1]

During roughly the same period, local communities—long the dominant focus of economic, social, and political interactions—have become weaker. They don't claim our attention as they once did. Neighbors don't seem as important to us as they once did. People have moved from stable roots and familiarity within smaller communities, to serial residency and anonymity within large metropolitan regions. They identify with their communities less. Except when threatened by outside forces, they trust their governments less.[2]

Given our longstanding traditions of equal opportunity and healthy communities, these are disappointing, perhaps even dangerous trends. But will they continue? If so, what can be done about them?

Why

"What we need is to better understand what is happening and why."

GREATER INEQUALITY AND WEAKER COMMUNITIES

Relationships in family, work, neighborhood, and other communities define much of our lives. Communities provide protection, production, recognition, validation, and other support. In defining and pursuing the "good life," we are greatly influenced by what others think and by comparing our own situation with theirs. We forge our identity through interactions with the community, motivated by a powerful need to belong.

Until recently, communities have been predominantly structured by physical interactions and physical acts of production. People talked and worked together. Individual roles differed, as did shares from collective production: We certainly weren't all paid the same. We commonly justified mild and even dramatic income differences as long as they weren't too dramatic. After all, results are an incentive. If people aren't accountable for results, they won't work as hard. Ultimately, without individual accountability, the entire community will suffer.

But in most modern societies, some inequalities are constrained by demands for fairness and cohesiveness. Particularly under democracies, communities have regulated the market

to protect those who couldn't protect themselves. Communities have provided education or transportation or other services at subsidized rates to "level the playing field" and to help disadvantaged individuals join the mainstream of economic life. And sometimes the community has forcibly transferred income or services from the "haves" to the "have nots." Government provides a safety net and narrows the gap between rich and poor.

In the U.S., however, trends toward equality no longer hold. Over the past thirty years, those in the middle and lower income groups have gained but little in real income and have lost ground to those in the wealthiest groups. In the meantime, our sense of belonging within local communities has also eroded. Life has become busier and more fragmented. People have become less invested in their neighbors. The post 9/11 mood has spurred new feelings of solidarity, but will the cohesiveness last?

Shifts to a knowledge-based economy contribute to these long-term trends. Tasks relying on cognitive skills and higher levels of education may continue to widen the gap between high-paid and low-paid performers. A digital divide may exacerbate the economic divide.

If these trends continue, the negatives of a maturing information age may soon outgrow the positives. Economic growth may not be able to compensate for what is being lost in our social and community lives.

On the other hand, it is possible that trends of the last thirty years or so may not continue. Throughout history, inequality has been based on an ability of the few to control factors of production such as land or capital. In a knowledge economy, codified knowledge is the key factor for production. But codified knowledge may be difficult for a small group to control because it is too easily copied and shared over networks. As the saying goes, "Information wants to be free." Networking that improves production may ultimately benefit all and may also foster a robust sense of belonging within physical as well as virtual communities.

What we need is to better understand what is really happening and why. How can we gain the benefits but avoid the risks as communication shifts to information systems?

Judgement

"... Careful judgement is required."

WHAT TO AVOID: INACTION OR IMPULSIVE ACTION

While leaders are worried about inequality and our eroding sense of community, investments in corrective programs are few and far between.

There are many rationales for inaction. Some people have simply not noticed the trends. Others see trends, but don't see them as a problem, at least not yet. Still others think the problems will go away as technology grows cheap enough to bridge the "digital divide." Some are concerned that government is financially powerless to act. In some communities, leaders seem helplessly resigned to a slow slide to economic and political stagnation.

Even leaders who are committed to action worry about the difficulties involved. For many, government appears too slow to exert much influence on a world of rapidly changing technologies. Government intervention could easily make things worse rather than better. Government could politicize things that shouldn't be politicized, or rush in with tax-funded programs that may primarily serve to push firms to move to lower-tax jurisdictions.

While threats to national security may have produced an upsurge of trust in government, trends over recent decades seem to be reorienting power away from government and towards the private and non-profit sectors.[3] Political support for government-mandated regulation and redistribution is generally low. Government capacity for tax-funded new job or community development programs is also generally viewed as low. In many settings, watchful waiting may be wiser than rushing in, with small efforts better than large ones. Careful judgment is required.

Balance

"... a constantly readjusting balance between individual accountability and community support."

WELL-CONSIDERED, BALANCED ACTION

Rather than inaction or impulsive action, we need well-considered, balanced action. But what will this mean?

To begin, leaders must manage risks as well as returns. We don't have large reservoirs of capacity and support to fall back on if we fail. Failures to reduce inequality or develop the community could make it difficult or even impossible for future projects to succeed.

To minimize risks we need to carefully prepare, then move decisively once we are ready. Small, quick projects will be less risky than large, slow ones. Lessons from early projects must be learned and shared as efficiently as possible.

To create fair and strong communities we must balance freedom and individual accountability against standards and community support. Too much reliance on individual freedom and markets will eventually lead to too much inequality and divisiveness. Situations offering huge economies of scale cannot be expected to regulate themselves. At the other extreme,

too much government regulation and community control will eventually stifle incentives and productivity. Governments mired in political debate will not be able to innovate fast enough. These concepts are summarized in Figure 1.

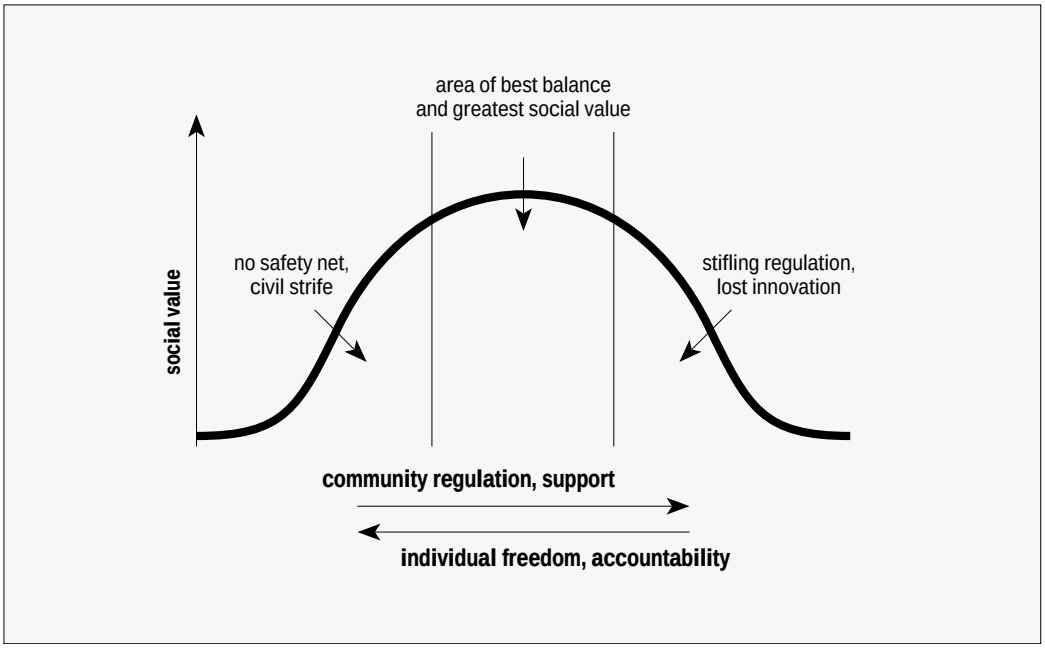

Figure 1: Balancing Individual Accountability and Community Support

To find and maintain balance, we need to learn how networks create leverage for change. A network—once built and developed—can be adapted to new uses or users at low marginal cost. This is the very definition of economies of scope and scale. The benefits of the network grow exponentially, with slow absolute growth at first. Then, when a "critical mass" or "tipping point" is reached…growth explodes.

This critical mass phenomenon can be used to benefit infrastructure, services, and social capital. The "tipping point" principle also occurs in social psychology, leading to dramatic changes in behavior once a certain level of acceptance has been achieved. We need to learn how
network-based applications might leverage these forces to reduce inequality, strengthen communities, and produce other value. If we can do this, we may yet be able to counter the negative elements of the information age via well-considered, balanced action.

Analyze

"...carefully analyze problems and opportunities, then act forcefully."

GUIDELINES FOR PROMOTING EQUAL OPPORTUNITY AND HEALTHY COMMUNITIES

So, how can we use the power of networks to promote equal opportunity and healthy communities? Consider the following eight guidelines.

1. Seek to measure and understand important social and economic trends.

The problem. Given the agency-oriented, internal focus of most government analysis, leaders may be left blind to broad-based problems in the external community and economy.

What to avoid. Beware of analysis that is too narrowly focused or fails to explore underlying causes and remedies.

What to do. Develop measurement and analytical programs including surveys to address important dimensions of community strength and weakness, especially regarding issues related to equity and citizen satisfaction.

An Example. City of Seattle Community Information Technology Indicators Program. Developed under the City of Seattle Citizens Technology Literacy and Access initiative in cooperation with the volunteer Citizens Telecommunications and Technology Advisory Board (CTTAB) and Sustainable Seattle, this program is designed to help understand the impacts of information technology on the vitality of the region. It is hoped that this research will encourage more effective resource allocation. Research topics include: Seattle Technology Residential Survey, Neighborhoods and Technology, Non-Profits and Technology, and Phase I: Indicator Development.

For more information visit: http://www.cityofseattle.net/tech/indicators/

An Example. Studies of the impacts of the Internet. Some governments are moving to learn how computer-mediated communications impact community, culture, and governance. In a government-funded study, researchers of Nanyang Technological University of Singapore recently explored how the Internet impacts children's activities and use of media. Among other things they found that "an increase in Internet use depressed television viewing, but stimulated newspaper reading, radio listening, and socializing with friends." Such studies can create a more informed basis for monitoring and managing computer-mediated communications.

For more information see: http://www.ascusc.org/jcmc/vol7/issue2/singapore.html

2. Improve life-long e-learning for a digital world.

The problem. The most important access issues are not to technology or information, but rather to education and jobs. Indeed, many think that the digital divide is a "literacy" problem more than an "access" problem.[4]

What to avoid. Do not ignore the need to reform education or to link it on a life-long basis to the world of work.

What to do. Provide at least basic access to e-learning in all communities. Then follow up with training and content for key stakeholders including teachers, administrators, employers, and parents, as well as students.

An Example. The Kentucky Virtual High School. Organized by the Kentucky Department of Education, the Council on Postsecondary Education, and major educational partners, the KVHS allows every Kentuckian to enroll in for-credit enrichment or college preparatory classes. Ranging from basic to advanced levels and taught by Kentucky certified teachers, courses are delivered online to schools, homes and other places with Internet access.

For more information on the Kentucky Virtual High School, visit: http://www.kvhs.org/

An Example. The Oklahoma VISION project. This project, led by a public/private consortium, is a statewide effort to produce digital infrastructure for communication, instruction, and accountability among teachers and students, teachers and parents, schools and districts, and districts and state agencies. Stemming from the Virtual Internet School in Oklahoma Network Act, VISION brings together hardware companies, content purveyors, application service providers, and policy leaders to demonstrate a new end-to-end educational infrastructure offering lowered cost and improved quality of service.

For more information, see:
www.onenet.net/onenetnews/category2/sub3/vision_project.htm

3. Protect the public's interest in open access to information services and infrastructure.

The problem. When networking economies of scope and scale are powerful, open standards and public access will often be required to protect the public interest.

What to avoid. While much investment in information infrastructure and related services will be private, avoid letting proprietary interests prevent fair and equitable use by the public.

What to do. Use regulatory and other powers as needed to develop and protect access to "universal service." Government may often need to serve as the "anchor tenant" for new investments in infrastructure, and may also need to update intellectual property policy to adjust to the new realities of an information-based world.

An Example. Section 508 requirements. In 1998, Congress amended the Rehabilitation Act to require Federal agencies to make their information technology accessible to people with

disabilities. Section 508 was enacted to eliminate barriers and encourage technologies promoting equal access.

For more information see: http://www.usdoj.gov/crt/508/508home.html

An Example. The E-rate program. Created as part of the Telecommunications Act of 1996, the E-rate program provides discounts of up to 90 percent of the costs of Internet access and infrastructure for schools and libraries. The independent non-profit corporation that administers the program paid out $2.22 billion in 2000, from a fund based on telephone bill taxes. While the program's future is in doubt, it has done much since its establishment to extend Internet connectivity to schools.

For information see: http://www.fcc.gov/learnnet/

4. Develop and deploy e-services to reach those who need them most.

The problem. While e-services may often be a good way to reach disadvantaged individuals and communities, the design and deployment of such services has often proceeded quite slowly.

What to avoid. Do not assume it is too costly to provide high-end applications for low-income populations. In fact, the reverse may be true, especially if easier-to-use interactivity leads to greater use of self-service applications.

What to do. Accept the challenge of designing e-services for disadvantaged communities. Use the broadly based productivity gains from e-services to focus on expanding opportunities for low-income populations.

An Example. e-NC. The purpose of e-NC is to use the Internet to improve the quality of life for all North Carolinians, especially those in rural areas. The Rural Internet Access Authority leads this grassroots initiative, with support from the N.C. Rural Economic Development Center, the legislature and state government, the telecommunications industry, non-profit organizations, and individuals. In its first year, e-NC has achieved its goal of making local dial-up Internet access available from every telephone exchange in North Carolina. Future goals include high-speed Internet access (at least 128K for residential customers and at least 256K for business customers) to all North Carolinians at competitive prices by 2003.

For more information on e-NC, visit: http://www.e-nc.org/

An Example. Telemedicine in Alaska and elsewhere. Because today's high-tech medicine requires specialized expertise, telemedicine is increasingly important, especially for remote locations. Lieutenant Governor Fran Ulmer of Alaska and others have provided leadership in developing wireless and other telemedicine techniques for Alaska. Texas, North Carolina, and Iowa are also serving as early movers in this critical public policy and service delivery arena.

For information see: http://www.telemedicine.alaska.edu/

An Example. The E-Community Connect (ECC) program in NYC. The City of New York helps overcome the digital divide in the Washington Heights section of upper Manhattan by providing access to the Internet and—more importantly—to training and community-specific content developed through partnering with community organizations.

5. Use networks to facilitate participation in local communities and institutions.

The problem. Technology has by and large not been used to help people manage their local lives more easily and in smaller units of time.

What to avoid. Don't give up on the concept of "community networks." Economies of scope and scale make locally oriented applications increasingly cost-effective.

What to do. Form public-private collaborations to help a variety of local institutions—churches, community centers, and small businesses—gain access to digital infrastructure and applications.

An Example. Smart City Cornwall. Cornwall, Ontario, a Canadian city of approximately 50,000, has aggressively sought to use intelligent systems and broadband communications to compete successfully for jobs and lifestyle in the information age. Under the leadership of Mayor Brian Sylvester, Cornwall has developed one of the fastest growing economies in Canada, focusing on job development, health care, and on a variety of tools to make it easy for citizens to participate productively and enjoyably in the life of the community.

For more information, see: http://www.smartcitycornwall.com/ and also http://www.thevillagehub.ca/

An Example. Austin, Texas. Austin has used the region's strong technical literacy and economic vitality to provide Internet access to low-income areas. With local government supporting such initiatives, Austin has become a leader in exploring the social and community-building potential of information technologies.

To examine what Austin has done, visit: http://www.ci.austin.tx.us/neighbor/default.htm

An Example. Gyandoot India Community-Owned Rural Internet Kiosks. The goal of this 2000 Stockholm Challenge IT Award-winning initiative is to establish community-owned and sustainable information kiosks in a poverty stricken rural area of Madhya Pradesh, India. Based on input from villagers, the kiosks provide access to information and records that were previously either difficult or impossible to obtain. The network of 31 kiosks now serves nearly half a million residents.

For more information, visit: http://gyandoot.nic.in/gyandoot/intranet.html

6. Use networks to strengthen social capital within virtual communities.

The problem. As life has become more frenetic and less locally oriented, many people feel a reduced sense of belonging, security, and commitment to their communities.

What to avoid. Do not think of network-based support only in terms of local communities and jurisdictions. Distant and virtual communities, dispersed jurisdictions and work groups, professional associations, ethnic, cultural, and other groups can offer many rewarding opportunities for developing social capital.

What to do. Invest in learning how groups relying heavily on computer-mediated communications can grow to become supportive, well-governed communities.

An Example. My Connected Community. My Connected Community (known as mc2) is a program funded by the Victoria, Australia, "Connecting Communities" policy to encourage community groups to create their own online communities.

"The My Connected Community program helps Victorians to get online, stay in touch, and build Internet skills and experience" said Marsha Thomson, Minister for Information and Communication Technology. "More than ever, the Internet is part of our everyday life, and the Bracks Government is committed to helping all community members to benefit from getting online."

Ms. Thomson has invited all Victorian community organizations to apply for funding, particularly those supporting hard-to-reach citizens including people from non-English speaking or indigenous backgrounds, people with disabilities, and people earning low incomes.

For more information on My Connected Community, visit: http://mc2.vicnet.net.au/

An Example. The Association of Computer Machinery's Special Interest Group on Supporting Group Work. ACM's SIGGROUP is organized to explore virtual communities and the tools that may assist in their formation, operation, and governance. The group has encouraged and evaluated the development of software. It has also organized conferences and publications that have not only researched developments related to virtual communities but have also applied them to their own multi-national "virtual" community.

For more information see: http://www.acm.org/siggroup/index.html

7. Develop an equitable revenue model for information age government.

The problem. Net-based activities may escape taxation more readily than traditional commerce, thereby reducing government funding for services to low-income populations.

What to avoid. Beware of too great a reliance on taxing sales, bank accounts, or other activities and assets that can easily be moved outside the jurisdiction.

What to do. Explore new revenue models for government, evaluating and responding to what could be lost and gained as economic activity becomes knowledge-based and global.

An Example. Ken Blackwell and business information for the State of Ohio. As in many states, the Ohio Secretary of State is responsible for business registrations and related information. As he entered office, Blackwell commissioned a performance audit that documented that many businesses had to wait several hours to get through to the Secretary of State's

office on the telephone. In offering computer-based approaches to extend access and improve service, Blackwell revised the fee structure to allow his office to cut tax-levy funding by roughly two-thirds while simultaneously improving responsiveness and customer satisfaction. According to one published study: "Ohio service on researching a corporate name and status is easier to use, better presented, with more information. It is one of the best in its class."

For more information see: http://www.state.oh.us/sos/Goals_Acc.htm

An Example. Tradable Universal Service Obligations. Universal service (i.e., the delivery of services to an entire population) is a goal of most telecommunications policies. Professor Jon Peha of Carnegie Mellon University has proposed "a novel policy to motivate private-sector operators of basic infrastructure to expand infrastructure into previously underserved regions."[5] Through this policy, telecommunications firms gaining access to state-controlled resources would also receive tradable obligations from the state in the form of commitments to service and milestones to be met. By specifying the ends (service commitments and milestones) rather than the means to achieve them (infrastructures and protocols), government can maintain competitive pressures while minimizing subsidies. With tradable obligations, firms are encouraged to develop more cost-effective strategies because they can adapt them over time to allow the most cost-efficient producer to meet the obligations.

For the full argument see: http://www.ece.cmu.edu/~peha/trade.pdf

8. Broadly engage the community in articulating future goals and plans.

The problem. The first movers to computer networking have largely been driven by market pressures and do not represent all the interests—especially the public interests—that the community should consider.

What to avoid. If government is too slow to respond to the digital world, developments could solidify in ways that are far less than optimal and very difficult to change.

What to do. Engage diversity. Community organizations, advocacy groups, and those who at present are not heavy network users will be important in defining our aspirations and investment goals.

An Example. Canada's Broadband planning process. In preparing for broadband infrastructure and applications, Canada's National Broadband Task Force has self-consciously sought to address cultural and political concerns in addition to issues of economic competitiveness. The Task Force is broadly representative of Canadian stakeholder groups and leaders.

For more see: http://broadband.gc.ca/english/resources/BroadbandSummary.pdf

An Example. Virginia's Digital Community Leadership Guidebook. While many governments are still building their e-government agenda from the inside out, some are aggressively reaching to engage a diversity of outside stakeholders in planning and development activities.

The Commonwealth of Virginia is one such government, producing guidebooks for leadership at:

http://www.councils.cit.org/ecommunities/pdf/guidelines.pdf, especially pages 34-40.

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Digital infrastructures are owned more by the private sector than earlier infrastructures such as those for transportation or analog communications. In a world of bigger and sometimes better markets the role of government has become less dominant, if not fundamentally less important. But we must remember that market forces alone will not solve some of our most critical problems related to equity and community. To maximize success, governments will need to carefully analyze problems and opportunities, then act decisively and with laser focus. Guidelines are summarized in Figure 2.

1. Seek to measure and understand important social and economic trends.
2. Improve life-long e-learning for a digital world.
3. Protect the public's interest in open access to information services and infrastructure.
4. Develop and deploy e-services to reach those who need them most.
5. Use networks to facilitate participation in local communities and institutions.
6. Use networks to strengthen social capital within virtual communities.
7. Develop an equitable revenue model for information age government.
8. Broadly engage the community in articulating future goals and plans.

In sum: Careful judgment needs to precede forceful action; market forces alone will not produce equity or strong communities.

Figure 2: Guidelines for Promoting Opportunity and Community

Next Steps

"How well are you prepared for the future?"

NEXT STEPS

To nurture equal opportunity and healthy communities, what should leaders do next? Three steps can get you started.

1. *Orient to the problem.* Issues of equality, trust, and community are often relatively invisible and unexamined. An essential but often overlooked starting point is simply to begin the conversations and exploration required for understanding relevant trends. Measure what is happening.

2. *Analyze and build support for future goals.* For many jurisdictions, starting by analyzing and building support for the future is likely to be better than rushing too quickly into risky and often controversial policies, especially those that rely on tax-based transfers from the rich to the poor.

3. *Then get into gear.* While some communities are pessimistic about the future, few are truly helpless. The information age is based on widespread and relatively inexpensive resources. Leadership is the most critical ingredient for future success.

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While most people are optimistic about the prospects for long-term economic growth, they are often pessimistic about a future beset by low social cohesiveness and trust. But the same information infrastructure and education required to develop economically can also be used to support social capital, inclusion, and participation. While rapid social change seems inevitably linked to anxiety, there is much we can do to benefit from a knowledge-based world while at the same time protecting against the risks. The future is ours to make.

This report has provided guidelines for promoting equal opportunity and healthy communities. Our next and final report in this series will explore how to prepare for the changing nature of democracy in a digital world.

The President. Using IT to develop inclusive and supportive communities requires new collaboration among the public, private, and non-profit sectors. Presidential leadership is needed to mobilize aspirations and resources.

Legislators. Locally elected legislators need to focus community attention on the need for social capital and inclusiveness as the information age matures.

Governors. Much as the President provides a focal point nationally, governors play a similar role at the state level. Governors need to mobilize stakeholders to explore issues of social capital and community.

Local leaders. While local leaders must skillfully address anxieties raised by rapid change, local success will require wise adaptation more than stubborn resistance to change.

Judges. Judges foster community through their critical role in conflict resolution. Judges must evaluate how judicial processes might best be revised to respond to emerging new patterns of conflict.

Budget directors. Resource allocation needs to meet challenges requiring private and non-profit as well as public resources. Develop an understanding of these needs and respond.

Agency and program heads. IT can be used to reach those who find traditional services difficult or even impossible to access. Your responsibility is to make sure that this potential access improvement materializes.

CIOs. IT managers have responsibility for using IT to revise business processes; in the future, CIOs must also use IT to support both real and virtual communities.

Technology community. The risks of technology must be addressed, including threats to jobs and social capital. The technology community must be a trusted partner in addressing these risks, and not seen as an opportunist.

Associations and interest groups. Groups must provide leadership in exploring how non-geographic communities can use IT to strengthen social capital and governance.

The media. "Provide light and people will find their own way." The media's searchlight is needed on issues of equity and community in a network-based world.

The public. Look for net-based ways to participate in geographic and virtual communities of importance to you.

Figure 3: Advice to Stakeholders for Promoting Opportunity and Community

Appendix A

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Appendix A

MEMBERSHIP OF THE HARVARD POLICY GROUP ON NETWORK-ENABLED SERVICES AND GOVERNMENT

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Appendix B

READINGS AND RESOURCES

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Appendix C

GLOSSARY

Application Service Provider (ASP)—A third-party organization that provides software-based services to clients from a single location over a wide-area network. Represents an outsourcing option for governments who cannot or do not want to deliver and support enterprise applications. Also referred to as Managed Service Providers (MSP) when the software is both delivered and managed by the third-party organization.

Asynchronous Communication—A communication pattern in which the two (or more) parties involved are not communicating at the same time. Telephone conversations are an example of synchronous communication—both parties must be on the telephone at the same time. An email message is an example of asynchronous communication—one party can send a message and the other can read it hours or days later.

Broadband—A general term for high-volume, multiple-channel telecommunications capacity available via a single medium (e.g. a wire or cable). While narrowband (the equivalent of one telephone voice channel) is adequate for the transmission of text and numerical data, broadband connections allow the efficient and reliable delivery of voice, data, and video over one integrated network. Because multimedia content is seen as vital to businesses and consumers alike, electronic networks are increasingly moving to broadband, which in turn will have important long-term implications for commercial development and civic life.

Database—A set of data structured to support the storage, retrieval, and analysis of information, often custom-designed for specific business applications. Databases are central to information processing since they allow new and more efficient ways of assembling records and organizing work. A key step in developing databases is implementing consistent definitions or standards so that data can be meaningfully shared among users. Examples include standard charts of accounts for financial data, standard methods of coding geographical information, and standard templates for archiving audio and video material. (See also: Standards.)

Digital—Data that has been created, transmitted, or stored as a string of signals coded as "1"s (on) or "0"s (off). Data in digital form (text, numbers, graphics, voice, video, etc.) can be stored and processed by computers and communicated at high speed over electronic networks with complete accuracy and reliability. Exact copies of digital data can be made in which the nth copy is indistinguishable from the original.

E-government—A term commonly used to describe the interaction between government and citizens over the Internet. E-government has evolved rapidly from merely publishing or disseminating government information electronically, to online interactions and transactions between government and citizens. As governments begin to reorganize and integrate their work processes to take advantage of computer networks, e-government may come to define a new or transformed relationship between citizens and government enabled by networks.

Electronic Benefits Transfer (EBT)—Refers to the transfer of government benefits (funds or resources) to individuals through the use of a card technology. Individuals access their benefits through Automated Teller Machines or retail point-of-sale terminals.

Electronic commerce (or e-commerce)—Transactions where money is exchanged for valuable goods and services with either the money and/or the goods and services transported over computer networks.

Encryption—The act of scrambling information into a form called a cipher, usually to keep it from being read or modified by unauthorized parties. This is achieved through the use of algorithmic "keys" that scramble the information at one end and unscramble it at the other. Computer-based encryption can be used both for purposes that society wants to prevent (criminal and terrorist communications) as well as those it wants to support (private and secure social and commercial communications).

Enterprise Application—A software application that is used throughout an organization (or enterprise). For example, payroll systems or resource management systems that are used by multiple departments or an online payment processing application that is used across organizational boundaries are all enterprise applications. Such applications are important for realizing economies of scale and for ensuring information can be shared.

Fast Follower(ship)—In the context of innovation diffusion, a fast follower is one who adopts an innovation shortly after the initial innovator (or first mover), but appreciably before the majority of those who eventually implement the innovation. For a more detailed discussion of innovation diffusion see Everett M. Rogers, *Diffusion of Innovations*, Third Edition. New York: The Free Press, 1983.

Geographic Information System (GIS)—A set of hardware and software tools used to gather, manipulate, and analyze geographically referenced data. GIS are used by many government agencies. For example, transportation departments use GIS to determine the most efficient corridors for highway construction, and housing departments use GIS to help select the best locations for urban renewal projects.

Geographic Positioning System (GPS)—A system that uses satellites and small, portable receivers to determine the physical position of an object or person. Increasingly ubiquitous, GPS are used to track the locations of airplanes, boats, cars, and even individuals to within an accuracy of a few meters.

Hardware—Broadly, the physical components of information technology: computers, peripheral devices such as printers, disks, and scanners, and the cables and switches that link digital networks. The key components of computer hardware are microprocessor chips, which have doubled in productivity every 18 months, as measured by instructions executed per dollar (a phenomenon referred to as Moore's law). (See also: Software.)

HTML—Hypertext markup language. See: World Wide Web.

Information infrastructure—The interdependent capacities and standards for digital communication and data processing (both hardware and software) that support the flow of information, much as a highway infrastructure supports the flow of vehicles. (Hence, the vernacular catchphrase, "Information Superhighway," as a general reference to the interconnected system of computer networks exemplified by the Internet.) The ongoing expansion of this information infrastructure raises vital issues about when and how to establish and refine the technical standards on which it operates, including important related questions about funding, security, privacy, and collective democratic values.

Information technology (IT)—The umbrella term that encompasses the entire field of computer-based information processing: computer equipment, applications and services, telecommunication links and networks, digital databases, and the integrated technical specifications that enable these systems to function interactively. (See also: Information infrastructure.) The rapid development and expansion of these technologies over the last twenty years has ushered in the current historical period widely referred to as the "Information Age" or "Information Revolution," comparable in economic and social magnitude to the Industrial Revolution of the early 19th century. The profound transformations brought about by computer networking have made information processing (rather than industrial manufacturing) the key factor in economic productivity and global commerce, thereby supplanting large segments of the traditional blue-collar labor market with a white-collar force of information or knowledge workers.

Internet—The vast network-of-networks that uses open rather than proprietary standards to support computer-based communications at an incredibly large and efficient worldwide scale. Originally developed by the U.S. Defense Department for use in research in the 1960s, the Internet has become the foundation of our information infrastructure, an ever-expanding universe of network services and applications organized in geographically dispersed rather than centralized form.

Kaizen—Originally defined in Masaaki Imai's book *Kaizen: The Key to Japan's Competitive Success*, *kaizen* refers to a process of continuous improvement through small sustainable steps.

Knowledge-based economy—A term used to describe an economy in which the defining factor of production is knowledge. The 19th century saw the rise of the industrial-based economy in which goods were produced in large industrial manufacturing plants. Today, a growing number of people produce, use, and share knowledge in their day-to-day work. Since information can be expressed digitally, computer networks have enabled the rapid growth of the knowledge-based economy.

Leadership—Any act by an individual member on the behalf of a group, with the intent to get the group to better meet its goals. Leadership for previously known problems relies heavily on authority and technical expertise, while leadership for new or adaptive problems relies on getting the group to confront the inadequacies of its old values and routines, and thereby develop more effective solutions. In general, the challenges of the information age (which involve a high degree of confusion and conflict resolution) call for adaptive leadership.

Lifecycle Costs—The costs of developing, maintaining, operating, and eventually retiring an IT system or application. When budgeting for IT initiatives, stakeholders often focus on development costs, overlooking future costs that can represent a larger percentage of the full lifecycle costs.

Managed (or Management) Service Provider (MSP)—See: Application Service Provider (ASP).

Marginal cost—The cost of the next in a series of products. Typically, first products cost more because of the expenditures required to set up the production process, with the unit cost then falling over time as the volume of activity increases. For most manufactured goods, however, diminishing returns-to-scale eventually cause marginal costs to rise. With information-technology products, by contrast, the dynamics are dramatically different: extremely high set-up costs (hundreds of millions of dollars for some software products) followed by almost zero costs for extra copies and no diminishing returns-to-scale for extremely high production volumes. Pricing policies for information goods are thus markedly different than for traditional industrial goods, and pricing policies in the economy at large are likely to change as the Information Age progresses.

Network—A set of communication paths (or channels) and the points (or nodes) they connect, including switches to determine which channel will be used when more than one is available. Computer networks, like telephone networks, can be thought of as telecommunications highways over which information travels. Networks benefit greatly from economies of scope and scale. Digital networks typically use packet-switching rather than circuit-switching to greatly increase efficiency and throughput. (See also: Switching)

Open-source—Computer programs that are distributed as open-source are distributed along with access to the source code—the program instructions as written by the programmer. Once distributed, the author of the program must allow users to modify the code and redistribute it freely, while users are prohibited from selling the program or any derivative thereof without the accompanying source code. The open-source nature of the program is usually protected by an open-source license such as the GNU General Public License (GPL). The rationale behind open-source is that a larger community of programmers will use, improve, and develop the program.

Pen-based Computer—A computer that the user interacts with via an electronic pen or stylus rather than a keyboard or mouse. Most PDAs (see below) or hand-held computers are pen-based computers.

Personal Digital Assistant (PDA)—A small hand-held computer that can be carried around by an individual, and that is most commonly used for personal management tasks such as storing phone numbers, reading email, or scheduling. As wireless technologies continue to develop, PDAs are also being used to communicate over networks.

Portal (or Internet Portal)—On one level, a gateway or single point of entry through which the user can access related information from a variety of sources. For example, many governments are launching portals as a single point of entry to government information. It is interesting to note, however, that as governments adjust to the concept of a single point of entry, they are beginning to rethink how they interact with constituents. Rather than organizing the user's experience around agency boundaries, they are breaking down these boundaries to organize information and interactions around the user's needs.

Productivity—The ratio of goods produced in relation to the resources expended in production. Increasing living standards largely depend upon increasing productivity. Production processes that use information efficiently will typically be much more productive overall than older industrial production methods. This is the principal driving force behind the commercial, social, and political changes catalyzed by information technologies.

Prototype—A pre-production, functioning model of a system or application. A prototype is generally used for the evaluation of design, performance, or production potential.

Public goods—Goods with impacts that "spill over" beyond those directly involved in buying and selling, thus weakening market forces as the mechanism for efficient resource allocation. Computer-based services have the potential of providing many positive spillovers to the public sector, since the marginal cost of IT production over time is virtually zero. One of the paramount political questions of the Information Age is where to draw the boundary between public and private benefits and, therefore, who should pay.

Scope Creep—The gradual accumulation of new or expanded requirements after a project plan (project scope) has been agreed upon by all parties. Scope creep is a significant risk to implementation success as it increases cost and extends project timelines.

Server—A computer program that provides services to other programs or computers. This term is also used to describe the computer on which such a program operates. In the "client-server" network model, client programs make requests from servers connected to the same network. On the World Wide Web (see below) a browser acts as a client program, making requests for files or other information from web servers. These servers can be located any place in the world that is connected to the Internet.

Share-in-Savings/Revenue—A financing strategy whereby government compensates a private-sector partner with a share of funds saved/raised as a result of the partnership. This financing strategy is commonly used when the private-sector partner agrees to cover the up-front costs of a project. It is also used to align incentives with desired outcomes.

Slow Trigger, Fast Bullet—An analogy used to describe an implementation strategy in which careful project planning and preparation (the slow trigger) is followed by swift and decisive action steps (the fast bullet) that quickly move the project to a stage that safely demonstrates value.

Smart Card—A small electronic device or token (often the size of a credit card) that stores information in a memory chip. Information can be added, read, or changed using a smart card reader.

Software—A catchall term for the sets of instructions (programs) used to operate computer hardware. Software production and maintenance today has become a primary determinant in the success or failure of business and government organizations.

Source Code—See: Open-source.

Standards—In the context of electronics, standardized technical specifications allow functions to be coordinated by automatically adhering to the set standard. Thus, standards for the voltages used for signaling allow devices to "talk to one another" in a consistent

format, and standards for financial accounting allow for the meaningful aggregation and analysis of financial databases. With information technologies there is an inherent tension between the creation of new capabilities through innovation (a few people trying new ways to do things) and the subsequent applications of those capabilities through standardization (many people following established ways of doing things). Determining when and how to set standards is therefore a critical leadership issue, as is deciding whether such standards should be "open" for use by the general public or whether they should be protected by copyright or patent statutes.

Switching—The engineering mechanism that designates alternate channels or paths in a telecommunications network. Historically, telephone networks have used circuit-switching, where an entire channel between two connections is made available for the duration of the communication. Most computer networks, by contrast, have been designed to use packet-switching, which breaks up the transmitted data into individual units or "packets," each of which contains the destination address of the data. The packets are then independently routed through the network and reassembled by the computer at the destination address. Packet-switching allows data from multiple users to efficiently use the same path on the network. Major developments are now underway to enable packet-switched networks to carry digital voice and video more effectively.

Total Quality Management (TQM)—A management philosophy that became popular in the 1980s and 1990s. TQM is focused on continuously improving the performance of all individuals and processes in achieving customer satisfaction.

World Wide Web (www or Web)—Standardized tools and software that allow non-technical users to find, display, and communicate text, graphics, voice, and video located on the Internet. The Web's fundamental components include HTML (hypertext markup language), pointers or hyperlinks (that rapidly access specific material that may reside on computers halfway around the world), and browsers (software that allows users to display and interact with Web content). Web technology is credited with democratizing the Internet by simplifying and streamlining key networking tools and functions for the general public.

END NOTES

[1] The Congressional Budget Office, Historical Effective Tax Rates, 1979-1997, Preliminary Edition, May 2001. http://www.cbo.gov/ftpdoc.cfm?index=2838&type=1. While intergenerational movement is higher in the U.S. than many other places, with options for upward (and downward) mobility—the gap between rich and poor is clearly growing.

[2] The erosion of social capital is forcefully presented in Robert Putnam's book *Bowling Alone: the Collapse and Revival of American Community*, Simon and Shuster, 2000. Efforts to measure and develop public policy responses are described and analyzed through the Saguaro Seminar at: http://www.ksg.harvard.edu/saguaro/putnam.html. The September 11, 2001 attacks on the World Trade Center and the Pentagon generated a swell of community consciousness that may or may not result in permanent change. Putnam's analysis has generated considerable attention and controversy, especially his public policy recommendations.

[3] See John Donahue and Joseph Nye (editors), *Governance Amid Bigger, Better Markets*, Brookings Institution Press, 2001.

[4] Andrew Blau as quoted in March 3, 2002 Mercury News article, reprinted at: http://e-ratecentral.com/archive/Bulletins2002/bulletin_203.htm

[5] From "Tradable Universal Service Obligations," Telecommunications Policy, Vol. 23, July 21, 1999, pp. 363-74. PDF, for other papers by Jon Peha, see: http://www.ece.cmu.edu/~peha/papers.html

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