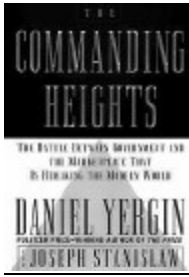


## HIGHLANDS READING LIST

The list appended below features a number of books that we have used in researching topics for Highlands Forum meetings. These books represent several categories: information theory, science, technology, management, history, and economics. They have been selected both for their topics as well as their capacity for broadening our understanding of emerging issues and the way that we think about things. Participants in previous Highlands Forum meetings have written a number; others were written by Forum participants as a direct outgrowth of papers or studies they completed for the Forum. This is a continuing work—additional titles will be added this year.



### **The Commanding Heights**

Daniel Yergin and Joseph Stanislaw

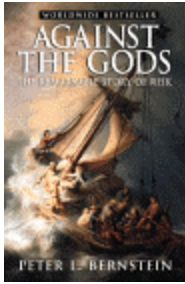
The Commanding Heights is about the most powerful political and economic force in the world today -- the epic struggle between government and the marketplace that has, over the last twenty years, turned the world upside down and dramatically transformed our lives. Now, the Pulitzer Prize-winning author of *The Prize* joins with a leading expert on the new marketplace to explain the revolution in ideas that is reshaping the modern world. Written with the same sweeping narrative power that made *The Prize* an enormous success, The Commanding Heights provides the historical perspective, the global vision, and the insight to help us understand the tumult of the past half century.

Trillions of dollars in assets and fundamental political power are changing hands as free markets wrest control from government of the "commanding heights" -- the dominant businesses and industries of the world economy. Daniel Yergin and Joseph Stanislaw demonstrate that words like "privatization" and "deregulation" are inadequate to describe the enormous upheaval that is unfolding before our eyes. Along with the creation of vast new wealth, the map of the global economy is being redrawn. Indeed, the very structure of society is changing. New markets and new opportunities have brought great new risks as well. How has all this come about? Who are the major figures behind it? How does it affect our lives?

The collapse of the Soviet Union, the awesome rise of China, the awakening of India, economic revival in Latin America, the march toward the European Union -- all are a part of this political and economic revolution. Fiscal realities and financial markets are relentlessly propelling deregulation; achieving a new balance between government and marketplace will be the major political challenge in the coming years. Looking back, the authors describe how the old balance was overturned, and by whom. Looking forward, they explore these questions: Will the new balance prevail? Or does the free market contain the seeds of its own destruction? Will there be a backlash against any excesses of the free market? And finally, *The Commanding Heights* illuminates the five tests by which the success or failure of all these changes can be measured, and defines the key issues as we enter the twenty-first century.

The Commanding Heights captures this revolution in ideas in riveting accounts of the history and the politics of the postwar years and compelling tales of the astute politicians, brilliant thinkers, and tenacious businessmen who brought these changes about. Margaret Thatcher, Donald

Reagan, Deng Xiaoping, and Bill Clinton share the stage with the "Minister of Thought" Keith Joseph, the broommaker's son Domingo Cavallo, and Friedrich von Hayek, the Austrian economist who was determined to win the twenty-year "battle of ideas." It is a complex and wide-ranging story, and the authors tell it brilliantly, with a deep understanding of human character, making critically important ideas lucid and accessible. Written with unique access to many of the key players, The Commanding Heights, like no other book, brings us an understanding of the last half of the twentieth century -- and sheds a powerful light on what lies ahead in the twenty-first century.



### **Against the Gods: the Remarkable Story of Risk**

Peter Bernstein

If you've ever cursed the fact that your auto insurance premiums are higher than average just because of that fender bender you had a few years back or that your healthcare premiums are higher because you are a smoker, one of the people you can thank is 18th century scientist Jacob Bernoulli. As Peter L. Bernstein points out in his fascinating *Against the Gods: The Remarkable Story of Risk*, the origins of modern risk management in financial services and industry in general, lie in the models and theories of thinkers of Bernoulli's ilk from Babylonian times through the Renaissance and the Age of Reason to the present day.

In this well-written look at the development of mathematical models and philosophy that define the basic parameters of codification and quantification of risk, Bernstein shows an acute appreciation of this arcane but highly interesting facet of history. At times, the work reads like a history of mathematics, but there are payoffs for those interested in how and why humans think about risk/reward problems and opportunities. To be sure, Bernstein explains how the world, or certain crucially important parts of the world, works.

Bernstein succeeds in satisfying his mission or thesis: "This book tells the story of a group of thinkers whose remarkable vision revealed how to put the future at the service of the present. By showing the world how to understand risk, measure it, and weigh its consequences, they converted risk-taking into one of the prime catalysts that drives modern Western society.... By defining a rational process of risk-taking, these innovators provided the missing ingredient that has propelled science and enterprise into the world of speed, power, instant communication, and sophisticated finance that marks our own age. Their discoveries about the nature of risk, and the art and science of choice, lie at the core of our modern market economy that nations around the world are hastening to join."

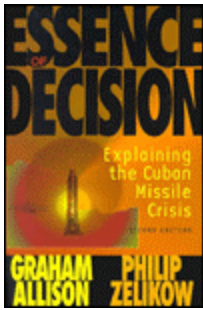


## **The Innovator's Dilemma**

Clayton Christensen

What do the Honda Supercub, Intel's 8088 processor, and hydraulic excavators have in common? They are all examples of disruptive technologies that helped to redefine the competitive landscape of their respective markets. These products did not come about as the result of successful companies carrying out sound business practices in established markets. In The Innovator's Dilemma, author Clayton M. Christensen shows how these and other products cut into the low end of the marketplace and eventually evolved to displace high-end competitors and their reigning technologies.

At the heart of The Innovator's Dilemma is how a successful company with established products keeps from being pushed aside by newer, cheaper products that will, over time, get better and become a serious threat. Christensen writes that even the best-managed companies, in spite of their attention to customers and continual investment in new technology, are susceptible to failure no matter what the industry, be it hard drives or consumer retailing. Succinct and clearly written, The Innovator's Dilemma is an important book that belongs on every manager's bookshelf.



## **Essence of Decision**

Graham Allison and Philip Zelikow

One of the most influential political science works written in the post World War II era, the original edition of Essence of Decision is a unique and fascinating examination of the pivotal event of the Cold War. Not simply revised, but completely re-written, the Second Edition of this classic text is a fresh reinterpretation of the theories and events surrounding the Cuban Missile Crisis, incorporating all new information from the Kennedy tapes and recently de-classified Soviet files. The Second Edition refines the arguments presented in the original book in light of Graham Allison's experience as the Assistant Secretary of Defense and the founding Dean of the John F. Kennedy School of Government at Harvard University. The Second Edition also features a new co-author, Philip Zelikow, author of the best-selling and critically-acclaimed The Kennedy Tapes, which was published by Harvard University Press in 1997. Essence of Decision, Second Edition, is a vivid look at decision-making under pressure and is the only single volume work that attempts to answer the enduring question: how should citizens understand the actions of their government?



## **Management Challenges for the 21<sup>st</sup> Century**

Peter Drucker

No single person has influenced the course of business in the 20th century as much as Peter Drucker. He practically invented management as a discipline in the 1950s, elevating it from an ignored, even despised, profession into a necessary institution that "reflects the basic spirit of the modern age." Now, in Management Challenges for the 21st Century, Drucker looks at the profound social and economic changes occurring today and considers how management--not government or free markets--should orient itself to address these new realities.

Drucker sees the period we're living in as one of "PROFOUND TRANSITION--and the changes are more radical perhaps than even those that ushered in the 'Second Industrial Revolution' of the middle of the 19th century, or the structural changes triggered by the Great Depression and the Second World War." In the midst of all this change, he contends, there are five social and political certainties that will shape business strategy in the not-too-distant future: the collapsing birthrate in the developed world; shifts in distribution of disposable income; a redefinition of corporate performance; global competitiveness; and the growing incongruence between economic and political reality. Drucker then looks at requirements for leadership ("One cannot manage change. One can only be ahead of it"), the characteristics of the "new information revolution" (one should focus on the meaning of information, not the technology that collects it), productivity of the knowledge worker (unlike manual workers, knowledge workers must be seen as capital assets, not costs), and finally the responsibilities that knowledge workers must assume in managing themselves and their careers.

Drucker's writing career spans eight decades and the years have only served to sharpen his insight and perspective in a way that makes most other management texts seem derivative. While Management Challenges for the 21st Century is no quick airplane read, it is a wise and thought-provoking book that will both challenge and inspire the diligent reader. This book is for people who care about their businesses and careers in the information age--CEOs, managers, and knowledge workers.



## **The Art of the Long View**

Peter Schwartz

At Highlands Forum IV, after remarkable presentations by historians taking us back 2000 years, and science fiction authors stretching us 2000 years into the future, Peter Schwartz and his team from Global Business Network took the Forum on scenario building exercises. Those scenarios on the future of conflict in an information age had a great impact on the writing of information and defense strategy. The basis for Peter's work is contained in this seminal book.

This book is about using future scenarios to make better current decisions. As Peter Schwartz alerts us, "Scenarios are not predictions." They represent instead, possible alternative dimensions of the future that reflect the driving forces of that future. This is particularly valuable now because unpredictability is growing. "Unpredictability in every field is the result of the conquest of the whole of the present world by scientific power."

Perhaps the greatest benefit of these practices is that "scenarios are . . . the most powerful vehicles . . . for challenging our 'mental models' about the world and lifting the 'blindness' that limit our creativity and resourcefulness." So you can think of scenarios as a stallbusting technique for overcoming the miscommunication, misconception, and disbelief stalls, as well. One of the book's great strengths is that it takes you through the process by which the author discovered these qualities about how to use scenarios. He begins with his exposure to the kind of scenarios that Herman Kahn was using for government policy development in the 1970s. You then meet Pierre Wack at Royal Dutch/Shell who used scenarios to help the company successfully prepare for the big price increases in oil during the Arab Oil Embargo. Mr. Schwartz later replaced Mr. Wack in that job and describes his experiences with later scenarios. One example that I found particularly interesting was thinking about putting in a new natural gas field offshore from Norway. Whether it made sense or not depended on whether the U.S.S.R. would continue to be an enemy of Western Europe and not ship its own low-cost natural gas to that market. That work led to understanding that the U.S.S.R. probably would fall many years before that occurred. There is a user's guide with eight requirements for holding strategic conversations built around these scenarios. That is followed by an appendix with an 8 step process for developing the scenarios to use. I thought that his section on "Information-Hunting and -Gathering" was especially good in helping you to spot the early sources of new future directions. These can come from technology trends, music, fringe areas, perceptions shaping events, remarkable people, sources of existing surprises, filters (such as magazines), and new networks.



### **Harnessing Complexity**

Robert Axelrod and Michael Cohen

As featured speakers at Highlands Forum VII, Robert Axelrod and Michael D. Cohen presented their ideas on the future of business and government in an age of complexity. They expanded on their theme with this wonderful book. Recent advances in the study of complexity have given scientists profound new insights into how natural innovation occurs and how its power can be exploited. Axelrod and Cohen provide leaders in business and government with a guide to complexity that will help them make effective decisions in a world of rapid change. Building on evolutionary biology, computer science, and social design, Axelrod and Cohen have constructed a unique framework for improving the way people work together. Their approach to management is based on the concept of the Complex Adaptive System, which can describe everything from rain forests to the human gene pool, and from automated software agents to multinational companies. The authors' framework reveals three qualities that all kinds of managers must cultivate in their organization:

**Variation.** What is the best way to manage the development of software? Should the problem be broken up into small pieces for programmers working independently, thus enhancing variation, or should there be a centralized hierarchy of programmers ruled by a chain of command? The authors show how the decentralized creation of variation combined with the centralized maintenance of standards was the key to the success of the Linux "open source software" project, which brought together thousands of volunteers in cyberspace to produce an operating system that can outperform Microsoft's.

**Interaction.** Why did northern Italy prosper while southern Italy remained poor? Recognizing the internal interactions of a Complex Adaptive System -- be it a national region, a company, or a nonprofit group -- reveals vital networks of trust. Axelrod and Cohen explain that in successful adaptive systems, rich networks of horizontal linkages foster cooperation and provide an advantage over other less cooperatively networked groups. In the case of Italy, voluntary

associations created networks of trust in the Middle Ages that became northern Italy's critical advantage over the south.

**Selection.** Is a Pulitzer Prize better than a National Book Award? How can foundations and corporations design competitions that have a positive effect on the evolution of excellence? The authors' framework makes clear that the worst selection processes are mired in orthodox standards that have not adapted to a new environment. The best selection processes, on the other hand, are created and run by leaders who understand how the standards they use can transform their organization and its environment.

This simple, paradigm-shifting analysis of how people work together will transform the way we think about getting things done in a group. *Harnessing Complexity* is the essential guide to creating wealth, power, and knowledge in the 21st century.

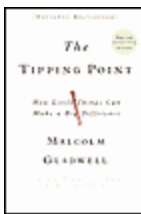


### **Blown to Bits**

Philip Evans and Thomas Wurster

The inspirational keynote speaker at Highlands Forum XVI: "Information Superiority", Philip Evans, has written this essential book with Thomas S. Wurster. They think that the Internet can blow away practically any business, and in Blown to Bits, they examine how the new economy is "deconstructing" industries such as newspapers, auto retailing, and banking while creating new opportunities for others. They write that the "glue that holds today's value chains and supply chains together" is melting, and that even "the most stable of industries, the most focused of business models and the strongest of brands can be blown to bits by new information technology."

Evans and Wurster, both executives of the Boston Consulting Group, argue that the Internet demands new business strategies because it provides companies tremendous "reach" for customers without sacrificing "richness," or the quality of the information about products and services. The book shows how some businesses--Microsoft and Intuit in personal finance, Dell Computer in retailing, and the Automotive Network Exchange in manufacturing supply--are thriving amid a rapid expansion of connectivity and the widespread acceptance of new technical standards on the World Wide Web. Clearly written and tough-minded, Blown to Bits is required reading for business leaders, entrepreneurs, strategists, and others concerned about the new economics of the information age.



### **The Tipping Point**

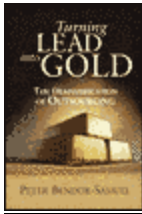
Malcolm Gladwell

The best way to understand the dramatic transformation of unknown books into bestsellers, or the rise of teenage smoking, or the phenomena of word of mouth or any number of the other mysterious changes that mark everyday life," writes Malcolm Gladwell, "is to think of them as epidemics. Ideas and products and messages and behaviors spread just like viruses do." Although anyone familiar with the theory of

memetics will recognize this concept, Gladwell's The Tipping Point has quite a few interesting twists on the subject.

For example, Paul Revere was able to galvanize the forces of resistance so effectively in part because he was what Gladwell calls a "Connector": he knew just about everybody, particularly the revolutionary leaders in each of the towns that he rode through. But Revere "wasn't just the man with the biggest Rolodex in colonial Boston," he was also a "Maven" who gathered extensive information about the British. He knew what was going on and he knew exactly whom to tell. The phenomenon continues to this day--think of how often you've received information in an e-mail message that had been forwarded at least half a dozen times before reaching you.

Gladwell develops these and other concepts (such as the "stickiness" of ideas or the effect of population size on information dispersal) through simple, clear explanations and entertainingly illustrative anecdotes, such as comparing the pedagogical methods of Sesame Street and Blue's Clues, or explaining why it would be even easier to play Six Degrees of Kevin Bacon with the actor Rod Steiger. The Tipping Point is one of the most effective books on science for a general audience in ages. It seems inevitable that "tipping point," like "future shock" or "chaos theory," will soon become one of those ideas that everybody knows--or at least knows by name.



### **Turning Lead Into Gold**

Peter Bendor-Samuel

Outsourcing has unparalleled power to generate value and wealth for those who learn to apply its principles effectively. Yet, pitfalls are many and deep for those who outsource without first taking the time to understand its underlying principles. Shrouded in mystery, outsourcing has been a source of confusion and frustration for many executives. Now for the first time, the principles of outsourcing have been clearly explained and illustrated in Turning Lead into Gold. Peter Bendor-Samuel, a world-renowned outsourcing authority, shares his insights on how and why outsourcing works, and how it can work for your organization. He presents documented evidence of success with examples from the real-life experience of major corporations, including EDS, IBM, AT&T, British Petroleum, Pricewaterhouse Coopers, J.P. Morgan & Co., Andersen Consulting, and JCPenney, among others."



### **New Rules for the New Economy**

Kevin Kelly

There's hype and then there's the Internet. The widespread emergence of the World Wide

Web and the idea of a network economy have set new records for excess in overheated marketing campaigns, breathless newspaper and magazine articles, and topsy-turvy financial markets. From his perch as founding editor of *Wired* magazine, Kevin Kelly tries to encapsulate the characteristics of this emerging economic order by laying out 10 rules for how the wired world operates. The result is a dizzying, sometimes confusing, but always thought-provoking look at the behavior of networks and their effect on our economic lives. At the root of this network revolution is communication. Like other prognosticators of the future--Alvin Toffler and John Naisbitt come to mind--Kelly's job is to imagine a new world. Far from hype, *New Rules for the New Economy* is required reading for anyone pondering business in the not-too-distant future.



### **The Social Life of Information**

John Seely Brown

How many times has your PC crashed today? While Gordon Moore's now famous law projecting the doubling of computer power every 18 months has more than borne itself out, it's too bad that a similar trajectory projecting the reliability and usefulness of all that power didn't come to pass, as well. Advances in information technology are most often measured in the cool numbers of megahertz, throughput, and bandwidth--but, for many us, the experience of these advances may be better measured in hours of frustration.

The gap between the hype of the Information Age and its reality is often wide and deep, and it's into this gap that John Seely Brown and Paul Duguid plunge. Not that these guys are Luddites--far from it. Brown, the chief scientist at Xerox and the director of its Palo Alto Research Center (PARC), and Duguid, a historian and social theorist who also works with PARC, measure how information technology interacts and meshes with the social fabric. They write, "Technology design often takes aim at the surface of life. There it undoubtedly scores lots of worthwhile hits. But such successes can make designers blind to the difficulty of more serious challenges--primarily the resourcefulness that helps embed certain ways of doing things deep in our lives."

The authors cast their gaze on the many trends and ideas proffered by infoenthusiasts over the years, such as software agents, "still a long way from the predicted insertion into the woof and warp of ordinary life"; the electronic cottage that Alvin Toffler wrote about 20 years ago and has yet to be fully realized; and the rise of knowledge management and the challenges it faces trying to manage how people actually work and learn in the workplace. Their aim is not to pass judgment but to help remedy the tunnel vision that prevents technologists from seeing larger the social context that their ideas must ultimately inhabit. The Social Life of Information is a thoughtful and challenging read that belongs on the bookshelf of anyone trying to invent or make sense of the new world of information.





### **Release 2.1**

Esther Dyson

Esther Dyson has spoken at and moderated panels at many Highlands Forum meetings. As a leader of the “wired” economy and a venture capitalist, and Chairman of the international commission on assigned names and numbers (ICANN) she is always on the leading edge of technology and ideas. This book is her "upgrade" to Release 2.0. Dyson discusses the changes that the Internet has imposed on many areas of our lives, such as work, communities, and education. She is optimistic about the growth of the Internet and addresses skeptics' concerns about the future of online privacy and security issues, ownership of online content, governance of cyberspace, and more.

Much has happened since the first edition of Dyson's book was published in 1997, and she smoothly blends her updates into the original manuscript. The most notable changes to the book reflect the growth of e-commerce. Dyson follows the progress of the original eight companies profiled in 2.0 and introduces five new Internet business pioneers. She also charts the advances in privacy and security tools, the backlash against spam, and the overturning of the Communications Decency Act (which occurred shortly before the publication of her first book). In this version, Dyson also excerpts e-mail comments and articles from her Web site ([www.edventure.com](http://www.edventure.com)) to support the statements in her text.



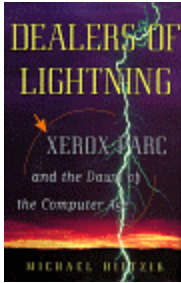
### **Jamming**

John Kao

Jamming is a lively look at the process that translates dreaming into doing, that turns 'what if' into 'why not' -- and then into successful new products. John Kao, a featured speaker at Highlands Forum XIII, “Innovation and Public Organizations”, offers inspiring, instructive tales of how creativity can be nurtured and managed to produce that flow of new ideas that is the only guarantee of continuing success. Changing the actual physical environment of the workplace, Kao reminds readers, also sends new signals to employees. The one-room office of First Virtual Corporation (which searches out cutting-edge technology for clients) both reflects and perpetuates founder Ralph Ungerman's business philosophy: There are no secrets in an open room. Since the purpose here is the leveraging of ideas, it is impossible for me or anyone not to have an instant grasp of what's going on in everybody's area. When a customer calls to say he's discovered a problem with a product, every single person in this company is involved within a few minutes.

An organization free of hierarchies, systems, and procedures that smother spontaneity has worked wonders at companies like Oticon, which eliminated job descriptions and encourages

people to do not only what they trained for but what interests them; 3M, where internal trade shows expose different departments to one another's brainstorms and innovations; and AlliedSignal, which took the suggestion of two frontline factory workers seriously, redesigned its factory in Arizona, increased productivity, and saved millions of dollars. Behind every business breakthrough, Kao points out, is a manager (or management team) willing to stretch, improvise, and create what no artist or techie can: a supportive atmosphere that integrates beliefs and goals, culture and strategy, performance and rewards. Kao reveals the tools and techniques that make up the creative manager's repertoire, from crafting a coherent challenge within the context of a company's goals to expediting the creative process by providing the necessary financial and technical support.



**Dealers in Lightning**  
Michael Hiltzik

Throughout the '70s and '80s, Xerox Corporation provided unlimited funding to a renegade think tank called the Palo Alto Research Center (PARC). Occupying a ramshackle building adjacent to Stanford University, PARC's occupants would prove to be the greatest gathering of computer talent ever assembled: it conceptualized the very notion of the desktop computer, long before IBM launched its PC, and it laid the foundation for Microsoft Windows with a prototype graphical user interface of icons and layered screens. Even the technology that makes it possible for these words to appear on the screen can trace its roots to Xerox's eccentric band of innovators. But despite PARC's many industry-altering breakthroughs, Xerox failed ever to grasp the financial potential of such achievements. And while Xerox's inability to capitalize upon some of the world's most important technological advancements makes for an interesting enough story, Los AngelesTimes correspondent Michael Hiltzik focuses instead on the inventions and the inventors themselves. We meet fiery ringleader Bob Taylor, a preacher's son from Texas known as much for his ego as for his uncanny leadership; we trace the term "personal computer" back to Alan Kay, a visionary who dreamed of a machine small enough to tuck under the arm; and we learn how PARC's farsighted principles led to collaborative brilliance. Hiltzik's consummate account of this burgeoning era won't improve Xerox's stake in the computer industry by much, but it should at least give credit where credit is due.

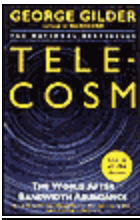


**Code and Other Laws of Cyberspace**  
Lawrence Lessig

Lawrence Lessig turns the now-traditional view of the Internet as an uncontrollable, organic entity on its head, and explores the architecture and social systems that are changing every day and taming the frontier. Code and Other Laws of Cyberspace is his well-reasoned, undeniably cogent series of arguments for guiding the still-evolving regulatory processes, to ensure that we don't find ourselves stuck with a system that we find objectionable. As the former Communist-bloc

countries found, a constitution is still one of our best guarantees against the dark side of chaos; and Lessig promotes a kind of document that accepts the inevitable regulatory authority of both government and commerce, while constraining them within values that we hold by consensus.

Lessig holds that those who shriek the loudest at the thought of interference in cyberdoings, especially at the hands of the government, are blind to the ever-increasing regulation of the Net (admittedly, without badges or guns) by businesses that find little opposition to their schemes from consumers, competitors, or cops. The Internet will be regulated, he says, and our window of opportunity to influence the design of those regulations narrows each day. How will we make the decisions that the Framers of our paper-and-ink Constitution couldn't foresee, much less resolve? Lessig proclaims that many of us will have to wake up fast and get to work before we lose the chance to draft a networked Bill of Rights.



### **Telecosm**

George Gilder

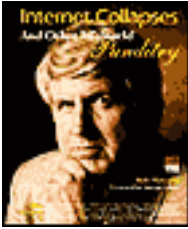
George Gilder, the tech-friendly author of the well-received chip treatise, *The Meaning of the Microcosm*, and publisher of the Gilder Technology Report, has brought forth *Telecosm: How Infinite Bandwidth Will Revolutionize Our World*, another work of technical prose that's sure to appeal to both techheads and non-technical folks alike.

*Telecosm* predicts a revolutionary new era of unlimited bandwidth: it describes how the "age of the microchip"--dubbed the "microcosm"--is ending and leaving in its wake a new era--the "telecosm," or "the world enabled and defined by new communications technology." Speaking like a prophet of the bandwidth deity, Brother Gilder lays down the telecosmic commandments--the Law of the Telecosm, Gilder's Law, the Black Box Law, and so on. He describes the gaggle of industry players--from cable and satellite to telephone and computer--who populate the telecosm arena.

Books about telecommunications rarely are quotable, but *Telecosm* at times is a brilliant example of magical and (believe it or not) mystical prose. Gilder's philo-techno perspective makes for interesting and thought-provoking musings: "Wrought of sand, oxygen, and aluminum, the three most common substances in the Earth's crust, the microprocessor distills ideas as complex as a street map of America onto a sliver of silicon the size of a thumbnail. This gift of the quantum is a miracle of compression." And, finally, he describes precisely what the telecosm will create among its congregation: "The gift of the telecosm is a miracle of expansion: grains of sand spun into crystalline fibers and woven into worldwide webs."

What happens when we become blessed with the miracle of infinite bandwidth? Gilder writes, "You can replace the seven-layer smart network with a much faster, dumber, unlayered one. Let all messages careen around on their own. Let the end-user machines take responsibility for them. Amid the oceans of abundant bandwidth, anyone who wants to drink just needs to invent the right kind of cup." And what of unlimited bandwidth? No mere contradiction in terms, unlimited bandwidth is what we strive for--"we" meaning those of us who suffer bravely through the contradictions of Moore's Law and Metcalfe's Law, as we increase our RAM and decrease our Net access time.

While it seems too simple to describe *Telecosm* as a telescopically written book of cosmic proportions, it is that and more. Gilder's political rants and raves for infinite bandwidth boldly foretell the age of the telecosm and its dramatic impact on all of us--of our metamorphosis from users who found ourselves bound by the limits of our networks to "bandwidth angels" who compute in the "Promethean light."



### **Internet Collapses and Other InfoWorld Punditry**

Bob Metcalfe

So deeply cynical you know he must be right, Bob Metcalfe has made a second career out of showing us the inner workings of the computer industry. With material culled from the best of nearly a decade's worth of columns, Internet Collapses and Other InfoWorld Punditry is guaranteed to both aggravate the reader and illuminate the issues, often at the same time. Perhaps better known as the inventor of Ethernet and founder of 3Com, Metcalfe is pretty much free from the need to self-censor and can write whatever InfoWorld will tolerate. His opinions generally leave no individual, business, or government agency unscathed--Metcalfe was Microsoft-bashing long before it was cool, although the U.S. Department of Justice, open-source advocates, and "paranoid anti-technology outlaw cyberpunks dressed in black" must also endure his scorn.

Even more appealing than Metcalfe's invective are his sometimes-outrageous predictions. After reading his 1994 offhand comment that antitrust enforcers would be wishing for timelier action against Microsoft five years later, the reader may be tempted to hustle down to the library to check the original. At other points in the book, such as when he foretold the "Internet's catastrophic collapse in 1996," readers can only marvel at the odd combination of hubris and humility that drove him to reprint the very wrong alongside the very right. This same combination allowed him to humble himself by publishing brief rebuttals by such industry heavies as Nathan Myhrvold and Vint Cerf--excellent foils whose styles complement Metcalfe's own. Whether you're an old-school InfoWorld reader or you've never had the pleasure of Metcalfe's virtual company, Internet Collapses will give you a brutally clear perspective on the birth of the Internet economy.



### **What If?**

Robert Cowley and Stephen Ambrose

Counterfactuals--what-if scenarios--fueled countless bull sessions in smoke-filled dorm rooms in the 1960s. Some of those dorm-room speculators grew up to be historians, and their generation (along with a few younger and older scholars) makes a strong showing in this anthology of essays, in which the what-ifs are substantially more plausible. What if Hitler had not attacked Russia when he did? He might have moved into the Middle East and secured the oil

supplies the Third Reich so badly needed, helping it retain its power in Europe. What if D-Day had been a failure? The Soviet Union might have controlled all of Europe. What if Sennacherib had pressed the siege of Jerusalem in 701 B.C.? Then the nascent, monotheistic Jewish religion might never have taken hold among the people of Judah—and the daughter religions of Christianity and Islam would never have been born.

So suggest some of the many first-rate contributors to this collection, which grew from a special issue of MHQ: The Quarterly Journal of Military History. One of them is classicist Josiah Ober, who suggests that if Alexander the Great had died at the age of 21 instead of 32, Greece would have been swallowed up by Persia and Rome, and the modern Western world would have a much different sensibility--and probably little idea of democratic government. Still other contributors are Stephen E. Ambrose, Caleb Carr, John Keegan, David McCullough, and James McPherson, who examine a range of scenarios populated by dozens of historical figures, including Sir Walter Raleigh, Chiang Kai-shek, Robert E. Lee, Benito Mussolini, and Themistocles. The result is a fascinating exercise in historical speculation, one that emphasizes the importance of accident and of roads not taken in the evolution of human societies across time.



### **The Killer Angels**

Michael Shaara

Shaara's Pulitzer Prize-winning novel of the Battle of Gettysburg makes inspiring reading. This novel reveals more about the Battle of Gettysburg than any piece of learned nonfiction on the same subject. Michael Shaara's account of the three most important days of the Civil War features deft characterizations of all of the main actors, including Lee, Longstreet, Pickett, Buford, and Hancock. The most inspiring figure in the book, however, is Col. Joshua Lawrence Chamberlain, whose 20th Maine regiment of volunteers held the Union's left flank on the second day of the battle. This unit's bravery at Little Round Top helped turned the tide of the war against the rebels. There are also plenty of maps, which convey a complete sense of what happened July 1-3, 1863. Reading about the past is rarely so much fun as on these pages. Great for understanding strategy and decision making.

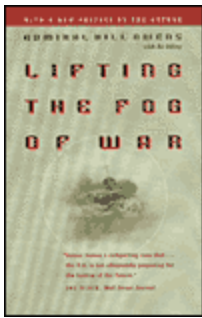


### **Black Hawk Down**

Mark Bowden

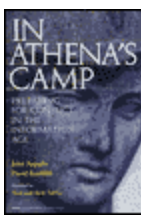
Journalist Mark Bowden delivers a strikingly detailed account of the 1993 nightmare operation in Mogadishu that left 18 American soldiers dead and many more wounded. This early foreign-policy disaster for the Clinton administration led to the resignation of Secretary of Defense Les Aspin and a total troop withdrawal from Somalia. Bowden does not spend much time considering the context; instead he provides a moment-by-moment

chronicle of what happened in the air and on the ground. His gritty narrative tells of how Rangers and elite Delta Force troops embarked on a mission to capture a pair of high-ranking deputies to warlord Mohamed Farrah Aidid only to find themselves surrounded in a hostile African city. Their high-tech MH-60 Black Hawk helicopters had been shot down and a number of other miscues left them trapped through the night. Bowden describes Mogadishu as a place of Mad Max-like anarchy--implying strongly that there was never any peace for the supposed peacekeepers to keep. He makes full use of the defense bureaucracy's extensive paper trail--which includes official reports, investigations, and even radio transcripts--to describe the combat with great accuracy, right down to the actual dialogue. He supplements this with hundreds of his own interviews, turning *Black Hawk Down* into a completely authentic nonfiction novel, a lively page-turner that will make readers feel like they're standing beside the embattled troops. Major issues include problems of interoperability, poor communication, information superiority, decision making under stress, and extreme valor. This will quickly be realized as a modern military classic.



**Lifting the Fog of War**  
William Owens

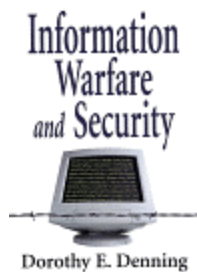
In his classic book *On War*, Carl von Clausewitz famously wrote: "War is the realm of uncertainty; three quarters of the factors on which action is based are wrapped in a fog of greater or lesser uncertainty." Ever since, "the fog of war" has been a standard concept in military theory. But now, says Admiral William A. Owens, the time has come to lift that fog with technology currently in development. Such technology may soon "revolutionize the way we conduct military operations," writes the author, who is the former vice chairman of the Joint Chiefs of Staff (America's second-highest-ranking officer) and now heads Teledesic. "In a future conflict," says Owens, "an Army corps commander in his field headquarters will have instant access to a live, three-dimensional image of the entire battlefield displayed on a computer screen, an image generated by a network of sensors, unmanned aerial vehicles, reconnaissance aircraft, and special operations soldiers on the ground. The commander will know the precise location and activity of enemy units--even those attempting to cloak their movements by operating at night, in poor weather, or hiding behind mountains or under trees." Yet Lifting the Fog of War is not merely high-tech happy talk. Owens is deeply concerned about U.S. military readiness: "The military as we know it is in trouble," he writes. "The impending collapse of our military capability in the oncoming 'defense train wreck' must occupy center stage in the 2000 presidential election." This book is at once an engaging review of recent military history, a gripping vision of what may come, and a compelling call to arms.



**In Athena's Camp**

John Arquilla and David Ronfeldt

A seminal work, a foundation of understanding the nature of information and warfare in the coming era. Essays about conflict in the information age that show how the information revolution is altering the nature of conflict. The authors ponder, correctly, whether a rigid, military command structure can adapt to the decentralized organizational restructuring that Net war will demand. The book correctly points out the importance of creating new doctrines within which to place the new technological developments. After all, to be effective, information must be combined with a coherent strategy, consistent organization and proper management of resources. They propose that information is a bigger, deeper concept than traditionally presumed and should be treated as a basic, underlying, and overarching dynamic of all theory and practice about warfare in the information-age. This view of information as having a transcendent, if not independent, role leads them into fascinating discussions of the nature of information and knowledge.



**Information Warfare and Security**

Dorothy Denning

Before reading half the book, I was ready to cancel my e-mail accounts, jettison my modems, cancel my credit cards, move what little money I have from the bank to my mattress, and head out for the Flint Hills. You see, part of what Denning has done in Information Warfare and Security is chronicle what seems to be just about every breach in computer security over the past few years. Page after page of hacks, cracks, phreaks, and psyopts by everyone from teenagers and thrill seekers to spies and nuts. Credit card numbers, passwords, bank accounts--they're all fair game for anyone who is bright, persistent, online, and so inclined.

Not that it was Denning's intent simply to titillate us with one interesting or exciting story after another. Instead, her goal is to provide us with a comprehensive overview of what's become known as "information warfare." In defining this term, Denning relies on a definition supplied by Winn Schwartau in his book *Information Warfare* (Thunder's Mouth Press, 1996) whereby:

"Information warfare consists of those actions intended to protect, exploit, corrupt, deny, or destroy information or information resources in order to achieve a significant advantage, objective, or victory of a specific adversary or adversaries."

However, Denning doesn't stop there. She goes on to explain that she attempts to take the definition deeper, to "... provide a theory of information warfare based on the value of information resources to an offense or defense... Information warfare is a 'win-lose' activity. It is about "warfare" in the most general sense of conflict, encompassing certain types of crime as well as military operations." To that end, Denning opens Information Warfare and Security with a description of the role of information warfare in the Gulf War. The brief history she presents is both interesting and exciting and immediately pulls you into the book. This chapter kicks off "Part I: Introduction" of the book, which covers other topics such as the author's theory of information warfare, and issues such as motivation and types of computer crime. From there, Denning moves to "Part II: Offensive Information Warfare" which addresses topics such as open

source (no, not source code, but the information about all of us that is open and easily accessible), psyops ("psychological operations"), traitors and moles, corporate espionage, dumpster diving, shoulder surfing, phone phreaking, packet sniffers, e-mail forgeries, and much more. Finally, in "Part III: Defensive Information Warfare," Denning surveys the tools and techniques that enable individuals and organizations to protect themselves from attacks: cryptography, RSA, biometrics, digital signatures, trash disposal, firewalls, and the like. Information Warfare and Security is important as a comprehensive introductory survey of the challenges we face in the coming century.

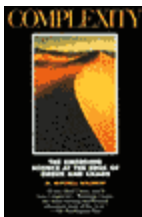


### **Secrets and Lies**

Bruce Schneier

Whom can you trust? Try Bruce Schneier, whose rare gift for common sense makes his book Secrets and Lies: Digital Security in a Networked World both enlightening and practical. He's worked in cryptography and electronic security for years, and has reached the depressing conclusion that even the loveliest code and toughest hardware still will yield to attackers who exploit human weaknesses in the users. The book is neatly divided into three parts, covering the turn-of-the-century landscape of systems and threats, the technologies used to protect and intercept data, and strategies for proper implementation of security systems. Moving away from blind faith in prevention, Schneier advocates swift detection and response to an attack, while maintaining firewalls and other gateways to keep out the amateurs.

Newcomers to the world of Schneier will be surprised at how funny he can be, especially given a subject commonly perceived as quiet and dull. Whether he's analyzing the security issues of the rebels and the Death Star in Star Wars or poking fun at the giant software and e-commerce companies that consistently sacrifice security for sexier features, he's one of the few tech writers who can provoke laughter consistently. While moderately pessimistic on the future of systems vulnerability, he goes on to relieve the reader's tension by comparing our electronic world to the equally insecure paper world we've endured for centuries--a little smart-card fraud doesn't seem so bad after all. You can trust Schneier to dish the dirt in Secrets and Lies.



### **Complexity**

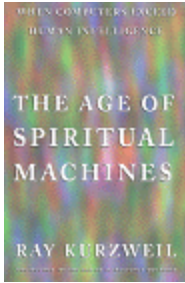
Mitch Waldrop

Why did the stock market crash more than 500 points on a single Monday in 1987? Why do ancient species often remain stable in the fossil record for millions of years and then suddenly disappear? In a world where nice guys often finish last, why do humans value trust and cooperation? At first glance these questions don't appear to have anything in common, but in fact every one of these statements refers to a complex system. The science of complexity studies how single elements, such as a species or a stock,



spontaneously organize into complicated structures like ecosystems and economies; stars become galaxies, and snowflakes avalanches almost as if these systems were obeying a hidden yearning for order.

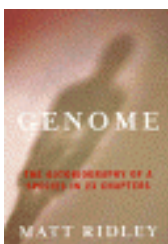
Drawing from diverse fields, scientific luminaries such as Nobel Laureates Murray Gell-Mann and Kenneth Arrow are studying complexity at a think tank called The Santa Fe Institute. The revolutionary new discoveries researchers have made there could change the face of every science from biology to cosmology to economics. M. Mitchell Waldrop's groundbreaking bestseller takes readers into the hearts and minds of these scientists to tell the story behind this scientific revolution as it unfolds.



**The Age of Spiritual Machines**  
Ray Kurzweil

How much do we humans enjoy our current status as the most intelligent beings on earth? Enough to try to stop our own inventions from surpassing us in smarts? If so, we'd better pull the plug right now, because if Ray Kurzweil is right, we've only got until about 2020 before computers outpace the human brain in computational power. Kurzweil, artificial intelligence expert and author of The Age of Intelligent Machines, shows that technological evolution moves at an exponential pace. Further, he asserts, in a sort of swirling postulate, time speeds up as order increases, and vice versa. He calls this the "Law of Time and Chaos," and it means that although entropy is slowing the stream of time down for the universe overall, and thus vastly increasing the amount of time between major events, in the eddy of technological evolution the exact opposite is happening, and events will soon be coming faster and more furiously. This means that we'd better figure out how to deal with conscious machines as soon as possible--they'll soon not only be able to beat us at chess, they'll likely demand civil rights, and they may at last realize the very human dream of immortality.

The Age of Spiritual Machines is compelling and accessible, and not necessarily best read from front to back--it's less heavily historical if you jump around (Kurzweil encourages this). Much of the content of the book lays the groundwork to justify Kurzweil's timeline, providing an engaging primer on the philosophical and technological ideas behind the study of consciousness. Instead of being a gee-whiz futurist manifesto, Spiritual Machines reads like a history of the future, without too much science fiction dystopianism. Instead, Kurzweil shows us the logical outgrowths of current trends, with all their attendant possibilities. This is the book we'll turn to when our computers first say "hello."

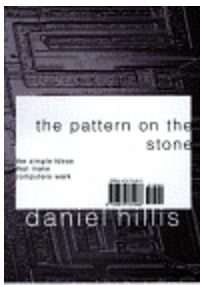


## **Genome**

Matt Ridley

Science writer Matt Ridley has found a way to tell someone else's story without being accused of plagiarism. Genome: The Autobiography of a Species in 23 Chapters delves deep within your body (and, to be fair, Ridley's too) looking for dirt dug up by the Human Genome Project. Each chapter pries one gene out of its chromosome and focuses on its role in our development and adult life, but also goes further, exploring the implications of genetic research and our quickly changing social attitudes toward this information. Genome shies away from the "tedious biochemical middle managers" that only a nerd could love and instead goes for the A-material: genes associated with cancer, intelligence, sex (of course), and more.

Readers unfamiliar with the jargon of genetic research needn't fear; Ridley provides a quick, clear guide to the few words and concepts he must use to translate hard science into English. His writing is informal, relaxed, and playful, guiding the reader so effortlessly through our 23 chromosomes that by the end we wish we had more. He believes that the Human Genome Project will be as world-changing as the splitting of the atom; if so, he is helping us prepare for exciting times--the hope of a cure for cancer contrasts starkly with the horrors of newly empowered eugenicists. Anyone interested in the future of the body should get a head start with the clever, engrossing Genome.



## **The Pattern on the Stone: The Simple Ideas That Make Computers Work,** Daniel Hillis

Danny Hillis is a veteran of several Highlands Forum meetings and his insights are always startling, provocative—and yet immediately strike us as a logical way of thinking about a problem. He has blended a peerless knowledge of computers with expertise in biology to take a totally different view on things and the results are always amazing.

As Amazon.com comments, "he has made a career of puzzling over the nature of information and the mechanisms that put information to use. Now, he's distilled his accumulated knowledge of computer science into The Pattern on the Stone, a glorious book that reveals the nature of logical machines simply and elegantly. Millions of times each second, to the drumbeat of a clock signal, electronic computers compare digital values. These comparisons, and the actions taken in response to them, are what computers are all about at their lowest levels, and, with the help of this book, they're not hard to comprehend. Moving on from the nature of logical circuits, the author deconstructs software and the mechanisms it employs to solve problems. Hillis then stands atop the building blocks he's arranged into a sturdy foundation and discusses the future of computing. Parallel processors already are in use, and neural networks with limited abilities to learn and adapt have proved quite good at certain jobs. Hillis explores the potential of both these technologies. Then, he throws some light on quantum computing and evolving systems—emerging ideas that promise to make computers much more powerful, and thereby change the world."



**Out of Control: The New Biology of Machines, Social Systems and the Economic World**  
Kevin Kelly

Kevin Kelly, the former editor-in-chief of Wired magazine, has another later book on our list: New Laws for the New Economy. He derives many of them, along with a host of other fascinating ideas from this earlier, more important work, Out of Control. A frequent participant in Highlands gatherings, Kelly tells us that in many ways, the 20th century has been the Age of Physics. Amazon.com says “Out of Control is an accessible and entertaining explanation of why the coming years will probably be the Age of Biology -- particularly evolution and ethology -- and what this will mean to most every aspect of our society. Kelly is an enthusiastic and well-informed guide who explains the promises and implications of this rapidly evolving revolution very well”. Forbes ASAP calls the book “the best of an important new genre. The book offers a pointed reminder that self organization...is the essence of innovation, progress, and life itself. These are eternal ideas -- and ideas whose time has come. Kelly’s ideas represent the wonderful sort of subject which can quickly transform a reader's idle curiosity into an obsessive craving for more knowledge and imaginative interpretation. Kelly offers plenty of both, with hackle-raising enthusiasm, eloquence, and even that scientific rarity, a sense of humor.”



**Information Rules**  
Hal Varian and Carl Shapiro

As key speakers at Highlands Forum VII, Varian and Shapiro took their views of market places, government, and information technology to an expanded form and produced this excellent book, one that should have been read by many day traders prior to the March-April 2000 tech stock meltdown. There is a lot of confusion these days in terms of trying to define the rules of success in the new economy. One thing for sure is that the pace of change we are experiencing today is unprecedented and can be ignored at our own peril. But amazingly, the rules of the game have not changed – as argued so powerfully in this book; the pace of the game has increased and it requires greater speed and agility to keep playing. But if the rules are the same and the pace has increased what about the playing field? Well, it is turning bigger and a player who wants to be in the game should know every inch of it. The main theme of the book centers on the concept that while we may adopt new strategies in the information economy the fundamental economic principles still apply. The goods that we are dealing with are information goods that are costly to produce and cheap to reproduce. In such a scenario, what are the cost characteristics, pricing strategies and market structures? Similarly the concepts of Versioning, Rights management, Lock-in, Networks & positive feedback are analyzed in great detail with appropriate illustrations and cases.



### **Darwin Among the Machines: The Evolution of Global Intelligence**

George B. Dyson

The second of our two Dysons on the list, George Dyson, was our keynote speaker at Highlands Forum VIII, "The Mind, the Brain, and Computing." He is a remarkable historian and thinker, and has a knack for bringing "dead" history to life in the stories he tells of his principal figures. This deep and elegant book derives both its title and its outlook from Samuel Butler's 1863 essay "Darwin Among the Machines." Observing the beginnings of miniaturization, self-reproduction, and telecommunication among machines, Butler predicted that nature's intelligence, only temporarily subservient to technology, would resurface to claim our creations as her own. Updating Butler's arguments, Dyson has distilled the historical record to chronicle the origins of digital telecommunications and the evolution of digital computers, beginning long before the time of Darwin and exploring the limits of Darwinian evolution to suggest what lies beyond. Weaving a cohesive narrative among his brilliant predecessors, Dyson constructs a straightforward, convincing, and occasionally frightening view of the evolution of mind in the global network, on a level transcending our own. Dyson concludes that we are in the midst of an experiment that echoes the prehistory of human intelligence and the origins of life. Just as the exchange of coded molecular instructions brought life as we know it to the early earth's primordial soup, and as language and mind combined to form the culture in which we live, so, in the digital universe, are computer programs and worldwide networks combining to produce an evolutionary theater in which the distinctions between nature and technology are increasingly obscured.



### **Seeing Differently: Insights on Innovation**

John Seely Brown (Editor)

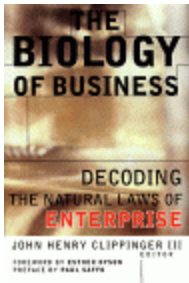
The second book on our list by John Seely Brown, this book set the stage for the discussions at Highlands Forum XIII, "Innovation and Public Organizations". John Seely Brown has examined the business literature, picked a few authors that really help us "see differently," found works that describe their ideas in tight little packages, and put it all in one book. JSB's own framing comments are also essential, and for the very busy executive who would like to read this book but finds himself short on time, JSB has done a fine job of providing short executive summaries of each essay. Some of the highlights include Brian Arthur on increasing returns (Highlands Forum II); Gary Hamel's Strategy as Revolution; Morris and Ferguson on the power of platforms; Brandenburger and Nalebuff on Game Theory for strategy; and sections on competitive advantage and managing innovation.



### **The Pursuit of Power, and Plagues and Peoples**

William H. McNeill

Many Highlands participants have commented that they consider Professor McNeill's presentation to Highlands Forum IV in Santa Fe as the most spellbinding they have ever heard. Taking the floor he walked us through 2000 years of history and described in riveting detail the impact of information and technology on power relationships. We offer these two books by Professor McNeill as a pair that should be read to understand the new security environment—as Barry Horton and Andy Marshall have told me, “if you want a new idea, read an old book”. These are not easy reads—serious time and reflection are necessary to appreciate the scope and import of these events and ideas. It is an enlightening book on the course of the world (not just military history. If you only read one book describing the influence of military developments on general history, read this one. In *Plagues and Peoples*, our readers will see the roots of Steve White's presentation to Highlands Forum XV on digital immune systems. McNeill shows us how disease circulation has shaped many aspects of human affairs, especially religion and power. Humans are forced to share the world with diseases, and both must continually adapt to live with one another. When humans alter the environment, they shift the delicate mutual balance between host and parasite, which often leads to widespread epidemics.



### **The Biology of Business : Decoding the Natural Laws of Enterprise**

John Henry Clippinger III (Editor)

John Clippinger is a frequent guest and speaker at Highlands Forum meetings, and the essence of this book was presented at a mini meeting on Knowledge Management to seniors in the Pentagon. *The Biology of Business* is a blueprint for sparking self-organization, knowledge, and rapid change in any company. Edited by John Henry Clippinger III, the book is a collection of 10 essays about the complexity theory of managing. Authors include top business professors and leading consultants from McKinsey & Company and Ernst & Young. A major theme: Traditional top-down management methods no longer work in an age of fast technological change and world competition. Instead, people must be free to manage themselves and come up with new solutions. The book's goal is to show how some companies are keeping "their enterprises balanced between order and chaos".



**Net Ready: Strategies for Success in the E-economy,**

Amir Hartman, John G. Sifonis, John Kador

Susan Bostrom, Senior Vice President for Internet Business at Cisco, spoke at Highlands Forum XVI on "net ready' Cisco and the "virtual close". She heads the division in which Net Ready authors Hartman and Sifonis work. Together, they have put together a set of principles that has guided Cisco's strategy, principles finding their way into many businesses and government agencies. Howard reviews says: "they are referring to "seamless interactivity" organization-wide, the recognition that manipulating customers is no longer easy--nor, for that matter, desirable--and other realities and requirements in the still-evolving commercial climate they've dubbed the "E-economy." Their book's opening section offers real-world trends and scenarios as a "framework to which emerging network-based businesses can map themselves," along with a "Net Readiness Scorecard" to measure preparedness in the core areas of leadership, governance, competencies, and technology. The second explores "using the Net to exploit new opportunities" by transforming products and markets, business processes, and entire industries. (They show, for example, how AOL reconceived itself from ISP to media company, how Ford connected with suppliers online, and how Schwab countered competitors by redefining the cyberbrokerage.) The third examines how everything comes together at Cisco Systems, and summarizes lessons learned--in 11 guiding principles. This is a serious book for those serious about doing business in the 21st century".