

# Uncharted Territory: New Frontiers of Digital Innovation

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

David Bollier, Rapporteur



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THE ASPEN INSTITUTE

*Communications and Society Program*  
Charles M. Firestone  
Executive Director  
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## Foreword

For the past nine summers the Aspen Institute's Communications and Society Program has convened a three-day roundtable dialogue among luminaries of the information, network, financial, scientific, business, government, and academic worlds to address societal issues arising from advances in digital technologies. This Aspen Institute Roundtable on Information Technology first considers where our economy and society might be headed in light of the digital revolution. The participants then exchange new insights about particular societal issues and problems, with the goal of improving the human condition as we improve the digital world.

In 1999 the dialogue originally was conceived as a follow-up to some of the Roundtable's early work in electronic commerce. Although it began as an inquiry into the "relationship beyond the transaction: e-commerce and community in the new economy," ultimately it broadened into what our rapporteur called "the new frontiers of digital innovation." In so doing, through the power of dialogue—and an excellent synthesis by our rapporteur David Bollier—we have produced for the reader a volume of accessible, novel, and meaningful insights on the new economy and its implications.

This volume begins with a comparison, framed by participant William Janeway, of the "current economy" versus the "capital economy," and the interplay between the two. The report then delves more deeply into the emerging world of mobile commerce and its potential for driving the next great boom in the economy. It also examines an assertion from former Federal Communications Commission Chairman Reed Hundt that the United States lags far behind Europe and Japan in wireless telephony. Later, the report again relies heavily on Mr. Hundt, a former antitrust attorney, for an analysis of the application of antitrust law and policy to the fast-paced digital industries.

The report also explores new business models resulting from the combination of mobile communications and the new economy. It singles out the model of an "e-lance economy" put forth by Massachusetts Institute of Technology Sloan Business School professor Thomas Malone. In a recent *Harvard Business Review* article (drawn from a scenario he wrote for this Roundtable several years ago), Malone suggests

that businesses will rely increasingly on freelance professionals and workers who come together for projects—much as movie production teams make motion pictures. By suggesting this scenario for organizational coherence, Malone challenges readers and critics to anticipate the ramifications of wireless, ubiquitous communications, abundant capital, and new attitudes by employers and employees about the nature of work.

Another example of a new business model explored in this report is “electronic communications networks” (ECNs). ECNs are Internet-based alternatives to established securities exchanges for direct buying and selling of stocks. ECNs have raised provocative questions because they have produced new efficiencies and inefficiencies. They have created a two-tiered market: the traditional public market and the new ECN market; the latter has better prices but limited access.

The volume concludes with a summary of public policy issues that have resulted from advances in the new technologies, the new economy, and the new workplace. Here our rapporteur draws primarily on a presentation by Elliot Maxwell, then special advisor to the United States Secretary of Commerce for the Digital Economy. Maxwell created a classification of public policy issues that includes legal, infrastructure, and confidence issues, as well as inclusiveness, measurement, governmental uses of technologies, and social-safety-net issues. This classification prompted discourse on several questions such as: What role should government play in each of these areas? Where can self-regulation achieve beneficial societal ends, and where is self-regulation unrealistic?

These and many other questions were raised, discussed, dissected, and at times dismissed at the ninth annual Roundtable. Although an exciting dialogue such as this one does not always translate into an interesting report, this volume does capture, I believe, the dynamism and energy of this conference.

## **Acknowledgments**

This year’s Roundtable was made possible by the generous support of our sponsors: BEA Systems, Inc., E.M. Warburg, Pincus and Company, Nortel Networks, Novell, Inc., Oracle, Xerox, and Zoologic. I would also like to thank the co-founder of the Roundtable, Jerry Murdock; our rapporteur, David Bollier; conference manager and

senior coordinator Tricia Kelly; conference coordinator Lisa Dauernheim; publications manager Sunny Sumter-Sana; and publication editor Jacqueline Arendse. Gratitude of course goes to the individuals listed in the Appendix, who were willing to share their time, energy, knowledge, and insights to create the raw material for this report. We thank them for their generosity of spirit.

Charles M. Firestone  
Executive Director  
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The Aspen Institute  
January 2001

# Uncharted Territory

## Introduction

Now that the heady first paroxysms of electronic commerce (e-commerce) have faded—and the online sector has experienced its first major shake-out—thinking about what it means to live in a digital economy is becoming more focused. Established businesses are becoming more strategic in exploiting digital technologies. Venture capitalists are becoming more discriminating in their investments. Governments at all levels are exploring how to integrate the Internet and other technologies to advance their missions.

Yet even as American society begins to do the hard work of metabolizing the digital revolution, a new generation of electronic technologies and business innovations is moving briskly forward. Although these innovations are still in the wings, they will soon wash over the first wave of e-commerce, provoking a new set of perturbations in the economy, public policy, and social practices.

What might this uncharted territory look like?

Clearly it is too early to make reliable predictions—so much experimentation, competition, and political negotiation must first take place. Nevertheless, we can glimpse some of the more important trends shaping the next stage of the digital economy. This report is an attempt to bring together some salient analysis and informed speculation about these trends. The focus is on five key areas:

1. *Digital technologies and macroeconomic change.* How are information technologies changing the dynamics of the “Current Economy,” as well as the “Capital Economy”? How might people’s cultural responses to new technologies affect their deployment and economic growth?

2. *The mobile commerce (m-commerce) revolution.* What types of novel functionalities will the new wireless technologies introduce? How will they disrupt existing telecommunications markets in creating a new m-commerce platform, and what impediments must be overcome?
  
3. *New business models.* Will the proliferation of information technologies give rise to a new wave of “e-lancing” and outsourcing, changing the optimum size of business organizations? What factors will complicate the restructuring of business enterprises—perhaps leading to hybrid forms of corporate organization that meld hierarchy with entrepreneurialism?
  
4. *The future of antitrust law in a digital economy.* Does the constant pace of technological innovation and ease of market entry render antitrust law obsolete? Or do the core principles of antitrust simply need to be adapted to take account of the special characteristics of the digital economy? What issues should a new dialogue about antitrust law focus on?
  
5. *New challenges for public policy.* What new public policy regimes will be needed to facilitate the growth of e-commerce and protect extra-market values such as privacy, free speech, and social equity? What new frameworks of law or cooperation can deal with questions of jurisdiction over the Internet and e-commerce? Which policy principles should guide the new telecommunications and computing infrastructures?

To probe these and related questions, the Aspen Institute Communications and Society Program convened twenty-three leading entrepreneurs, technologists, academics, venture capitalists, and policy experts for the Ninth Annual Aspen Institute Roundtable on Information Technology. The conference took place August 9–12, 2000,

in Aspen, Colorado; it was moderated by Charles M. Firestone, Executive Director of the Communications and Society Program of the Aspen Institute. This report is a synthesis and interpretation of the conference discussions.

This report represents a series of quick snapshots of the next wave of digital innovation. The framing of the subject may be somewhat off, some details may be blurry. But given the pace of change, even snapshots are valuable in illuminating a fast-approaching future.

### **The Current Economy and the Capital Economy**

It is fashionable to speak about “New Economy” businesses—Internet-based, decentralized, networked enterprises—as if they operated on a fundamentally different footing from “Old Economy” businesses. But this dichotomy between New Economy and Old Economy may be a misleading and transient one, argues Bill Janeway, vice chairman of E.M. Warburg Pincus and Company, LLC. A more useful distinction is between the “Current Economy” and the “Capital Economy,” he suggested.

The Current Economy consists of those markets and businesses that produce goods and services for current consumption. The Capital Economy, by contrast, consists of markets that supply equity financing to the Current Economy. The Capital Economy is where investors decide whether to buy or build new productive capacity—“whether it’s cheaper to drill for oil in the Gulf of Mexico or on the floor of the New York Stock Exchange,” as an old financial saw has it.

This distinction between the Current Economy and Capital Economy is useful, said Janeway, because “the enhanced efficiency of the Current Economy is the direct result of the radically *inefficient* functioning of the Capital Economy.” The Capital Economy has been propelling the adoption of new information technologies throughout the Current Economy because of the many predictable efficiencies that result. But predictable efficiencies are the last thing that can be wrung out of the Capital Economy, however—through information technology (IT) or otherwise—because the Capital Economy is best understood as a social/cultural system that is driven by highly imperfect knowledge and irrational expectations.

The “ergodic principle”—the idea that the future behavior of a system can be inferred from its historically observed behavior—simply does not apply to the Capital Economy. This principle helps to explain why IT does not necessarily produce efficiency gains in the Capital Economy and why “rational expectations” theory is a *non sequitur*. Financial markets are not mechanical, physical systems that exhibit predictable, rational behaviors. They are inherently unpredictable social systems that exist in constantly changing historical circumstances.

### *The Current Economy and Its New Dynamics*

If we make this distinction between the Current Economy and the Capital Economy, how then shall we understand the peculiar dynamics of each and the special ways that information technologies are transforming them?

A small industry of analysts is churning out books that attempt to answer this very question. Kevin Kelly’s *New Rules for the New Economy* (Viking Penguin, 1998) draws from complexity theory to explain how information technologies are altering the economic dynamics of firms and the macroeconomy. Carl Shapiro and Hal R. Varian’s *Information Rules: A Strategic Guide to the Network Economy* (Harvard Business School Press, 1999) takes similar themes to new levels of academic rigor, describing the “economics of attention,” information as an “experience good,” and the importance of technology lock-ins, switching costs, and intellectual property.

Building on such analysis, conference participants offered their own strategic critiques about the future directions of the Current Economy.

Bill Coleman, chairman and chief executive officer (CEO) of BEA Systems, argued that except for the IT sector, the Current Economy resembles a game of musical chairs. All market shares are up for grabs, but it is a zero-sum game because overall consumption will not necessarily increase. “We aren’t going to buy 100 percent more cars in ten years just because companies are more efficient in manufacturing them,” he said. “And over the long term companies are not going to make a lot more profits just because they are more efficient. But we are getting disintermediation in every kind of market as business models change.”

Traditional intermediaries in the chain of commerce—supply, production, and distribution—are being bypassed, compressed, or

replaced. “People can actually make their demands known without having to be tied to the traditional institutional aggregators of demand,” said Angie Kim, founder, president and chief customer officer for EqualFooting.com, a business-to-business (B2B) online marketplace for small manufacturing and construction businesses. The new consumer sovereignty is not producing a large, undifferentiated market of individual buyers and sellers. It is spurring the creation of entirely new sorts of intermediaries—a process that might be called *re-intermediation*. Entrepreneurs are creating online companies such as eBay and Priceline, as well as new types of search engines and shopping agents, to connect buyers and sellers in more efficient, flexible ways.

### ***Radical new efficiencies***

As it becomes possible to gain direct access to consumers in rich modalities that use the Internet and related technologies, markets are being transformed by an unprecedented cost/price transparency and radical new efficiencies, according to Coleman. What this means, he says, “is the replacing of Alfred Chandler’s *Visible Hand*”—a landmark book about how corporate management shapes markets—“with the original *Invisible Hand* of Adam Smith.”

The keynote of this transformation is greater efficiency. Transactions that once entailed a great amount of imperfect information, legal barriers, and cumbersome negotiation can now be consummated with much greater ease and at much less cost. The “information tax” that operates in so many organizations and marketplaces—as Jerry Murdock, co-founder and managing director of Insight Capital Partners, dubbed traditional inefficiencies—can be dramatically reduced in countless arenas.

Information technologies are introducing many other significant efficiencies to the Current Economy. These technologies are enabling consumers to better express highly specific demand-preferences, and companies to better ascertain those preferences. This is propelling the creation of new regimes of “production lots of one,” micro-marketing, and differential pricing for distinct market segments.

The technology is also enabling companies to dispense “discrete, lumpy products” such as enterprise-class software in smaller, tailored units rather than larger, undifferentiated units—“by the drake rather than by the hogshhead.” An example is a new business model, generally called the appli-

cation service provider (ASP) model, whereby a customer purchases access to specific software services, delivered on an outsourced basis over the Internet, for a monthly and/or transaction fee. The ASP model (itself a reinvention of the service bureau model that delivered application functionality over private networks when computers were expensive) challenges the fixed-price, nonexclusive, perpetual licensing scheme for enterprise-class software.

The explosive growth of the IT sector stems from the fundamental ability of IT to spur new efficiencies. This growth has been so powerful and sustained because IT is no longer regarded as a part of overhead—a regrettable cost—but as a strategic tool for achieving greater productivity and profitability. “For the first time in history,” said Coleman, “IT has gone from being on the ‘L’ side of the accounting ledger—loss—to the ‘P’ side—profit.” This analysis suggests why the IT sector has been able to avoid the zero-sum scenario that afflicts most markets. Coleman predicts, in fact, that the most significant new market capitalizations in the economy will occur chiefly among “IT enablers,” although the number of winners is not likely to be large.

We may have only scratched the surface of new efficiency gains through IT, speculates John Seely Brown, director of Xerox PARC. We are approaching a time when automobiles will need software updates, jet engines will constantly transmit performance data back to their manufacturers, and digital machines will “talk” to other machines. As computerization is integrated into all sorts of products and infrastructure, the relentless efficiency gains of IT—and Moore’s Law—may soon apply to material substances themselves.

Moore’s Law (named after Gordon Moore, co-founder of Intel) holds that computing power is destined to double every eighteen months—a “rule” whose applicability over the past twenty years has spurred the IT revolution. What happens if Moore’s Law or some variant of it begins to drive similar innovation and efficiencies in material products? “I think when we drive digitalization into matter, it means that matter itself starts to obey Moore’s Law,” said Brown. “And when matter itself starts to obey Moore’s Law, we have no economic principles that are prepared to predict what that will mean.”

### ***IT tames the business cycle***

It is not widely appreciated that information technologies are playing an important role in muting the business cycle. “It used to be that if

you didn't have good information, you tended to keep more inventory than you needed," said Robert Hormats, vice chairman of Goldman Sachs International. "If the economy began to slow, you'd have an excessive amount of inventory. Instead of producing more, you would just dump the inventory on to the market. That created an enormous cyclicity in the economy." Lack of good information once tended to produce a similar cyclicity in labor markets as well. Employers faced with an economic slowdown would suddenly lay off large numbers of employees all at once, causing structural unemployment.

But by enabling employers to acquire more timely and specific market information, information technologies have helped businesses avoid the boom-and-bust cycles that have long plagued the economy. Sellers can better control inventories and track shifting consumer demand. This information helps them prevent unwanted accumulations of inventory and forced liquidations. Human resources can also be managed in more timely, responsive ways. As a result, overall economic growth has proceeded far more smoothly, with fewer ups and downs.

Nevertheless, growth is not evenly distributed among economic sectors. Over the short term, some dot-com retail and service enterprises have been conspicuously successful. But most dot-com experiments are not likely to fare as well, Coleman predicts, either because their business models are not sustainable or because they do not truly transform the chains of commerce. "Amazon.com is not a disrupter," Coleman said. "It has figured out how to handle the distribution side of the book business, but it hasn't managed the inventory side."

The long-term winners, Coleman believes, will be those companies that succeed in leveraging their brand names, account controls, and customer bases in an integrated fashion. Wal-Mart and its online affiliate may offer the best example of this paradigm, he said. Wal-Mart has stores within twenty minutes of most consumers in the country; it can leverage the economics of both the online and real-world retail markets; and its brand-name is well-recognized and highly marketable.

A less appreciated asset in the new equation for business success may be human talent, noted John Herron, chairman of Zoologic, a software publishing and e-learning firm. Businesses in the networked economy tend to be less capital-intensive than talent-intensive. Example: Sun Microsystems recently bought a server appliance company, Cobalt Networks, for \$2 billion. Number of employees: 300. When businesses were more capi-

tal-intensive, the historic norm, a handful of people at the top could make major decisions, leaving an army of fairly low-skilled people to carry out orders. In a networked economy, however, sophisticated talent is needed at many nodes throughout a decentralized organization and in diverse market battlefronts. A centralized executive staff is not necessarily an asset; frequently it is a liability. This analysis implies that new kinds of organizational structures and behavioral processes will be needed to nurture talent.

### *The Capital Economy and Its New Volatility*

Unfortunately, the new efficiencies that IT is achieving in the Current Economy are not having a similar impact on the Capital Economy. This is chiefly because the Capital Economy has less to do with objective, reliable knowledge and much more to do with psychological and social influences. “The functioning of the capital market is a function of *expectations*,” said Bill Janeway. “It is driven by the current value of discounted future expected returns. By definition, that means it’s volatile.”

Janeway urges that we understand the Capital Economy as John Maynard Keynes did: “not as a physical system that endlessly reproduces its own behavior when the same stimulus is applied to it but as a social/cultural ‘economy’ that is evolving through historical time, constantly coming upon new kinds of events.” Despite our pretensions to make decisions on the basis of objective information in stable probability distributions, Janeway said, “In the Capital Economy we rationally hedge against our fundamental ignorance. We work out strategies for protecting ourselves against what we can’t know, and, at the same time, we more or less irrationally pursue *highly* unlikely outcomes.”

For example, the new “winner take all” opportunities in the Current Economy beckon with highly unlikely investment returns. Only a few companies ever generate the fabulous equity gains of a Microsoft, a Netscape, a Dell, or an AOL. Because the payoffs in this environment can be so huge, however, investors clamor to fund new ventures. This illogical desire to invest in startups that are not likely to pay off—and to bid up stock price-to-earnings multiples that far exceed the norm—prompted Federal Reserve Chairman Alan Greenspan to coin his memorable phrase, “irrational exuberance.”

There is nothing new about irrational exuberance. Notes Janeway: “The deployment of fundamental economic infrastructure—the kind of infrastructure that transforms the competitive environment—is

*always* funded, in one way or another, outside of the conventional economic process of rational calculation.” The logic may be political or cultural. “National security” and “economic development,” after all, were the official justifications for federal subsidization of the transcontinental railroad and the interstate highway system, and for state government financing of canals. Alternatively, the financing of fundamental infrastructure also occurs through the wasteful, mad speculation of stock market bubbles.

Alfred Chandler’s great first volume on the Second Industrial Revolution, *The Visible Hand*, makes a sobering point: In the 1880s, 70,000 miles of railroad track were financed and built in the United States—the largest amount in any country, in any equivalent period of time. Between 1894 and 1898, 40,000 miles of railroad track went bankrupt. “We’ve been there before, and we will be there again,” said Janeway. “The government financed the Internet to a critical take-off point, and then the stock market bubble took over. That’s how our system works. It is the inefficiency of the capital market—the Capital Economy—that drives the extraordinary, enhanced productivity and efficiency of the Current Economy.

“In the Capital Economy, ‘waste’ is a virtue,” Janeway continued. “When there is a great availability of capital *before* you even know if your business experiment is going to work, the demand-pull by start-ups creates a phenomenal supply of capital. Right now, we have in place a huge reservoir of amateur capital. It reminds me of a line from the time when capital was bankers’ capital, not venture capitalists’ capital: ‘Giving liquidity to a banker is like giving a barrel of beer to a drunk. You know exactly what he’s going to do. You just don’t know which wall he’s going to choose.’”

### ***New volatility in the capital economy***

If stock market bubbles are nothing new, there are a number of novel factors—especially information technology—that make the contemporary Capital Economy distinctively prone to speculative volatility. One of the most conspicuous changes has been the democratization of access to the stock market via 401k plans and electronic trading. These innovations have disintermediated the role of money managers at pension funds, reducing the institutional “buffers” that might absorb and diffuse market swings.

A great deal of power has thus shifted to individuals, who are a dominant force in today's equity markets. More than 50 percent of U.S. households now own stock, and daily trading volumes on the New York Stock Exchange often reach more than one billion shares, compared to 150 million shares just ten years ago. When the market takes a dip, it directly affects the net worth statements of millions of individual investors. Interestingly, however, institutional players such as mutual funds may be more responsive to market swings than individual investors. In any case, the constant scrutiny of dozens of business media outlets seems to be amplifying and accelerating market volatility.

The herd mentality in the stock market may also be fostered by what Stanford University professors Mordecai Kurz and Jeffrey Brock call "model uncertainty." Contrary to the "rational expectations" premise of economic theory, investors no longer know the relevant model for making "rational" choices. There are simply too many competing business models and experiments. By default, a herd-like behavior ensues, with everyone following the vanguard industries and companies. Information technology makes it far easier to identify quickly what "the mob" of investors is doing, and then to join the mob. This dynamic naturally fuels "irrational exuberance" and market bubbles.

IT has instigated another important change in the Capital Economy—the radical collapse of the "time constant" for anyone to react to market signals. This development first appeared in 1987, when the computerized-trading practices known as portfolio insurance helped to trigger a major stock market crash. Trading patterns for a large segment of the stock market were automated, making market shifts frighteningly fast and volatile.

Yet another IT factor that contributes to volatility is what Janeway calls "pseudo-hedges." By this term Janeway means the ability to use sophisticated IT systems to sift through great masses of statistical data to develop computer-crafted securities. The value of these securities is based on historically observed price trends in diverse financial markets. The problem with this tactic is that a hedge is supposed to provide access to cash when an investor suddenly needs liquidity. Pseudo-hedges, however, are a statistical exercise that have no basis in a real trading market. In practice, therefore, when push comes to shove, a pseudo-hedge may not be able to deliver liquidity upon demand. That is precisely what happened in the Long-Term Capital Management crisis in 1998:

deposits whose expected value was derived from exhaustive analysis of relative historical forces could not be turned into cash at any price.

It is reassuring to know that there are major structural protections in place to deal with wild market swings. There are brakes on computerized trading; there is federal deposit insurance; the Federal Reserve clearly recognizes its role as the lender and financier of last resort. It is also reassuring to note that investor enthusiasm is often fully warranted by productivity and profitability gains in the Current Economy. The stock market's rise is not merely a case of speculation. Yet it is also disquieting to realize that the last time the stock market was driven by individual investors rather than institutions was approximately seventy years ago.

To several conference participants, the volatility of the stock market—and its special characteristics today—raises new questions about the Federal Reserve's ability to manage the Capital Economy. Trading volumes are much larger and faster-moving, and thus less amenable to Fed interventions. The Fed's policies may also be less influential in an economy in which talent and ideas are often more critical than capital alone. Paradoxically, Fed policies, if misguided, could have a larger impact than ever before, even though the Fed may be less important, noted Robert Hormats of Goldman Sachs: "If something should go wrong with Fed policy or with financial policy, it could have a disproportionately large effect on shareholders, who are a much more important factor in the economy today. That could create a new source of volatility. This is unknown territory."

### *Political and Cultural Responses to Economic Change*

Besides the Capital Economy and the Current Economy, there is a third, equally significant, "leg on the stool" that any prognostications must take into account: politics and culture. The new IT-driven global economy does not work in a vacuum, after all, but in a political and cultural context that itself will influence the shape of the new economic paradigms. For example, the growing gap between haves and have-nots—which some analysts associate with the prevalence of computer ownership and Internet access—could be a potentially destabilizing force, warns John Kunzweiler, a general partner of AC Ventures, the venture arm of Accenture (previously Andersen Consulting).

Some developing nations are rapidly adopting new information technologies and integrating their economic resources into the global economy. But large segments of the world's population are being bypassed entirely by the IT revolution, effectively consigning them to a life of economic deprivation and social unrest. Yet it is not at all clear that the cultural traditions that sustain the IT revolution in the United States can be readily exported to other nations.

"We have an 'equity culture' in the extreme," noted Robert Hormats. "Virtually no other country, with the possible exception of Great Britain and perhaps Israel, has our attitudes towards risk-taking, equity ownership, and innovation. Most countries want the kind of growth we have—the 'Silicon Valley effect.' But they don't want to absorb the kind of investment and job risks that we are willing to accept."

Hormats cited a confluence of factors that have made the United States a high-tech powerhouse. The deregulation of various industries in the 1970s and 1980s, particularly in financial markets, was extremely catalytic to new entrepreneurial ventures. Allowing federally regulated ERISA pension monies to be put into venture capital funds was another important landmark. The United States also has enjoyed far more fluid and flexible labor markets than virtually any other part of the world, which has facilitated new business start-ups and expansions. Collaborative links between academic institutions and the corporate sector have been another important engine of economic growth and innovation.

Beyond such specific catalysts, the United States has had 200 years to build what Hormats calls "the institutions of the market"—credible banks, bankruptcy law, commercial law, intellectual property protection, and more. "We expect other countries to superimpose a market economy on societies that have none of these institutions," said Hormats. "But development is not a matter of giving people computers and intelligent advisors to help them modernize their economies. Development is a *building process*, and it doesn't happen overnight."

Hormats wondered whether the cultural traditions of other countries would in fact be flexible enough to embrace American-style markets. Yet it may be imperative for other nations to build the social and political institutions for a market economy, he said, in order to address the growing disparities between haves and have-nots.

As it happens, the growth of a global economic culture may be providing some help in this regard. High-tech talent from China, India, and

other developing nations often come to the United States to learn about business and technology and later return to their native countries to start their own companies. This *diaspora* of talent is not a widely noticed phenomenon, but it may stimulate new market-oriented social and economic reforms in developing nations.

The spread of the market to more corners of the world may have some less attractive outcomes as well. "There is a potential that the globalization of markets and technology will drive those other economic environments faster, which will then seek to consume at greater levels than they are consuming today," warned Michael Fields, chairman and CEO of The Fields Group, a management consulting firm. What are the environmental implications of a huge new consumer demand and greater consumption of natural resources?

The political and cultural fallout of the IT revolution will not be confined to developing nations. U.S. Representative Edward J. Markey (D-Mass.), ranking minority member of the House Telecommunications Subcommittee, explained how the New Economy is already transforming the politics of education in his Congressional district. "In my hometown of Malden, Massachusetts, which is 42 percent minority, a lower-middle class to poorer community, we have torn down every school in our community. In the fall of 2000, every single child in Malden will go to a brand new school. And every single child will have a laptop computer." The town is spending \$100 million to revamp the school system, and property values have risen 15 percent annually over each of the past three years.

The town's bold commitment to better public schools and computer literacy marks a dramatic new approach, said Markey: "Employers applaud this, saying, 'That's excellent, because now we can educate all these Hispanic, Asian, and African American children. We're going to need them in our workforce.' In my district, there's 2 percent unemployment. It turns out that you don't need a welfare-to-work program. As soon as the companies say, 'We need these people,' guess what? They go to work. You don't need some very complicated system to figure out how to break this cycle of unemployment over many years. Employers look at people as assets and figure that once they hire people, they can educate them."

One lesson of this story, said Markey, is that in the New Economy local challenges increasingly are considered in a national context. The

town of Malden judged the deficiencies of their local schools and local economy by the metrics of the New Economy. This same dynamic may apply to individual nations, which will increasingly judge their national performance by the metrics of the global economy. Companies can locate where they can find educated talent—in Korea, India, the Netherlands, or many other nations. “This puts real pressure on the political system to respond,” said Markey.

### **The Next Great Boom: Mobile Commerce**

In the next few years, mobile commerce (m-commerce) will be one of the biggest new waves of technological innovation to hit global markets. Most analysts predict that within three years, more people will use wireless technology than personal computers as their primary pathway to the Internet on a global basis. But there is little agreement about what this new digital platform—the infrastructure, handheld devices, software applications, contents, and services—will eventually look like.

That is because so many of these factors in this market-in-the-making remain in flux. Wireless technologies are plagued by significant technical problems, economic uncertainties, regressive public policies, and ambiguities about consumer preferences. The current infrastructure simply does not support enough powerful applications to attract a large enough customer base—and the nature of the most promising wireless appliances, contents, and services remains speculative. There are also some large, complex public policy issues—such as security and privacy—that must be addressed.

Nonetheless, wireless is regarded as a tremendously important technology because of its potential to radically transform the telecommunications marketplace. “This is one of the most disruptive technologies that we are dealing with right now,” avers Reed Hundt, former chairman of the Federal Communications Commission (FCC) and now a senior advisor to McKinsey & Company. “It attacks the existing wire telephone infrastructure. And the more that the transmission speeds increase—enabling more and more applications to be delivered—the more industries wireless will attack. It is *totally* an attack-based technology.”

Worldwide, analysts expect that more than 750 million new mobile phones will be sold by 2003, and at least 500 million of them will be Internet-ready. Even though the United States lags behind in wireless Internet access, it does have an estimated 75 million cell phone users

and more than 42 million households (as of August 2000) with access to the Internet via personal computers.

Thus, m-commerce markets seem poised to take off. The vision is there, the technology is within reach, e-commerce growth is doubling every year, new investment is already strong, attractive applications are being developed, and consumer demand is likely to be significant.

But, there also are many formidable complications. The following section explores some of the more compelling visions for m-commerce; this review is followed by a discussion of the challenges in building the new wireless infrastructure and the reasons that the United States is seriously lagging behind Europe and Asia in developing a diversified wireless industry.

#### *What Will M-Commerce Look Like?*

Champions of m-commerce foresee a global revolution in how myriad daily transactions will be conducted. For the moment, this revolution remains a grand vision because even m-commerce revolutionaries concede that the infrastructure, handheld devices, applications, and content do not exist. An entirely novel platform, with largely unimagined capabilities, needs to be invented.

Jerry Murdock, managing director of Insight Capital Partners, sketched a number of scenarios in which new wireless technologies could be extremely useful. Unlike information that is distributed via the Web, Murdock believes that wireless technology will allow content providers to manage the sale and use of information in a more time-sensitive manner. The new technologies, for example, could help investment firms make financial presentations in a very careful, time-controlled manner, as required by securities law. Murdock envisions wireless technology as a vehicle “to monitor, meter, and control how information is distributed, and to whom—a new feature that we don’t see today on the Internet.”

Murdock also foresees the emergence of “ambient intelligence” that will be based on a new set of wireless digital intermediaries with whom people will conduct transactions. For example, a person traveling to the airport could learn—through a wireless intermediary—that her flight had been cancelled and send a message that arranges for a new flight. A wireless intermediary could also use computerized personal information about a subscriber to identify opportunities that might be useful at a given

moment—for example, that a friend is nearby or a specified product is on sale. Murdock envisions subscribers “negotiating desired levels of interaction with intermediaries.”

The kinds of relationships that people have with wireless intermediaries will be quite different from current relationships with software applications, predicts Alfred S. Chuang, president and chief operations officer at BEA Systems. “The things we are talking about have very specific, streamlined content base and are event-driven kinds of activities. That is not at all how applications work today. Our applications today try to mimic something that we do in a very process-driven, sequential kind of way.”

Wireless devices will also have to evolve in new directions, predicts Chuang. “We don’t know whether the primary device is going to be a cell phone or not,” he said. A cell phone has the advantage of allowing voice contact, but “it has, and should continue to have, a very poor user interface,” he said. Yet integrating a video screen into a cell phone is likely to be too cumbersome for easy use. That is the implicit lesson of the Palm Pilot’s attempt to engineer various plug-in attachments, Chuang said. “A whole new set of things need to be done, from providing the applications that can justify the type of devices, to what types of devices we’ll be using.”

The kinds of applications eventually accepted in the marketplace are likely to vary by culture, according to Peter Brockmann, vice president of commercial marketing for Nortel Networks. People in Europe and Japan, for example, have a richer cultural tradition of using public spaces and taking public transit, which presents new market opportunities for wireless technologies. In Japan, people who are waiting in queues or riding mass transit use the iMode wireless service to play games. In China, music transmissions are popular.

In South America and Europe, where credit card usage is more modest than in the United States and culturally alien, m-commerce is likely to evolve as a substitute vehicle for credit cards, especially for smaller transactions. Consumers will be able to buy items from vending machines, or buy other services, and the transaction can then be registered on a wireless phone bill. This kind of billing arrangement is culturally familiar in Europe and South America, making it a natural platform for new kinds of m-commerce.

In North America, Brockmann said, the most promising wireless applications are likely to be sales force automation and employee empow-

erment. Going beyond paging, the new services might give employees in the field detailed information about a customer's relationship with the company, enabling the sales force to boost its productivity. Alternatively, a service might offer a private radio frequency that allows employees to use their cell phones to chat with anyone else in the company.

Other wireless applications could enhance the company's relationships with its customers. Just as FedEx gave its customers the ability to track the whereabouts of shipments via the Internet, other companies might use the new m-commerce platform to give customers access to their own information or to make business transactions easier.

### ***The bluetooth juggernaut***

The development of new kinds of m-commerce could be radically accelerated by a new kind of short-distance wireless technology known as Bluetooth, which is still in the development stage but is moving forward rapidly. Bluetooth is a versatile, inexpensive, low-power system for sending electronic signals to a radius of 10 to 100 meters. Originally intended as a way to eliminate tangles of wire cables, Bluetooth is being developed as a way to bring "ambient intelligence" to meeting areas, hotel lobbies, train stations, and other places.

Bluetooth developers are exploring how to use the technology to eliminate queues at ticket windows and reservation counters. The idea is to allow consumers to use wireless devices to interact electronically with Internet servers or telephone systems to make their own travel or hotel arrangements. In remote places where cell phone access and advanced telecommunications services are not available, Bluetooth could serve as a local access portal to various wireless services.

Bluetooth technology is especially attractive because it uses a portion of the electromagnetic spectrum that does not require licensure. International bodies are working aggressively to ensure that spectrum and technical protocols will be standardized, so that Bluetooth will work anywhere in the world. Bluetooth's backers anticipate that it will be adopted with unprecedented speed. It took 75 years for telephone services to have 50 million users. Radio took 50 years to reach that level of usage, television took 25 years, and the Internet took four years. Analysts believe that Bluetooth will reach 50 million users within 18 months and that \$30 billion will be invested in the "market space" by the year 2003.

While it is difficult to predict exactly how the new m-commerce platform will unfold, John Seely Brown of Xerox sees wireless technologies acting as “a new kind of credit card. It will be a credit card that leverages the backroom clearing mechanisms of cellular phones to do cost accounting and billing at an infinitely cheaper rate than current credit cards. So a cell phone will actually be a bimodal device: It will have short-range linkages, using infrared techniques or Bluetooth, and a long-distance connection back to the billing system.”

Because such systems will be both flexible and low in cost, Brown sees the possibility of a new type of very low cost, transaction-based e-commerce that may offer spot pricing on a wide variety of products. Although some vendors may regard this kind of “ambient pricing” as a great leap forward—the ultimate in market efficiency—others may regard it as an exploitative new form of price discrimination. Will there be a consumer backlash, for example, if soft drink vending machines try to charge higher prices on hot days? Or will “captive audience” price-gouging be accepted by consumers? However ambient intelligence evolves, the proliferation of ambient pricing and billing through wireless devices could give rise to an important new niche in commercial life.

### *Developing the Wireless Infrastructure*

Actually building a working global infrastructure for m-commerce will be far more formidable than postulating a vision. It will take a great deal of time, market experimentation, and political contention to coordinate competing technical standards, develop viable business models, identify suitable market applications, and enact public policies to facilitate the emergence of an m-commerce market.

One reason that the evolution of wireless industry will be so tortuous is that it involves market competition and government policymaking on a global scale. “Everything about this industry, in every country of the world, is shaped by government. *Everything!*” said Hundt. “The fundamental policy decisions in wireless have been made by just three great groups—Europe, North America, and Japan/Asia—and each has been the function of government policies. Not only have these policies been different, but they’ve actually been shaped so as to have these continents compete with each other. This is a globalization story, big time.”

In Europe, according to Hundt, the policy was to promote a few leading equipment manufacturers—such as Nokia and Ericsson—by creat-

ing a single standard that would create an immediate market to benefit those companies and consumers. Foreign competitors were essentially frozen out of the market. From 1997 to 1999, the number of wireless short-messaging service (SMS) messages sent per month in Europe soared from zero to more than two billion, with Norway and the Netherlands in the lead. (SMS consists of short text messages transmitted through wireless handheld devices with tiny alphanumeric keys.) Among young people, SMS has become a major cultural phenomenon.

Europe's wireless systems are based on the Global System for Mobile communications standard (GSM). Because Europe and China have adopted the GSM standard, cost efficiencies should help these markets grow briskly. On the other hand, this system is a closed, proprietary system, so it may not experience the kinds of rapid innovation and scaling that open protocols tend to encourage. But Europe's wireless market has had a head start over others, and it is ready to grow rapidly, according to Jerry Murdock of Insight Capital Partners. Internet penetration in Europe is expected to climb from 8 percent today to 30 percent by 2003; Nordic countries, already at 30 percent penetration, are expected to reach even higher usage levels.

Scandinavia is the clear pacesetter in the adoption of wireless technologies, especially among young people. Approximately 78 percent of Finland's 2.35 million households had at least one mobile phone in 1999, and virtually all Finns between the ages of 15 and 39 use mobile phones. The "disruptor effect" is already evident: one-quarter of Finland's households no longer have a traditional land-line phone. Sweden, too, is a "wireless Valhalla," in which people use their cell phones to listen to music, send short text messages, buy soft drinks from vending machines, and even participate in mobile-dating services (which let potentially compatible couples know when they are close enough for a rendezvous).<sup>1</sup>

To deal with varying wireless transmission protocols around the world, a common format for wireless Internet applications known as wireless access protocol (WAP) has been created. WAP allows any enabled cell phone to use WAP-based Internet applications no matter which cellular network is being used. Despite the goal of providing a universal protocol, however, not all companies have embraced WAP. The Japanese have gone their own way with the iMode wireless technology, developing a clear lead in wireless over the Europeans and

Americans. But whatever the technical platform, there is enormous exuberance worldwide about the prospects for mobile commerce.

### *Why the United States Lags in Wireless*

While other continents have been moving rapidly forward in developing a wireless infrastructure, the United States is considered to be at least three to five years behind Europe. According to former FCC Chairman Reed Hundt, much of the blame can be traced directly to misguided public policies that stretch back twenty years. Hundt explained, “The FCC decided in the early 1980s that the United States would achieve the following results in wireless: No scale effects. No network effects. No national licenses. Analog systems. No competition with wire telephony. Economic disincentives to ever make a call from a wire phone to a wireless phone. No overriding of local zoning laws. No roaming, except at exorbitant prices. Overall, no competition. Very high prices. And very low penetration.”

“Every one of those decisions can be documented,” said Hundt. “And those who know this industry know that those were specific, debated decisions. That’s how we got the worst wireless system of any country in the world.” Currently, the four leading U.S. wireless carriers—Verizon, Sprint PCS, AT&T, and Voicestream—use three incompatible systems. Steps are now underway to develop a “second-and-a-half” standard, which will later be replaced by a third-generation, or 3G, wireless network protocols. The 3G formats will allow for higher-speed data transmissions and thus more versatile, useful applications. They will also ameliorate, but not necessarily solve, many incompatibility problems.

Some valuable policy shifts occurred in the 1990s when the FCC was authorized to conduct spectrum auctions for wireless licenses, said Hundt. This process gave rise to robust competition and the aggregation of local licenses into national systems. This competition, in turn, led to scale efficiencies and network effects, as well as national marketing of wireless services, which greatly increased market penetration. But future progress is likely to be stymied, he said, because of a serious shortage of available spectrum. Current spectrum is about one-third less than is needed for the various wireless applications that the industry envisions.

The shortage of spectrum can be traced to the powerful television broadcast lobby, which persuaded Congress to give the TV industry an

additional six Mhz of spectrum in order to convert their transmissions from analog to digital signals, said Hundt and Markey. The problem is that, under the Telecommunications Act of 1996 (which granted the new spectrum), broadcasters will maintain control over *both* analog and digital sets of spectrum until 80 percent of Americans have the capacity to receive digital TV signals. This level of digital TV penetration is supposed to occur by 2006, but few industry observers believe that digital TV penetration will reach the 80 percent threshold.

“The way broadcasters have worked it,” said Markey, “they’ll be able to hold onto both of these spectrum spaces in perpetuity because the government doesn’t have the nerve to take them on. And we’re going to be left without this huge asset that we should be deploying in the wireless area.”

Even though the law requires that the “old” broadcast spectrum be auctioned, potential bidders are not likely to be motivated to bid aggressively for spectrum that will not be available for ten years or more; indeed, there is no guaranteed date for acquiring access to the spectrum. Consequently, the government will end up getting less money for the lease of spectrum space, and broadcasters will continue to control it indefinitely. “We’re in this no man’s land right now,” Markey said.

The economic magnitude of this stalemate is significant, said Hundt. According to one of his associates at McKinsey & Company, the wireless sector will fail to earn some \$75 billion in revenues per year unless more of the spectrum is made available to support advanced wireless applications. As a result, not only will fantastic new market capitalizations in this emerging industry fail to materialize, but U.S. companies will not develop the technologies and market positions to compete in the global m-commerce space, which is expected to be a \$100 billion market by the year 2020.

Why, then, is Congress not mobilizing to rectify this situation? “Because,” said Rep. Markey with wry humor, “that would mean taking on existing monopolists to help as-yet unformed companies. Electorally, that’s a counter-intuitive position to put yourself in.” The only way the situation will change, said Markey, is if the current high-tech sector and would-be entrepreneurs come together to lobby Congress for a spectrum giveback.

Privacy and security are another set of public policy issues that will need to be addressed if m-commerce is going to expand. The pro-

liferation of wireless systems creates vast new opportunities for unauthorized interception of data. If Bluetooth becomes a ubiquitous technology—embedded in hotel lobbies, offices, and dozens of other public and private spaces—the opportunities to eavesdrop or acquire highly personal information will multiply exponentially. Cell phones and other mobile devices that use location-tracking technologies such as the Global Positioning System (GPS) could also enable third parties, especially government, to monitor exactly where people go and what they do. These issues have received extremely little attention to date.

### **The Search for New Business Models**

One of the most enduring changes wrought by the Internet has been the search for new models of business and commerce. It is no longer self-evident that there is one universally applicable ideal for running an efficient, profitable business. Nowadays, as digital technologies transform the basic business structures, the range of compelling business models is multiplying.

A central question raised by this ferment is: How will IT change the way work is organized and the size of firms? Business is essentially a mechanism for coordination, and IT is an unprecedented tool for organizational coordination. Will business organizations grow even larger thanks to the capabilities of IT and the Internet? Or will the playing field be leveled—allowing smaller, decentralized organizations to compete more effectively?

#### *The Rise of the E-Lance Economy*

The “E-lance Economy” has been a subject of sustained inquiry by Thomas W. Malone, the Patrick J. McGovern Professor of Information Sciences at the Massachusetts Institute of Technology’s (MIT) Sloan School of Management (along with others at the MIT initiative on Inventing the Organizations of the 21st Century). In an article in the September/October 1998 issue of the *Harvard Business Review*, Malone and coauthor Robert J. Laubacher ponder whether big companies will become obsolete, supplanted by a new “E-lance Economy.” By *e-lance*, Malone and Laubacher mean “electronically connected freelancers who join together into fluid and temporary networks to produce and sell goods and services.” Although Malone concedes that no one really

knows whether e-lancing will indeed become a broad-scale phenomenon, he said his research convinces him “that there are some pretty deep theoretical reasons for thinking that there is a sea change coming.”

Much of the change is being driven by competition and changes in the basic economics of organizations. “When it is cheaper to conduct transactions internally, within the bounds of a corporation, organizations grow larger, but when it is cheaper to conduct them externally, with independent entities in the open market, organizations stay small or shrink,” write Malone and Laubacher, summarizing the basic conclusions of business historians, organizational theorists, and economists.

The big question is: What happens to organizational structures when new information technologies are introduced, bringing new capabilities and efficiencies to virtually every business function?

Malone argues that several factors are driving business to embrace the e-lance model or some hybrid version of it. This dynamic is evident in the growth of outsourcing among large companies and the rise of smaller companies, many of which cater to large companies, says Malone. Cheap and versatile information technology has fueled this trend, he said, because it allows companies to find the best suppliers and partners anywhere in the world. It also helps companies manage their relationships with outsiders over great distances and lengths of time.

Outsourcing facilitated by IT has allowed large companies such as Nike and Cisco to flourish. Both enterprises are widely regarded as manufacturing enterprises, but both outsource this basic function, focusing instead on product design and marketing. At the other end of the outsourcing chain, companies such as EDS and Accenture (previously Andersen Consulting) have positioned themselves as business process outsourcing specialists.

The move from centralized organizations to temporary, networked structures is evident throughout today’s economy. In some industries, such as the film business, ad hoc sets of professionals often come together to work on individual projects. Filmmaking is essentially the creation of a temporary company of a director, actors, screenwriters, and technical crew, which then disbands when the project is finished.

So, too, among many startup companies today. When Banc One and First USA wanted to start an online, customer-direct bank, WingspanBank.com, the idea went from concept to beta version in about 93 days, reports Angie Kim, who at the time was a leader in McKinsey &

Company's e-commerce practice. The only way that such rapid planning and execution could occur, she said, was by assembling a team of about 120 full-time outsourcing contractors. "Everything was outsourced," said Kim, "including the strategy and management of the freelancers."

Kim relied on a similar outsourcing model when she started her current company, EqualFooting.com. "When we started, it was just three of us working out of my basement. We used the same model ourselves—outsourcing everything and using some of the people we had worked with before. We were able, without that much seed money and in only four months, to actually get our beta site up."

Malone reported that Topsy Tail, a fashion accessories company, contracts with various injection-molding companies to manufacture its goods; uses design agencies to create its packaging; and distributes and sells its products through a network of independent fulfillment houses, distributors, and sales representatives. The company has revenues of \$80 million—and only three employees.

As IT breaks down the barriers that have historically defined organizations, making them more fluid and permeable, it is unleashing lots of new experimentation in business models. There is no longer a presumption that there is a "right" way to accomplish something. Instead, all sorts of novel models are being launched. For example, many new ventures are experimenting with giving something away (e-mail service, catalogs of information, software) to sell something else (advertising, technical support, service). The efficiencies of IT are giving rise to new buyers' cooperatives, whereby groups of businesses or retail buyers are banding together to obtain group discounts.

The advantages of the e-lance model are not just economic. It also allows a new venture to move very quickly with the best available talent, so time need not be wasted recruiting full-time employees. Accountability based on strict performance also seems to work more naturally in e-lance teams than in large organizations. This accountability is especially important in a startup venture with few resources and small margins for error. Creativity and control are also maximized in an e-lance model. Without fixed bureaucratic systems to contend with, a small, ad hoc team can act swiftly and decisively, improvising when necessary. This flexibility frequently is impossible in large organizations.

### *Inherent Limits to the E-lance Model*

While it is clear that IT has propelled many trends toward e-lancing, conference participants noted that this model has distinct limits as well. Malone, for one, notes that e-lancing is never going to do away with large companies, and that outsourcing cannot replace all organizational functions. “The things that are easy to outsource are things you can contract out,” said Malone. “The messy parts of coordination will tend to remain inside single organizations.” Yet even if the size of a firm does not change, Malone believes that “the *inside* of large organizations will come to look more and more decentralized—more and more like the kind of e-lance economy that is emerging outside of the organization.”

An important distinction should be drawn between *outsourcing* and *e-lancing*, cautioned Bill Janeway of Warburg Pincus. The e-lance model brings together an hoc team whose skills and group performance may or may not deliver the results sought. Outsourcing, however, implies the existence of a larger, enduring organization that can deliver proven quality that is based on measurable metrics and operating through long-term relationships. The latter model gives rise to reputation, brand identity, and goodwill over time. E-lance teams may or may not achieve the same results.

This point highlights a key limit for e-lancing, said John Herron Jr. of Zoologic: “E-lancing works very well where there are very well-defined goals and relatively short time-horizons. Producing a film and developing a new software program are examples. But shareholders who invest in companies pay for more than ‘one act’—the assemblage of occasional business ideas. They want organizational value over time, which implies an enduring institutional capacity to learn and innovate. Indeed, at a time when change is so rapid, the importance of *organizational learning* is a factor that neither outsourcing nor e-lancing considers.”

Therefore, companies should not simply outsource whatever they can; they should carefully consider what core capacities should always be kept within the company. Geoffrey A. Moore’s recent book, *Living on the Fault Line* (Harperbusiness, 2000), makes a distinction between the *core functions* and the *context* of a business enterprise. Outsourcing the context—functions such as payroll that are important but are not likely to affect one’s competitive position—makes perfect sense. By contrast, a company’s core functions should not be outsourced, lest the company lose sight of key competitive conditions or allow an outsider

to commit a fundamental mistake. A company that keeps core functions within its four walls is more likely to have the institutional memory and resources for ongoing learning.

Another significant limit to the e-lance model is its inability to mobilize capital and deliver satisfactory returns over the long term. “I would assert that there would be no material capital available to the movie business over time,” said Bill Janeway, “if the sources of it weren’t also looking for non-financial returns in one form or another”—such as chasing starlets or associating with celebrities.

The e-lancing model also fails to protect a value that is particularly important to larger companies—reputation. Established organizations have much more at stake than ad hoc teams; indeed, that reputation—the real or perceived stability of the institution—is partly what investors pay for. Thus, many large companies might eschew e-lancing simply because slipshod performance by transient workers might jeopardize their reputation. Robert Hormats of Goldman Sachs called this issue the “nuclear power plant problem—if one part blows up, it can blow up the whole company.” That, in fact, is what happened with Berings Bank: the rogue activities of a single executive led to a fatal blow to its investment portfolio and reputation. Thus, while large companies may wish to reap the cost-efficiencies that can come with outsourcing, they also want to keep reputational issues under sufficient control.

But will brand reputation continue to be so valuable? Malone believes that the importance of branding as a signal of quality may well decrease in the coming years as better indices of quality emerge. He cited as examples several new objective rating services—such as Epinions, Déjà vu, and BizRate—that offer rigorous, trustworthy ratings of products. If such independent sources gain currency, some brand-name, reputational issues may diminish in importance. This may be particularly true if subsidiary brands can be created to insulate the parent company from harm, as Disney has done by creating Touchstone Pictures.

Although the e-lance model may offer new opportunities for creativity and autonomy, it may fail to provide several benefits that many workers have come to expect from their jobs—financial security, health insurance, learning opportunities, professional credentials, social contact, and even the personal identity that can come from belonging to an organization. If e-lancing separates more employees from the institutional care of large corporations, then who will take care of their larger needs?

Malone envisions the rise of a new type of professional society that could take care of many, if not all, of these needs: “You could call these organizations ‘networks’ or ‘communities’ or ‘homes,’ but the term I like best, harking back to the Middle Ages, is *guilds*.” Malone cited the Screen Actors Guild as an example of an independent contracting structure that takes dues from its members and provides generous health insurance, pensions, and training programs for its members. He envisions professional societies, college alumni associations, and temporary staffing agencies as organizational umbrellas for support to professional e-lancers.

Hormats was skeptical that e-lancing could take root in nations whose cultures are averse to risk-taking and mobility. In Japan, for example, where workers cannot be fired and pensions and health care are not portable, there would be a great deal of resistance to the e-lancing model. Even in the United States, e-lancing could prove to be unpopular if and when an economic downturn occurs. Job security and a steady income may become radically more important in such a climate. To work, therefore, the e-lance model may require a government role to assure that individuals could move from project to project without bearing all of the risks and penalties alone.

### *Hybrid Versions of E-lancing*

Although the e-lancing model accurately describes certain trends, several conference participants believe that the “free agent” capacities made possible by IT will be integrated within large companies. A new hybrid of large organizations and decentralized work teams could well emerge.

Angie Kim, president of EqualFooting.com, envisions a new form of large corporate organization that sponsors work teams that are semi-autonomous and entrepreneurial but also meet the performance metrics of larger enterprises. She sees this hybrid form of organization as bridging disparate goals. Workers’ desire for health and pension benefits, social interactions, and a sense of control over one’s destiny is made possible; at the same time, the work team meets crucial performance metrics and accomplishes specific goals. The people within each “cluster,” said Kim, could feel very much like free agents, yet they would be working toward the larger goals of the company.

John Kunzweiler of AC Ventures, the venture arm of Accenture (previously Andersen Consulting), agreed that this hybrid model may be most realistic. “When you have 100,000 employees, you really can’t

manage something that big. We worry about a sense of affiliation. Can employees connect with being a part of a company that large?" But by offering a large corporate umbrella that supports, but does not over-manage, smaller work teams that have a large measure of autonomy, the virtues of bigness and smallness can be artfully combined.

To be sure, there are deep tensions in this model. Smaller work units are naturally more predisposed to creativity and task-specific performance. But as their projects grow in size and duration, they will need to acquire some of the features of large corporate structures—strategic planning, systems management, and equity sharing. If talented professionals can reap more equity by migrating to small start-up ventures, then large corporate organizations will need to do more to recruit and retain such employees. One obvious tool, already widely used in many high-technology companies, is stock options and other forms of employee ownership. If equity functions as a kind of institutional memory, then sharing equity among employees is an important way of recognizing people's contributions to an enterprise's success—and assuring that it continues.

This insight highlights another limitation of the e-lancing model: the potential absence of equity-sharing among participants in ad hoc teams. Why participate in such projects if you will never realize any of the equity gains that may result? A similar question could be asked of e-lance guilds: Who "owns" them, both in terms of management control and equity assets?

The hybrid model of e-lancing within large organizations is attractive, at least in the abstract. But can it be readily replicated? Eric Schmidt, chairman and CEO of Novell, is doubtful: "If it were so easy, there would be more than one Cisco, right? CMGI is a holding company with a lot of little companies. The model is that people in the little companies get stock in the big company, instead of their little companies. It sounds great, but look at their stock performance in the last year."

## **Redefining Antitrust in the New Economy**

If e-lancing represents one extreme of market structure—a neoclassical ideal of atomistic competitors—the opposite extreme is monopoly, in which a single company utterly dominates a market to the detriment of competition, fair prices, and innovation. If the networked environment naturally gives rise to "winner take all" markets, as some observers

argue, then is antitrust law more important than ever? Or does the pace of innovation render antitrust less necessary and more problematic?

Reed Hundt, an antitrust litigator for 17 years before he became chairman of the FCC, offered his own reflections on how antitrust law ought to evolve in the new economy. He began by noting that antitrust law is really “a series of choices about two basic concerns: What is the desired structure of markets? And what is the desired behavior of firms in those markets?”

Antitrust is not an archaic set of principles being unfairly applied to a new industry that is inherently competitive, said Hundt—a criticism frequently made about the Microsoft antitrust case. The idea that antitrust should not apply to the New Economy is “absurd,” Hundt argued. He agreed, however, that the Microsoft case is controversial “because it represents a new set of choices about what we desire for the structure of markets and for the behavior of firms. It really is a virgin territory.”

The problem, Hundt said, is that antitrust law has to evolve in new ways to take account of the distinctive dynamics of information markets in the new networked economy. “No one has really yet offered a coherent description of what we ought to desire in terms of market structure or appropriate firm behavior in the today’s information markets,” he said.

There is nothing unusual about American society making deliberate choices about appropriate market structures, Hundt said. Congress and the courts do it all the time. The Newspaper Preservation Act—“really the ‘Newspaper Pro-Monopoly Act,’” said Hundt—is a series of specific mandates that exempts newspapers from behaviors that would otherwise violate antitrust laws. The Soft Drink Competition Act sanctions the Pepsi Cola/Coca Cola duopoly. The Automobile Dealers Act is designed to shift bargaining power from manufacturers to dealers. The Robinson Patman Act was designed to protect “mom-and-pop” grocery stores from the A&P in the 1930s and to prevent A&P from getting too much of a price discount from its suppliers. And, of course, the Sherman Act and Clayton Act, enacted in the late nineteenth and early twentieth centuries, include two core antitrust provisions: a prohibition against price-fixing and an anti-monopoly law that stipulates acceptable market structures.

Exactly *how* these antitrust choices are translated into action is a matter of great flexibility, Hundt conceded. The choices may be set

forth in specific statutes, they may be interpreted by the courts, or they may be defined by antitrust enforcers as they apply the law to particular circumstances in a particular industry. The point, Hundt stressed, is that it is entirely appropriate for legislators, courts, and antitrust enforcers to make these choices.

What has not yet occurred, however, is a formal reckoning of how antitrust principles ought to apply to the New Economy. Some very distinctive features of today's digital economy are not fully understood by contemporary antitrust law; these features make a difference in how the law should evolve. Three issues stand out, said Hundt:

1. *The cost of the first product is very high, whereas the cost of the second product is zero.* Developing a new software product costs a great deal of money, but the ease of digital copying means that the second unit of the product may cost virtually nothing. "This is pretty much the opposite of how product costs mount up in manufactured goods in the Old Economy," said Hundt. "Consequently, *virtually all antitrust precedent is about a set of facts that is different from the prevailing set of facts in the New Economy.* This matters, because antitrust is fundamentally about facts and the how particular sets of facts should be treated." Hundt commended the book *Information Rules* (Harvard Business School Press, 1999), by Shapiro and Varian, for an elaboration of this theme.

2. *The information economy is global in scope.* Because it is much easier to globalize information products and services than manufacturing, it is impractical to pursue antitrust policy on a domestic basis alone. But the U.S. government has no tradition of cooperating with other nations to develop antitrust policy; indeed, it refuses to do so. Yet this refusal is disingenuous because although the U.S. government rejects any coordinated international policymaking, in practice it does cooperate with other nations in antitrust *enforcement*—as it did in rejecting the Sprint-Worldcom merger.

3. *New business models call into question established standards of antitrust law.* In the networked economy, companies common-

ly give away their product to gain market share and build a network effect—steps toward enthroning a product as the industry standard. This market share is what Microsoft accomplished by distributing its Word 4.0 software program for free with Windows 95. Within a year, as computer users gave up WordPerfect and began to use Word, the previously dominant word-processing program—WordPerfect—was marginalized. Microsoft settled subsequent litigation against it on terms that were extremely favorable to WordPerfect, which Hundt believes amounts to a *de facto* admission that Microsoft drove the product from the market. The question posed by this and other free distributions of software is whether they constitute “predatory pricing.” Clearly, free distribution amounts to “pricing below cost,” but does this practice warrant prosecution under antitrust law?

#### *What the Microsoft Case Means*

The Justice Department’s antitrust case against Microsoft is worth examining because it represents one of the most consequential crucibles for defining how antitrust law will apply in the New Economy. The case illuminates the limits of existing antitrust doctrine as well as new patterns of market behavior that are widely denounced and perhaps ought to be curbed by new antitrust doctrines.

The Microsoft decision by Judge Robert Penfield Jackson provides “a brilliant exposition of the market,” Hundt claimed. There may be controversy over the most appropriate remedies, but the description of how the market operates is absolutely accurate, he said. “What Microsoft has done, over and over, is to take advantage of its ‘earned monopoly’ in operating systems. What it has done—through low-price pricing, failing to provide interoperability, and exclusionary contracts—is to make sure that no applications that are not a part of the Microsoft Suite could in some way themselves become platforms for a competing operating system. That’s what this case is all about. It is what Judge Jackson calls ‘the application barrier.’”

The Microsoft case highlights an inherent paradox that Americans have about monopolies, said Hundt: “We don’t mind, and have never minded, anyone competing so well that they become a monopoly. But we do mind the *behavior* of a monopoly. And there are certain behaviors in the

software markets that Jackson and the Justice Department are saying are not acceptable.”

Monopoly pricing seems not to be the paramount concern, said Hundt. We are not especially bothered by high profit margins for the second, third, or millionth copy of a software product. Indeed, Treasury Secretary Lawrence Summers criticized the Justice Department case for sending a dangerous signal to would-be innovators that their market successes will be taken away from them. Antitrust law should therefore tolerate and even *sanction* “winner take all” markets, said Summers, in an implicit swipe at the Justice Department for bringing its case. Hundt noted that our tolerance for high profit margins in software stands in conspicuous contrast to our suspicion about high margins in manufacturing, where they are a red flag for predatory behavior.

The real point of the Microsoft case is not about price relative to cost, said Hundt, but about *innovation*. We care most about how Microsoft’s dominance of the computer desktop market has artificially impeded innovation in other operating systems and desktop applications. A second key point of the case—which is related to the first—is the *importance of interoperability* among software and other computer components. In a market governed by digital interconnection, the overall value of the network increases by  $n^2$  as each new participant ( $n$ ) joins the network—a phenomenon known as Metcalfe’s Law. Microsoft’s critics objected to the company’s attempt to use its monopoly power to privatize this growth in the network’s value. “Microsoft’s efforts to be successful in the market need to be endorsed,” said Hundt, “because it is the kind of animal enthusiasm that is the core of capitalism. But its tactics also included efforts to ensure that other people’s products *not* work, *not* interconnect, *not* be interoperable, and so limit the overall value and growth of the network. This lawsuit is about saying that may be a prohibited tactic.”

The case is surely about a monopolist’s *behavior*, added Bill Janeway. There are other monopolists such as Intel that, despite enjoying similar dominance over the current software architecture, “have behaved in such a way as neither to attract nor catalyze an industry-wide assault upon it—which is what Microsoft did. A great deal of this case is about a class of behavior that, when exhibited by a company with that kind of market dominance, is unacceptable, and must be shown to be unacceptable.”

*Does Antitrust Matter in a World of Continuous Innovation?*

In some quarters, the Microsoft case is something of a joke because it is so belated. The computer desktop is no longer the single most important site of digital innovation. With the rise of the Internet and distributed networks, the hot new arenas of innovation have migrated to e-commerce, networks, and wireless industries, leaving behind a mature desktop market whose products will become increasingly commodified.

This is the perspective taken by Bill Coleman, chairman and CEO of BEA Systems, who has had extensive experience competing against Microsoft. Coleman argues that “monopolies are inherently unstable because they can only maintain their monopoly by slowing down or stopping innovation. Microsoft tried to stop innovation in e-commerce by trying to take over Java and the Internet browser,” he said. “Microsoft’s control is based on its control of Windows, which is a non-distributed environment,” said Coleman. “All of its applications and tools are tied to Windows. But the future is about a *distributed* world, not a non-distributed world. By endorsing the Web browser, Microsoft really endorsed the replacement of Windows as a client buy-in [to Microsoft products]. By trying to create a monopolistic distributed environment, they did exactly what IBM did with OS2 [an operating system]—they created an antibody that nobody wanted to adopt.”

Microsoft’s basic mistake, according to Coleman, was to take a “component model” of software development—a PC-based paradigm that reuses and modifies software components for a stable platform—and extend it to a networked environment. “Microsoft tried to take that model and extend it, trying to run the software as if it were distributed on the network,” said Coleman. “They kept renaming it—first it was called OLE, then COM, then DCOM and COM+. Now they have announced that, since none of those work, in the next two or three years they will have something called .Net [“dot net”]. Well, the fact is, nobody’s building on that standard for e-commerce, and in the wireless world browsers are running on other companies’ software, not Windows CE.

“Because Microsoft tried to maintain its monopoly—meaning control of innovation—it is no longer relevant going forward,” Coleman continued. “It’s not as if they will not be a player—they certainly can be—but to the extent that they try to keep everything tied to that one obsolete piece, the PC platform, that’s going to be their boat anchor.”

Microsoft's coming decline, if it happens, may simply make the company another in a series of IT monopolies that have come and gone over the past generation, said John Kunzweiler of AC Ventures. Much of this history surely relates to the "winner take all" dynamic, he said, and with the very rapid pace of innovation. "It's an odd industry where companies come in, take 80 percent market share, and then go away, all in the course of ten or twenty years," he said. For whatever reasons, antitrust enforcers and the courts "do not do a very good job of agreeing on what is unacceptable behavior, identifying it, and doing something about it."

### ***Can innovation outflank IT monopolies?***

A germane question is whether innovative companies can, in fact, turn the tables on monopolies—or at least carve out a viable market niche. Angie Kim urged us to consider America Online (AOL) as a kind of "new Microsoft" in the portal and operating-system application space. AOL is the dominant Internet service provider for Americans, and most of its subscribers stay within the AOL platform of content-providers and services. This dominance enables AOL to charge e-commerce companies between \$20 million and \$50 million to become an "anchor tenant" on any of its online properties, said Kim, and essentially dictate the terms of deals.

What is interesting is how MSN, Microsoft's online competitor to AOL, has responded. MSN is *paying* companies that establish new marketplaces on its network; in return, MSN gains the ability to control the site as a kind of "private-label" e-commerce site. By contrast, said Kim, "AOL is *charging* a sliding fee to the e-commerce marketplaces that want distribution and access to its customer base, with some revenue-sharing component. These are two very different ways of doing business, with the revenue-sharing component distinguishing the two." Whether MSN's imaginative strategy can gain a stable footing in the AOL-dominated market remains to be seen.

Nortel Networks faced a similar strategic challenge in trying to compete against Cisco, which has 80 to 90 percent of the market share in the Internet protocol (IP) router market. (Routers forward packets of information on the Internet and share information about the topology of the network.) "The first thing we've had to do is develop a strong self-confidence that innovation is the way to ultimately turn the tables," said Peter Brockmann, vice president of commercial marketing for Nortel Networks. "We had to believe that the evolution of the marketplace *will* change the natural dynamics that allow Cisco to maintain its monopolistic dominance." Nortel's

response was to develop a new routing product called “Open IP Environment,” which uses the routing protocol called OSPF—open shortest path first—that can be simply integrated into hardware components, allowing customers new competitive options against the Cisco router monopoly.

Taking this step was difficult for Nortel because it meant competing with itself, harming the marketability of its own routers with a new, potentially less attractive technology. But Nortel was willing to take this risk because it had confidence that its Open IP (Internet Protocol) software could eventually reinvent the terms of competition in the router marketplace. For Brockmann, Nortel’s experience suggests the ultimate vulnerability of monopoly positions in the IT world.

Yet another example of how new technologies can be used to reinvent the terms of competition in a market is “electronic communications networks,” (ECNs). ECNs are Internet-based alternatives to the established securities exchanges that directly link *buy* and *sell* orders for stocks. Now accounting for 30 percent of the share volume and 40 percent of the dollar volume of Nasdaq’s daily stock trades, ECNs bypass the conventional Wall Street trading firms and allow investors to consummate trades at much lower commissions: a radically disruptive business model in the financial services industry.

ECNs have raised provocative new questions because they have fragmented securities markets and introduced both new efficiencies and inefficiencies. A June 2000 report by the Securities and Exchange Commission explains:

When ECNs first developed, they were not integrated into the national market system, but primarily served as private trading vehicles for institutional investors and broker-dealers. Over time, as these subscribers posted prices in ECNs that were better than the prices they were posting in Nasdaq, the public quote became less reliable and the market became fragmented. This led to artificially wide spreads in the public markets. As a result, many investors, particularly retail investors, were receiving executions at prices inferior to those displayed by market makers and other subscribers on ECNs. This essentially created a two-tiered market—the traditional public market, and the new ECN market with better prices and limited access.<sup>2</sup>

Although the extent to which regulators eventually may address the market changes wrought by ECNs is unclear, there is little question that they represent a serious threat to established exchanges—a threat that was inconceivable five years ago.

The ubiquity of innovative business models suggests that maintaining monopoly power to control innovation is becoming increasingly difficult, said Alfred Chuang, president of BEA Systems. Two factors distinguish our time from previous ones, he said: one, barriers to entry have never been lower, and two, mass adoption rates for new technologies are extremely fast. These conditions make it much more difficult for traditional monopolies to survive, he said.

Seen from a broader perspective, today's business environment continuously creates new opportunities for standard architectures, said Bill Janeway. He cited the evolution of the standard computing architecture from the IBM mainframe universe, to client-server computing, and then only PC-led client-servers and first-generation distributed computing. Now the standard architecture is narrow-band Internet, which is simultaneously morphing into broadband Internet and a wireless architecture. Each of these standard architectures is created when new configurations of communications and computing technology crystallize, said Janeway.

The significance of this evolution is that “there is a kind of tactical competitive environment that is *within* an architecture, and there is a kind of strategic competition *between* architectures,” said Janeway. “Twice we have seen a dominant player in a standard architecture focus so intently on stifling innovation in order to maintain its position there—first IBM and now Microsoft—that each did some very nasty things. But in so doing, they opened themselves up to being blindsided by their customers, who aggressively sought out alternatives. In time, this prodded the ongoing innovation in computing and communications to generate a new standard architecture.”

### *Whither Antitrust?*

In light of the perplexing realities of contemporary markets—the ease of entry to markets, the constant innovation, the fairly rapid evolution of standard architectures—what role should antitrust law play?

Although Reed Hundt does not have a developed theory, he did venture some rebuttable presumptions. The first is that “we should be more

relaxed about industry structure than historically we have been. The market with only one, two, or three firms is not necessarily as frightening today as it was in the years when there wasn't so much innovation, barriers to entry were higher, and capital markets were less robust."

A second presumption is that openness and interoperability should be assured at critical interfaces in the Internet and other interfaces between markets—between operating systems and applications, between a database and applications, between the portal and potential competitors and users. As a broad principle, openness and interoperability help to assure ongoing competition and innovation.

This principle is related to a third presumption, that great ease of entry to markets is somehow assured. Hundt is not certain how that easy entry might best be achieved, but he believes it is an issue that needs to be addressed: "I think we need a very serious, very public, and very specific debate about appropriate market behavior in Information Economy markets," he urged. "Right now we don't have that. The point ought to be to ensure that we have concrete *macro mala prohibita* behaviors. [*Mala prohibita* are acts or offenses that are stipulated as criminal by statute but which are not criminal in and of themselves.] I don't know what these five or six prohibited behaviors ought to be in the New Economy. We do not have any consensus about them at this point. But we are not having a sufficiently rich debate."

A fourth presumption relates to the scope of the debate about antitrust in the future. "Antitrust law is not just to maximize economic welfare gains," Hundt said. "It is a kind of mitigation of capitalism—a way to send a message to those who are not part of the existing 'winner group' that they also have a chance of succeeding. That is a cultural value, and not necessarily an economic efficiency argument. It's worth remembering that an awful lot of antitrust is not about efficiency."

How will antitrust law evolve to shape markets in the New Economy? Much will depend on whether the distinctive dynamics of the New Economy—low barriers to entry, open standards, interoperability across technologies, rapid innovation, new business models, robust capital markets—actually persist in the years ahead. Much will also depend on a frank political reckoning by the new administration's antitrust enforcers about what constitutes "fair" market structures and behaviors in the New Economy. Finally, the willingness of the courts to apply familiar antitrust doctrines to novel fact-sets will be a significant variable in the evolution of antitrust law.

## Public Policy Choices for the New Economy

As new digital technologies burst upon the stage, there is little question that public policy will become increasingly important. There was a time when many computer users thought that the Internet should be left alone, and that any sort of government involvement would be disastrous to a network seen as utterly autonomous and self-organizing. Yet the rise of e-commerce challenged this view, as various industries arose to demand laws that would make the Internet safe for commerce—through new regimes for managing domain names, enforcing online contracts, intellectual property protection, and so forth.

### *Vital Public Policy Concerns*

The real question, said Elliot Maxwell, special advisor to the Secretary of Commerce for the Digital Economy, is not whether the government should regulate the Internet but what the proper government role ought to be. Government policymaking need not be regulatory and restrictive; it can facilitate. But it is clear that public policy is needed in many areas either to enable commercial dealings to flourish or to defend values that the marketplace may not, such as privacy, free speech and social equity.

Maxwell offered a wide-ranging inventory of public policy issues that are likely to need attention. They include:

- **Legal Framework.** The legal framework for conducting electronic commerce will need to be expanded and improved in the coming years.

*Electronic signatures* that are enforceable for online contracts received a big boost with passage of recent congressional legislation, but much remains to be achieved in getting consumers comfortable with such a system.

*Jurisdictional issues* over Internet activity may be the most difficult policymaking challenge. Consumers and businesses alike want predictability in the legal rules that will govern online activity. Consumers and businesses often have serious conflicts, however, about the legal standards that ought to prevail in consumer protection, privacy, and other dealings, and naturally

they will seek jurisdictional rules that they believe will advantage them. Consumers may seek rules that would provide them with the highest standard of legal protection and the greatest convenience for small purchasers. Business interests seek predictability and less burdensome legal requirements but may have divergent interests that are based on their particular line of business. Local auto dealers, for example, may seek to invoke state authority over online car sales while “e-tailers” advocate national rules. “The disjunction between the jurisdiction of the physical world and the jurisdiction of the electronic world will have to be played out over time,” said Maxwell.

*Tariffs* are a recurring issue for international trade in electronically delivered information. Currently, there are no tariffs for such goods and services, but there is concern that some countries will erect tariffs to protect their own industries or to reap new revenues.

*Tax policy* also is a central issue for e-commerce. Domestically and internationally, policymakers debate whether there should be sales or use taxes imposed on e-commerce or discrete taxes on telecommunications that may raise the costs of electronic transactions. Europeans have raised the possibility of levying value-added taxes on digital goods delivered electronically to Europe—a stance that is likely to raise significant problems between the United States and the European Community.

Electronic payment issues are obviously of interest to treasuries around the world that are concerned about money laundering and currency stability, as well as to consumer protection officials who are fighting electronic fraud.

*Antitrust law*, as mentioned in Section IV, represents another large set of policy issues that will require considerable scrutiny in the coming years, particularly because the framework for antitrust policy will have such far-reaching impact on competitiveness and innovation.

- ***Infrastructure Issues.*** The development of underlying networks on which the Internet rides raises several issues.

*Spectrum policy* will become increasingly important as industry demand for spectrum space increases. In choosing how to allocate spectrum, government will be making important choices about national competitiveness, competing uses of spectrum, and federal revenue. How should government weigh the interests of broadcasters or other users compared to the national interest in promoting a robust wireless industry? How much spectrum is enough for competing uses? What is the most equitable and efficient process for assigning spectrum space?

*Open access* to underlying networks—telephone, cable, wireless—raises major structural policy issues. Historically, of course, Internet service providers (ISPs) have enjoyed non-discriminatory, open access to the telephone network, which has fostered robust competition and affordable prices for Internet access. Access rules for cable's broadband plant have become contentious with difficult legal and technical issues. Similar questions are also likely to arise in the wireless world: Will consumers have a choice of ISPs to access the Internet via wireless technologies?

There are larger issues related to the openness of the Internet. Should government help assure that consumers can reach all Internet content providers under the same non-discriminatory conditions? Should government have any response to the "walled gardens" that are developing on the Internet? Should there be interoperability obligations for emerging instant messaging systems, or will market forces achieve the desired goals?

*Standards and interoperability* of the Internet, hardware, and software are increasingly important in the formation, expansion, and robustness of markets. Accordingly, government has a keen interest in good standards, well arrived-at, and a presumption that open standards and interoperability are preferred. But there are major issues about the role of governments with respect to standards, even though the character of stan-

dards for openness and interoperability has important implications for competitiveness and innovation.

*Domain names and management of technical infrastructure.* The creation of the Internet Corporation for Assigned Names and Numbers (ICANN) has been an attempt to move from government to private-sector control over the technical resources of the Internet in ways that might bridge national boundaries. Although officially concerned with technical issues, ICANN's policymaking also implicates certain larger policy values such as intellectual property, free speech, and national sovereignty. It remains to be seen where this experiment in Internet governance will lead and what its implications for other jurisdictional questions will be.

- **Confidence Issues.** *User confidence issues* are growing in importance as more transactions migrate to the Internet. Among the more important issues that deserve attention are rules governing contracts; questions of authentication; security and privacy in online transactions; the legal redress that aggrieved consumers can obtain in e-commerce; and the reliability of the system as a whole.

*Authentication, security, privacy, and reliability* in a general context—beyond the buyer-seller relationship—will grow in importance because the computing environment is becoming more complex. As computing becomes pervasive and as wireless systems become more universal, the issues of security, reliability, and privacy will become even more difficult.

*Control of Internet content* will continue to be a controversial issue. Historically, a nation's control over its communications architecture helped bolster social norms and political control. Now that the Internet is overriding national control of communications, the Chinese government is taking steps to ban content it considers seditious; Singapore has imposed filters against "pornographic" Internet content; Germans want to prohibit Nazi regalia on the Web; and many Americans want to ban pornography and gambling sites. Disputes over what con-

tent will be acceptable raise complicated international policy questions, exemplified by courts' attempts to control content from sites beyond their borders—such as the recent case in which French authorities pressed Yahoo to filter out Nazi Web sites.

*Intellectual property rights* in the digital environment are likely to become much more contentious. On the one hand, creators understandably want greater legal protection for digital content that they place on the Internet, arguably the world's most efficient copying machine. On the other hand, copyright law has never granted creators absolute control of their intellectual property, forever and for all purposes; the public has had rights to obtain copies for personal use as well as rights to fair use of copyrighted material for educational and research purposes—rights that are crucial to encourage democratic discourse, education, and scientific inquiry, as well as new creative expression.

- **Inclusiveness.** *The digital divide* is a term that has come to mean the disenfranchisement of access to the Internet, computing resources, and other vital technologies. It typically refers to people who are excluded from these technologies because of their income, education, or race. But it can also refer to disenfranchisement because of where one lives—such as in rural areas, inner cities, or developing nations. There are also particular user communities, such as disabled people, who have highly limited access to disabled-friendly Web sites. Relative to larger business enterprises, small- and medium-sized businesses may also need policy assistance and education to help them exploit e-commerce opportunities.
- **New Metrics.** *Measuring commercial activity* is fundamentally challenged by the Internet and the digital revolution. Government programs in the Commerce Department, the Bureau of the Census, and other agencies must now grapple with the question: What are the most appropriate statistical measures for determining the performance of industry sectors and the new economy? This issue is increasingly difficult as the Internet blurs sectoral distinctions, for instance, by allowing manufacturers to sell directly to consumers and as the significance of industry categories declines.

The government took years to adopt North American industry codes. Within five years, will these categories be worthless? Fortunately, the Census is actively trying to develop new measures and new means for data collection and analysis.

- **Government Use of Technologies.** *Revamping government services to take advantage of new information technologies is a major unmet challenge. Even though the U.S. government generates enormous amounts of valuable data, this information has not been readily available to the layperson, notwithstanding the ubiquity of the Web. A more serious problem is that most government agencies have not structured their decisionmaking or their transactions with their customers in consumer-friendly ways. “If the government were running Amazon.com,” goes the joke, “it would have the CEO’s picture and the stock price on its home page but nothing about how to order books.” A signal challenge for government is to find new ways to overcome this mentality and its “stovepipe” organizational structure to make citizen and business interactions with government more “customer-facing,” efficient, and effective.*
- **Social Safety Net Issues.** *Government support for labor mobility and entrepreneurialism could be important if an economy of e-lancing and outsourcing becomes more prevalent. For example, government-assisted portability of health care and pensions, as well as education and training programs, could help the American workforce capitalize on the New Economy without suffering serious social setbacks. Government could provide a more refined social safety net—not just to provide basic support to the poor and disabled, but to facilitate labor mobility, income security, and education and thereby help American companies compete more effectively in the digital economy.*

#### *What Role for Government?*

Needless to say, each of the foregoing issues is very complex and controversial in important aspects. Government is likely to be called upon to address each of these issues in coming months and years, if only because some companies will seek a competitive advantage through policy or because new abuses or practices will provoke a political response.

A first priority, counseled Reed Hundt, is “for government to figure out (a) what its objective should be, and (b) whether it actually can accomplish that objective.” Although this formulation may sound simplistic, he said, it is too rarely done, especially in the context of the Internet. “As our case is new, so we must think anew,” he said. “We should remember Lincoln’s definition of the purpose of government—to do what needs doing, but which no one can do so well acting alone.”

By clearly articulating objectives, we can then establish the most appropriate legal frameworks for achieving them, Hundt said. That is what Congress did when it decided that a universal broadcast system was important; its subsequent emphasis on localism in the Communications Act of 1934 helped to assure universal coverage. So too, when Congress decided that universal telephony was important, it created a regulatory system that allowed that to be achieved.

Unfortunately, we often do not have that kind of clarity in making public policy for the Internet, Hundt said. “The President said a few months ago that we ought to have broadband Internet access as a universal service. But we’ve had no discussion about whether that ought to be a government policy, and no policy for achieving it. Most of the objectives that we might talk about, we have not concretely defined. And even those that we have concretely defined, we have only the most minimal initial efforts to realize them—because this is all very, very new.”

Although the details of government policymaking will of course vary from one arena to another, conference participants offered some strategic suggestions for achieving results:

- *Regulate behavior, not bits*, urged Eric Schmidt, chairman and CEO of Novell. “As a rule, you cannot force electronic bits to be what you want them to be. But you can regulate the behavior of humans in the physical world.” By this, Schmidt means that you can try to regulate MP3 files, Web site content, and recordable compact disks, but the only really effective way to regulate online data is by controlling behavior in the physical world.
- *Induce paranoia*. Rep. Markey contends that the key to the Telecommunications Act of 1996 is the paranoia that it induces in competitors. Because all technologies (broadcast, cable, satellite, telephony, etc.) are placed on an equal footing, there is

always some paranoia that another industry might try to outmaneuver one's own. If cable complains that it does not have the incentives to build out broadband, then it must worry that the telephone companies or satellite industry might go after those customers instead. Paranoia is the key to successful policymaking, Markey argued, because it induces companies to innovate and compete. They cannot shield themselves from competition with legal entitlements or market power.

- *Nurture a convergence of policy norms.* Marc Rotenberg, executive director of the Electronic Privacy Information Center, pointed out that the choice is not simply between government-imposed laws and self-regulation through private contract. Another approach is to encourage various parties to develop policy norms and best practices that can be culturally enforced over time. This practice is especially effective in international contexts, where there simply are no institutions with the coercive powers to enforce legal policies. Although there may be a certain fuzziness about policy norms, the consensus that eventually develops can be tremendously stable, evolutionary, and effective in disciplining rogue actors.

## Conclusion

Living through times of revolutionary change is difficult. The superficial and transient can mesmerize—while deeper changes go unexamined. The hype and excitement about one set of changes can lead one to be weary and cynical—even though significant challenges cry out for action. It is hard to know when to apply the intellectual categories of a previous time to new circumstances, and when a new vocabulary and analysis should be embraced. Simply assembling the facts to synthesize a more holistic picture of this sprawling digital revolution is a formidable task. This report, therefore, has tried to synthesize the perspectives of leading thinkers about digital innovation into a more coherent view of the whole.

Already we have seen sweeping changes in the character of the economy. New efficiencies within firms have contributed to important macroeconomic trends such as productivity gains, low unemployment, and an

apparent taming of the business cycle. Yet a variety of information technologies has arguably intensified the volatility of the Capital Economy.

The coming revolution in wireless technologies will be remarkable in its scope and power. Combined with the existing infrastructure of the Internet and computing technologies, wireless technology will drive a whole new set of innovations in business models and organizational behavior. “Conversations” between technology and markets, organizations and employees, legal regimes and citizens, and other realms of society will only grow more intense, more complex, and more interesting.

Although most attention is focused on technology and markets, clearly a significant challenge for the coming decade will be crafting appropriate antitrust policies. While technological innovation and ease of market entry are powerful forces against monopoly, these factors may be products of an unprecedentedly robust venture capital market. In any case, the victors in “winner take all” markets retain many weapons for stifling competition, including artificial impediments to interoperability and open markets.

Beyond antitrust, public policy more generally will need fresh attention, both to channel technology markets in the most constructive directions and to protect important societal values. This will require serious work because it will entail nothing less than reinventing the process of democratic decisionmaking for the digital age. Uncharted territory indeed.

## Notes

<sup>1</sup>Peter H. Lewis, "Wireless Valhalla: Hints of the Cellular Future," *New York Times* (July 13, 2000), E1.

<sup>2</sup>Securities and Exchange Commission, Division of Market Regulation, "Electronic Communication Networks and After-Hours Trading," June 2000, available at <http://www.sec.gov/news/studies/ecnafter.htm> (last accessed December 28, 2000).



# APPENDIX

The Ninth Annual Aspen Institute  
Roundtable on Information Technology

*The Relationship Beyond the Transaction:  
E-Commerce and Community in the New Economy*

## List of Conference Participants

August 9-12, 2000  
Aspen, Colorado

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**William Coleman**

*Chairman and Chief Executive  
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**Robert D. Hormats**

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**Charles M. Firestone**

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**William H. Janeway**

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

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The Aspen Institute

## About the Author

**David Bollier** is an independent author, journalist, and consultant who writes frequently about the civic and social implications of the digital media. A long-time collaborator with television writer and producer Norman Lear, Bollier is Senior Fellow at the Lear Center at the University of Southern California's Annenberg School of Communications. He is also Project Director of the Information Commons Project at the New America Foundation in Washington, D.C. Bollier is the author of five books, including *Aiming Higher* (1996). He is a graduate of Amherst College and Yale Law School.

# **The Aspen Institute Communications and Society Program**

The Communications and Society Program is a global forum for leveraging the knowledge and power of leaders and experts to improve the human condition.

The overall goal of the Program is to promote innovative, knowledge and values-based decision making in the fields of communications, information and new media. As a neutral and nonpartisan convenor, the Communications and Society Program is uniquely situated to accomplish this goal. It does so through a variety of activities aimed at promoting constructive inquiry and dialogue, and the development and dissemination of new models and options for informed and wise policy decisions.

In particular, the Program provides an active venue for global leaders and experts from a variety of disciplines to exchange and gain new knowledge and insights on the societal impact of advances in digital technology and 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, Communications Technology and the Democratic Process, Information Technology and Social Change. Ongoing activities of the Communications and Society Program include the Aspen Institute Internet Policy Project, the annual Aspen Conference on Telecommunications Policy and the Aspen Institute Roundtable on Information Technology, a conference series on Elections in Cyberspace (a joint project with the American Bar Association Standing Committee on Election Law), a ceo-level Forum on Communications and Society, and annual domestic and international conferences on journalism and freedom of expression.

Conference reports and other materials are distributed to key policy-makers and opinion leaders, within the United States and around the world, and to the public at large through the World Wide Web.

**Charles M. Firestone** is executive director of the Aspen Institute Communications and Society Program. Prior to joining the Aspen Institute in 1989, Mr. Firestone was director of the Communications Law Program at the University of California at Los Angeles and an adjunct professor at the UCLA Law School. He was also the first president of the Los Angeles Board of Telecommunications Commissioners.

Mr. Firestone's career includes positions as an attorney at the Federal Communications Commission, as director of litigation for a Washington, D.C. based public interest law firm, and as a communications and entertainment attorney in Los Angeles. He has argued several landmark communications cases before the United States Supreme Court and other federal appellate courts. Mr. Firestone is the editor or co-author of seven books, and has written numerous articles on communications law and policy. He holds degrees from Amherst College and Duke University Law School.

## **Previous Publications from the Aspen Institute Roundtable on Information Technology**

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

David Bollier. This report explores the nature of innovation and the role of information and communications sectors in fostering ecologies of innovation. In this context, the report examines the ways that the creation of new ecologies are impacting 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. 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)*

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

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*The Future of Electronic Commerce* (1996)

David Bollier. This report examines the communications and information technologies that are redefining the fundamental conditions and relationships of commercial transactions, and 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. This report concentrates on issues of personal identity, community building, and setting boundaries in our lives and our environment, and includes a background paper entitled, "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. This report explores the use of complex adaptive systems as a model for determining information technology's role in both the workplace and diverse societal settings. It includes a background paper by John Seely Brown, Paul Duguid, and Susan Haviland entitled, "Towards Informed Participants: Six Scenarios in Search of Democracy in the Electronic Age," that 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. This report explores the use of a new paradigm, that 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.



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