

The Mobile Generation

Global Transformations at the Cellular Level

A Report of the Fifteenth Annual Aspen Institute
Roundtable on Information Technology

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THE ASPEN INSTITUTE

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This report is written from the perspective of an informed observer at the conference. Unless attributed to a particular person, none of the comments or ideas in this report should be taken as embodying the views or carrying the endorsement of any specific participant at the conference.

Foreword

Every year we see a new dimension of the ongoing Digital Revolution, which is enabling an abundance of information to move faster, cheaper, in more intelligible forms, in more directions, and across borders of every kind. The exciting new dimension on which the Aspen Institute focused its 2006 Roundtable on Information Technology was *mobility*, which is making the Digital Revolution ubiquitous. As of this writing, there are over two billion wireless subscribers worldwide and that number is growing rapidly.

People are constantly innovating in the use of mobile technologies to allow them to be more interconnected. Almost a half century ago, Ralph Lee Smith conjured up “The Wired Nation,” foretelling a world of interactive communication to and from the home that seems commonplace in developed countries today. Now we have a “Wireless World” of communications potentially connecting two billion people to each other with interactive personal communications devices.

Widespread adoption of wireless handsets, the increasing use of wireless Internet, and the new, on-the-go content that characterizes the new generation of users are changing behaviors in social, political and economic spheres. The devices are easy to use, pervasive and personal. The affordable cell phone has the potential to break down the barriers of poverty and accessibility previously posed by other communications devices.

An entire generation that is dependant on ubiquitous mobile technologies is changing the way it works, plays and thinks. Businesses, governments, educational institutions, religious and other organizations in turn are adapting to reach out to this mobile generation via wireless technologies—from SMS-enabled vending machines in Finland to tech-savvy priests in India willing to conduct prayers transmitted via cell phones.

Cellular devices are providing developing economies with opportunities unlike any others previously available. By opening the lines of communication, previously disenfranchised groups can have access to information relating to markets, economic opportunities, jobs, and weather to name just a few. When poor village farmers from Bangladesh can auction their crops on a craigslist-type service over the mobile phone, or government officials gain instantaneous information

on contagious diseases via text message, the miracles of mobile connectivity move us from luxury to necessity. And we are only in the early stages of what the mobile electronic communications will mean for mankind. We are now “The Mobile Generation.”

Aspen Institute Roundtable on Information Technology. To explore the implications of these phenomena, the Aspen Institute Communications and Society Program convened 27 leaders from business, academia, government and the non-profit sector to engage in three days of dialogue on related topics. Some are experts in information and communications technologies, others are leaders in the broader society affected by these innovations. Together, they examined the profound changes ahead as a result of the convergence of wireless technologies and the Internet.

In the following report of the Roundtable meeting held August 1-4, 2006, J. D. Lasica, author of *Darknet* and co-founder of Ourmedia.org, deftly sets up, contextualizes, and captures the dialogue on the impact of the new mobility on economic models for businesses and governments, social services, economic development, and personal identity.

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The Aspen Institute

January 2007

THE MOBILE GENERATION

GLOBAL TRANSFORMATIONS
AT THE CELLULAR LEVEL

J. D. Lasica

The Mobile Generation

Global Transformations at the Cellular Level

J. D. Lasica

Introduction

Innovative mobile technologies are causing disruptive, tectonic changes that will shape inalterably the way the next generation will live, work, play, and interact with the rest of the world. Evidence of these changes is so great among young people today that some observers are dubbing youth culture “The Mobile Generation” because of their propensity to remain attached to a wireless device that is evolving into not so much a phone as an “always on” digital communicator.

In India, worshippers send text prayers to the temple of a Hindu God. In China, coupons received on cell phones are redeemable at McDonald’s. In Singapore, drivers can pay tolls and buy tickets with a mobile device. In South Korea, an online dating service sends a text message when a person matching your profile is nearby. In Los Angeles, high school students flirt, make dates, and carry on courtship rituals in electronic form. People in 22 countries cast 680 million text-message votes for contestants during the most recent season of *American Idol*. In Bangladesh, farmers use mobile devices to learn the true market value of their produce, cutting out unscrupulous middlemen. In Stockholm, customers use mobile phones to find nearby restaurants. A British mobile carrier lets users point their cell phones to the sky to identify constellations. British soccer star David Beckham carried on an affair via mobile texting and was undone when his pecked peccadilloes were revealed to the media. In Japan, a breath analyzer attached to a mobile device screens truck drivers and bus drivers for intoxication. In Milan, a traveler can window shop at pricey boutiques, tag locations with her mobile phone, and share the information with her friends so they can retrace her steps when they visit months later.

In short, mobile devices are fast becoming the most pervasive and ubiquitous technology ever invented.

The implications of the new mobile landscape are just beginning to be appreciated. Among those attempting to assay the new landscape were 27 thought leaders from the worlds of mobile technology, public policy, online business, academia, finance, and national diplomacy who were convened by the Aspen Institute Communications and Society Program for the Fifteenth Annual Aspen Institute Roundtable on Information Technology (see Appendix for a list of roundtable participants). The fundamental question from which they began was this: How will the user of 2015 use these devices and services?

The roundtable, held in Aspen, Colorado, from August 1-4, 2006, explored a variety of related issues, including technological and behavioral changes already taking place around the world as a result of widespread and innovative uses of wireless devices; trends in these behaviors, especially among the youth generation; and the possible impact on cultural values in the decade ahead. The roundtable also looked at the new economics of the Mobile Internet and emerging business models, from small startups in remote outposts to transnational telecommunications giants, as well as the social and political implications of these changes.

Charles M. Firestone, executive director of the Aspen Institute Communications and Society Program, moderated the discussions. J. D. Lasica, an author and co-founder of the grassroots media organization Ourmedia.org, served as rapporteur. This report represents the rapporteur's synthesis of the highlights of the four-day roundtable, buttressed by excerpts from reading materials provided to the participants.

Background of the Mobile Telephony Marketplace

In his book *The Mobile Connection* (Elsevier, 2004), Rich Ling traces the history of mobile telephony, beginning with marine communications as one of the first mobile radio-based systems in the first years of the 1900s. By the middle of the 20th century, police departments, fire-fighting units, taxi companies, and others began widespread deployment of radio-based communications.

The 1980s saw the maturation of various mobile telephony standards, allowing increasing capacity as mobile telephony became more popular with the public at large. In the late 1980s European public telephone net-

work operators began to develop GSM, a digitally based standard that has come to dominate the world's mobile telephone market. Ling writes:

GSM allows for international roaming, is backward compatible with other systems, allows for various national tariff systems, and includes the ability to send and receive various data-based services, such as the much-maligned Wireless Application Protocol (WAP) and the much-adulated Short Message System (SMS). In addition, it includes items such as caller ID, call waiting, and voice mail.¹

By 2003 nearly 69 percent of all mobile telephone subscribers in the world were using the GSM system. In Japan, DoCoMo I-mode emerged with an alternative system that provides access to a variety of services, including short text messages. At the same time, handheld devices worldwide were becoming smaller and less bulky, with lunchbox-size phones best suited for the car giving way to lightweight handsets that could be carried conveniently in the user's pocket.

By 2003... more people had mobile subscriptions than subscriptions to traditional land lines.

More recently, mobile communication has expanded in several new directions. In addition to person-to-person voice calls, the average consumer now has a wealth of choices, including access to wireless local area networks (LANs), handsets that browse the World Wide Web, and turbo-charged network speeds for commercial customers. In addition, social networking has exploded in popularity, with millions of people using cell phones and other mobile devices to exchange photographs, video clips, and sound files with each other, as well as to publish them to public and private Web sites.

By 2003 there were about 1.16 billion subscriptions to mobile telephone services worldwide—indeed, more people had mobile subscriptions than subscriptions to traditional land lines. That year, roughly one-third of all mobile phones were in Europe, 40 percent in Asia, and slightly less than a quarter were in the Americas. About 3 percent of mobile telephones were in Africa, and 1 percent were in Oceania.

The number of mobile subscribers worldwide recently reached 2 billion. With the Earth's population at 6.6 billion people, this means that roughly 3 out of every 10 people now have mobile devices. Connecting the first billion mobile users took 12 years; connecting the second billion took 2.5 years, and connecting the third billion will take less than that.

Three out of every ten people now have mobile devices.

Although a 2000 study by Eurescom² showed some educational and income-based differences in access to and use of the mobile telephone, on the whole, Ling and other observers conclude that the “digital divide”

issues associated with the personal computer and the Internet do not appear to apply to the world of mobile telephony. A mobile phone requires the user to dial a number to put a call through—no extraordinary feat for most people. Beyond that basic function, multimedia messages, Internet chat, and other advanced functionalities seem to befuddle rich and poor, educated and uneducated alike.

Overview of the New Paradigms

As we plunge headlong into an interconnected mobile society, wireless will be a linchpin of the new order. The information, communications, and entertainment platforms of the 21st century are moving from the telephone, television, and personal computer to broadband-enabled mobile devices. The new capabilities enabled by mobile telephony are changing the behaviors of the emerging mobile Internet generation and beginning to shape cultural values and norms.

An astonishing 750 million mobile phones were sold during 2005 with users spanning the globe:

<i>Country</i>	<i>Users in millions</i>
China	440
United States	177
India	123
Japan	88
Germany	69
United Kingdom	54
Italy	54
South Korea	37

This snapshot merely hints at the diversity in the needs and uses of mobile telephony in various countries. On the whole, most of the 2 billion people who use mobile telephony are considered low-end users.

The following are some of the trends that Dan Schulman, chief executive officer of Virgin Mobile USA, said his company is seeing:

- The limits of battery life matter greatly to mobile users,
- The basic cell phone's form factor (i.e., factors related to design and functionality) needs to be enhanced,
- Standards for sharing media and paid content—including reasonable use of digital rights management—still need to be worked out in the marketplace; people want to own content and access it across multiple devices,
- In developing nations, ring tones are an increasingly significant presence on cell phones, allowing users to personalize their devices and make them their own,
- Mobile phones with modern software store the user's content, preferences, and contacts while letting the network know where the user is; in the near future, a mobile device will double as an electronic wallet, permitting fast and convenient payments with a click or two.

In the United States, mobile users' behavior is shaped in part by the capabilities of their devices. "Business models affect usage models," Esther Dyson, an Internet investor, author, and editor of *Release 1.0* at CNET, observed. The Pew Internet and American Life Project, Associated Press, and AOL conducted a survey of the U.S. public during the period of March 8-28, 2006, asking cell phone users what features they have on their phones and what they would like to add.

The percentage of cell phone owners who said they use certain features was as follows:³

<i>Percentage of users who use this feature now on their cell phones</i>	
Send and receive text messages	35%
Take still photos	28%
Play games	22%
Access the Internet	14%
Send/receive e-mail	8%
Perform Internet searches	7%
Trade instant messages	7%
Play music	6%
Record video clips	6%
Get mobile maps	4%
Watch video or TV programs	2%

The following were the features survey respondents said they don't use but would like to have and use on their mobile devices:

<i>Percentage of users who don't use this feature now but would like to have and use on their cell phones</i>	
Get mobile maps	47%
Send/receive e-mail	24%
Perform Internet searches	24%
Play music	19%
Take still photos	19%
Record their own video clips	17%
Access the Internet	16%
Watch video or TV programs	14%
Send and receive text messages	13%
Play games	12%
Trade instant messages	11%

In addition, the Pew study found evidence of a variety of social changes that mobile telephony seems to be shaping.

Cell phones enable real-time action and engagement. One example is how people use their mobile phones to get help in emergencies. Another example is evident when people use their phones to alert each other on the fly about all kinds of things—personal news, spur-of-the-moment events, gossip, changes in plans, convening of groups or meetings, even political activity. One term that is now used to describe these communications is “smart mobbing,” which means that this technology allows people to pass along information and to learn and act instantly on data that is important to them.

Cell phone use also is changing the character of our public spaces.

Cell phone use is encouraging people to reallocate portions of their time and their communications patterns. Many people use their phones for spontaneous “calling around” when they have free time on their hands. They make these spontaneous calls when they are traveling, when they are waiting in line, and when they are walking down the street. This phenomenon appears to be adding to the volume and flow of communication with others.

Cell phone use also is changing the character of our public spaces. One can now sit on a train or walk through a park and hear some of the most intimate details of strangers’ lives because of the way they are chatting on their cell phones. To a great many people, this phenomenon comes as an unwelcome consequence of their use of a mobile phone. Cell phones are blurring the boundaries between what is public and what is private.

Cell phone use is changing expectations about when and how others are available to us. The survey results show how much cell owners have a love-hate relationship with their phones. On one hand, they like to be able to reach out to others no matter where they are. On the other hand, they sometimes are not too happy that others—perhaps including their bosses and work colleagues—can reach out to them at any place and time.

The Pew survey suggests the new ways in which mobile media use might grow in the near future. Notable numbers of cell owners know about and want access to the new applications that are being installed in cell phones: Internet browsing (especially for maps and directions),

music playing, gaming, photo sharing, video watching, and, of course, instant messaging and texting.⁴

A recent survey found that 80 percent of Americans ages 18 to 29 own cell phones, and 65 percent of those users send text messages on a regular basis. This practice has become so widespread that the National Collegiate Athletic Association (NCAA), which restricts phone communications with sports recruits, recently announced that it is considering imposing text-message limits as well.⁵

A vice president at the research firm M:Metrics told *Advertising Age*, “They [cell phone users age 13-17] are crazy for mobile. They see [a mobile device] as this little digital communicator that they can take with them wherever they go.”⁶

Indeed, the Pew survey found differences in cell phone use among various age groups. The survey makes clear that young cell phone users—those between ages 18 and 29—have different experiences with their cell phones than do older Americans. Compared to older cell phone owners, young adults are more likely to reserve their calls until the hours that do not affect the minutes used in their rate plan; they are more likely to make spontaneous calls when they have free time; they are more likely to use a cell phone to avoid disclosing where they are; and they are more likely to feel burdened by the intrusions the cell phone brings into their lives. In addition, they are more likely to experience sticker shock when monthly bills arrive.⁷

Young people in particular are embracing forms of participatory media. Already, 33.2 percent of 18- to 24-year-old Americans post photos to Web sites via mobile phones, according to another survey.⁸ By contrast, only 18.7 percent of these young adults play downloadable mobile games.

Studies show that young consumers are among the heaviest users of premium wireless features such as messaging, game downloads, photo services, sports information, and entertainment news. Teens ages 13-17 use phone features to get restaurant and movie information at more than twice the national average.

People in vastly different societies are embracing cell phones—the new kids on the technology block—at a faster rate than they are adopting personal computers because they are easier to use and less expensive than PCs. “A mobile phone is more personal,” Stanca said. “We keep it

in our pocket. It's always on. Ubiquity is key." People use Short Message System (SMS) and e-mail in entirely different ways, with SMS reigning supreme on the mobile.

Indeed, the cell phone, rather than the personal computer, is the constant companion for today's hip and socially networked consumer. Why wait until you get home to log onto the PC to tell your 10 closest friends about your date? Teens use a network-friendly cell phone to relay stories, pictures, and videos instantly. "You can use [the mobile application] in this 2- or 3-minute gap while waiting for a train," Kakul Srivastava, product manager for photo-sharing site Flickr, told *Business Week*. "People are out there, living their lives. They are not sitting in front of the computer."

Cell phones offer other capabilities PCs lack. A service called Dodgeball allows users to see a real-time map of friends' locations, collected through the Global Positioning Systems (GPS), which is available in most phones. When users of JuiceCaster.com, a service of mobile marketer Juice Wireless, post pictures or video from their phones, users can see information about where the pictures were shot.

Differences by Region, Not Just by Age

Several roundtable participants—particularly Dyson of CNET and Kamal Quadir, CEO of CellBazaar—underscored the different roles cell phones play in different geographical regions. In southern Asia and Africa, for example, mobile subscribers share information about crop prices to prevent unscrupulous middlemen from taking advantage of them. "These devices are not just about media and entertainment," Dyson underscored.

Padmasree Warrior, executive vice president and chief technology officer of Motorola, said that the needs of the developing world will be a dominant force in steering the mobile marketplace in the years immediately ahead. Mobile is a global market with widely divergent needs in different regions. "Of the next billion people who'll connect, more than half are in places like India, China, Brazil, and Africa," Warrior said. In India, 700 million people are under the age of 35, and many of them will want to see how mobile devices can add value to their daily lives. There and elsewhere in the developing world, illiteracy is a fact of life, and mobile devices will need to adapt to people instead of the other way around.

Reaching people who are unconnected presents enormous design challenges in that significant numbers of potential mobile users cannot type or read. Text messaging is foreign to them, and many cannot even enter a phone number. Mobile companies are working on new form factors that replace the need to press alphanumeric keys with other input-output options. “We have to think beyond typing,” Warrior said.

In other places, poverty alone is not a barrier to mobile phone penetration. Mircea Dan Geoana, Senator and chairman of the foreign relations committee of Romania’s Senate, said that in his relatively poor country of 22 million people there are already 10 million mobile phone subscribers—a number that far outpaces PC penetration.

The full scope of how mobile technologies will affect our lives in the areas of public safety, education, politics, and others has yet to be appreciated. Murray Gell-Mann, co-founder of the Santa Fe Institute, observed that we have only begun to recognize some of the ways in which mobile technologies will affect contemporary society. Mobile devices are now routinely used during drug deals and other crimes. Terrorists and insurgents have used cell phones as triggers for roadside bombs, and they are sophisticated in their use of prepaid cell phones to avoid detection.

On the positive side of the ledger, mobile communication offers the prospect of in-the-field distance learning programs and other educational opportunities. Mobile technology provides fertile ground for experimentation in political activism and civic engagement. In the past two U.S. national elections, the two major political parties began to use cell phones and personal digital assistants (PDAs) tied to remote databases in massive get-out-the-vote operations.

Even in the unlikely realm of religion, mobile is making an impact. Indonesian entrepreneur Craig Abdurrohim Owensby sends subscribers a daily text message with a verse from the Koran. In Germany, the Hanover Evangelical Youth church relays its service using SMS. More than 1,000 people across Europe may take part in the weekly service; churchgoers are permitted to send up to five heartfelt messages or personal prayers during mass, and the priest reads some of the text messages during the service. An Internet company contracted by the church transmits the service in short, youth-friendly phrases such as, “God says fear not cos I’ve saved u.”

“Mobile phones are a hugely popular form of communication among young people, and we wanted to bridge the gap between youth culture and the church,” the Reverend Stefan Heinze told *The Guardian* newspaper.¹⁰

From places of worship to the classroom and the workplace, one thing is certain: Future uses of mobile will play out in ways none of us can imagine.

Myths and Realities of the Mobile Landscape

To date, a variety of myths have sprung up around the mobile marketplace. Shona Brown, senior vice president of business operations for Google, and Deep Nishar, product management director of Google, spelled out several areas in which we need to separate perception from reality.

The first misconception, Brown and Nishar said, is that the United States could be regarded as a Third World country with regard to mobile penetration and usage. Compared to Europe and Japan, Americans are often described as far behind the curve in the mobile telephony marketplace.

In fact, there are more than 177 million users of mobile phones in the United States, compared with 205 million PC users and 211 million Internet users, and mobile telephony is being adopted at a far faster rate than was radio, television, cable TV, or the Internet. Americans, particularly young users, are embracing mobile technologies in large numbers.

Another widespread myth, Brown and Nishar said, is that small mobile devices have an input-output problem that needs to be solved. According to this belief, these devices are now so small and contain so many features and functions that they perform none of those functions well.

“The fact is that generation 2015 has already adapted to this device,” Nishar maintained. He pointed to the example of his seven- and nine-year-old daughters, Shivani and Devanshi, who took their father’s cell phone and quickly figured out how to snap photos, upload them to the Web, and add text captions. “Now they want to do this all the time,” he added.

A third myth is the notion, put forward chiefly by the entertainment companies, that mobile users are primarily interested in rich multimedia content. The oft-heard battle cry emanating from corporate board rooms—“Content is king!”—consists of more than a little wishful thinking, Brown and Nishar said.

The reality is that speed, ease of use, and in-the-moment sharing are features that users find much more engaging and useful than taking repurposed fare from television or the movies and sticking it on a mobile device. In Japan, fewer than 2 percent of mobile customers access streaming television programming, although such programming is widely available. In China, one billion text messages are exchanged each day over wireless phones. The same phenomenon is evident in Western culture; young people in the West can't get enough of sending text messages to each other. Perhaps conversation, rather than content, is the ruler of the kingdom.

A final myth is the popular notion that phones will eventually replace computers. After all, the thinking goes, cell phones have already morphed into cameras and music players; why should they not also absorb, Borg-like, the functions of the personal computer as well?

Such a change simply won't happen, Brown and Nishar said. When the day arrives that a device as small as an iPod nano has all the processing power of today's most powerful desktop computers, people will still not gravitate to a handheld device for their computing tasks. The average session on a mobile phone lasts four minutes. The average Internet session on a personal computer lasts two hours. "You're not going to do that on your phone," Nishar said. People use these devices for different purposes. They are not about to spend two hours pecking at small keys on a handheld device.

This observation does not mean that certain features of the PC will not be adopted by mobile phones. They will. More of us will use our mobiles to send e-mails, text message our friends, and engage in real-time chats while having seven sessions open at a time. All the other reasons for which we use PCs—such as creating word processing documents, communicating, playing big-screen games, creating illustrations, and editing photos—will remain, while our mobile devices whirl and ring nearby, at the ready for more episodic, less intense uses.

Padmasree Warrior of Motorola introduced—and summarily shot down—another prevailing myth: the idea that we will see "a single über-device—a Swiss Army device that will do everything." Today's young people increasingly are relying on the versatility and always-on nature of modern mobile devices. Because multitasking is part of their cultural aesthetic, they seek out multiple experiences on their devices.

No single device, however, can comfortably deliver the full panoply of needs demanded by serious gadget hounds. A Sidekick will always deliver a more satisfying Web browsing experience, although a matchbook-thin cell phone may provide a superior music listening experience and unparalleled portability.

Arturo Artom, founder and CEO of Netsystem in Milan, concurred that the 1990s notion of convergence—the idea of a single box containing a television, computer, and telephone—is dead. “The future is making niche devices that perform tasks exceptionally well,” Artom said.

At the same time, Warrior added, mobile phones serve as a “sharp multiplier” of access devices as increased digital functionality is integrated into them. Many new cell phones come bundled with features such as digital picture-taking, e-mail, MP3 music playback, video, and so on. Those kinds of feature add-ons are likely to continue in the years ahead.

Shifting Cultural Behaviors and Values

As wireless devices penetrate our daily lives and disrupt social rhythms that have evolved over decades, it is only fair to raise questions about the impact and disruptions that are likely to play out in the workplace, schools, relationships, family life, and elsewhere.

On one level, wireless technologies are already affecting how members of the Mobile Generation interact with others—across the hall, down the street, or around the globe—through text, voice, and pictures. On a deeper level, we are beginning to see glimpses of how increased connectivity will affect such basic underpinnings of our social fabric as individuality, privacy, and identity. For example, the combination of location-specific technologies with mobile-commerce records can create a profile of individual actions, behavior, and even thought that exceeds anything previously possible.

The implications for widespread social change wrought by mobile technologies are potentially staggering. At the same time, technology rarely brings about change or dislocation without a culture ripe for its transformative effects. The Japanese experience in adopting mobile telephony may prove instructive.

Mizuko Ito, a cultural anthropologist of technology and editor of the book *Personal, Portable, Pedestrian: Mobile Phones in Japanese Life*, has observed that despite the popular tendency to equate Japan with the

future of mobile phone use, many of the hallmarks of Japanese's fascination with wireless are deeply embedded in the culture. Any exploration of modern Japanese technoculture typically begins with the *keitai* Internet.¹¹

Keitai, the Japanese term for a mobile phone, might roughly translate as a *portable*, or something you carry with you. In contrast to the cell phone or the mobile, however, which emphasize technology and function, the Japanese term emphasizes the relationship between user and device, Ito observes. "A *keitai* is not so much about a new technical capability or freedom of motion but about a snug and intimate technosocial tethering, a personal device supporting communications that are a constant, lightweight, and mundane presence in everyday life." People came to understand the term *keitai* to convey the idea of always-on, always with you connectivity. By 1999 Internet e-mail and Web surfing had become standard features of the *keitai*, and in the past few years digital photos, video, games, instant messaging, and digital cash have been added to the mix. Among Japanese young people, the *keitai* has become more of a text-based communication device than a phone.¹²

In a series of ethnographic studies Ito helped conduct in 2004 at Japan's Keio University, she found that most mobile phone communication was carried on with an intimate circle of close friends and family—generally two to five others and rarely more than 10. She also found that uptake of mobile telephony was highest for users who had the greatest motivation. In a 2005 article in the periodical *Japan Focus*, she writes:

The value on personal and private communication was particularly strong for high school students living with their parents, who had very few settings in which they could have private conversations with friends and lovers. We found the highest rates of mobile communication among young couples living apart. The mobile phone became a space of intimacy that was theirs alone. Much of the exchange between couples was "sweet nothings" that functioned to affirm their connection with each other rather than explicit acts of communication. For example, a teenage couple in one of our studies would start by sending a steady stream of e-mail messages to each other after parting at school.

These messages would continue through homework, dinner, television shows, and bath and would culminate in voice contact in the late evening, lasting for an hour or more. A trail of messages—"it was nice talking to you," "yeah, me too," "I'm getting sleepy"—might follow the voice call, ending in a good night exchange and would begin again upon waking. This steady stream of text exchange, punctuated by voice calls and face-to-face meetings, define a kind of "tele-nesting" practice that young people engage in, where the personal medium of the mobile phone becomes the glue for cementing a space of shared intimacy.¹³

For heavy mobile phone users and texters, Ito writes, their social relations are always on: "The connected state is the default, and the discontinued state is noted." A secondary feature of always-on mobile youth culture is young people's tendency to text or talk while doing something else. Such multitasking manifests itself in numerous different ways, as in scenes in urban Japan in which school kids text while riding their bicycles at a snail's pace along crowded sidewalks or travel to and from school in small packs while chatting and talking and typing into their phones.

Ito cautions that each society absorbs and internalizes technologies in different ways. In the same article, she writes:

I don't see technology as a foreign object "impacting" and "transforming" social life and cultural patterns. Rather, the relationship between technology and society is more organic and co-constitutive. Technologies are objectifications of particular cultures and social relationships and, in turn, are incorporated into the stream of social and cultural evolution. In other words, Japanese technology and usage patterns are likely to replicate in other contexts only to the extent that there are similarities in the overall "technosocial" ecologies of mobile media practice and communication. Nothing "inherent" in the mobile handsets themselves is socially or culturally transformative.

Ito predicts that the recent massive wave of mobile phone adoption in China and India, as well as the more advanced wireless and broadband infrastructures of South Korea, promise to overshadow Japan's dominance in any discussion of mobile societies. Although the Japanese played a key role as early adopters of the mobile revolution, a new phase is beginning, in which ubiquity, utility, and engagement are the catchwords.

Brendan Gaffey, principal of McKinsey & Company, told the roundtable participants that he is increasingly seeing people gravitate to the mobile phone or personal computer to accomplish different tasks. "People are more comfortable doing certain things on a mobile device rather than on a computer," Gaffey said. For example, young women in Japan say they often shop online at night on their mobile phones from the comfort of their bed. The personal computer, particularly in Japanese society, is a shared device, whereas the phone is considered a personal device tied to a particular user.

The current norm—the idea that mobile devices are tied to an individual—is part of a general trend in the personalization of media. Padmasree Warrior noted, "With a cell phone, instead of calling a place, you're now calling a person."

The freedom to reach out and touch somebody anywhere can hardly be overemphasized in the mobile realm. "These devices are ushering in a subtle but profound change in how we interact with one another," said Jerry Murdock, co-founder and managing director of Insight Venture Partners. "The desire to be in the moment marks a real shift, as the line between the virtual experience and the discrete experience begins to blur. A couple goes to a movie, parts ways, and then texts each other before they go to sleep. The notion of people maintaining an ongoing dialogue with one another, wherever they are and throughout the course of a day, week, or month, is a real change." Murdock used the term "co-presence" to describe this emerging era of continual communication.

Dan Schulman of Virgin Mobile said he sees the emergence of a generational gap between what adults and the youth market think is proper or acceptable social behavior in the mobile space. Whereas adults fret about their children's lack of social interaction, as they sit in solitude texting near-strangers, youths take a different view. "Talk to kids and they think they have more friends than they've ever had," Schulman said. "Thirty-four percent of kids claim they have a best friend whom they've never met."

We are using our mobile devices not just to stay in touch and make friends but as a substitute for other social interactions. “I know a 32-year-old whose boyfriend used SMS to break up with her,” recounted John Seely Brown, director emeritus of Xerox PARC. Google’s Shona Brown shot back: “For the record, that’s tacky.”

Recently the media have produced numerous stories about the social networking craze seen chiefly in Web sites such as YouTube, Facebook, and MySpace (the latter has more than 100 million registered users). In many ways, the phenomenon reaches back to older virtual communities such as the WELL and Tripod, which were early manifestations of the idea that online relationships and friendships could be based not on geography but on affinity and mutual interests. “You have real relationships with these people that you’ve never met,” Murdock said.

Apart from the personal relationships struck on these so-called friends sites, another interesting aspect of social networks, Schulman said, is that youth culture places a higher value on corporate brands than does mainstream society. “On MySpace, brands and bands have more friends than anyone else. Kids trust brands much more than institutions to improve the world. I think authority is moving away from institutions to brands,” Schulman said.

Troy Pearsall, senior vice president of technology at In-Q-Tel, wondered what will happen when Generation 2015 moves into the workplace. “I don’t want my confidential business information flowing into your social network,” Pearsall said. There also must be limits on employees sharing and publicly disclosing work products, he said. “Hiring managers need to ask, ‘am I hiring an individual or a mob?’”

The social networking phenomenon is not really new, nor is it a hallmark of the digital age. It harks back to clan culture and the desire to join social groups. “What is MySpace but a high school at a national level?” observed Deep Nishar of Google. What has changed, however, is that the dialogue has turned into an ongoing, always-on conversation. Today, social networks, or friend sites, are wising up to wireless, and

**“...I think
authority is
moving away
from institutions
to brands.”**

Dan Schulman

MySpace now comes preloaded on at least one wireless start-up's cell phones. Companies such as Google, Yahoo!, and Facebook have designs on mobile social networking. "The connectivity of technology has moved mobile," said moderator Charles M. Firestone, executive director of the Communications and Society Program at the Aspen Institute.

That facet of ongoing dialogue can be witnessed not only in texting but in the phenomenon of sharing photos, and now videos, with friends, colleagues, and loved ones. Several Web 2.0 start-ups are banking on the Mobile Generation's itch to instantaneously share with others dark and grainy footage, taken at dank bars, crowded dance clubs, and raucous concert halls. Instantaneousness, not high production values, is the whole point.

John Seely Brown of Xerox PARC called this capability "a powerful context mechanism." A video or series of images, coupled with a handful of words, can convey a great deal of information about an event or experience. Brown also pointed to an even newer phenomenon: the explosion of massive multiplayer online games in China, where as many as 100,000 people turn out in the streets of an urban center with their mobile devices to participate in a "treasure hunt."

Yet such always-on connectivity pose potential downsides. Nishar, who oversees Google's wireless efforts, said, "Our synapses are becoming hard-wired. We had Generation X and Generation Y. Now we have Generation ADD"—an allusion to the multiplicity of media and communication data streams vying for our attention. If multitasking is an essential trait of the Mobile Generation, what do we lose in the bargain?

To be sure, that behavior is not restricted to young people. William T. Coleman III, founder, chairman, and CEO of Cassatt Corp., said he returns phone calls, listens to CNBC, tracks his stock portfolio, and reads his e-mail while driving to work. He often sees his fellow gym members flit between three TV channels simultaneously while walking a treadmill. "People are learning to multiprocess better. Gamers may have a different set of talents and need to learn how to develop their skills to focus on a single problem."

Esther Dyson of CNET spoke about the expansive opportunities for mobile applications that "foster interaction among people. These devices are present almost all the time. They become almost part of you. Some large percentage of people with a cell phone sleep within eight

feet of it.” She also picked up on the theme of the culture of distraction—the constant pressure to stay engaged and to focus on the *now*, crowding out reflection and perhaps the ability of younger people to think long-term or broadly. She expressed concern about the long-term societal implications of this trend, citing psychology professor Barry Schwartz’s book *The Paradox of Choice*: “You don’t have to commit, since you can always change your plans, and you don’t want to commit, because you can always find out about another, newer possibility.”

“I’m concerned about whether kids will learn how to think analytically and structurally if they haven’t been challenged to,” Dyson said. “I worry about something I call Mental Diabetes Type 2—a lack of ability to think deeply and in a concentrated fashion over a period of time. We have too many choices too much of the time. What should I be paying attention to? Will kids develop passion on their own if their attention is distributed too widely? We’re getting a diet of empty information calories that’s overprocessed, oversugared, and too bite-sized. While appealing, it leads to a lack of commitment and satisfaction and ultimately makes you less happy.”

David Kirkpatrick, a columnist and senior editor at *Fortune* magazine, observed that the always-on characteristic of the Mobile Generation instills a different kind of media experience and ultimately a different social environment. “If you always have instant access to the Internet with an infinite number of video streams, ranging from amateur videos to old reruns of *Friends*, it presents a different world. You risk the fragmentation of a shared experience, the loss of a commonality and social glue that binds us together,” Kirkpatrick said.

Michael Lomax, president and CEO of the United Negro College Fund, wondered whether the ways in which young people are using mobile devices to establish relationships will have a long-term effect on how we interact with one another as a society: “If I’m a teenager and I’m constantly expressing every feeling I have, does that spill over when I don’t have the device? Does restraint go out the window entirely?”

Youths Develop New Sets of Skills

Other participants at the roundtable were more sanguine, asserting that mobile phones and computers were leading kids to have more friends and more social interaction. Particularly for young people,

texting on mobile devices has become as natural as putting on jeans in the morning.

SMS text messaging was never intended to be a mass market data application. Mobile networks invented it as a way to alert us when we had voicemail. “Nobody expected this to become a person-to-person service,” writes Alan Moore, a mobile industry consultant and author of *m-Profits*. “But we humans are unpredictable.”¹⁴

Person-to-person SMS has grown to become the largest data application on the planet.

The first text message was sent December 3, 1992, when British engineer Neil Papworth sent an early “MERRY CHRISTMAS” from his computer to a colleague’s mobile phone. Since its launch, person-to-person SMS has grown to become the largest data application on the planet. Americans sent nearly 65 billion SMS messages in the first six months of 2006—nearly double the number sent during the same period in 2005, according to the CTIA-The Wireless Association. With 1.8 billion active users of SMS text messaging worldwide today, there are almost twice as many users of SMS as there are Internet users (1.05 billion), and five times more people actively send SMS than use any form of instant messaging (IM).

Although a widespread perception exists that Americans aren’t taking to SMS, analysts believe U.S. usage is running only four years behind the adoption curve in Europe. Today, 40 percent of American mobile users use SMS regularly, according to a September 2006 study by the CTIA. By contrast, 92 percent of Scandinavian mobile users and 75 percent of British mobile users tap out SMS messages daily. “This is an absolute certainty,” Moore writes. “SMS will be as huge in America as it is in Scandinavia, Korea, Singapore, etc.”

The amount of SMS traffic today is staggering. In the United Kingdom, 10 percent of mobile users under age 20 average at least 100 text messages per day. In South Korea the figure is 30 percent: Nearly one in three Korean teenagers thumbs out 100 text messages every day. Across the globe, in survey after survey, young people say they much prefer SMS to e-mail.

Texting has become an everyday part of life for many youths. A 14-year-old South Carolina girl used a text message to rescue herself from

an earthen dungeon. A 16-year-old used the cell phone she had gotten as a birthday present to send a parting message to her family before a gunman in her Colorado school fatally shot her: Emily Keyes wrote, “I love u guys.”¹⁵ Millions of members of the Mobile Generation are using mobile technologies to interact, share, answer polls, enter sweepstakes, donate to charity, and stay connected.

Such widespread use of social media by young people should allay some concerns about whether we are ushering in a Generation ADD. McKinsey & Company’s Gaffey said, “Access to information is ubiquitous today, and while we suffer on the level of deep thought, today’s kids are developing a more intricate set of skills in a much faster way, allowing them to combine knowledge across industries and interest groups.”

Vanu G. Bose, CEO of Vanu, Inc., a wireless communications infrastructure company, said that the misgivings about the always-on Mobile Generation expressed by Dyson and others “made me shudder, because it reminded me of what my dad was always telling me.” Bose noted that parents in every generation worry about the same issues of focus and attentiveness. In his youth, he spent much of his time on video games and recreational sports. “But I did develop some ability to concentrate. You learn to concentrate around the things you’re passionate about. I think the fundamental issue is: Are you passionate about something?”

Shona Brown, who is part of Google’s senior management team, agreed: “I was a precocious and lazy child who got terrible grades in high school. It was only while playing sports that I learned leadership skills and discipline.”

Jerry Murdock of Insight Venture Partners and others said that the fears of generational ADD are overblown. “The interesting thing about the social networking phenomenon,” Murdock said, “is that the kids are displaying new modes of behavior and interaction, without putting a value judgment on it. We’re moving out of the information age—information is ubiquitous, it’s become a commodity—and we’re moving into an age where the *context* of what you’re communicating is key. We all know an order of magnitude more than our fathers and grandfathers did. The speed with which kids are processing information from all directions is scary. They’re displaying bimodal communication and new, unique forms of expressing themselves digitally. Compared to my generation growing up in the 1970s, kids today are much more connected to

their groups of friends and networks, and they're much more intent on extracting value from them. To my mind, the always-on generation means that kids are becoming increasingly aware of context and value."

David Kirkpatrick of *Fortune* pointed to a bill passed in the U.S. House of Representatives in July 2006 by a vote of 415-10 that would ban all social networks from public schools. The Deleting Online Predators Act would cordon off access to commercial Web sites that let

"The digital world gives us total reach—the ability to distribute our own works all over the world..."

John Seely Brown

users create public "Web pages or profiles" and offer a discussion board, chat room, or e-mail service. Such a broad category would not only cover social networking sites, it also would sweep in a wide range of interactive Web sites and services, including Blogger.com, AOL, and Yahoo's instant-messaging features, as well as Microsoft's Xbox 360, which permits in-game chat. Most important, Kirkpatrick said, it would have no effect on online predators. "It's indicative of the mindset of the older generation. Rather than thinking about the tremendous virtues that can come out of social networks, they're moving in the opposite direction. They're all terrified of MySpace."

The lone teenager in the room, Andrei Mihai Pogonaru, from Romania, came forward and related his experience in playing massively multiplayer online games for years. The most popular of these games, *World of Warcraft*, now has 6 million subscribers worldwide. In the game, he developed a close relationship with a knight elf queen. They finally decided to meet in person in London. "He was a nice guy, but we had little in common outside the game. We disagreed on everything." Although the distinction between role-playing fantasy worlds and the real world can sometimes blur, youths and adults generally understand that millions of us move seamlessly from one role and context to another.

John Seely Brown of Xerox PARC said the most important cultural shift he is witnessing is the rise of the amateur class—*amateur* taken from its Latin root, meaning "to love." "The kids today are committed to passion-based creativity," Brown said. He cited DJ Danger Mouse's *Grey Album* mash-up; the millions of examples of user-created anime pinging around the Internet; and countless examples of fan fiction,

which offer a rich backstory for characters that may have been created by professional authors. Hip-hop continues to thrum with the jargon and poetry of the streets, and the number of kids doing remixes is skyrocketing. “All this requires immense concentration,” Brown said. “The digital world gives us total reach—the ability to distribute our own works all over the world. I think we have an inspiration gap, and a lot of the kids we’ve been talking about here—the distracted and the dispossessed—have no inspiration.”

“Technology does not manufacture wisdom.”

Charles M. Firestone

Brown added that youths are starting to engage in productive learning, or productive inquiry, around subjects they are passionate about. The result, he said, is a coupling of imagination with productive inquiry to build entirely new environments. “Many kids today do more than just explore the Web. They create, tinker, share, and build on each other’s creations. We are gradually building a culture of tinkering, which lays the foundation for a grounded understanding of theoretical topics that you learn about in school. Also, the Net helps you put into practice those theoretical concepts. A young person can learn what it means to be a computer programmer by joining an open-source community such as Linux. What a great way to learn—acculturating into a new, distributed kind of apprenticeship where the community mind becomes the expert to which one apprentices.”

Aedhmar Hynes, CEO of the global marketing firm Text100 International, said her two teenage children have “far richer” social interactions with their friends than she did during her youth. MySpace allowed her 13-year-old daughter to remain connected with friends after the family moved from San Francisco to Connecticut. “Parents and teachers are ignorant about these new technologies, and the younger generation is laughing at them. You don’t need to fear, or even understand, the technology. You need to be talking to your kids,” Hynes said.

Charles Firestone of the Aspen Institute added, “Sometimes we get caught up in the radical changes that technology can foster. But the technology does not manufacture wisdom. We need to remember the value of the human element: the nurturing parent, the inspiring teacher, the wise leader.”

Looking farther out, Hynes said, “By 2015, people will think and operate in very different ways than they do today. We’re seeing an increasing fragmentation of where people are getting their information. No longer are major institutions exerting the most powerful influence on the way young people think and behave. Now it’s all about peer groups and communities. With the continued growth of the long tail, what we all look at on our mobile device’s third screen will be terribly different.”

The New Economics of the Mobile Internet

Over the roundtable’s four days, the participants touched on several factors that are driving the mobile Internet—or, perhaps more precisely, mobile Internets, given that the tastes of cell phone-carrying American teens have little in common with the practical needs of Bangladeshi farmers. Societies are bending the new wireless tools in different directions. In the West and in Japan, multimedia-rich features are geared to middle-class consumer markets. In developing nations, mobile telephony is creating local entrepreneurs, investments at the edges, and push-based billing services.

The first “mobile commerce” application came about in 1998, when two Coca-Cola vending machines in Finland were SMS-enabled. A thirsty consumer who didn’t have cash could just send a text to the vending machine, and out popped a can of Coke.

The year 2000 saw the first mobile advertising via SMS. A decade ago, no one could have predicted that SMS text messaging revenues today would exceed \$70 billion per year. (Those dollars aren’t for cans of Coke, but mobile carriers’ cash registers go *ka-ching* every time someone sends a text message.) That figure is more than 30 times greater than total e-mail revenues worldwide—indeed, it is greater than Hollywood box office, global music sales, and video game software revenues combined.¹⁶

Stakeholders are now looking at the mobile space for signs of the next SMS-style revenue potential. Particularly in Europe, Asia, and North America, the mobile Internet opens the door to multiple avenues of monetizing products, services, and content (in the broadest sense of the word) offered by a wide variety of actors. Although SMS, ring tones, and music subscriptions have commanded most of the attention in the

mobile space to date, other commercial opportunities are beginning to elbow their way to the foreground.

Gone are the days when the telecommunications industry forecast unbridled growth and handsome profits on the basis of voice communication. Instead, McKinsey & Company's Brendan Gaffey described to the roundtable participants how mobile operators are seeking new markets in data services. One potentially lucrative opportunity takes the form of mobile television.

A McKinsey survey of German consumers in October 2005 found widespread support—at least in the abstract—for mobile television.¹⁷ Survey respondents gave the following chief reasons for why they might want to watch mobile TV:

<i>Percentage of users who access mobile TV for the following reasons</i>	
To pass the time	57%
Because I can	52%
To stay informed	43%
Only access to video	14%
Enjoy content	5%
Other	7%

If the mobile TV marketplace proves fertile, the kinds of companies primed to get in on the action and profit handsomely span the gamut globally.

- *Content providers* such as Universal, Formula 1, and the National Basketball Association, create or own the broadcasting and distribution rights for mobile video or sell the rights to broadcasters and third parties.
- *Broadcasters* buy content or produce content themselves, transform content into broadcast-ready formats, and schedule programming for streaming broadcasts: CNN, NBC, MTV, and Eurosport are prime examples.

- *Mobile aggregators* are new players in this space. They adapt content to the requirements of handsets and package programs for mobile delivery. Go TV and MobiTV are among the start-ups seeking to carve out a niche for themselves.
- *Platform operators* bundle channels and encrypt content for secure delivery to multiple destinations. Crown Castle (from the United States) and tu-media (in South Korea) offer these services.
- *Network operators* supply infrastructure for broadcasting and are responsible for broadcasting over available frequencies. Crown Castle and T-Systems (Germany) are among the players in this arena.
- *Customer management companies* and distributors engage the customer in a contractual relationship, handle the billing, and distribute devices to the customer. T-Mobile, Vodafone, and Verizon are among the carriers that offer retail services.
- *Handset manufacturers* produce TV-enabled mobile handsets and make them available to customers, either directly or through a retail distributor. Nokia, Motorola, Samsung, and Siemens are some of the better-known mobile device makers.
- *Operating system producers* make the software that powers the mobile TV devices. Symbian and TTPCom are two such players.

Factoring in all these players with a potential finger in the pie, McKinsey & Company's Gaffey described a "mobile paradox." Although mobile phones are in the hands of 2 billion people today, data services account for only about \$25 billion in revenue, and most of this total comes from text messaging. The hurdles are large, therefore, in getting people to use, adopt, and pay for new data services.

How will the spoils of mobile TV be divided up? That, indeed, is the

question. Based on established data revenue models, with streaming video—the 3G and 4G Unicast model—the content producer can rake in about 40 percent of revenues (based on a consumer paying a subscription of \$15 per month), the aggregator 10 percent, and the carrier or network operator 50 percent. In the mobile video broadcast model, with a separate network owner (i.e., an additional player in the value chain), the content producer and mobile operator would receive less (e.g., 25-35 percent of the proceeds for the content owner, 35-45 percent for the mobile operator service provider), with the third-party network operator capturing perhaps 25-35 percent of the revenue. With cache-and-carry devices such as the iPod or PlayStation Portable, for which content is downloaded rather than streamed, the content producer (such as CBS or a movie studio) likely takes in 65-75 percent and the aggregator the balance of the revenues (perhaps \$2 per file).

How will this all pan out? It is too early to determine which players will capture the lion's share of mobile video revenues. The mobile carriers would love a mobile universe in which the first two models prevailed. The content providers would prefer a time-shifted cache-and-carry world, in which the mobile operators are cut out of the action. Many billions of dollars ride on which business model or models win in the marketplace. In all likelihood, several different kinds of models ultimately will succeed.

In a May 2006 working paper, McKinsey & Company pointed out that “there is surprisingly little agreement about the true size and profit potential of the mobile TV opportunity or the best approach to building such a service.”¹⁸ The Yankee Group forecasts the mobile TV marketplace at 3 million to 4 million users in the United States by 2008, generating annual revenues of \$750 million.

In its upbeat forecast, McKinsey predicts 25 billion in annual revenues for mobile TV in the European Union within a decade—more than today's revenues from mobile games, music, and ring tones combined.¹⁹ “If all goes well,” the report states, “and given normal word-of-mouth for such innovations, more than 65% of today's mobile subscribers in this region will use mobile TV by 2015. Furthermore, profit margins may be 30%—similar to those that mobile telcos already enjoy.”

Whether such rosy forecasts will materialize remains to be seen. One potential obstacle is the ready availability of free content online. A sec-

ond is still-spotty high-speed connections that are required for rich media such as mobile TV. Virgin Mobile's Dan Schulman is among the skeptics. He cautioned that mobile devices will not become the much-hyped "third screen" touted by Hollywood as a portable alternative to the silver screen and television. "Recognize what mobile is great for and what its limitations are," Schulman said.

Middle-Class Markets in the Mobile Bazaar

In addition to voice and mobile TV, broadband-enabled mobile devices can deliver games, instant messaging, video clips, blogs, mobile finance information, and music. Internet-ready portable devices such as the Nokia 770 Internet tablet or smart phones such as the Motorola Q and Nokia E61—with their diminutive size, capable keyboards, luminous displays, and zippy 3G connections—apparently are beginning to take the place of wi-fi-enabled laptops among early adopters. The consumer masses will follow.

"Consumption and consumer behaviors are starting to shift," McKinsey & Company's Brendan Gaffey said. For example, electronic commerce over wireless devices has been hugely successful in Japan, allowing customers to use NTT DoCoMo's I-mode service to purchase products wirelessly from vending machines and to shop on the Internet. Since I-mode was introduced in early 1999, Japan has become the world's leading market for mobile "content," mobile commerce (or mobile shopping), and mobile auctions (m-auctions), which together make up a \$4 billion annual industry. In this context, content refers not to purchased programming or shows but to ring tone melodies (which account for 45 percent of revenues in mobile commerce, or m-commerce), visuals, games, and information services.²⁰ Ring tones are now a \$5 billion annual industry worldwide. Bidding on auction items by handset is growing at an impressive clip in Japan, expanding by 45 percent a year. Mobile commerce is growing at an even more robust 280 percent annual rate in Japan.

Virgin Mobile's Dan Schulman described a still-evolving mobile music marketplace in the West, particularly the United States, that requires new thinking on the part of the principals to adapt to the emerging market's realities. Consider that consumers will pay \$1.49, at most, to download a song to a mobile device. Most carriers, however,

set a price point of \$2.49 to \$2.99 per song to recoup their costs because the music labels demand to retain 70 percent of every purchase. Because carriers must pay an average of 50 cents to deliver a song, the carrier still loses 5 to 10 cents for every \$3 purchase. “That’s a ridiculous model,” Schulman said. One alternative is a peer-to-peer (P2P) model that offloads the cost of data transmission to the edges. Yet if P2P explodes, he added, “content companies will be unhappy about that” because of the loss of control over the content. At the same time, the music labels want to break the near-monopoly Apple’s iTunes exerts in the online music marketplace, and the carriers may prove to be their only hope of doing so.

Today, Schulman said, about 90 percent of music downloads are hip-hop tracks, with most of the remainder classic rock. Several roundtable participants pointed out that downloads of user-created music and independent artists are on the rise, offering the possibility of a counterweight to the major labels in the mobile music space.

One staple of the old media economy that has not yet taken off in a big way on mobile devices is advertising. Esther Dyson of CNET observed that network television may appear to be free, but it is so only because of the commercials. “We pay for it because we watch ads. It’s a business model that won’t disappear,” Dyson noted. With a cell phone, the presumption of advertising on the network is not there yet, but it will happen. However, she added, the advertiser might pay for results rather than exposure. “It goes from cost per clicking to cost per action.”

Advertising in the new mobile environment will work only if it is relevant and holds value. “People won’t pay to watch spam on their phone,” Dyson said. Google’s Shona Brown added, “People don’t want nontargeted, undifferentiated ads.” Lucio Stanca of Aspen Institute Italia observed that there is a limit to how many ads we’re willing to accept on our phones—far fewer than we’re willing to put up with on television. Aedhmar Hynes of Text100 International declared that advertising would need to reinvent itself as consumers are now actively blocking ad messages. The roundtable participants agreed that dialogue and discussion are key ingredients to a new interactive model of advertising, which traditionally has been a monologue. Dyson suggested that if this was the case, then “the future of advertising is public relations,” which has traditionally been about generating such dialogues.

The more one engages in m-commerce or uses discounts and coupons, the more one's network—and one's phone—learns about one's personal shopping habits. That phenomenon raises questions of privacy and the degree to which consumers are willing to trade away their personal data for a price break.

Dan Schulman recounted a Virgin Mobile program in which the carrier gave its customers free minutes in exchange for the customer's agreement to watch commercials. The financial incentive proved irresistible. "We were shocked at how many kids signed up for the service," Schulman said. "They see it as entertainment." Advertisers participating in the program include Pepsi and Xbox.

The roundtable participants also discussed some of the likely mobile applications of the future. Google's Shona Brown predicted, "Someone will pay for pizza with a cell phone, and their friend will split the bill by using phone-to-phone infrared to top off the others' stored value card. So the mobile phone is already a camera and a PDA, but it also becomes your wallet."

Several participants said they would love to see mobile devices access a service that combines real-time traffic data with Google Earth, providing instantaneous information about traffic jams and alternative routes. That would be the ultimate "killer app."

Mobile's Impact in Developing Economies

When the mobile hive grows to 3 billion users, most of the new additions will come from the developing world, where mobile connectivity is rarely about entertainment or games and is far more likely to be a tool for staying in touch with loved ones or gaining a critical economic edge in the marketplace.

Internet Protocol (IP)-enabled cell phones create unparalleled opportunities for development in rural areas. Through the lower costs and easier access of wireless networks, disadvantaged people in developing countries—as well as underserved populations in developed countries—can now access information such as weather, markets, and government services that plays a key role in improving their economic and social conditions.

The evidence suggests that mobile technology is having a modest but detectable impact on developing economies, primarily by lowering

transaction costs. Over the long term, innovative mobile technologies hold out the promise of reducing poverty in some of the world's most disadvantaged areas.

The mobile phone has already spread throughout much of the developing world more quickly and deeply than any previous technology. Mobile phones now account for 75 percent of all telephone connections in 19 of the poorest countries in Africa. In Morocco, there were no mobile subscribers in 1998; in 2006, 24 of every 100 Moroccans had mobile phones—six times the number of fixed-line subscribers. In the same period, mobile phone penetration rose from zero to 36 percent in Albania, zero to 30 percent in Paraguay, and zero to 21 percent in China.

The benefits of mobile telephony are evident in microeconomies. Rural merchants can more efficiently shop around for supplies. A handyman living in a village can advertise in the large town nearby for work. In Kwa Kgapane, South Africa, for example, contract workers use mobile phones to remain on call for when work becomes available and then use their phones to keep in touch with their families. Similarly, in Nairobi, Kenya, a text messaging service has been set up to alert unemployed people to job opportunities.²¹ Fishermen in Tanzania use mobile phones to get market, fishing, and weather information, which helps them offer the best price when they take their goods to market.

In Tanangozi, a farming community in western Tanzania, most butchers cannot stock large amounts of meat because they have no electricity or cannot afford refrigerators; as a result, there are frequent meat shortages. Customers can now use mobile phones to place orders ahead of collection, enabling butchers to buy the right amount to satisfy their customers' needs.²²

“With these technologies, you're making transparent a range of new markets,” McKinsey & Company senior partner James Manyika said. “All of a sudden you're expanding the range of groups that can communicate. You're making it possible for new economic activity to take place.”

A mobile entrepreneur who participated in the roundtable, Kamal

Mobile technology is having a modest but detectable impact on developing economies.

Quadir of CellBazaar, described how his company is serving 8.5 million people in Bangladesh by connecting buyers and sellers in an electronic marketplace over cell phones. Rural business-people access the online service exclusively over mobile phones, enabling sellers to list details of their products, produce, or services in a database while buyers look for any of this information through SMS. Developed at the MIT Media Lab, CellBazaar does not handle transactions; it simply puts buyers and sellers in contact with each other via mobile phone.

“Mobile has become a new income-generating tool.”

Iqbal Quadir

The company charges nothing for the service; it is akin to craigslist over a cell phone. Instead, CellBazaar makes money by sharing in the revenues that Grameen Telecom, the country’s largest cell carrier, generates from carrying the calls.

“Mobile has become a new income-generating tool,” Quadir said. “One study showed that more than 40 percent of rural cell phone use in Asia is for business.” That figure may seem high, but in countries such as Bangladesh, where the transport infrastructure is in poor shape, electronic and mobile commerce may have even greater appeal than in developed countries.

In India, a business-finder technology developed by IBM helps customers find taxis, plumbers, carpenters, and even physicians who are nearby. “The business-finder technology combines sophisticated geographic information and data analysis with mobile telephone systems,” Daniel Dias, director of IBM’s India research lab, told the Associated Press.

In the Philippines, tens of thousands of people use G-Cash, a mobile commerce service from Globe Telecom. Many poor Filipinos who cannot afford a bank account use their mobile phone as a “mobile wallet.” With only a mobile phone and SMS (US\$0.02 per local text), subscribers can buy goods and services, send money person-to-person, and receive domestic fund transfers and international remittances. More than 31,000 retail outlets, such as 7-Eleven, accept Person to Person (P2P) payments this way.

Other enterprising cash-strapped people in developing countries are using text messages to pay bills, removing the need to hold large amounts of cash that make them susceptible to theft. In Zambia, street-market

vendors of Coca-Cola pay for new orders of Coke by text message. Pilot schemes are underway to use mobile phones to deliver microcredit loans to poor people in areas that lack anything resembling a bank branch. In parts of Africa, Latin America, and India, cell phones often are used not as personal phones but as community devices. A Kenyan company called Safari.com has developed a billing system that lets people keep track of how much of their phone time friends have used, allowing people to set up businesses that resell minutes on their cell phones.²³

From this vantage point, innovation occurs not just at the device level or when a company rolls out a new service but also when groups of enterprising users adapt off-the-shelf technologies in ways that are ideally suited to their local situations. Open-source software presents one possible approach to distributed community development, enabling individuals to develop an expertise that allows them to route around the often inadequate solutions proffered to them through conventional channels.²⁴

Arturo Artom of Netsystem reminded roundtable participants that despite the ways in which mobile telephony is extending the reach of the Internet, mobile is no substitute for the Internet. Certain regions of the world, such as northern Africa, would benefit enormously from the rollout of broadband connectivity. "It's a mistake to call it the mobile Internet," Artom said. "It doesn't substitute for a computer." Egyptians and Algerians, he pointed out, need to use computers with good broadband connectivity as well as mobile devices with features that enable additional functionality.

At the same time, Andrew Graham, Master of Balliol College at Oxford University, underscored the proverbial bang for the buck that mobile technology provides. "The mobile is different than the Internet," Graham said. "There's a much higher payoff because the mobile phone is cheap, low-level, and stays with people." Of mobile's penetration in the developing world, he said, "The numbers are striking, and the results speak for themselves."

In regards to creating environments in which such mobile technologies could flourish, two themes emerged on a regular basis during the roundtable: the need to eliminate trade barriers as a way to spur economic growth and the need to root out government corruption, which presents roadblocks to economic growth and social cohesion.

Social Services and M-Governance

New mobile technology can change how governments relate to their citizens, how teachers interact with their students, and how elected officials serve their constituents. Electronic government (e-government) is still a relatively new phenomenon; mobile governance (m-governance) poses an even wider range of variables and unknowns.

At its simplest, m-governance offers the potential to extend the reach of e-government. In most countries, mobile penetration is at least equal to Internet penetration, which enables more people to reach government offices and services.

In developing countries, the ability to bring the Internet to remote locations holds great promise to foster telemedicine. Similarly, a mobile uplink would allow health care officials to report the number of victims in epidemics in a timely manner, allowing for more immediate response from governments. In the developed world, m-governance holds out the promise of more immediate dialogue between public officials and citizens.

“We don’t fully understand the full implications of using technology in the democratic process,” Lucio Stanca of Aspen Institute Italia (and a member of Italy’s Senate) told roundtable participants. “One thing is for certain: Mobile and the Internet will usher in major changes in the relationship between elected officers and their constituents as well as in how political parties will be organized.”

M-government services complement e-government services in two principal areas: new forms of electronic participation, which enhance the citizenry’s participation in government, and electronic information-based services to citizens, which improve the efficiency of government agencies.

M-democracy services could give citizens the ability to mobilize volunteers and canvas workers during a political convention or election, request information from government databases while on the move or report traffic light outages or potholes, as well as provide access to government portals and services from a cell phone. Other possibilities include remote participation in opinion polls or even elections, or simply providing ideas, feedback, and policy recommendations to authorities through a mobile device.

One powerful example of m-democracy took place during the 2000 national elections in Ghana—a pivotal moment in the history of the

nation. Two decades ago, J. J. Rollings took power in a coup; he ruled Ghana as an unelected despot for many years before he allowed democratic elections and then was elected three times. In 2000, when he was constitutionally mandated to step down, presidential elections were held, and his hand-picked successor lost. The Ghanaian elections were widely regarded as free, peaceful, and fair.

One of the factors that helped was a form of ad hoc vote monitoring that happened throughout Ghana. As Ethan Zuckerman, co-founder of the community site GlobalVoices, related, “Many, many people in Ghana have mobile phones, and they were able to go to polling stations that had mobile phone coverage during the 2000 election. When they saw people being intimidated with threats of physical violence or being prevented from voting, instead of calling police stations or the electoral commission—both of whom might ignore the call—they called the radio stations. Ghana has a very service-oriented radio sector. The stations took the calls live over the air, and everyone found out that people were being prevented from voting at particular stations. The police came out and investigated, otherwise they would have been accused of collaborating with the vote rigging. And by and large, the intimidation was curtailed. Transparency was the key here. If you have individuals with reporting skills who use mobile to broadcast to a wide audience, that makes a tremendous difference. If you can put those factors together, these technologies become extraordinarily powerful technologies for freedom.”²⁵

M-administration takes place once a government and social services are in place and include the following:

- government officials using mobile devices in the field to improve communication with the office,
- the public receiving location-sensitive or time-critical information during an emergency via mobile phones,
- real-time traffic information,
- the ability to learn the arrival and departure times of the next train or bus,
- police and citizens communicating about ongoing crimes,

- schools notifying parents on their mobile phones about a child's absence from school, or other educational uses,
- doctors' offices calling patients' mobile phones for appointment reminders and other health services,
- mobile payment systems that send reminders about payment of government fees to mobile phones,
- use of mobile phones to verify users of digital signature services for identification purposes.

In most places, m-governance is still more theory and art than an intact, fully operational system. However, m-government trial experiments have been carried out in Tallinn, Estonia's capital, in major cities in China, and elsewhere.

At the end of 2004, Beijing had an estimated 13.3 million mobile phone users, of a total population of 14 million, prompting many government departments to try to take advantage of mobile telephony to deliver better public services. These services focus chiefly on the use of SMS to deliver information to citizens. For example, the taxation department uses SMS to deliver information about tax collection, the police authority uses it to convey information about emergencies, and the education department uses it to release exam results.²⁶

The same phenomenon is taking root in the West as well. "Mobile government is the next inevitable stage of the e-government evolution," said Professor Ibrahim Kushchu, chairman of Euro mGOV 2005—the first European conference on mobile government. "Researchers, practitioners, and policymakers need to embrace it now in order to provide citizens with effective and efficient services and to sustain government organizations which can compete with cutting-edge technologies."

At a more significant level, an always-on citizenry could begin to engage civic leaders in a conversation about local issues, particularly issues that may be time-sensitive or fast-moving. One could easily imagine citizen participation at some level in a parade, peaceful street rally, or protest march.

"Smart mobs" wielding mobile devices have taken to the streets in large numbers to wage political protests. In early 2006, for example, Philippines

President Gloria Macapagal Arroyo became the target of a text messaging campaign by opposition protestors alerted by text messages.²⁷

Aedhmar Hynes of Text100 International suggested that mobile technology offers “huge implications” for uniting the forces of political reform, especially in developing countries. Esther Dyson of CNET expressed reservations, however: “This technology creates change and disruption, but not necessarily in favor of freedom or democracy. Each situation is different.”

Kamal Quadir of CellBazaar pointed out that in Bangladesh, citizens have already used photo- or video-enabled mobile phones to document instances of government corruption. On the battlefields of Iraq and in Abu Ghraib prison, U.S. soldiers used digital cameras and mobile devices to transmit the horrors of the war to friends, family, and the public.

Michael Lomax of the United Negro College Fund added, “With mobile, every citizen can be an investigative reporter. It could well change the relationship between the citizenry and public officials, bringing about a new era of transparency and dissemination of vital information. Imagine how much better organized the civil rights movement may have been if we were mobile.”

Cary Davis, managing director of Warburg Pincus, pointed to the increasing number of mobile users who are using New York City’s 311 phone number for government information and nonemergency services. The 311 line provides the public with around-the-clock access to all New York City government agencies and offers a channel through which residents can offer input on public policy and city services.

Mircea Dan Geoana, a member of Romania’s Senate, said that mobile technology offers an opportunity for the government to become more responsive to the electorate—but that it has not yet happened in his country. “In Romania, there’s an opaque and arrogant attitude in government structures toward the citizenry. The more transparent uses that the citizenry makes of mobile, the more the public will increase their rights. Most of our citizens are not aware of their rights. If you file

Mobile technology offers an opportunity for the government to become more responsive to the electorate.

Mircea Dan Geoana

a petition with the federal government, by law we have responsibility to respond within three days. Few people are aware of that.”

Hundreds of efforts are underway around the world to bring low-cost, high-speed wireless broadband connectivity to municipalities, villages, city governments, and corporations. Morotola’s Padmasree Warrior told the roundtable participants about “many attempts to kill” the company’s MOTOw4 Canopy platform because of claims that it interferes with the existing radio spectrum. Nevertheless, Motorola, working with partners such as Earthlink and others, has deployed Canopy in more than 100 countries. In India and Africa, this technology allows teachers to reach students with e-education in slums and far-flung locations where they would be unable to attend a nearby school.

Michael Lomax of the United Negro College Fund equated modern bloggers with the pamphleteers of the 1700s who ushered in the American revolution. “Because SMS and blogging are so new, we’re defensive about it. The reality is, for government and politicians, this is a changed landscape. If you’re an elected official, you’ve got to pay attention to your constituents who are blogging or texting and communicating with each other in real time.”

Yet that instantaneous nature gives pause to roundtable participants such as CNET’s Esther Dyson. “There may be a danger in having governments elected by information diabetics,” Dyson said. “Misleading advertising or bad information can put a bad government into power. Mobile fosters quick answers rather than the construction and design of more thoughtful long-term answers.”

Dan Schulman of Virgin Mobile called mobile’s transfer of power to the public a positive development, but he too cautioned against regarding mobile technology as a magic bullet for the democratic masses to exert “people power” at the expense of special interests. A more troubling concern, Schulman said, is that the proliferation of mobile recording devices may prevent political leaders from taking risks. “I worry about an era where every mistake that a politician makes is documented. Will it drive tepid, conservative approaches rather than the radical approaches that may sometimes be needed? Bold is not always popular at first.”

In a polarized society, participants pointed out, mobile can either help bring people together or fragment us further into smaller groups where consensus-building is more difficult. John Seely Brown of Xerox

PARC cited game play at the Annenberg Center of Communication, where citizens are invited to take part in an exercise relating to redistricting and gerrymandering. “That kind of interaction can foster a new kind of conversation between people who would not otherwise be talking with each other. This leads to an extended conversation where people take other points of view into account.”

Digital Identity

The roundtable participants also took up the issue of digital identity, which refers to the electronic representation of a real-world person or organization. Proponents of digital technologies believe that users, not governments or corporations, should decide how their digital identities are used especially during a verification process while that person is registering, shopping, or engaging in other activities online. Complex questions of privacy, ownership, and security surround the issue.

David Kirkpatrick of *Fortune* magazine pointed out that at a recent conference on digital identity at Harvard University’s Berkman Center for Internet and Society, technology giants such as Microsoft, Sun, IBM, Cisco, and Hewlett Packard were coming together on defining standards, but there were no representatives from the telecom industry. “We can see converging set of interests that are not being acknowledged by parties responsible for policy,” Kirkpatrick said. “It’s a very real possibility that your cell phone can become your de facto national identity card.”

Troy Pearsall of In-Q-Tel added, “The device has already become a proxy for your mobile identity. One day soon, your mobile will have the ability to know who you are, where you are, who you’re talking with, and who you associate with.”

Roundtable participants concurred that any business consortiums or free-market solutions to the digital identity issue would be preferable to government interference. Public policy regarding this issue needs to be carefully managed. Said one speaker, “There’s a real, and legitimate, fear of Big Brother. People’s trust is fundamental, and it can be easily lost.”

In formulating public policy around e-commerce, Lucio Stanca of Aspen Institute Italia listed five factors that should be kept in mind:

- Digital identity is a global issue and requires transactions that transcend national borders,

- Nations ought to confer legal recognition on digital signatures,
- Governments should place the highest priority on ensuring the privacy and protection of personal data collection,
- Given widespread recognition of the Internet as a no-tax environment, taxation must be applied where goods and services are used and consumed,
- A secure payment system, not tied to any single corporation, must be made widely available to the public.

Conclusion: Rules of the New Mobile Order

With the number of wireless users growing rapidly and many cell phones built with processing power comparable to a PC in 1998—and getting more powerful by the day—the underlying assumption throughout the roundtable was that mobile connectivity has the potential to dramatically change our lives. But how? In what ways?

• *Mobile technology will bring about changes both beneficial and deleterious.*

One central challenge in incorporating the vast sweep of possibilities offered by the new mobile technologies into our lives is how to balance their benefits against uses for ill-intended ends. In a post-9/11 world, where terrorism's long shadow affects not just personal security but cultural attitudes toward privacy and liberty, we have retreated a little into our own bubbles: physical, intellectual, and political enclaves in which we seek the refuge of family and like-minded friends. Mobile devices, instead of connecting us to new people or places, may wind up tethering us more closely to home.

When the roundtable threatened to turn into a blue-sky pep rally on behalf of mobile technologies, Murray Gell-Mann of the Santa Fe Institute brought the participants back to earth with this reality check: “The new communications devices play a big role in how we’re now dealing with crime, corruption, illegal immigration, monitoring of human rights violations—these are desirable uses. But as the number and power of these devices keeps going up, what are the antisocial pur-

poses looming on the horizon? Censorship and repression by authoritarian governments cannot be ruled out.”

William T. Coleman of Cassatt Corporation suggested that we decide every day on the tradeoff between personal freedom and convenience, on one hand, and economics and security on the other. Mobile technology must play a role in society’s formulation of the proper balance between privacy and security, added Lucio Stanca of Aspen Institute Italia: “This is not just about fighting terrorists. In my country, the success of many police investigations depends on the ability to monitor phone conversations. How long should phone records be kept? Who should have access to them?”

Greater freedom is not an inevitable result of the new mobile technologies.

Esther Dyson

The challenge, moderator Charles Firestone of the Aspen Institute observed, will be in deciding how to go from a culture of transparency and global-village goodwill to a culture that is inoculated against the dangers of terrorism, identity theft, phishing attacks, and other predatory behavior in the online and mobile worlds.

Esther Dyson of CNET pointed out that greater freedom is not an inevitable result of the new mobile technologies. “For some people, mobile phones may mean access to information, communication with others, and the means to take action and exercise one’s individual power. But the same technology can be used by governments and other repressive powers to watch people and curtail their freedom. The technology is neutral.”

• *We should strategically explore mobile’s uses in serving poor and dispossessed people.*

Michael Lomax of the United Negro College Fund said he would like more studies undertaken to determine whether mobile devices are having a positive economic and social effect on serving underserved populations. In the United States, he observed, a significant number of low-income African Americans and Latinos have adopted cell phones. “Is it having an economic impact? Or is mobile just a middle-class entertainment and communication experience? Can mobile make a difference in the lives of itinerant and low-income kids moving from place to place

without a consistent address? We ought to be as strategic here as we are in the developing world in studying mobile's impact, and acting on those findings."

James Manyika of McKinsey & Company agreed on the need to tie social services to a person or family rather than a physical location. He suggested that mobile technology can play a role in providing educational and entrepreneurial opportunities in marginalized communities.

Mobile technology can play a role in providing educational and entrepreneurial opportunities in marginalized communities.

James Manyika

One possibility, moderator Charles Firestone of the Aspen Institute suggested, would be a microenterprise loan program targeting mobile connectivity for some segments of society. Lomax said that philanthropic organizations, nonprofit networks, businesses and government might all take a look in deciding on their appropriate roles.

John T. Kunzweiler, retired senior partner of Accenture, said any such programs would need to be carefully tailored to maximize economic development. "To just give people cell phones would be like putting computers in classrooms without anyone behind them," he said. In the inner city school where Kunzweiler works, access to PCs and mobile devices is a pipe dream. "It's more basic there. People are in survival mode. We may be middle-classing this discussion."

• *The mobile world needs a space for openness.*

Esther Dyson of CNET returned the discussion to some of the themes for which she has become famous in the digital world. The Internet has blossomed because of its openness. Open source and open application programming interfaces (APIs) are major trends driving the growth of the Internet and the powers it gives to individuals and social groups. There is no equivalent movement toward openness in the proprietary mobile industry, however.

In general, users still have to go through a mobile operator—a gatekeeper—to access a new application. Application developers can't simply put an application online (as they can on the Web) and invite all comers to try it out. That's why the advent of phone-based Internet

access and WiFi phones, phones that are in fact Internet devices, is so exciting: It will enable users to bypass the mobile operator gatekeepers. These gatekeepers have blocking techniques, however. It will be an interesting war. (The good news, however, is that most mobile operators are interested in money rather than politics. On the other hand, mobile operators, like Internet service providers [ISPs], can be a chokepoint for interfering governments.)

“In the end, the excitement is not about the nodes or the piping but the people on the network,” Dyson said. “The goodness or badness of the technology depends on the people using it.”

How can we know who is using it? Dyson raised the issue of reputation systems, in which people are rated by others. Rather than a closed system like the one on eBay, in which buyers rate merchants and vice versa, an open reputation system would rely on a distributed web of people who will vouch for each other—or against each other. (Such a system needs its own reputation system, however, to rate the raters and avoid abuse.) “A persistent identity that is not tied to a government institution is an important part of this,” Dyson said. “In general, transparency and the prevalence of visible identities are good for society, but they also make us vulnerable to abuse. There’s no easy solution.”

• *Privacy will be harder to maintain in the new order.*

Our gadgets are getting smarter. Technicians are developing a new generation of mobile phones that will be able to detect where users are, what they are doing, and what activities they will or won’t be interested in. In short, phones are quickly morphing into information retrieval devices. In October 2006 MasterCard announced a new service through which customers can call a phone number, state their coordinates, and receive a text message directing them to the nearest automatic teller machine. It won’t be long before a single click on the cell phone will produce the same result.

This year, GPS phones and family-locator services are becoming commonplace for family members who want to keep tabs on one another. These services are being marketed as a way for parents to keep

“The goodness or badness of the technology depends on the people using it.”

Esther Dyson

track of school-age children, but they can be used for much more than that. A husband or wife can keep track of a spouse's whereabouts. A phone in the purse of an elderly father with Alzheimer's can help his children find him. Family members are left to sort out the privacy implications. Rental car companies, meanwhile, are using mobile technologies to charge customers hundreds of dollars when they drive a car out of state, violating the rental agreement they signed.

The market for tracking services will soon reach billions of dollars, analysts predict. What is less certain is whether there will be a robust public debate about when and how it is proper to track the whereabouts of a loved one, and when such tracking crosses the line of propriety.

• *Disruptive change will be a hallmark of the new order.*

The new wireless technologies threaten to disrupt decades-old government-imposed rules regarding spectrum licensing. Rules governing analog broadcasting need to be updated to conform to the new digital realities, in which scarcity is no longer a limiting factor. Brendan Gaffey of McKinsey & Company said that as we approach the "2015 world," the business rules need to become clearer so that stakeholders can better understand how their billions of dollars in investments can drive innovation within a currently closed environment.

Municipalities are experimenting with wi-fi, wimax, and mesh networks to extend the reach of the Internet into citizens' homes. Wimax is a new wireless technology that could bring broadband to millions of current subscribers and voice to multitudes around the world, changing the face of the telecommunications landscape and disrupting the power and business models of multinational media corporations.

John Seely Brown of Xerox PARC said that the wild card in all this is whether governments will step in to regulate these new spaces, creating a business reality that forces industry to move in a certain direction. With the dawning realization that spectrum may not be scarce after all, old assumptions are thrown into disarray. "If you change the rules, this game changes. Power shifts in significant ways," Brown said.

• *Community will take on even greater importance.*

The evidence suggests that digital community behavior is migrating toward the mobile phone. From multiplayer gaming to online dating to bloggers who have taken up moblogging (blogging from mobile

devices), a shift is underway to turn what might seem to be a solitary experience—fiddling with a phone—into a social experience.

Alan Moore, an author and expert in mobile technologies, regards mobile community services as the long-awaited “killer app” for modern third-generation mobile phones worldwide. We can already detect this phenomenon in activities such as moblogging, user-generated video and photos, and mobile social networks that let users capture and share events with friends and loved ones. Moore estimates that digital community services on mobile phones constitute a \$3.45 billion marketplace today and have a sharp growth curve. Already, 38 percent of South Koreans actively engage in moblogging. Europeans, and then Americans, will not be far behind.

“If you are not on mobile, [your business] won’t be relevant soon,” Moore warns. “The [mobile] phone is rapidly becoming the dominant mass medium, in particular for digital communities, as it already generates more than half of all social networking service revenues worldwide.”²⁸

Text messaging, meanwhile, continues to assimilate the Mobile Generation. Young people are using mobile devices to develop new social spaces, revealing deeper dimensions of their characters and forming “true, genuine relationships,” says Michael J. Bugeja, director of the Greenlee School of Journalism and Communication at Iowa State University.²⁹

As tens of millions of us embrace these bright, shiny gizmos, we need to reflect on how they are changing us in ways as individuals and societies.

John Seely Brown summed up the challenge facing us: “We have a world where technology is changing at unprecedented speed, and it’s frightening people. We need to engage in a dialogue about basic, fundamental literacy about those changes, in order to get to a deeper understanding of the forces at play. It’s exciting to be a technologist today, but also a little frightening.”

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APPENDIX

**Fifteenth Annual Aspen Institute
Roundtable on Information Technology**

The Mobile Generation

The Aspen Meadows Resort • Aspen, Colorado
August 1-4, 2006

Roundtable Participants

Arturo Artom

Founder and Chief Executive
Officer
Netsystem

Vanu G. Bose

Chief Executive Officer
Vanu, Inc.

John Seely Brown

Director Emeritus
Xerox Palo Alto Research Center
(PARC)

Shona Brown

Senior Vice President
Business Operations
Google, Inc.

William (Bill) T. Coleman III

Founder, Chairman, and Chief
Executive Officer
Cassatt Corporation

Cary Davis

Managing Director
Warburg Pincus

Esther Dyson

Editor, *Release 1.0*
CNET Networks

Charles M. Firestone

Executive Director
Communications and Society
Program
The Aspen Institute

Brendan Gaffey

Principal
McKinsey & Company

Murray Gell-Mann

Distinguished Fellow
and
Co-Founder
Santa Fe Institute

Note: Titles and affiliations are as of the date of the conference.

Mircea Dan Geoana

Senator
and
Chairman of the Foreign Relations
Committee of the Senate,
Romania

Andrew Graham

The Master
Balliol College
Oxford University

Patrick W. Gross

Chairman
The Lovell Group

Aedhmar Hynes

Chief Executive Officer
Text100 International

David Kirkpatrick

Senior Editor, Internet and
Technology
Fortune Magazine

John T. Kunzweiler

Retired Senior Partner
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J. D. Lasica

Co-founder and Executive
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Michael L. Lomax

President and Chief Executive
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United Negro College Fund, Inc.

James Manyika

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William E. Mayer

Partner
Park Avenue Equity Partners

Jerry Murdock

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Troy Pearsall

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In-Q-Tel

Kamal Quadir

Chief Executive Officer
CellBazaar

Dan Schulman

Chief Executive Officer
Virgin Mobile USA

Lucio Stanca

Vice-Chairman
Aspen Institute Italia
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Member of the Senate, Italy

Padmasree Warrior

Executive Vice President and
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Deep Nishar

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Note: Titles and affiliations are as of the date of the conference.

About the Author

J. D. Lasica is an independent strategist, journalist, author, and new media pioneer. He is co-founder and president of Ourmedia, a free global repository, learning center, and community space for user-created video and audio.

Lasica explores the personal-media revolution and the emerging media landscape in his book *Darknet: Hollywood's War Against the Digital Generation*. He blogs about citizens' media, digital rights, and grassroots video at Newmediamusings.com, Darknet.com, and RealPeopleNetwork.com. CNET recently named him one of the 100 most influential bloggers in the world.

In a previous life, Lasica was an editor at the *Sacramento Bee* and served in senior management at several Silicon Valley start-ups. He has written for the *Washington Post*, *Salon*, *Legal Affairs*, and other publications. He lives in the San Francisco area and is a frequent speaker and panelist at new media and technology conferences. He welcomes e-mail—but not spam—at jd@ourmedia.org.

Previous Publications from the Aspen Institute Roundtable on Information Technology

When Push Comes to Pull: The New Economy and Culture of Networking Technology (2005)

David Bollier, rapporteur

The author considers how communications, economics, business, cultural, and social institutions are changing from mass production to an individualized “pull” model. *When Push Comes to Pull* describes the coexistence of both push (top down or hierarchical) and pull (bottom up or networked) models—how they interact, evolve, and overlay each other in the networked information economy. The report explores the application of “pull” to the worlds of business and economics; the content and intellectual property industries; the emergence of an economy of the commons; and personal and social dynamics, including leadership in a pull world. It also touches on the application of the pull model to learning systems; the military, in the form of network-centric warfare; and the provision of government services. 78 pages, ISBN Paper 0-89843-443-2, \$12.00 per copy.

Information Technology and the New Global Economy: Tensions, Opportunities, and the Role of Public Policy (2004)

David Bollier, rapporteur

This report provides context and insight into the unfolding of new economic realities arising from the information revolution—how the world’s players will live, learn, innovate, offer, consume, thrive, and die in the new global economic landscape. *Information Technology and the New Global Economy* draws a portrait of a changing global economy by describing new business models for the networked environment, exploring topics of innovation and specialization. Among the more creative concepts propounded at the roundtable was an analysis of the world’s economy in terms of video game theory that suggests that if developing countries are not incorporated into the world economic community in some acceptable way—if they cannot make economic progress—they could become disrupters to the entire economic or communications system. The report also explores

issues of outsourcing and insourcing in the context of digital technologies moving work to the worker instead of vice versa. Participants concentrated on developments in India and China, taking account of some of the vulnerabilities in each of those countries as well as the likely impact of their rapid development on the broader global economy. 57 pages, ISBN Paper: 0-89843-427-0, \$12.00 per copy.

People / Networks / Power: Communications Technologies and the New International Politics (2003)

David Bollier, rapporteur

This report explores the sweeping implications of information technology for national sovereignty, formal and informal diplomacy, and international politics. Bollier describes the special challenges and new rules facing governments and nongovernmental organizations in projecting their messages globally. The author further explores the relationships between the soft power of persuasion and the more traditional hard power of the military and discusses how governments will have to pay close attention to newly burgeoning social communities in order to prosper. 68 pages, ISBN Paper: 0-89843-396-7, \$12.00 per copy.

The Rise of Netpolitik: How the Internet Is Changing International Politics and Diplomacy (2002)

David Bollier, rapporteur

How are the Internet and other digital technologies changing the conduct of world affairs? What do these changes mean for our understanding of power in international relations and how political interests are and will be pursued? *The Rise of Netpolitik* explores the sweeping implications of information technology for national sovereignty, formal and informal international diplomacy, politics, commerce, and cultural identity. The report begins with a look at how the velocity of information and diversification of information sources are complicating international diplomacy. It further addresses the geopolitical and military implications as well as how the Internet is affecting cross-cultural and political relationships. It also emphasizes the role of storytelling in a world where the Internet and other technologies bring our competing stories into closer proximity with each other and where stories will be interpreted in different ways by different cultures. 69 pages, ISBN Paper: 0-89843-368-1, \$12.00 per copy.

The Internet Time Lag: Anticipating the Long-Term Consequences of the Information Revolution (2001)

Evan Schwartz, rapporteur

Some of the unintended consequences of the Internet and the freedoms it symbolizes are now rushing to the fore. We now know that the network of terrorists who attacked the World Trade Center and the Pentagon made full use of communication technologies, including e-mail, Travelocity.com, automatic teller machines (ATMs), data encryption, international money transfers, cell phones, credit cards, and the like. Is the Internet an epochal invention, a major driver of the economy for many years to come, or just a passing fad? Will the new phenomena of recent years—such as the contraction of hierarchies, instant communication, and lightning-fast times to market—last beyond the funding bubble? What is the next new economy? What are the broader social consequences of the answers to those earlier questions? This report takes a wide-ranging look at the economic, business, social, and political consequences of the Internet, as well as its wide-ranging ramifications for the process of globalization. 58 pages, ISBN Paper: 0-89843-331-2 \$12.00 per copy.

Uncharted Territory: New Frontiers of Digital Innovation (2001)

David Bollier, rapporteur

This report looks critically at key insights on the new economy and its implications in light of the digital revolution. The report begins with an examination of the interplay between the current economy and the capital economy and then probes the emerging world of mobile commerce and its potential for driving the next great boom in the economy. It further explores new business models resulting from the combination of mobile communications and the new economy. 68 pages, ISBN Paper: 0-89843-307-X 12.00 per copy.

Ecologies of Innovation: The Role of Information and Communications Technologies (2000)

David Bollier, rapporteur

This report explores the nature of innovation and the role of the information and communications sectors in fostering ecologies of innovation. In this context, the report examines the ways in which the creation of new ecologies are affecting significant societal institutions and policies, including foreign policies, industry and business structures, and power relationships. 44 pages, ISBN Paper: 0-89843-288-X, \$12.00 per copy.

The Global Wave of Entrepreneurialism: Harnessing the Synergies of Personal Initiative, Digital Technologies, and Global Advance (1999)

David Bollier, rapporteur

This report examines problems arising from the growth of entrepreneurialism and digital technologies. 41 pages, ISBN Paper: 0-89843-264-2, \$12.00 per copy.

The Global Advance of Electronic Commerce: Reinventing Markets, Management, and National Sovereignty (1998)

David Bollier, rapporteur

This report addresses issues of electronic commerce in the context of global marketplace impact and the transformation of national sovereignty. 64 pages, ISBN Paper: 0-89843-236-7, \$12.00 per copy.

The Networked Society: How New Technologies Are Transforming Markets, Organizations, and Social Relationships (1997)

David Bollier, rapporteur

This report explores how electronic networking—the Internet and intranets—is transforming commerce, organizational performance and leadership, business and social relationships, and personal identity and allegiances. 43 pages, ISBN Paper: 0-89843-213-8, \$10.00 per copy.

The Future of Electronic Commerce (1996)

David Bollier, rapporteur

This report examines communications and information technologies that are redefining the fundamental conditions and relationships of commercial transactions, as well as the implications of the new electronic commerce for individuals, businesses, and society. 64 pages, ISBN Paper: 0-89843-188-3, \$10.00 per copy.

The Future of Community and Personal Identity in the Coming Electronic Culture (1995)

David Bollier, rapporteur

This report concentrates on issues of personal identity, community-building, and setting boundaries in our lives and our environment; it includes a background paper titled “The New Intermediaries” by Charles M. Firestone. 48 pages, ISBN Paper: 0-89843-166-2, \$10.00 per copy.

The Promise and Perils of Emerging Information Technologies (1993)

David Bollier, rapporteur

This report explores the use of complex adaptive systems as a model for determining information technology's role in the workplace and in diverse societal settings. It includes a background paper by John Seely Brown, Paul Duguid, and Susan Haviland titled "Towards Informed Participants: Six Scenarios in Search of Democracy in the Electronic Age," which offers progressive scenarios of how the interaction of humans and information technologies might influence and affect democratic life in the coming decade. 44 pages, ISBN Paper: 0-89843-149-2, \$10.00 per copy.

The Information Evolution: How New Information Technologies Are Spurring Complex Patterns of Change (1993)

David Bollier, rapporteur

This report explores the use of a new paradigm of co-evolving complex adaptive systems for thinking about information, information technologies, and information-oriented societies. 28 pages, ISBN Paper: 0-89843-132-8, \$10.00 per copy.

About the Communications and Society Program

www.aspeninstitute.org/c&s

The Communications and Society Program is an active venue for global leaders and experts from a variety of disciplines and backgrounds to exchange and gain new knowledge and insights on the societal impact of advances in digital technology and network communications. The Program also creates a multi-disciplinary space in the communications policy-making world where veteran and emerging decision-makers can explore new concepts, find personal growth and insight, and develop new networks for the betterment of the policy-making process and society.

The Program's projects fall into one or more of three categories: communications and media policy, digital technologies and democratic values, and network technology and social change. Ongoing activities of the Communications and Society Program include annual roundtables on journalism and society (e.g., journalism and national security), communications policy in a converged world (e.g., the future of video regulation), the impact of advances in information technology (e.g., "when push comes to pull"), advances in the mailing medium, and diversity and the media. The Program also convenes the Aspen Institute Forum on Communications and Society, in which chief executive-level leaders of business, government and the non-profit sector examine issues relating to the changing media and technology environment.

Most conferences utilize the signature Aspen Institute seminar format: approximately 25 leaders from a variety of disciplines and perspectives engaged in roundtable dialogue, moderated with the objective of driving the agenda to specific conclusions and recommendations.

Conference reports and other materials are distributed to key policy-makers and opinion leaders within the United States and around the world. They are also available to the public at large through the World Wide Web, www.aspeninstitute.org/c&s.

The Program's Executive Director is Charles M. Firestone, who has served in that capacity since 1989, and has also served as Executive Vice

President of the Aspen Institute for three years. He is a communications attorney and law professor, formerly director of the UCLA Communications Law Program, first president of the Los Angeles Board of Telecommunications Commissioners, and an appellate attorney for the U.S. Federal Communications Commission.