MIT ESD

Massachusetts Institute of Technology
Engineering Systems Division

ESD Working Paper Series

ESD Summer Reading Lists 2003–2014

Joseph M. Sussman
JR East Professor of Civil and Environmental Engineering and Engineering Systems
Massachusetts Institute of Technology
Cambridge, USA
sussman@mit.edu

ESD-WP-2014-17 June 2014 esd.mit.edu/wps

ESD Summer Reading Lists—2003-2014

June 11, 2014

ESD Summer Reading Lists

Back in 2003, when ESD was a toddler of about 4 1/2, we were preparing for our spring semester offsite traditionally held at the end of the academic year in late May or early June. I had the idea of preparing a short list of books with relevance to the ESD mission-the study of complex sociotechnical systems-and presented that idea to the then (and founding) ESD director Prof. Daniel Roos. He agreed it would be worthwhile as an experiment, and so I did create the first ESD Summer Faculty Reading List. A "summer" reading list carries the suggestion of books you can take to "the beach". So no "text books" were included. The books were treatments of critical contemporary issues that the world faces, important methods and perspectives germane to these issues and the complex sociotechnical systems in general, and relevant history. In retrospect, the beach would likely be too distracting a venue for many of these books!

I got some "attaboys" on the 2003 list. A number of my colleagues said it was nice to take a look at my ideas about what books might be interesting reading. So with that positive feedback, I began to do this ESD Faculty Summer Reading List each year. When I did it the second year, I noted that this had now become a "tradition" and with an organization as young as ESD, we needed all the traditions we could get.

You can see where it has gone from here. The tradition has continued to the present day, with now twelve years of history for this reading list. In the early days, the commentary on the books was largely my own. As years wore on we would include materials that others-the publisher or book reviewers-had prepared with some supplementary comments from me. And in later years my comments became less and less prevalent and even non-existent.

Another thing we did regularly was to include books that had been published during that current academic year by ESD faculty/teaching staff, so this served as a mechanism for highlighting the scholarly work of my ESD colleagues and in 2013, two books published by MIT Press and Penguin Press book were included.

In any case, we have these reading lists encompassing books over this twelve-year period and thought it would be helpful to publish it as an ESD working paper to give our colleagues at MIT and outside the Institute access in one document to this eclectic potpourri of books. You may even find something you want to read that you missed the first time around.

We hope the reader finds this compendium to be useful and we look forward to any feedback that you may have including suggestions for 2015 and forward.

Joseph M. Sussman
JR East Professor
Professor of Civil & Environmental Engineering
and Engineering Systems
MIT

ESD Summer Reading Lists—2003-2013
Table of Contents

Books on the 2014 list

Books on the 2013 list

Books on the 2012 list

Flexibility in Engineering Design
Richard de Neufville and Stefan Scholtes

Engineering Systems: Meeting Human Needs in a Complex Technological World
Olivier L. de Weck, Daniel Roos and Christopher L. Magee

Engineering a Safer World: Systems Thinking Applied to Safety
Nancy G. Leveson

Design Structure Matrix Methods and Applications
Steven D. Eppinger and Tyson R. Browning

Aging America and Transportation: Personal Choices and Public Policy
Editors: Joseph F. Coughlin and Lisa A. D'Ambrosio

Technology, Globalization, and Sustainable Development: Transforming the Industrial State
Nicholas A. Ashford and Ralph P. Hall

A Century of Innovation: Twenty Engineering Achievements that Transformed Our Lives
George Constable and Bob Somerville

Multiple Intelligences
Howard Gardner

Books on the 2011 list

Flexibility in Engineering Design
By Richard de Neufville and Stefan Scholtes

From Understanding to Action: Sustainable Urban Development in Medium-Sized Cities in Africa and Latin America
Editors: M. Keiner; C. Zegras; W.A. Schmid; D. Salmerón

The Shallows: What the Internet Is Doing to Our Brains
By Nicolas Carr

The Paradox of Choice: Why More Is Less
By Barry Schwartz

Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives—How Your Friends' Friends' Friends Affect Everything You Feel, Think, and Do
By Nicholas Christakis

The Enlightened Economy: An Economic History of Britain 1700-1850
By Joel Mokyr

Books on the 2010 list

Aging America and Transportation: Personal Choices and Public Policy
By Joseph Coughlin and Lisa D'Ambrosio

Staying Power: Six Enduring Principles for Managing Strategy and Innovation in an Uncertain World
By Michael Cusumano

The Checklist Manifesto: How to Get Things Right
By Atul Gawande

The Fourth Paradigm: Data-intensive Scientific Discovery
Editors: Tony Hey, Stewart Tansley, and Kristin Tolle

Outliers: The Story of Success
By Malcolm Gladwell

Thinking in Systems: A Primer
By Donella Meadows, edited by Diana Wright

Books on the 2009 list

Moveable Feasts: From Ancient Rome to the 21st Century, the Incredible Journeys of the Food We Eat
By Sarah Murray

The Two Cultures (50th anniversary edition, which includes The Two Cultures: A Second Look)
By C.P. Snow

Bold Endeavors: How our Government Built America and Why It Must Rebuild Now
By Felix Rohatyn

Traffic: Why We Drive the Way We Do (and What It Says About Us)
By Tom Vanderbilt

Environmental Law, Policy, and Economics: Reclaiming the Environmental Agenda
By Nicholas A. Ashford, Charles C. Caldart

RFID Technology and Applications
Editors: Stephen B. Miles, Sanjay E. Sarma, John R. Williams

Chasing the Rabbit: How Market Leaders Outdistance the Competition and How Great Companies Can Catch Up and Win
By Steven Spear

Transportation in a Climate-Constrained World
By Andreas Schäfer, John B. Heywood, Henry D. Jacoby, and Ian A. Waitz

Books on the 2008 list

Reasonable Rx: Solving the Drug Price Crisis
By Stan Finkelstein and Peter Temin

Digital Apollo: Human and Machine in Spaceflight
By David A. Mindell

Moving Millions: Transport Strategies for Sustainable Development in Megacities
By Fred Moavenzadeh and Mike Markow

Five Minds for the Future
By Howard Garner

Micromotives and Macrobehavior
By Thomas C. Schelling

The Wisdom of Crowds
By James Surowiecki

Books on the 2007 list

Design-Inspired Innovation
By Jim Utterback

The Organization and Architecture of Innovation: Managing the Flow of Technology
By Tom Allen

Programming the Universe
By Seth Lloyd

Operations Strategy: Competing in the 21st Century
By Donald Rosenfield

Knowledge and the Wealth of Nations: A Story of Economic Discovery
By David Warsh

The Black Swan: The Impact of the Highly Improbable
By Nassim Nicholas Taleb

Books on the 2006 list

The Human Side of Enterprise
By Joel Cutcher-Gershenfeld

The Resilient Enterprise: Overcoming Vulnerability for Competitive Advantage
By Yossi Sheffi

Restoring the American Dream: A Working Families' Agenda for America
By Tom Kochan

Books on the 2005 list

Pursuing the Endless Frontier: Essays on MIT and the Role of Research Universities
By Charles M. Vest

Surprise, Security and the American Experience
By John Lewis Gaddis

Moneyball
By Michael Lewis

Blink: The Power of Thinking Without Thinking
By Malcolm Gladwell

The World is Flat: A Brief History of the Twenty-first Century
By Thomas Friedman

Books on the 2004 list

Sources of Power: How People Make Decisions
By Gary Klein

Priceless: On Knowing the Price of Everything and the Value of Nothing
By Frank Ackerman and Lisa Heinzerling

Universities in the Marketplace: The Commercialization of Higher Education
By Derek Bok

Books on the 2003 list

Retooling: A Historian Confronts Technological Change
By Rosalind Williams

Linked: The New Science of Networks
By Albert-Laszlo Barabas

Our Final Hour: A Scientist's Warning: How Terror, Error, and Environmental Disaster Threaten Humankind's Future In This Century–On Earth and Beyond
By Martin Rees

Reinventing the Bazaar: A Natural History of Markets
By John McMillan

ESD Summer Reading List—Summer 2014

Books of interest to the ESD community:

The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies

Erik Brynjolfsson (MIT Sloan)

In recent years, Google's autonomous cars have logged thousands of miles on American highways and IBM's Watson trounced the best human Jeopardy! players. Digital technologies—with hardware, software, and networks at their core—will in the near future diagnose diseases more accurately than doctors can, apply enormous data sets to transform retailing, and accomplish many tasks once considered uniquely human.

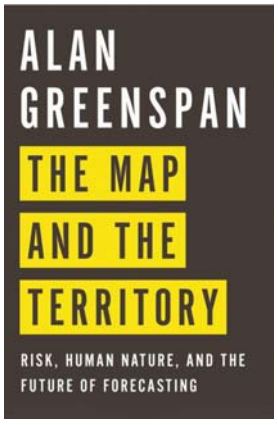
In *The Second Machine Age* MIT's Erik Brynjolfsson and Andrew McAfee—two thinkers at the forefront of their field—reveal the forces driving the reinvention of our lives and our economy. As the full impact of digital technologies is felt, we will realize immense bounty in the form of dazzling personal technology, advanced infrastructure, and near-boundless access to the cultural items that enrich our lives.

Drawing on years of research and up-to-the-minute trends, Brynjolfsson and McAfee identify the best strategies for survival and offer a new path to prosperity. These include revamping education so that it prepares people for the next economy instead of the last one, designing new collaborations that pair brute processing power with human ingenuity, and embracing policies that make sense in a radically transformed landscape.

—W. W. Norton & Company

The Map and the Territory: Risk, Human Nature, and the Future of Forecasting

Alan Greenspan



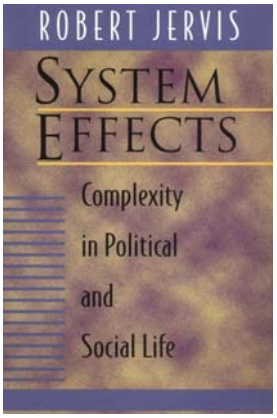
Greenspan, Federal Reserve Bank chairman from 1987 to 2006, investigates the financial crisis of 2008 with a focus on economic forecasting, and he sets out to understand how we got it wrong and what we can learn from our mistakes. The author determines there is something more systematic about the way people behave irrationally, especially during economic crises, and this behavior can be measured and incorporated into economic forecasting and setting economic policy. Greenspan's considerations include behavioral imperatives (fear, optimism, etc.) and their role in rational economic behavior and market outcomes; bubbles and their differences; and the roots of the crisis in

securitized U.S. subprime mortgages. He identifies too big to fail as the most problematic trend from the recent financial debacle and strongly supports modern industrial capitalism, although he notes its inherent creative destruction in a system of winners and losers that imposes hardship on workers who lose jobs and homes. This challenging, thought-provoking book sheds an important perspective on events that triggered possibly the greatest financial crisis ever.

—Booklist review

System Effects: Complexity in Political and Social Life

Robert Jervis



Based on more than three decades of observation, Robert Jervis concludes in this provocative book that the very foundations of many social science theories—especially those in political science—are faulty. Taking insights from complexity theory as his point of departure, the author observes that we live in a world where things are interconnected, where unintended consequences of our actions are unavoidable and unpredictable, and where the total effect of behavior is not equal to the sum of individual actions. Jervis draws on a wide range of human endeavors to illustrate the nature of these system effects. He shows how increasing airport security might actually cost lives, not save them, and how removing dead trees (ostensibly to give living trees more room) may damage the health of an entire forest. Similarly, he highlights the interconnectedness of the political world as he describes how the Cold War played out and as he narrates the series of events—with their unintended consequences—that escalated into World War I.

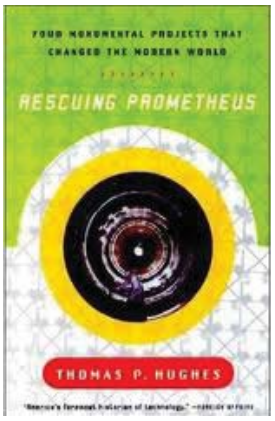
The ramifications of developing a rigorous understanding of politics are immense, as Jervis demonstrates in his critique of current systemic theories of international politics—especially the influential work done by Kenneth Waltz. Jervis goes on to examine various types of negative and positive feedback, bargaining in different types of relationships, and the polarizing effects of alignments to begin building a foundation for a more realistic, more nuanced, theory of international politics. *System Effects* concludes by examining what it means to act in a system. It shows how political actors might modify their behavior in anticipation of system effects, and it explores how systemic theories of political behavior might account for the role of anticipation and strategy in political action. This work introduces powerful new concepts that will reward not only international relations theorists, but also all social scientists with interests in comparative politics and political theory.

—Princeton University Press

Rescuing Prometheus: Four Monumental Projects that Changed the World

Thomas P. Hughes

Tom Hughes died earlier this year. He was a giant in the field of the history of technology and spent considerable time at MIT during his distinguished career. He had a profound effect on a number of MIT faculty. Read SHASS tribute to Hughes: "Tom Hughes: Remembering a Non-Lifer."

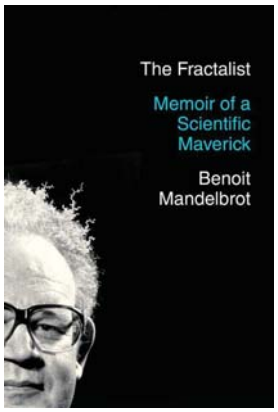


Rescuing Prometheus is an eye-opening and marvelously informative look at some of the technological projects that helped shape the modern world. Thomas P. Hughes focuses on four postwar projects whose vastness and complexity inspired new technology, new organizations, and new management styles. The first use of computers to run systems was developed for the SAGE air defense project. The Atlas missile project was so complicated it required the development of systems engineering in order to complete it. The Boston Central Artery/Tunnel Project tested systems engineering in the complex crucible of a large-scale civilian roadway. And finally, the origins of the Internet fostered the collegial management style that later would take over Silicon Valley and define the modern computer industry. With keen insight, Hughes tells these fascinating stories while providing a riveting history of modern technology and the management systems that made it possible.

—Vintage

The Fractalist: Memoir of a Scientific Maverick

Benoit Mandelbrot

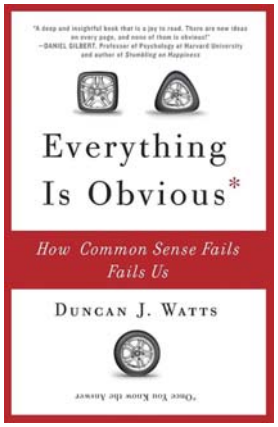


Benoit Mandelbrot, the creator of fractal geometry, has significantly improved our understanding of, among other things, financial variability and erratic physical phenomena. In *The Fractalist*, Mandelbrot recounts the high points of his life with exuberance and an eloquent fluency, deepening our understanding of the evolution of his extraordinary mind. We begin with his early years: born in Warsaw in 1924 to a Lithuanian Jewish family, Mandelbrot moved with his family to Paris in the 1930s, where he was mentored by an eminent mathematician uncle. During World War II, as he stayed barely one step ahead of the Nazis until France was liberated, he studied geometry on his own and dreamed of using it to solve fresh, real-world problems. We observe his unusually broad education in Europe, and later at Caltech, Princeton, and MIT. We learn about his thirty-five-year affiliation with IBM's Thomas J. Watson Research Center and his association with Harvard and Yale. An outsider to mainstream scientific research, he managed to do what others had thought impossible: develop a new geometry that combines revelatory beauty with a radical way of unfolding formerly hidden laws governing utter roughness, turbulence, and chaos.

—Pantheon

Everything is Obvious: How Common Sense Fails Us

Duncan J. Watts



Why is the Mona Lisa the most famous painting in the world? Why did Facebook succeed when other social networking sites failed? Did the surge in Iraq really lead to less violence? How much can CEO's impact the performance of their companies? And does higher pay incentivize people to work hard?

If you think the answers to these questions are a matter of common sense, think again. As sociologist and network science pioneer Duncan Watts explains in this provocative book, the explanations that we give for the outcomes that we observe in life—explanation that seem obvious once we know the answer—are less useful than they seem.

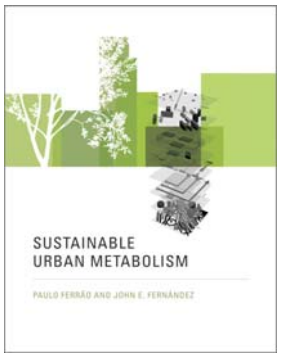
Drawing on the latest scientific research, along with a wealth of historical and contemporary examples, Watts shows how common sense reasoning and history conspire to mislead us into believing that we understand more about the world of human behavior than we do; and in turn, why attempts to predict, manage, or manipulate social and economic systems so often go awry.

—Crown Business

Books of interest to the ESD community:

Sustainable Urban Metabolism

Paulo Ferrão and **John E. Fernández**



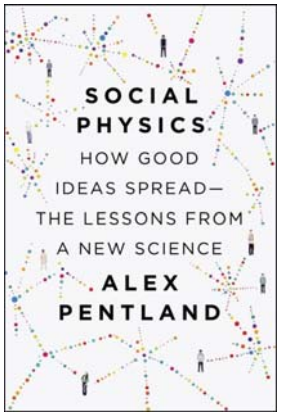
Urbanization and globalization have shaped the last hundred years. These two dominant trends are mutually reinforcing: globalization links countries through the networked communications of urban hubs. The urban population now generates more than eighty percent of global GDP. Cities account for enormous flows of energy and materials—inflows of goods and services and outflows of waste. Thus urban environmental management critically affects global sustainability. In this book, Paulo Ferrão and John Fernández offer a metabolic perspective on urban sustainability, viewing the city as a metabolism, in terms of its exchanges of matter and energy. Their book provides a roadmap to the strategies and tools needed for a scientifically based framework for analyzing and promoting the sustainability of urban systems.

Using the concept of urban metabolism as a unifying framework, Ferrão and Fernandez describe a systems-oriented approach that establishes useful linkages among environmental, economic, social, and technical infrastructure issues. These linkages lead to an integrated information-intensive platform that enables ecologically informed urban planning. After

establishing the theoretical background and describing the diversity of contributing disciplines, the authors sample sustainability approaches and tools, offer an extended study of the urban metabolism of Lisbon, and outline the challenges and opportunities in approaching urban sustainability in both developed and developing countries.

Social Physics: How Good Ideas Spread—The Lessons from a New Science

Alex Pentland



If the Big Data revolution has a presiding genius, it is MIT's Alex "Sandy" Pentland. Over years of groundbreaking experiments, he has distilled remarkable discoveries significant enough to become the bedrock of a whole new scientific field: social physics. Humans have more in common with bees than we like to admit: We're social creatures first and foremost. Our most important habits of action—and most basic notions of common sense—are wired into us through our coordination in social groups. Social physics is about *idea flow*, the way human social networks spread ideas and transform those ideas into behaviors.

Thanks to the millions of digital bread crumbs people leave behind via smartphones, GPS devices, and the Internet, the amount of new information we have about human activity is truly profound. Until now, sociologists have depended on limited data sets and surveys that tell us how people say they think and behave, rather than what they actually do. As a result, we've been stuck with the same stale social structures—classes, markets—and a focus on individual actors, data snapshots, and steady states. Pentland shows that, in fact, humans respond much more powerfully to social incentives that involve rewarding others and strengthening the ties that bind than incentives that involve only their own economic self-interest.

Pentland and his teams have found that they can study *patterns* of information exchange in a social network without any knowledge of the actual content of the information and predict with stunning accuracy how productive and effective that network is, whether it's a business or an entire city. We can maximize a group's collective intelligence to improve performance and use social incentives to create new organizations and guide them through disruptive change in a way that maximizes the good. At every level of interaction, from small groups to large cities, social networks can be tuned to increase exploration and engagement, thus vastly improving idea flow.

Social Physics will change the way we think about how we learn and how our social groups work—and can be made to work better, at every level of society. Pentland leads readers to the edge of the most important revolution in the study of social behavior in a generation, an entirely new way to look at life itself.

—Penguin Press

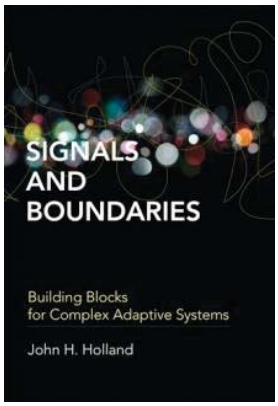
→ Back to Table of Contents

ESD Summer Reading List—Summer 2013

Books of interest to the ESD community:

Signals and Boundaries: Building Blocks for Complex Adaptive Systems

John H. Holland



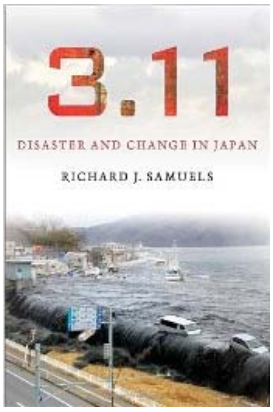
Signals And BoundariesComplex adaptive systems (cas), including ecosystems, governments, biological cells, and markets, are characterized by intricate hierarchical arrangements of boundaries and signals. In ecosystems, for example, niches act as semi-permeable boundaries, and smells and visual patterns serve as signals; governments have departmental hierarchies with memoranda acting as signals; and so it is with other cas. Despite a wealth of data and descriptions concerning different cas, there remain many unanswered questions about "steering" these systems. In Signals and Boundaries, John Holland argues that understanding the origin of the intricate signal/border hierarchies of these systems is the key to answering such questions. He develops an overarching framework for comparing and steering cas through the mechanisms that generate their signal/boundary hierarchies.

Holland lays out a path for developing the framework that emphasizes agents, niches, theory, and mathematical models. He discusses, among other topics, theory construction; signal-processing agents; networks as representations of signal/boundary interaction; adaptation; recombination and reproduction; the use of tagged urn models (adapted from elementary probability theory) to represent boundary hierarchies; finitely generated systems as a way to tie the models examined into a single framework; the framework itself, illustrated by a simple finitely generated version of the development of a multi-celled organism; and Markov processes.

—MIT Press

3.11: Disaster and Change in Japan

Richard J. Samuels (Ford International Professor of Political Science and director of the Center for International Studies at MIT)



3.11On March 11, 2011, Japan was struck by the shockwaves of a 9.0 magnitude undersea earthquake originating less than 50 miles off its eastern coastline. The most powerful earthquake to have hit Japan in recorded history, it produced a devastating tsunami with waves reaching heights of over 130 feet that in turn caused an unprecedented multireactor meltdown at Fukushima Daiichi Nuclear Power Plant. This triple catastrophe claimed almost 20,000 lives, destroyed whole towns, and will ultimately cost hundreds of billions of dollars for reconstruction.

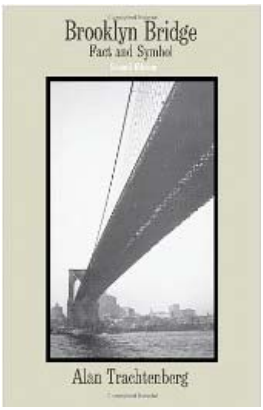
In 3.11, Richard Samuels offers the first broad scholarly assessment of the disaster's impact on Japan's government and society. The events of March 2011 occurred after two decades of social and economic malaise—as well as considerable political and administrative dysfunction at both the national and local levels—and resulted in national soul-searching. Political reformers saw in the tragedy cause for hope: an opportunity for Japan to remake itself. Samuels explores Japan's post-earthquake actions in three key sectors: national security, energy policy, and local governance. For some reformers, 3.11 was a warning for Japan to overhaul its priorities and political processes. For others, it was a once-in-a-millennium event; they cautioned that while national policy could be improved, dramatic changes would be counterproductive. Still others declared that the catastrophe demonstrated the need to return to an idealized past and rebuild what has been lost to modernity and globalization.

Samuels chronicles the battles among these perspectives and analyzes various attempts to mobilize popular support by political entrepreneurs who repeatedly invoked three powerfully affective themes: leadership, community, and vulnerability. Assessing reformers' successes and failures as they used the catastrophe to push their particular agendas—and by examining the earthquake and its aftermath alongside prior disasters in Japan, China, and the United States—Samuels outlines Japan's rhetoric of crisis and shows how it has come to define post-3.11 politics and public policy.

—Cornell University Press

Brooklyn Bridge: Fact and Symbol (2nd edition)

Alan Trachtenberg

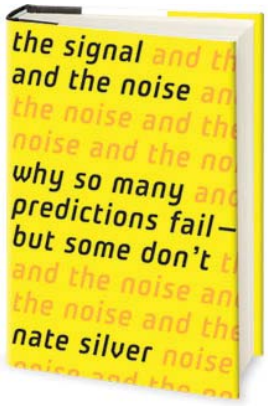


Brooklyn BridgeI read this excellent book during the 2013 Independent Activities Period. It's an effective blend of engineering, U.S. history, politics, and art. The author, Alan Trachtenberg (now Professor Emeritus of English and American Studies at Yale), is not an engineer, but seems to have some facility with writing about the technology. The main focus of this book is the historical importance of the Brooklyn Bridge for both the New York metro area and the United States as a whole. The latter several chapters of the book look at the bridge as it is represented in American art, especially photography and poetry.

—University of Chicago Press

The Signal and the Noise: Why So Many Predictions Fail — but Some Don't

Nate Silver



Design StructureNate Silver built an innovative system for predicting baseball performance, predicted the 2008 election within a hair's breadth, and became a national sensation as a blogger—all by the time he was thirty. The New York Times now publishes FiveThirtyEight.com, where Silver is one of the nation's most influential political forecasters.

Drawing on his own groundbreaking work, Silver examines the world of prediction, investigating how we can distinguish a true signal from a universe of noisy data. Most predictions fail, often at great cost to society, because most of us have a poor understanding of probability and uncertainty. Both experts and laypeople mistake more confident predictions for more accurate ones. But overconfidence is often the reason for failure. If our appreciation of uncertainty improves, our predictions can get better too. This is the "prediction paradox": The more humility we have about our ability to make predictions, the more successful we can be in planning for the future.

In keeping with his own aim to seek truth from data, Silver visits the most successful forecasters in a range of areas, from hurricanes to baseball, from the poker table to the stock market, from Capitol Hill to the NBA. He explains and evaluates how these forecasters think and what bonds they share. What lies behind their success? Are they good—or just lucky? What patterns have they unraveled? And are their forecasts really right? He explores unanticipated commonalities and exposes unexpected juxtapositions. And sometimes, it is not so much how good a prediction is in an absolute sense that matters but how good it is relative to the competition. In other cases, prediction is still a very rudimentary—and dangerous—science.

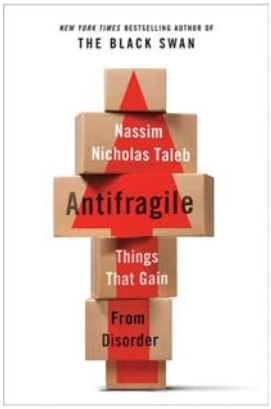
Silver observes that the most accurate forecasters tend to have a superior command of probability, and they tend to be both humble and hardworking. They distinguish the predictable from the unpredictable, and they notice a thousand little details that lead them closer to the truth. Because of their appreciation of probability, they can distinguish the signal from the noise.

With everything from the health of the global economy to our ability to fight terrorism dependent on the quality of our predictions, Nate Silver's insights are an essential read.

—Amazon.com

Antifragile: Things That Gain from Disorder

Nassim Nicholas Taleb



AntifragileNassim Nicholas Taleb, the bestselling author of The Black Swan and one of the foremost thinkers of our time, reveals how to thrive in an uncertain world.

Just as human bones get stronger when subjected to stress and tension, and rumors or riots intensify when someone tries to repress them, many things in life benefit from stress, disorder, volatility, and turmoil. What Taleb has identified and calls "antifragile" is that category of things that not only gain from chaos but need it in order to survive and flourish.

In The Black Swan, Taleb showed us that highly improbable and unpredictable events underlie almost everything about our world. In Antifragile, Taleb stands uncertainty on its head, making it desirable, even necessary, and proposes that things be built in an antifragile manner. The antifragile is beyond the resilient or robust. The resilient resists shocks and stays the same; the antifragile gets better and better.

Furthermore, the antifragile is immune to prediction errors and protected from adverse events. Why is the city-state better than the nation-state, why is debt bad for you, and why is what we call "efficient" not efficient at all? Why do government responses and social policies protect the strong and hurt the weak? Why should you write your resignation letter before even starting on the job? How did the sinking of the Titanic save lives? The book spans innovation by trial and error, life decisions, politics, urban planning, war, personal finance, economic systems, and medicine. And throughout, in addition to the street wisdom of Fat Tony of Brooklyn, the voices and recipes of ancient wisdom, from Roman, Greek, Semitic, and medieval sources, are loud and clear.

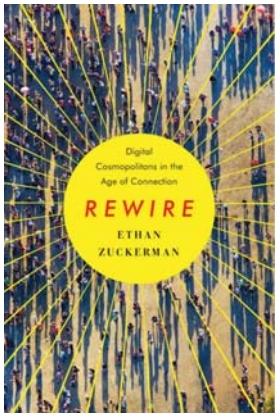
Antifragile is a blueprint for living in a Black Swan world.

Erudite, witty, and iconoclastic, Taleb's message is revolutionary: The antifragile, and only the antifragile, will make it.

—Amazon.com

Rewire: Digital Cosmopolitans in the Age of Connection

Ethan Zuckerman (Director, MIT Center for Civic Media)



RewireWe live in an age of connection, one that is accelerated by the Internet. This increasingly ubiquitous, immensely powerful technology often leads us to assume that as the number of people online grows, it inevitably leads to a smaller, more cosmopolitan world. We'll understand more, we think. We'll know more. We'll engage more and share more with people from other cultures. In reality, it is easier to ship bottles of water from Fiji to Atlanta than it is to get news from Tokyo to New York.

In Rewire, media scholar and activist Ethan Zuckerman explains why the technological ability to communicate with someone does not inevitably lead to increased human connection. At the most basic level, our human tendency to "flock together" means that most of our interactions, online or off, are with a small set of people with whom we have much in common. In examining this fundamental tendency, Zuckerman draws on his own work as well as the latest research in psychology and sociology to consider technology's role in disconnecting ourselves from the rest of the world.

For those who seek a wider picture—a picture now critical for survival in an age of global economic crises and pandemics—Zuckerman highlights the challenges, and the headway already made, in truly connecting people across cultures. From voracious xenophiles eager to explore other countries to bridge figures who are able to connect one culture to another, people are at the center of his vision for a true kind of cosmopolitanism. And it is people who will shape a new approach to existing technologies, and perhaps invent some new ones, that embrace translation, cross-cultural inspiration, and the search for new, serendipitous experiences.

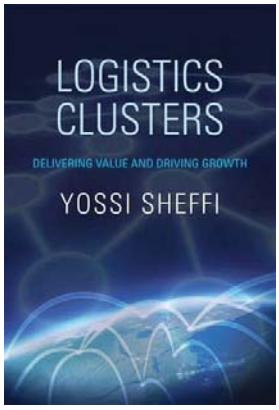
Rich with Zuckerman's personal experience and wisdom, Rewire offers a map of the social, technical, and policy innovations needed to more tightly connect the world.

—Amazon.com

BOOKS FROM ESD FACULTY

Logistics Clusters: Delivering Value and Driving Growth

Yossi Sheffi



Logistics ClustersWhy is Memphis home to hundreds of motor carrier terminals and distribution centers? Why does the tiny island-nation of Singapore handle a fifth of the world's maritime containers and half the world's annual supply of crude oil? Which jobs can replace lost manufacturing jobs in advanced economies?

Some of the answers to these questions are rooted in the phenomenon of logistics clusters--geographically concentrated sets of logistics-related business activities. In this book, supply chain management expert Yossi Sheffi explains why Memphis, Singapore, Chicago, Rotterdam, Los Angeles, and scores of other locations have been successful in developing such clusters while others have not.

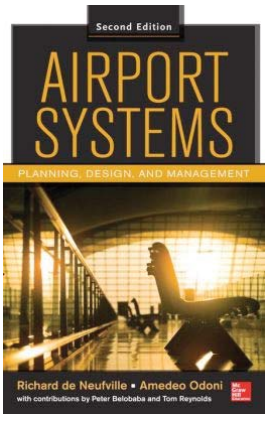
Sheffi outlines the characteristic "positive feedback loop" of logistics clusters development and what differentiates them from other industrial clusters; how logistics clusters "add value" by generating other industrial activities; why firms should locate their distribution and value-added activities in logistics clusters; and the proper role of government support, in the form of investment, regulation, and trade policy.

Sheffi also argues for the most important advantage offered by logistics clusters in today's recession-plagued economy: jobs, many of them open to low-skilled workers, that are concentrated locally and not "offshorable." These logistics clusters offer what is rare in today's economy: authentic success stories. For this reason, numerous regional and central governments as well as scores of real estate developers are investing in the development of such clusters.

—MIT Press

Airport Systems: Planning, Design and Management – 2nd Edition

Richard de Neufville, Amedeo Odoni

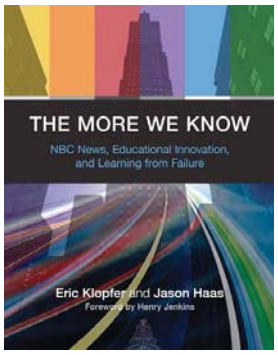


Over the past decade, the airport industry has evolved considerably. Airport technology has changed. New research has taken place. The major airlines have consolidated, changing demand for airport services. In order to reflect these and other major shifts in the airport industry, some of the world's leading professionals have updated the premier text on airport design – making it, now more than ever, the field's most comprehensive resource of its kind.

—McGraw-Hill

The More We Know: NBC News, Educational Innovation, and Learning from Failure

Eric Klopfer, Jason Haas



In 2006, young people were flocking to MySpace, discovering the joys of watching videos of cute animals on YouTube, and playing online games. Not many of them were watching network news on television; they got most of their information online. So when NBC and MIT launched iCue, an interactive learning venture that combined social networking, online video, and gaming in one multimedia educational site, it was perfectly in tune with the times. iCue was a surefire way for NBC to reach younger viewers and for MIT to test innovative educational methods in the real world. But iCue was a failure: it never developed an audience and was canceled as if it were a sitcom with bad ratings. In The More We Know, Eric Klopfer and Jason Haas, both part of the MIT development team, describe the rise and fall of iCue and what it can teach us about new media, old media, education, and the challenges of innovating in educational media.

Klopfer and Haas show that iCue was hampered by, among other things, an educational establishment focused on "teaching to the test," television producers uncomfortable with participatory media, and confusion about the market. But this is not just a cautionary tale; sometimes more can be learned from an interesting failure than a string of successes. Today's educational technology visionaries (iPads for everyone!) might keep this lesson in mind.

—MIT Press

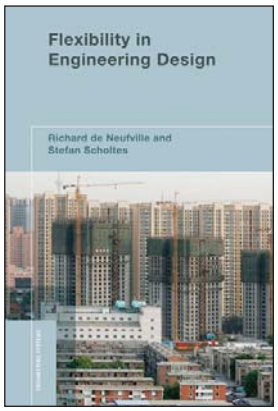
→ Back to Table of Contents

ESD Summer Reading List—Summer 2012

MIT PRESS ENGINEERING SYSTEMS BOOKS SERIES:

Flexibility in Engineering Design

Richard de Neufville and Stefan Scholtes



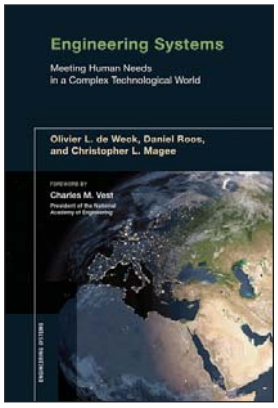
Project teams can improve results by recognizing that the future is inevitably uncertain and that by creating flexible designs they can adapt to eventualities. This approach enables them to take advantage of new opportunities and avoid harmful losses. Designers of complex, long-lasting projects—such as communication networks, power plants, or hospitals—must learn to abandon fixed specifications and narrow forecasts. They need to avoid the "flaw of averages," the conceptual pitfall that traps so many designs in underperformance. Failure to allow for changing circumstances risks leaving significant value untapped. This book is a guide for creating and implementing value-enhancing flexibility in design. It will be an essential resource for all participants in the development and operation of technological systems: designers, managers, financial analysts, investors, regulators, and academics.

The book provides a high-level overview of why flexibility in design is needed to deliver significantly increased value. It describes in detail methods to identify, select, and implement useful flexibility. The book is unique in that it explicitly recognizes that future outcomes are uncertain. It thus presents forecasting, analysis, and evaluation tools especially suited to this reality. Appendixes provide expanded explanations of concepts and analytic tools.

—MIT Press

Engineering Systems: Meeting Human Needs in a Complex Technological World

Olivier L. de Weck, Daniel Roos and Christopher L. Magee



Engineering, for much of the twentieth century, was mainly about artifacts and inventions. Now, it's increasingly about complex systems. As the airplane taxis to the gate, you access the Internet and check email with your PDA, linking the communication and transportation systems. At home, you recharge your plug-in hybrid vehicle, linking transportation to the electricity grid. Today's large-scale, highly complex sociotechnical systems converge, interact, and depend on each other in ways engineers of old could barely have imagined. As scale, scope, and complexity increase, engineers consider technical and social issues together in a highly integrated way as they design flexible, adaptable, robust systems

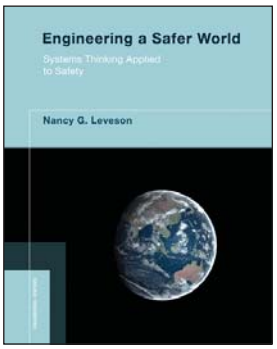
that can be easily modified and reconfigured to satisfy changing requirements and new technological opportunities.

Engineering Systems offers a comprehensive examination of such systems and the associated emerging field of study. Through scholarly discussion, concrete examples, and history, the authors consider the engineer's changing role, new ways to model and analyze these systems, the impacts on engineering education, and the future challenges of meeting human needs through the technologically enabled systems of today and tomorrow.

—MIT Press

Engineering a Safer World: Systems Thinking Applied to Safety

Nancy G. Leveson



Engineering has experienced a technological revolution, but the basic engineering techniques applied in safety and reliability engineering, created in a simpler, analog world, have changed very little over the years. In this groundbreaking book, Nancy Leveson proposes a new approach to safety--more suited to today's complex, sociotechnical, software-intensive world--based on modern systems thinking and systems theory. Revisiting and updating ideas pioneered by 1950s aerospace engineers in their System Safety concept, and testing her new model extensively on real-world examples, Leveson has created a new approach to safety that is more effective, less expensive, and easier to use than current techniques.

Arguing that traditional models of causality are inadequate, Leveson presents a new, extended model of causation (Systems-Theoretic Accident Model and Processes, or STAMP), then shows how the new model can be used to create techniques for system safety engineering, including accident analysis, hazard analysis, system design, safety in operations, and management of safety-critical systems. She applies the new techniques to real-world events including the friendly-fire loss of a U.S. Blackhawk helicopter in the first Gulf War; the Vioxx recall; the U.S. Navy SUBSAFE program; and the bacterial contamination of a public water supply in a Canadian town. Leveson's approach is relevant even beyond safety engineering, offering techniques for "reengineering" any large sociotechnical system to improve safety and manage risk.

—MIT PreDesign Structure Matrix Methods and Applicationsss

Design Structure Matrix Methods and Applications

Steven D. Eppinger and Tyson R. Browning

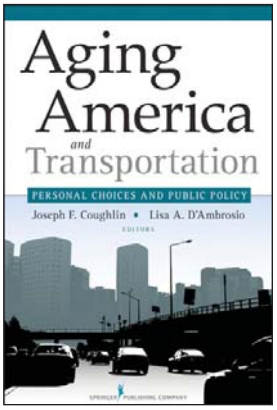
Design structure matrix (DSM) is a straightforward and flexible modeling technique that can be used for designing, developing, and managing complex systems. DSM offers network modeling tools that represent the elements of a system and their interactions, thereby highlighting the system's architecture (or designed structure). This book addresses the four primary types of DSM models, offering tools for representing product architectures, organization architectures, process architectures, and multidomain architectures (which combine different types of DSM models to represent multiple domains simultaneously). Each chapter provides many real-world examples of applications of the DSM types, representing a wide range of industries (including automotive, aerospace, electronics, building, and pharmaceutical), countries (among them Australia, Germany, Japan, Turkey, and the United States), and problems addressed (modularity, outsourcing, system integration, knowledge management, and others).

—MIT Press

BOOKS FROM OTHER MIT AUTHORS:

Aging America and Transportation: Personal Choices and Public Policy

Editors: Joseph F. Coughlin and Lisa A. D'Ambrosio

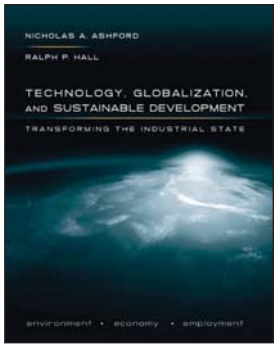


This solution-focused volume fills a gap in the literature by addressing the key issues around mobility and transportation for the aging Baby Boomer generation--issues that will be significantly different than those of previous generations of older adults. This new generation, many of whom will continue to work past the traditional retirement age and expect to pursue an active lifestyle, may have to confront new transportation technology, the need to use public transportation, and ways to continue driving safely as their eyesight fades and reaction time slows down. This volume examines many of the issues faced by policymakers, transportation officials, vehicle manufacturers, health and human services professionals, and aging adults themselves as the largest generation prepares to enter late adulthood.

—Springer

Technology, Globalization, and Sustainable Development: Transforming the Industrial State

Nicholas A. Ashford and Ralph P. Hall



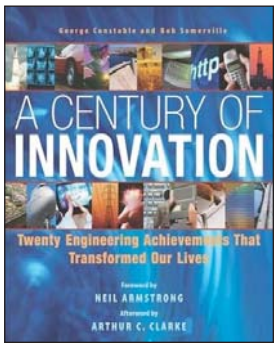
In this book Nicholas A. Ashford and Ralph P. Hall offer a unified, transdisciplinary approach for achieving sustainable development in industrialized nations. They present an insightful analysis of the ways in which industrial states are currently unsustainable and how economic and social welfare are related to the environment, to public health and safety, and to earning capacity and meaningful and rewarding employment. The authors argue for the design of multipurpose solutions to the sustainability challenge that integrate economics, employment, technology, environment, industrial development, national and international law, trade, finance, and public and worker health and safety. This book is essential reading for anyone with a policy or scholarly interest in sustainable development and the critical roles of the economy, employment, and the environment.

—Yale University Press

BOOKS MENTIONED AT 2011 BRUNEL LECTURE:

A Century of Innovation: Twenty Engineering Achievements that Transformed Our Lives

George Constable and Bob Somerville

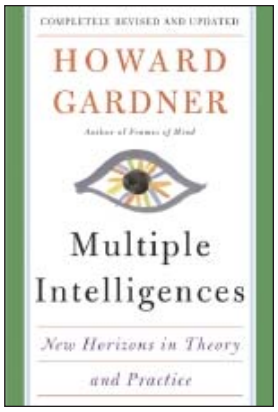


Celebrating a century of innovation, the National Academy of Engineering and a consortium of professional engineering societies present the most significant engineering triumphs of the era. While the achievements encompass many dramatic and highly visible engineering feats, from the first flight at Kitty Hawk to the birth of the Internet, the lineup is largely composed of more commonplace advances that had a truly profound and widespread effect on all of society. Indeed, most of the achievements profiled in this book are so much a part of our lives that we have come to take them for granted. But to learn the stories behind these great achievements is to behold and appreciate them anew.

—Joseph Henry Press

Multiple Intelligences

Howard Gardner



Howard Gardner's brilliant conception of individual competence has changed the face of education in the twenty-three years since the publication of his classic work, Frames of Mind. Since then thousands of educators, parents, and researchers have explored the practical implications and applications of Multiple Intelligences theory—the powerful notion that there are separate human capacities, ranging from musical intelligence to the intelligence involved in self-understanding. The first decade of research on MI theory and practice was reported in the 1993 edition of Multiple Intelligences. This new edition covers all developments since then and stands as the most thorough and up-to-date account of MI available anywhere. Completely revised throughout, it features new material on global applications and on MI in the workplace, an assessment of MI practice in the current conservative educational climate, new evidence about brain functioning, and much more.

—Perseus Books Group

→ Back to Table of Contents

ESD Summer Reading List—Summer 2011

MIT PRESS ENGINEERING SYSTEMS BOOKS SERIES:

Flexibility in Engineering Design

Richard de Neufville and Stefan Scholtes

Project teams can improve results by recognizing that the future is inevitably uncertain and that by creating flexible designs they can adapt to eventualities. This approach enables them to take advantage of new opportunities and avoid harmful losses. Designers of complex, long-lasting projects—such as communication networks, power plants, or hospitals—must learn to abandon fixed specifications and narrow forecasts. They need to avoid the "flaw of averages," the conceptual pitfall that traps so many designs in underperformance. Failure to allow for changing circumstances risks leaving significant value untapped. This book is a guide for creating and implementing value-enhancing flexibility in design. It will be an essential resource for all participants in the development and operation of technological systems: designers, managers, financial analysts, investors, regulators, and academics.

The book provides a high-level overview of why flexibility in design is needed to deliver significantly increased value. It describes in detail methods to identify, select, and implement useful flexibility. The book is unique in that it explicitly recognizes that future outcomes are uncertain. It thus presents forecasting, analysis, and evaluation tools especially suited to this reality. Appendixes provide expanded explanations of concepts and analytic tools.

—MIT Press

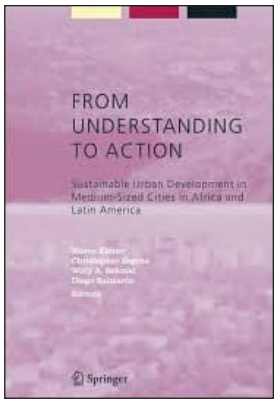
The other forthcoming books in the Engineering Systems Series include:

- Engineering a Safer World: Systems Thinking Applied to Safety
  Nancy G. Leveson
  (NOTE: This book is currently available for free download at
  http://sunnyday.mit.edu/safer-world

- Engineering Systems: Meeting Human Needs in a Complex Technological World
  Olivier L. de Weck, Daniel Roos and Christopher L. Magee

From Understanding to Action: Sustainable Urban Development in Medium-Sized Cities in Africa and Latin America

Editors: Keiner, M.; Zegras, C.; Schmid, W.A.; Salmerón, D.



This book provides a framework for the design, implementation, and measurement of sustainable urban development in developing countries. It presents the findings of an AGS-sponsored project. Based on case studies in Johannesburg, Gabarone, and Santiago de Chile, the book identifies challenges and potentials for sustainable urban development and suggests alternative ways that governments, city-regions, communities, and planners can respond to these challenges.

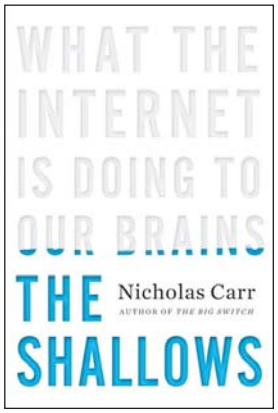
The introductory part highlights the problem of global urbanization, focusing on cities of sub-Saharan Africa and Latin America. The design part includes a context/needs analysis followed by recommendations of broad frameworks for sustainable urban development. The implementation part looks at the institutional and policy framework and strategies necessary for sustainable urban development, while the measurement part deals with the required mechanisms and tools for evaluating sustainable urban development policy and strategies as well as the review of outcomes/impacts (indicators).

This publication is of special interest for university researchers and students, international experts, and organizations for sustainable urban development in developing countries, but also practitioners from planning authorities worldwide.

—Springer

The Shallows: What the Internet Is Doing to Our Brains

Nicolas Carr

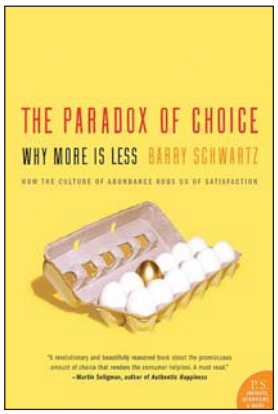


Carr—author of The Big Switch (2007) and the much-discussed Atlantic Monthly story "Is Google Making Us Stupid?"—is an astute critic of the information technology revolution. Here he looks to neurological science to gauge the organic impact of computers, citing fascinating experiments that contrast the neural pathways built by reading books versus those forged by surfing the hypnotic Internet, where portals lead us on from one text, image, or video to another while we re being bombarded by messages, alerts, and feeds. This glimmering realm of interruption and distraction impedes the sort of comprehension and retention "deep reading" engenders, Carr explains. And not only are we reconfiguring our brains, we are also forging a "new intellectual ethic," an arresting observation Carr expands on while discussing Google's gargantuan book digitization project. What are the consequences of new habits of mind that abandon sustained immersion and concentration for darting about, snagging bits of information? What is gained and what is lost? Carr's fresh, lucid, and engaging assessment of our infatuation with the Web is provocative and revelatory.

—From Booklist

The Paradox of Choice: Why More Is Less

Barry Schwartz

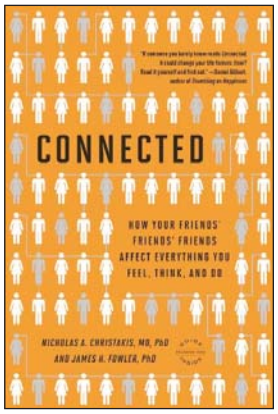


Like Thoreau and the band Devo, psychology professor Schwartz provides ample evidence that we are faced with far too many choices on a daily basis, providing an illusion of a multitude of options when few honestly different ones actually exist. The conclusions Schwartz draws will be familiar to anyone who has flipped through 900 eerily similar channels of cable television only to find that nothing good is on. Whether choosing a health-care plan, choosing a college class or even buying a pair of jeans, Schwartz, drawing extensively on his own work in the social sciences, shows that a bewildering array of choices floods our exhausted brains, ultimately restricting instead of freeing us. We normally assume in America that more options ("easy fit" or "relaxed fit"?) will make us happier, but Schwartz shows the opposite is true, arguing that having all these choices actually goes so far as to erode our psychological well-being. Part research summary, part introductory social sciences tutorial, part self-help guide, this book offers concrete steps on how to reduce stress in decision making.

—From Publishers Weekly

Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives—How Your Friends' Friends' Friends Affect Everything You Feel, Think, and Do

Nicholas Christakis

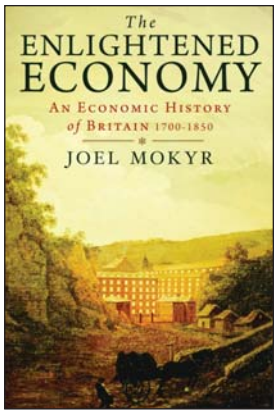


Harvard professor and health care policy specialist Christakis (Death Foretold: Prophecy and Prognosis in Medical Care) became interested in social connectivity when observing that the mortality rate of spouses spike after a partner passes away. Christakis sought out a collaboration with Fowler, a health systems and political scientist, and together they compare topology (the hows of a given structure) across different social networks to better explain how participation and positioning enhances the effectiveness of an individual, and why the "whole" of a network is "greater than the sum of its parts." Five basic rules describe the relationship between individuals and their networks-including mutual adaptation, the influence of friends and friends' friends, the network's "life of its own"—but the results do more than promote the good of the group: they also spread contagions; create "epidemics" of obesity, smoking and substance abuse; disseminate fads and markets; alter voting patterns; and more.

—From Publishers Weekly

The Enlightened Economy: An Economic History of Britain 1700-1850

Joel Mokyr



This book focuses on the importance of ideological and institutional factors in the rapid development of the British economy during the years between the Glorious Revolution and the Crystal Palace Exhibition. Joel Mokyr shows that we cannot understand the Industrial Revolution without recognizing the importance of the intellectual sea changes of Britain's Age of Enlightenment. In a vigorous discussion, Mokyr goes beyond the standard explanations that credit geographical factors, the role of markets, politics, and society to show that the beginnings of modern economic growth in Britain depended a great deal on what key players knew and believed, and how those beliefs affected their economic behavior. He argues that Britain led the rest of Europe into the Industrial Revolution because it was there that the optimal intersection of ideas, culture, institutions, and technology existed to make rapid economic growth achievable. His wide-ranging evidence covers sectors of the British economy often neglected, such as the service industries.

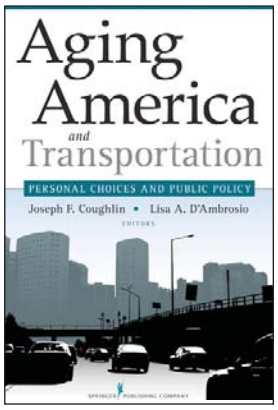
—Amazon product description

→ Back to Table of Contents

ESD Summer Reading List—Summer 2010

Aging America and Transportation: Personal Choices and Public Policy

Joseph Coughlin, Lisa D'Ambrosio



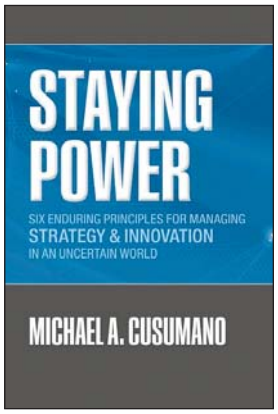
Older adults are continuously confronted with challenges and conflicts concerning transportation, such as whether to use public transportation, how to understand the new technology, and simply how to continue to drive safely. This volume examines many of the issues faced by policymakers, transportation officials, vehicle manufacturers, health and human services professionals, and aging adults themselves, as the largest generation prepares to drive into late adulthood.

Comprehensive and well-organized, this book introduces the problem of aging America and transportation, describes the transportation infrastructure, explains the conflicts of the new, older driver, and discusses the innovations that will significantly impact the future of mobility for all older adults. Not only does the book pose key questions and concerns that older adults will face in the coming decades, but it proposes practical solutions and strategies for keeping these seniors active and mobile.

—Springer Publishing Company

Staying Power: Six Enduring Principles for Managing Strategy and Innovation in an Uncertain World

Michael Cusumano



As we move into an era of simultaneous innovation and commoditization, enabled by digital technologies, managers around the world are asking themselves "how can we both adapt to rapid changes in technology and markets, and still make enough money to survive—and thrive?"

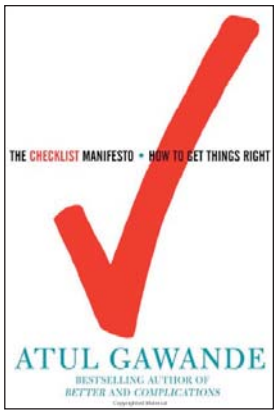
To provide answers to these important and urgent questions, MIT Sloan School of Management Professor Michael Cusumano draws on nearly 30 years of research into the practices of global corporations that have been acknowledged leaders and benchmark setters—Microsoft, Apple, Intel, Google, and others in software, internet services, and consumer electronics, and Toyota in manufacturing.

If we look deeply enough, he contends, we can see the ideas that underpin the management practices that make for great companies, and drive their strategic evolution and innovation capabilities. From his deep knowledge of these organizations, Cusumano distils six enduring principles that he believes have been—in various combinations—crucial to their strategy, innovation management practices, and ability to deal with change and uncertainty.

—Oxford University Press

The Checklist Manifesto: How to Get Things Right

Atul Gawande



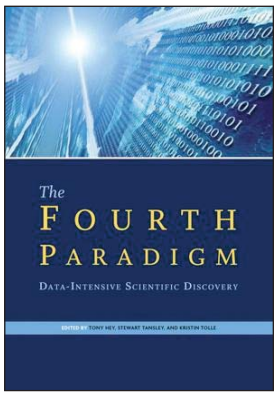
Gawande, a professor of surgery at Harvard Medical School and a staff writer at *The New Yorker*, makes the case that checklists can help us manage the extreme complexity of the modern world. In medicine, he writes, the problem is "making sure we apply the knowledge we have consistently and correctly." Failure, he argues, results not so much from ignorance (not knowing enough about what works) as from ineptitude (not properly applying what we know works).

Medicine is not the only complex profession where lives are on the line. In making his argument, Gawande deftly weaves in examples of checklist successes in diverse fields like aviation and skyscraper construction. He maintains that checklists not only help pilots and builders get the stupid stuff right, but foster the communication required to deal with the unexpected. His discussion of aviation accidents, including the emergency landing on the Hudson River last January (during which the copilot simultaneously managed checklists for restarting the engine and ditching the plane), makes for fascinating reading.

—*The New York Times*: "One Thing After Another" by Sandeep Jauhuar (January 22, 2010)

The Fourth Paradigm: Data-intensive Scientific Discovery

Tony Hey, Stewart Tansley, and Kristin Tolle (editors)



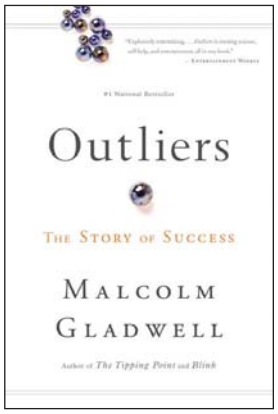
Increasingly, scientific breakthroughs will be powered by advanced computing capabilities that help researchers manipulate and explore massive datasets. The speed at which any given scientific discipline advances will depend on how well its researchers collaborate with one another, and with technologists, in areas of eScience such as databases, workflow management, visualization, and cloud computing technologies.

In *The Fourth Paradigm: Data-Intensive Scientific Discovery*, the collection of essays expands on the vision of pioneering computer scientist Jim Gray for a new, fourth paradigm of discovery based on data-intensive science and offers insights into how it can be fully realized.

—*Microsoft Research*

Outliers: The Story of Success

Malcolm Gladwell

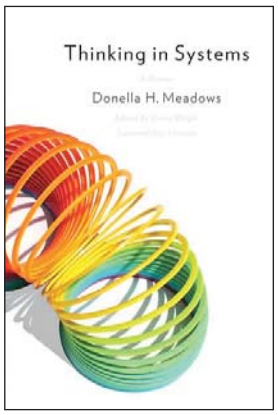


In *Outliers*, Gladwell (*The Tipping Point*) once again proves masterful in a genre he essentially pioneered—the book that illuminates secret patterns behind everyday phenomena. His gift for spotting an intriguing mystery, luring the reader in, then gradually revealing his lessons in lucid prose, is on vivid display & Through case studies ranging from Canadian junior hockey champions to the robber barons of the Gilded Age, from Asian math whizzes to software entrepreneurs to the rise of his own family in Jamaica, Gladwell tears down the myth of individual merit to explore how culture, circumstance, timing, birth and luck account for success—and how historical legacies can hold others back despite ample individual gifts.

—Publishers Weekly

Thinking in Systems: A Primer

Donella Meadows, edited by Diana Wright



This was published posthumously with editing by one of Donella Meadows colleagues. Donella Meadows' co-authored, along with Dennis Meadows, *Limits to Growth*, a famous report also known as *The Club of Rome Report* that "predicted" the Earth running out of resources, sometime around now. While that didn't happen, the report was quite influential in highlighting issues the planet faces. – JS

In the years following her role as the lead author of the international bestseller, *Limits to Growth*—the first book to show the consequences of unchecked growth on a finite planet—Donella Meadows remained a pioneer of environmental and social analysis until her untimely death in 2001.

Meadows' newly released manuscript, *Thinking in Systems*, is a concise and crucial book offering insight for problem solving on scales ranging from the personal to the global. Edited by the Sustainability Institute's Diana Wright, this essential primer brings systems thinking out of the realm of computers and equations and into the tangible world, showing readers how to develop the systems-thinking skills that thought leaders across the globe consider critical for 21st-century life.

Some of the biggest problems facing the world—war, hunger, poverty, and environmental degradation—are essentially system failures. They cannot be solved by fixing one piece in isolation from the others, because even seemingly minor details have enormous power to undermine the best efforts of too-narrow thinking. While readers will learn the conceptual tools

and methods of systems thinking, the heart of the book is grander than methodology. Donella Meadows was known as much for nurturing positive outcomes as she was for delving into the science behind global dilemmas. She reminds readers to pay attention to what is important, not just what is quantifiable, to stay humble, and to stay a learner.

In a world growing ever more complicated, crowded, and interdependent, *Thinking in Systems* helps readers avoid confusion and helplessness, the first step toward finding proactive and effective solutions.

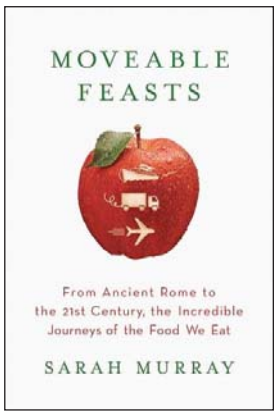
—*Chelsea Green Publishing*

→ Back to Table of Contents

ESD Summer Reading List—Summer 2009

Moveable Feasts: From Ancient Rome to the 21st Century, the Incredible Journeys of the Food We Eat

Sarah Murray

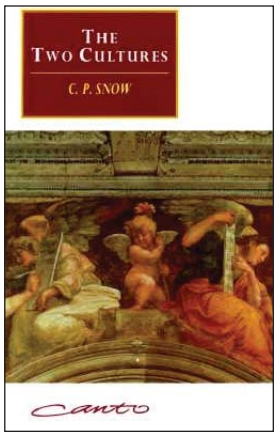


Murray, a Financial Times contributor, takes a look at the literal journey of food through multilayered essays of the history of food transportation. From the banana export business of Central America (which was rife with America's economic gain and political manhandling) to the creation of the barrel (which revolutionized transcontinental trading and contributed a new dimension to the art of winemaking), the dozen chapters each start with a straightforward item-the shipping container, a tin can, a tub of yogurt, etc.-and delve into topics of greater significance like globalization, empire building, localized farming and food aid programs. For example, her essay on the amphora, a container used to carry olive oil throughout the ancient Roman Empire, not only depicts the social and economic importance of olive oil in Roman times but also leads into the contemporary debate of regional designation of origins for foods like Parmigiano-Reggiano cheese or Newcastle brown ale. Erudite and thoroughly researched, this is a fascinating read for both foodies and those who love how the minutiae of life often provide a fresh lens with which to (view the world.

—Publishers Weekly

The Two Cultures (50th anniversary edition, which includes The Two Cultures: A Second Look)

C.P. Snow

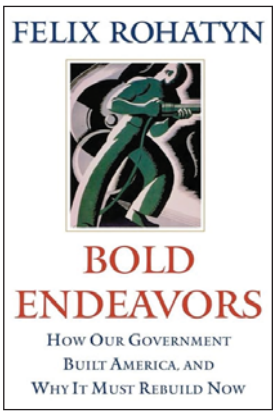


The notion that our society, its education system and its intellectual life, is characterised by a split between two cultures—the arts or humanities on one hand, and the sciences on the other—has a long history. But it was C. P. Snow's Rede lecture of 1959 that brought it to prominence and began a public debate that is still raging in the media today. This 50th anniversary printing of The Two Cultures and its successor piece, A Second Look (in which Snow responded to the controversy four years later) features an introduction by Stefan Collini, charting the history and context of the debate, its implications and its afterlife. The importance of science and technology in policy run largely by non-scientists, the future for education and research, and the problem of fragmentation threatening hopes for a common culture are just some of the subjects discussed.

—Cambridge University Press

Bold Endeavors: How our Government Built America and Why It Must Rebuild Now

Felix Rohatyn



This is a short, relatively easy read by Felix Rohatyn, whose main claim to fame was as the chairman for 18 years of the Municipal Assistance Corporation (MAC) for the state of New York "where he managed the negotiations that enabled New York City to resolve its financial crisis."

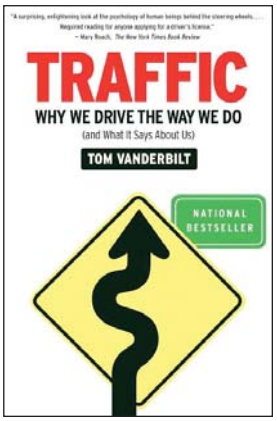
His main thesis in this book is that determination and political will, together with the imagination to invest wisely, can move the nation forward—but ideologically he believes that this can only be done by the government, in particular the federal government in most cases. His book is not scholarly, but he makes a good anecdotal case for his thesis. He looks at the Louisiana Purchase, the Erie Canal, the transcontinental railroad, the land grant colleges, the Homestead Act, the Panama Canal, the Rural Electrification Administration, the Reconstruction Finance Corporation, the GI Bill and finally the Interstate system. The casual history of these events has some merit, and his argument that history can provide a guidepost to the future is interesting and useful. This is a legitimate summer read; you could take this to the beach and work your way (through it in a couple of hours.

For the transportation people among us I note that the Erie Canal, the transcontinental railroad, the Panama Canal and the Interstate highway system are all transportation initiatives—large-scale infrastructure—and as educators we are interested in the land grant colleges and the GI Bill as major education initiatives.

—JS

Traffic: Why We Drive the Way We Do (and What It Says About Us)

Tom Vanderbilt

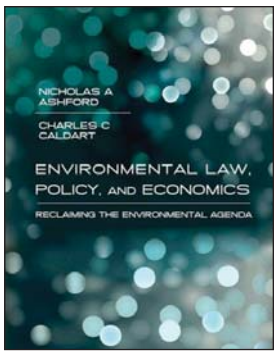


Whether driving to work or heading to the shore on summer weekends, Americans spend lots of time in their cars—much of it bemoaning the habits of other drivers. Writer Tom Vanderbilt plumbs the psychology and sociology of driving in *Traffic: Why We Drive the Way We Do (and What It Says About Us)* (Knopf). When people get behind the wheel, he observes, "We are navigating through a legal system, we are becoming social actors in a spontaneous setting, we are processing a bewildering amount of information, we are constantly making predictions and calculations and on-the-fly judgments of risk and reward." Vanderbilt's readers learn, among other things, that roads that look dangerous have fewer accidents than those that seem safe, that the least corrupt countries have the lowest crash rates, and that people don't drive nearly as well as they think they do. This includes you.

—The Boston Globe, "The Books of Summer," May 25, 2009

Environmental Law, Policy, and Economics: Reclaiming the Environmental Agenda

Nicholas A. Ashford, Charles C. Caldart



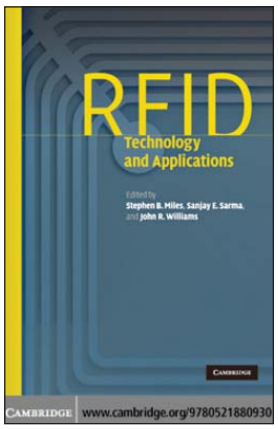
The past twenty-five years have seen a significant evolution in environmental policy, with new environmental legislation and substantive amendments to earlier laws, significant advances in environmental science, and changes in the treatment of science (and scientific uncertainty) by the courts. This book offers a detailed discussion of the important issues in environmental law, policy, and economics, tracing their development over the past few decades through an examination of environmental law cases and commentaries by leading scholars. The authors focus on pollution, addressing both pollution control and prevention, but also emphasize the evaluation, design, and use of the law to stimulate technical change and industrial transformation, arguing that there is a need to address broader issues of sustainable development.

Environmental Law, Policy, and Economics, which grew out of courses taught by the authors at MIT, treats the traditional topics covered in most classes in environmental law and policy, including common law and administrative law concepts and the primary federal legislation. But it goes beyond these to address topics not often found in a single volume: the information-based obligations of industry, enforcement of environmental law, market-based and voluntary alternatives to traditional regulation, risk assessment, environmental economics, and technological innovation and diffusion. Countering arguments found in other texts that government should play a reduced role in environmental protection, this book argues that clear, stringent legal requirements—coupled with flexible means for meeting them—and meaningful stakeholder participation are necessary for bringing about environmental improvements and technological transformations.

—MIT Press

RFID Technology and Applications

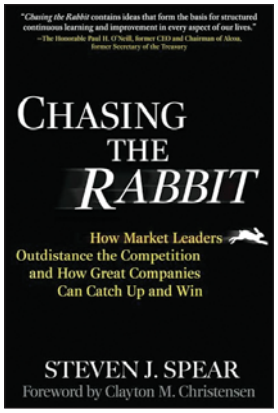
Editors: Stephen B. Miles, Sanjay E. Sarma, John R. Williams



Covering both passive and active RFID systems, the challenges to RFID implementation are addressed using specific industry research examples and common integration issues. Key topics include RF tag performance optimization, evaluation methodologies for RFID and Real-Time-Location Systems (RTLS) and sensors, EPC network simulation, RFID in the retail supply chain, and applications in product lifecycle management, anti-counterfeiting and cold chain management. The book brings together insights from world's leading research laboratories in the field, including the Auto-ID Labs at MIT, successor to the Auto-ID Center which developed the Electronic Product Code scheme which is set to become the global standard for product identification.

Chasing the Rabbit: How Market Leaders Outdistance the Competition and How Great Companies Can Catch Up and Win

Steven Spear

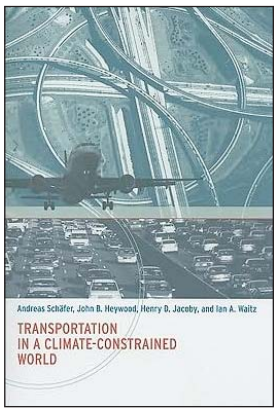


Steven Spear is no stranger to Toyota watchers, students of the Toyota Production System, or HBR readers. Over the past 10 years, ever since he co-wrote (with H. Kent Bowen) his first HBR article, "Decoding the DNA of the Toyota Production System," Spear, now a senior lecturer at MIT, has dazzled readers with his insights into what makes Toyota tick and his understanding of how any organization can use those ideas to improve its effectiveness. Not surprisingly, his first tome was highly anticipated, and it's probably an understatement to say that it won't disappoint.

Writing in an eminently approachable fashion, Spear quickly sets up the problem he plans to tackle: namely, how companies can catch up with what he calls high-velocity organizations, such as Alcoa, Southwest Airlines, and, of course, Toyota. He argues that the reason companies like these excel is that they accept, first, that because systems are complex, problems are bound to occur, and second, that because processes cross boundaries, problem solving has to cut across functions.

Transportation in a Climate-Constrained World

Andreas Schäfer, John B. Heywood, Henry D. Jacoby, and Ian A. Waitz



In the nineteenth century, horse transportation consumed vast amounts of land for hay production, and the intense traffic and ankle-deep manure created miserable living conditions in urban centers. The introduction of the horseless carriage solved many of these problems but has created others. Today another revolution in transportation seems overdue. Transportation consumes two-thirds of the world's petroleum and has become the largest contributor to global environmental change. Most of this increase in scale can be attributed to the strong desire for personal mobility that comes with economic growth.

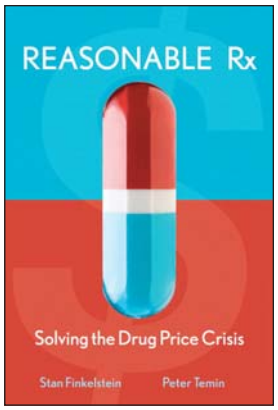
In *Transportation in a Climate-Constrained World*, the authors present the first integrated assessment of the factors affecting greenhouse gas (GHG) emissions from passenger transportation. They examine such topics as past and future travel demand; the influence of personal and business choices on passenger travel's climate impact; technologies and alternative fuels that may become available to mitigate GHG emissions from passenger transport; and policies that would promote their adoption. And most important, taking into account all of these options, they consider how to achieve a more sustainable transportation system in the next thirty (to fifty years.

→ Back to Table of Contents

ESD Summer Reading List—Summer 2008

Reasonable Rx: Solving the Drug Price Crisis

Stan Finkelstein and Peter Temin



Finkelstein and Temin believe that the mounting U.S. drug price crisis can be contained and eventually reversed by separating drug discovery from drug marketing and by establishing a non-profit company to oversee funding for new medicines. They present their research and detail their proposal for dealing with the U.S drug price crisis. They address immediate national problems—the rising cost of available medicines, the high cost of innovation and the 'blockbuster' method of selecting drugs for development—and predict worsening new ones, unless bold steps are taken.

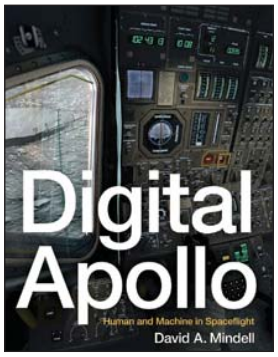
Following the utility model, Finkelstein and Temin propose establishing an independent, public, non-profit Drug Development Corporation (DDC), which would act as an intermediary between the two new industry segments—just as the electric grid acts as an intermediary between energy generators and distributors. The DDC also would serve as a mechanism for prioritizing drugs for development.

Finkelstein and Temin's plan would also insulate drug development from the blockbuster mentality, which drives companies to invest in discovering a billion-dollar drug to offset their costs.

—Pharmaceutical News, March 2008

Digital Apollo: Human and Machine in Spaceflight

David A. Mindell



As Apollo 11's Lunar Module descended toward the moon under automatic control, a program alarm in the guidance computer's software nearly caused a mission abort. Neil Armstrong responded by switching off the automatic mode and taking direct control. He stopped monitoring the computer and began flying the spacecraft, relying on skill to land it and earning praise for a triumph of human over machine.

In *Digital Apollo*, engineer-historian David Mindell takes this famous moment as a starting point for an exploration of the relationship between humans and computers in the Apollo program. In each of the six Apollo landings, the astronaut in command seized control from the computer and landed with his hand on the stick. Mindell recounts the story of astronauts' desire to control their spacecraft in parallel with the history of the Apollo Guidance Computer. From the early days of aviation

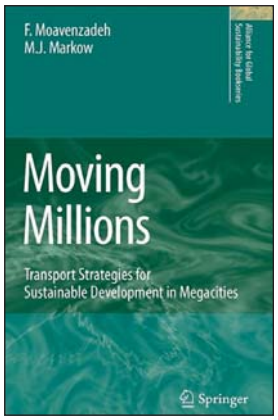
through the birth of spaceflight, test pilots and astronauts sought to be more than "spam in a can" despite the automatic controls, digital computers, and software developed by engineers. *Digital Apollo* examines the design and execution of each of the six Apollo moon landings, drawing on transcripts and data telemetry from the flights, astronaut interviews, and NASA's extensive archives.

Mindell's exploration of how human pilots and automated systems worked together to achieve the ultimate in flight—a lunar landing—traces and reframes the debate over the future of humans and automation in space. The results have implications for any venture in which human roles seem threatened by automated systems, whether it is the work at our desktops or the future of exploration.

—Publisher Comments, MIT Press, March 2008

Moving Millions: Transport Strategies for Sustainable Development in Megacities

Fred Moavenzadeh and Mike Markow



Moavenzadeh and Markow explore how the issues of transportation strategy and environmental sustainability interact in the context of megacities, especially those megacities in the developing world where the rapid rates of growth in population and economic development outpace the supply of infrastructure. While much of the current literature assumes a tradeoff between transportation and environmental sustainability, this book looks to the synergy between the two if public policies are crafted in the proper way. Transportation infrastructure capacity is typically a serious constraint in urban areas worldwide.

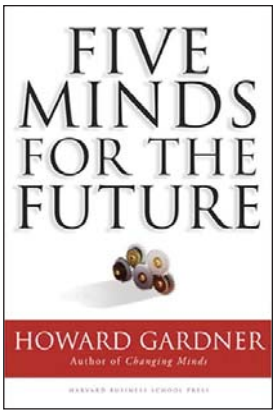
Problems in providing additional infrastructure—whether related to available financial resources, environmental protection, local institutional capabilities, available technology, available land and land use, social disruption, and other factors—tend to be magnified in rapidly developing megacities. Given the reality of these constraints, there are nevertheless several ways in which the demand for transportation and the efficient operability of the available supply can be managed successfully to relieve the pressure on existing infrastructure, accommodate the time needed to build additional capacity, and balance the competing requirements among urban mobility, economic development, and environmental sustainability such that each area sees gains.

This book demonstrates how transportation strategy and environmental sustainability can be pursued in a comprehensive and harmonious, rather than unconnected and potentially conflicting, set of public policies by applying lessons from several urban areas around the world (e.g., Bogota, Singapore, Mexico City, Sao Paulo and others).

—Publisher Comments, Springer, 2007

Five Minds for the Future

Howard Garner



This is a relatively short and accessible book and I enjoyed it. It is interesting to contemplate how these five minds relate to the ESD concept of engineering systems thinking – JS

Five Minds for the Future outlines the specific cognitive abilities that will be sought and cultivated by leaders in the years ahead.

They include:

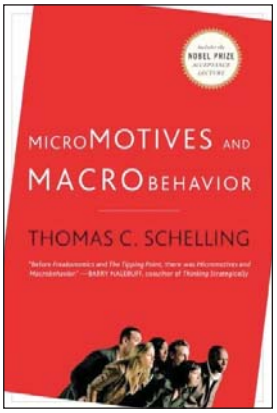
- **The Disciplinary Mind**: the mastery of major schools of thought, including science, mathematics, and history, and of at least one professional craft.
- **The Synthesizing Mind**: the ability to integrate ideas from different disciplines or spheres into a coherent whole and to communicate that integration to others.
- **The Creating Mind**: the capacity to uncover and clarify new problems, questions and phenomena.
- **The Respectful Mind**: awareness of and appreciation for differences among human beings and human groups.
- **The Ethical Mind**: fulfillment of one's responsibilities as a worker and as a citizen.

Gardner draws from a wealth of diverse examples to illuminate these ideas, designed to inspire lifelong learning and also to provide valuable insights for those charged with training and developing organizational leaders.

—From Publishers Weekly, 2007

Micromotives and Macrobehavior

Thomas C. Schelling



Given its positioning as a "popular" book, I was surprised to see it get pretty mathematical pretty quickly. Not light reading in many sections—but some very interesting ideas – JS

"Schelling here offers an early analysis of 'tipping' in social situations involving a large number of individuals."—official citation for the 2005 Nobel Prize.

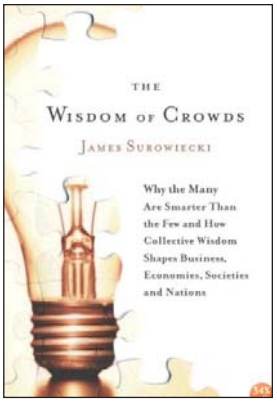
Before The Tipping Point there was this classic by the 2005 Nobel Laureate in Economics. Micromotives and Macrobehavior was originally published over twenty-five years ago, yet the stories it tells feel just as fresh today.

And the subject of these stories—how small and seemingly meaningless decisions and actions by individuals often lead to significant unintended consequences for a large group—is more important than ever. In one famous example, Thomas C. Schelling shows that a slight-but-not-malicious preference to have neighbors of the same race eventually leads to completely segregated populations.

—Publisher comments 2006

The Wisdom of Crowds

James Surowiecki



This book starts out with a hackneyed story about averaging the predictions of a number of people about the weight of an ox, and that average being very close to the correct weight. The crowd was wiser collectively than the expert. But it gets a lot better and more interesting quickly. A very enjoyable book – JS

New Yorker columnist James Surowiecki explores a deceptively simple idea that has profound implications: large groups of people are smarter than an elite few, no matter how brilliant better at solving problems, fostering innovation, coming to wise decisions, even predicting the future.

This seemingly counterintuitive notion has endless and major ramifications for how businesses operate, how knowledge is advanced, how economies are (or should be) organized and how we live our daily lives. Surowiecki ranges across fields as diverse as popular culture, psychology, ant biology, economic behaviorism, artificial intelligence, military history and political theory to show just how this principle operates in the real world.

—Publisher Comments, Anchor Press, August 2005

→ Back to Table of Contents

ESD Summer Reading List—Summer 2007

Design-Inspired Innovation

Jim Utterback

Professor Jim Utterback and several co-authors have written a book which looks at the intersection between design and innovation, and explores the novel ways in which designers are contributing to the development of products and services. Its scope is international, with emphasis on design activities in Boston, England, Sweden, and Milan. Using a variety of cases and cultural prisms, the book extends the traditional design viewpoint and stretches the context of industrial design to question—and answer—what design is really all about. It gives readers tools for inspiration, and shows how design can change language and even create human possibilities. (Adapted from material provided by the publisher). (Dr. Utterback is David J. McGrath jr (1959) Professor of Management and Innovation and Professor of Engineering Systems at MIT.)

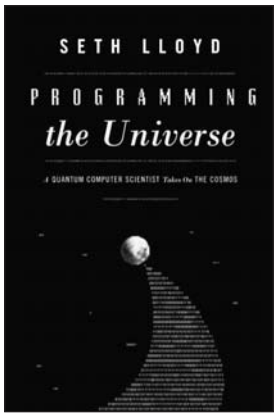
The Organization and Architecture of Innovation: Managing the Flow of Technology

Tom Allen

Co-authored by Prof. Tom Allen and award-winning German architect Gunter Henn of HENN Architekten, explores the combined use of two management tools to make the innovation process most effective: organizational structure and physical space. They present research demonstrating how organizational structure and physical space each affect communication among people in this case, engineers, scientists, and others in technical organizations and they illustrate how organizations can transform both to increase the transfer of technical knowledge and maximize the communication for inspiration that is central to the innovation process. (Adapted from material provided by the publisher). (Dr. Allen is Margaret MacVicar Faculty Fellow, Howard W. Johnson Professor of Management, Professor of Engineering Systems, and a Co-Director of the Leaders for Manufacturing and System Design and Management Programs at MIT.)

Programming the Universe

Seth Lloyd

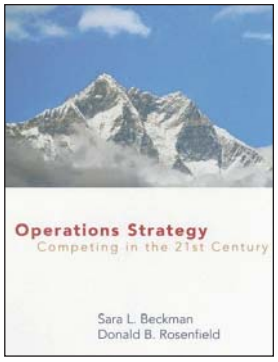


Is the universe actually a giant quantum computer? According to Dr. Lloyd, the answer is yes.

All interactions between particles in the universe, he explains, convey not only energy but also information in other words, particles not only collide, they compute. What is the entire universe computing, ultimately? "Its own dynamical evolution," he says. "As the computation proceeds, reality unfolds." (*Adapted from material provided by the publisher*). (Dr. Lloyd is Professor of Mechanical Engineering and Engineering Systems at MIT.)

Operations Strategy: Competing in the 21st Century

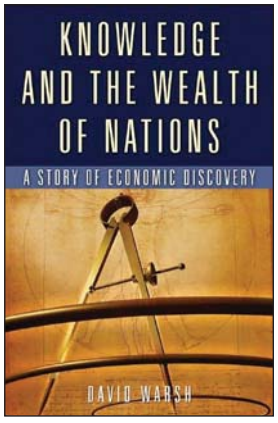
Donald Rosenfield



Co-authored with Prof. Sara Beckman of University of California Berkeley, this book addresses the basic decisions leaders of operations must address: vertical integration, capacity, facilities, process technology, information technology, sourcing, business process management, capabilities development and supply chain integration. It integrates strategic considerations with analytical models and provides a comprehensive view of these critical decisions and the tools used to help make them. The themes and conclusions offered by the authors are based on recent research, particularly from LFM. (Adapted from material provided by the publisher). (Dr. Rosenfield is a senior lecturer at the Sloan School of Management and Director of the LFM Fellows Program at MIT.)

Knowledge and the Wealth of Nations: A Story of Economic Discovery

David Warsh



David Warsh used to write a fine column for the Boston Globe on Sundays in the business page and I often wondered if he was thinking of a book about economic history. I guess he was and this is the book! He says "it is the story of a single technical paper in economics"—Paul Romer's "Endogenous Technological Change," dealing with the "economics of knowledge" and how knowledge leads to economic growth, but the book is much more. It really builds the history of economic thought in an impressive and interesting way starting with Adam Smith!

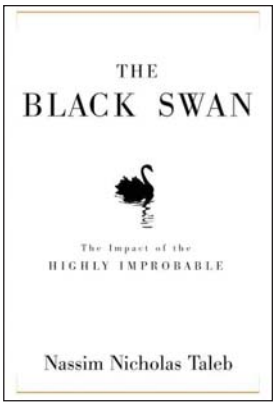
A lot of MIT folks in this—Samuelson, Solow, Krugman and on and on. And some interesting ideas on modeling—here is a quote from the flyleaf.

"The construction of a model, or any theory for that matter (or the writing of a novel, a short story or a play) consists of snatching for the enormous and complex of facts called reality a few simple, easily-managed key points which, when put together in some cunning way, become for certain purposes a substitute for reality itself." Evsey Domar

Sounds like ESD to me!—J. Sussman, May 26, 2007

The Black Swan: The Impact of the Highly Improbable

Nassim Nicholas Taleb



Taleb believes that the big money business and government spend on prediction is useless and he chastises MBA- and Nobel Prize-credentialed experts who earn their living from economic forecasting. Taleb employs the metaphor of "the black swan," whose discovery invalidated the theory that all swans are white. Taleb explores the unpredicted event in a range of phenomena, such as why a book becomes a best-seller or how an entrepreneur becomes a billionaire and integrates this with discussions on philosophers who have addressed the meaning of the unexpected and confounding. (Adapted from a review by the American Library Association).

Dr. Taleb is on leave as the Dean's Professor in the Sciences of Uncertainty University of Massachusetts at Amherst, a Fellow & Adjunct Professor of Mathematics at the Courant Institute of Mathematical Sciences of New York University (since 1999), and affiliated faculty, Wharton School Financial Institutions Center. Starting September 2007, he will be a visiting professor at London Business School.

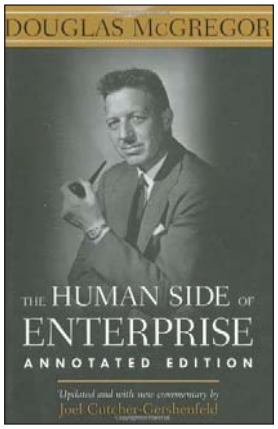
Colleagues—I have the book and plan to read it this summer—very well recommended by several of our systems colleagues at the U. of Michigan – JS

→ Back to Table of Contents

ESD Summer Reading List—Summer 2006

The Human Side of Enterprise

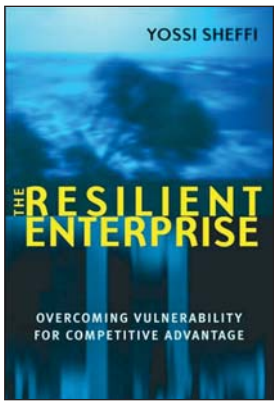
Joel Cutcher-Gershenfeld



Dr. Joel Cutcher-Gershenfeld has updated and provided new commentary for this annotated edition of *The Human Side of Enterprise* by Douglas McGregor, McGraw-Hill, 2006.In the book, Dr. Cutcher-Gershenfeld illustrates how today's leaders have successfully incorporated McGregor's methods into modern management styles and practices. He also identifies the management challenges—illuminated by McGregor—that remain central to managerial and societal success. (Dr. Cutcher-Gershenfeld is Executive Director, MIT Engineering Systems Learning Center and Senior Research Scientist, MIT Sloan School of Management, and Co-director of the Center for Technology, Policy, and Industrial Development (CTPID) project on Labor Aerospace Research and of CTPID's Working Group on Lateral Alignment in Complex Systems.)

The Resilient Enterprise: Overcoming Vulnerability for Competitive Advantage

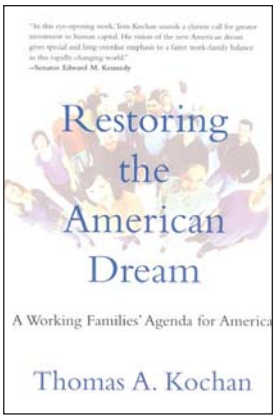
Yossi Sheffi



A business book best-seller, *The Resilient Enterprise* received rave reviews from the *Wall Street Journal*, *New York Times* and *The Economist*, as well as dozens of trade journals. It was also recognized by the Financial Times as one of the best business books of 2005. The Resilient Enterprise provides a clear plan for managing corporate disaster and disruption. From fires and earthquakes to labor strikes and terror attacks, Dr. Sheffi provides a rich set of lessons on how to prepare for and manage the many business shocks of today's global market. (Dr. Yossi Sheffi is Professor of Engineering Systems and Civil and Environmental Engineering, Director of the Center for Transportation and Logistics, and Director of the Master of Engineering in Logistics (MLOG) Program).

Restoring the American Dream: A Working Families' Agenda for America

Tom Kochan



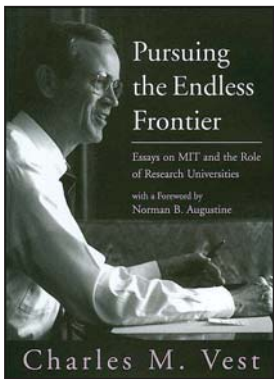
Publisher's Weekly called this an "earnest and meticulous volume...in which. (Dr. Thomas) Kochan argues that Americans need to view work and family as 'tightly coupled issues' so that the former can be managed to complement the latter...(Its ideas) await a candidate and movement ready to translate Kochan's 'vision for the longer term' into a workable plan."

Dr. Thomas Kochan is George Maverick Bunker Professor of Management and Professor of Engineering Systems. He is also Co-director of the Institute for Work and Employment Research at MIT Sloan School of Management and Co-director of the MIT Workplace Center.

→ Back to Table of Contents

ESD Summer Reading List—Summer 2005

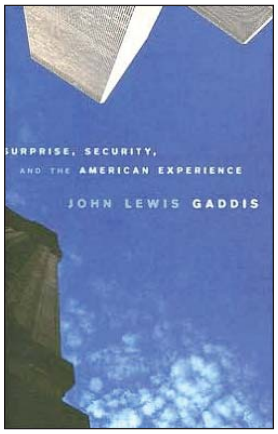
Pursuing the Endless Frontier: Essays on MIT and the Role of Research Universities



Charles M. Vest, a book of essays by outgoing MIT president Charles M. Vest, it includes his inaugural address in 1991 and each of his annual reports to the faculty. It is an excellent history of MIT during the Vest years and covers his thoughts on many issues facing MIT and research universities in contemporary society; the need to develop industrial support without losing our souls; the ups and downs of federal support for fundamental research; innovations as the economic engine of the US and academia's role in generating it—retaining the US's technological lead in global markets; diversity as critical—racial, gender, and intellectual; systems and the need for integrative education; MIT as an international as well as a national institution; the overlap group and MIT stand against the DoJ; OCW; the implications of the IT revolution for research and education; the environment; the value of the tenure system; and lots more. Anyone with an interest in MIT would find this book of value. Further, anyone with an interest in what it takes to run a first-class research university could use this book as a text.

Surprise, Security and the American Experience

John Lewis Gaddis



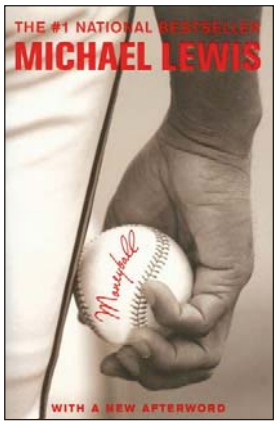
Gaddis is a professor at Yale and this short book (120 pages) was based on his Goldman Memorial Lectures at the NY Public Library in 2002. Stimulated, of course, by 9/11, he traces America's approach to national security from the inception of the Republic. So this book is about "**grand strategy**." Gaddis discusses the three great surprises in US history with national security implications—The burning of the White House and the Capitol by the British in 1814, the attack on Pearl Harbor by the Japanese in 1941 and 9/11 and how these events shaped US strategy.

The three principles America has built security policy around are preemption—taking care of dangers by attacking first, unilateralism—not depending upon others for permission, and hegemony—being so strong that no one dares attack. Gaddis points out that in the modern world that hegemony depends to an extent on consent and consent requires that there be something worse than your hegemony (the USSR played that negative role in the Cold War). (Gaddis says transportation revolution changed everything in America's grand strategy in the first half of the 20th Century—hegemony in our own hemisphere wasn't adequate anymore; geographic separation no longer worked!

So why on the ESD list?—well, not for political reasons, one way or the other—but rather because I argue that "grand strategy" is a form of systems thinking. Read it and see if you agree.

Moneyball

Michael Lewis



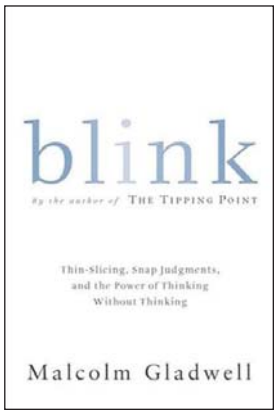
Last summer, I told Tom Magnetic and the rest of the MIT baseball Mafia, if I had the nerve I was going to put this on the ESD Summer Reading List in 2005, because while it is a baseball book, it is also a **systems** book. In honor of the Red Sox World Series, I have included it.

The book describes Billy Beane's approach to baseball at GM of the Oakland A's. The A's have a record of wins per $ of salary that is exceptionally good—he finds players the market undervalues and pays them small money, getting rid of people he thinks the market overvalues. So he said at the beginning of Tejada's last year that he was not going try to sign him, realizing as a small market team that he couldn't meet the market and anyway, he could spend that $ more efficiently. He doesn't believe in batting average but rather on-base % and slugging %. No sacrifices—don't give away outs. Don't steal—same reason. Beane believes the market overvalues speed and fielding. "Real baseball" people hate him!

This is a "systems" book, I argue. It has ideas like thinking about what you are really trying to optimize, the value of solid quantitative analysis—you can't tell who is a good player by simply watching them and other ideas. If you like baseball, this is a must read.

Blink: The Power of Thinking Without Thinking

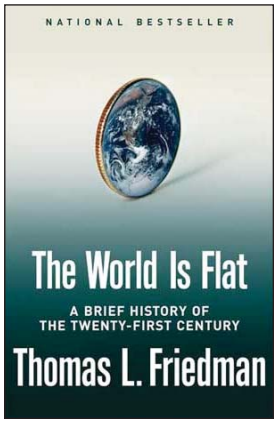
Malcolm Gladwell



The idea is that "experts" internalize what they know so that their first reaction to a situation is often right. So an art expert spots a forgery in one glance but can't you why he just knows it's a fraud. So students who are "experts" at evaluating how good a teacher a professor is, look at 15 seconds of tape of a lecture and their evaluation based on that time slice correlates very well with full semester evaluations! A tennis coach knows when a player is going to double-fault before the player hits the ball. The concept is called "thin-slicing"—getting a lot of information very quickly. I think it's a systems concept—it takes integrative thinking. The author wrote "The Tipping Point"; he is a great science writer drawing on research results and weaving it into a compelling story.

The World is Flat: A Brief History of the Twenty-first Century

Thomas Friedman



I haven't had a chance to read this book, but Dan Hastings recommends it. It's by a NY Times columnist and a well-regarded observer of global economic issues (The Lexus and the Olive Tree, for example). Here is Amazon.com's review: (Thomas L. Friedman is not so much a futurist, which he is sometimes called, as a presentist. His aim, in his new book, The World Is Flat, as in his earlier, influential Lexus and the Olive Tree, is not to give you a speculative preview of the wonders that are sure to come in your lifetime, but rather to get you caught up on the wonders that are already here. The world isn't going to be flat, it is flat, which gives Friedman's breathless narrative much of its urgency, and which also saves it from the Epcot-style polyester sheen that futurists—the optimistic ones at least—are inevitably prey to.

What Friedman means by "flat" is "connected": the lowering of trade and political barriers and the exponential technical advances of the digital revolution have made it possible to do business, or almost anything else, instantaneously with billions of other people across the planet. This in itself should not be news to anyone. But the news that Friedman has to deliver is that just when we stopped paying attention to these developments—when the dot-com bust turned interest away from the business and technology pages and when 9/11 and the Iraq War turned all eyes toward the Middle East—is when they actually began to accelerate. Globalization 3.0, as he calls it, is driven not by major corporations or giant trade organizations like the World Bank, but by individuals: desktop freelancers and innovative startups all over the world (but especially in India and China) who can compete—and win—not just for low-wage manufacturing and information labor but, increasingly, for the highest-end research and design work as well. (He doesn't forget the "mutant supply chains" like Al-Qaeda that let the small act big in more destructive ways.) Friedman tells his eye-opening story with the catchy slogans and globe-hopping anecdotes that readers of his earlier books and his New York Times columns will know well, and also with a stern sort of optimism. He wants to tell you how exciting this new world is, but he also wants you to know you're going to be trampled if you don't keep up with it. His book is an excellent place to begin.

—Tom Nissley

→ Back to Table of Contents

ESD Summer Reading List—Summer 2004

Engineering Systems Monograph—presented at the ESD Symposium by Members of the MIT Engineering Systems Division—March 2004. Quoting from the preface:

The Engineering Systems Symposium, March 29-31, 2004, represents a milestone for the MIT Engineering Systems Division. In it, we present our approach to the study of large-scale, complex, technologically enabled systems. This monograph, prepared for attendees at the Symposium, contains the history of ESD and our vision of its future. We also define the foundation and the research agenda for the emerging field that we call Engineering Systems. The papers in this monograph are based on several prior efforts to outline the foundation and the research agenda for Engineering Systems.

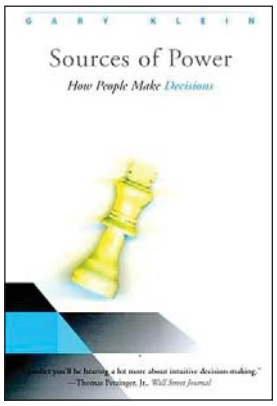
So how often have you been involved in the start-up of a field, which is documented in a book written by you and your colleagues? It's my very first time! So how can you NOT read this book? To tempt you further, here's the table of contents.

TABLE OF CONTENTS

(for more inforamtion visit: esd.mit.edu/symposium/monograph)

Sources of Power: How People Make Decisions

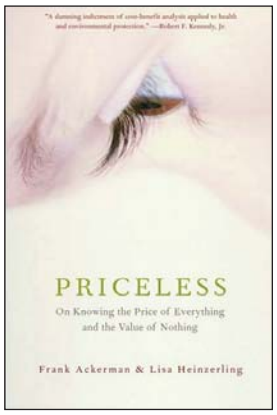
Gary Klein



Dan Frey mentioned this book during his April ESD lunch seminar and I went right out to buy it from MIT Press on his say-so. A fine book—It deals with how people make decisions under severe time pressures. Firefighters, surgeons, and soldiers are among those considered. Klein, through empirical research, suggests that traditional decision-making structures do not apply at all and that his ideas about decision-making apply even when time pressures are absent. So the process of identify alternatives, develop metrics and weights, evaluate each alternative using the metrics and weights, do the arithmetic and decide rarely is used. Rather the Recognition-Primed Decision Model or RPM is what Klein says people really use—recognize the situation through your experience and go from there. A good read.

Priceless: On Knowing the Price of Everything and the Value of Nothing

Frank Ackerman and Lisa Heinzerling



This is an interesting and useful book although more polemic than I would like. They write effectively to debunk the use of monetized valuation of priceless things like human life and health and then using those "values" derived from arcane and poorly-posed questions in surveys in shopping malls in benefit-cost analysis to reach public policy decisions, such as arsenic standards for water. They say that costs in $ can be well-estimated (although industry usually over-estimates them) and benefits, not in $, cannot be and certainly can't be compared to $.

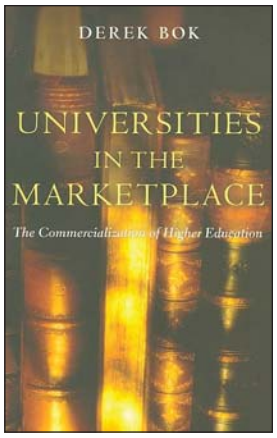
They discuss the precautionary principle as a more useful way of making decisions under large uncertainty that often exists in this context; GCC is a good example. Indeed they argue that very large defense expenditures during the Cold War was an application of this principle. We didn't know how strong the USSR was or what they were going to do, so we had to spend a lot of $ to guard against that threat—and we gained a lot of spin-off benefits—computer technology, the Internet &So we should do the same, they say, for GCC—the uncertainties are large and the downside is very large—and we'll get great spin-offs here, too.

To quote: "A different method of analysis and comparison is needed to separate good policy proposals from bad ones, a method that does not pretend that a mathematical formula can solve our problems for us & In this book we offer an attitude rather than an algorithm & we advocate a more holistic analysis, one that replaces the reductive approach of cost-benefit analysis with a broader and more integrative perspective." They speak of commonsensical deliberation as a way forward and discuss the progressive 1970s environmental legislation as an example. (They also say that an after-the-fact look at benefits-cost analysis would show the benefits far outstripping the costs, a bit ingenious from authors who just spent the last 100 or so pages hammering BCA!)

The book is worth reading—it does a good job of showing the fallacies of BCA and blind monetization. But except for telling us we need to have a holistic and commonsense attitude, they don't really present a viable alternative—and at the end of the day, we have to make decisions.

Universities in the Marketplace: The Commercialization of Higher Education

Derek Bok



In essence, a cautionary tale. Bok, the former president of Harvard, is concerned with the commercialization of our nation's universities and the risks to the values so important to higher education, which he views as a special institution in contemporary society. He says being a professor is a calling.

There are many opportunities for commercialization, he says—athletics, extension schools, executive education, the Internet, funding by pharma companies for scientific research—in exchange for access to students. He realizes all this is tempting for presidents, deans and faculty members in an era in which the knowledge being produced and taught is valued more and more by society, especially for schools with small endowments and big ambitions to move into the first rank. He argues there are all sorts of risk in universities taking this easy money which can undermine the fundamental values of the university—its search for truth and its responsibility to its students.

He argues that the downside is real, but that the financial rewards are often ephemeral. He cites athletics as a good case in point where the monies derived from big-time sports, especially football and basketball, somehow don't filter into more academic uses on the campus. But by admitting students well below the norm for their athletic prowess, we threaten the core mission of the university, which is education.

So what's to be done if universities are not to be led into the path of temptation? He discusses options like standards for behavior agreed to by schools in the same athletic conference—very hard, he says. Other options include a firmer role for boards of trustees—again he is not optimistic, saying that the trustees may be a part of the problem, not the solution, in many cases. Self-policing by presidents and deans—again he is not sanguine. It's the faculty, he says, that have to be the safeguard. They are there all the time and it is in their interest to do just that.

So far, for the most part, universities have done the right thing (although this book is full of incidents in which they have not), academic norms being stronger than the temptations of making money. But he is concerned about the future. "Universities may not yet be willing to trade all of their academic values for money, but they have proceeded much further down that road than they are generally willing to admit."

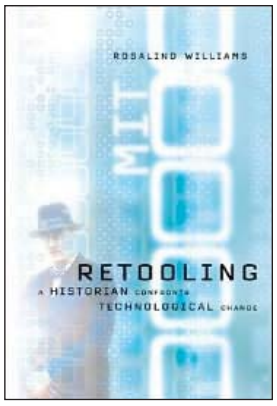
All in all, clearly written and generally balanced.

→ Back to Table of Contents

ESD Summer Reading List—Summer 2003

Retooling: A Historian Confronts Technological Change

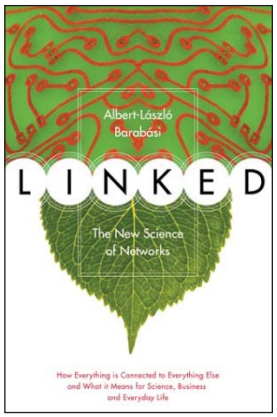
Rosalind Williams



An MIT colleague, now head of STS takes a different view of engineering and MIT. You may not agree with it all but it's worthwhile reading. Prof Williams is the granddaughter of Warren K Lewis, the founding head of Chemical Engineering at MIT and chair of the Lewis Commission in 1949, which led to the formation of MIT's School of Humanities and Social Science. She has a very interesting chapter called "The Expansive Disintegration of Engineering" aka "The profession formerly known as Engineering." She talks about the modern-day SoE at MIT and the changes that are wrenching the various departments, the role of ESD and BED. I am sure some in the SoE will be upset by her views. She is concerned that expanding the notion of engineering a la ESD can be damaging but at the same time, she decries the narrow view—non-integrative—of earlier engineering programs. She also has a chapter on 're-engineering MIT' in the Champy sense. She was undergraduate dean during that and learned a good deal about MIT culture from the process.

Linked: The New Science of Networks

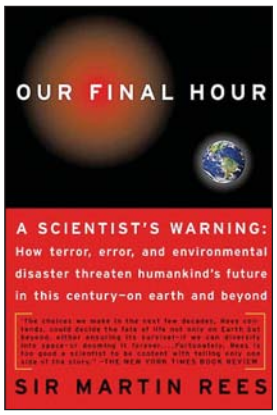
Albert-Laszlo Barabas



The author is a professor at Notre Dame with a physics doctorate. The book is kind of "pop" but I found it quite interesting. He traces network theory from Erdos and random networks, Granovetter and the importance of weak links to the development of scale-free networks, governed by power laws and the formation of hubs—the web without a spider—self-organization, the edge between order and disorder. If a network is growing and if new nodes attach preferentially to nodes that are already well connected, hubs and scale-free behavior is exhibited. He discusses "fitness" of particular nodes, makes an analogy to the Bose-Einstein condensate and how this reads to winner takes all behavior, like Microsoft. He notes that scale-free networks are resilient against (random) failures of nodes because the network is decentralized and vulnerable against explicit attacks where the enemy attacks the important hubs. He talks about Al-Qaeda as a network but notes that the underlying rationale for people joining the network as new nodes has to be addressed if the network is to be defeated—there are too many hubs to kill the network otherwise. He claims a strong tie between networks and complexity and makes a pretty good case.

Our Final Hour: A Scientist's Warning: How Terror, Error, and Environmental Disaster Threaten Humankind's Future In This Century–On Earth and Beyond

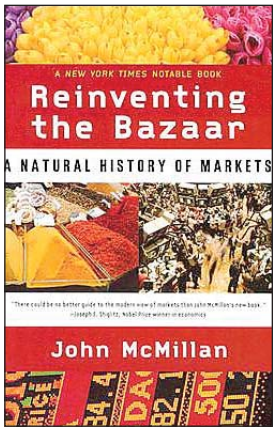
Martin Rees



This is brand-new and I have it on order. It was positively reviewed by the NY Times on Sunday, May 18. Rees is the Astronomer Royal and a professor of cosmology at our partner, Cambridge U. With all the possible disasters "Bioterror, nuclear war, asteroids or nanoparticles", he rates civilization's chances of survivals as no better than 50-50.

Reinventing the Bazaar: A Natural History of Markets

John McMillan



A very readable discussion of markets and how they relate to other societal systems and especially of interest to us is how they relate to innovation. Some of his emphases include:

- Tragedy of the Commons—fishing and overfishing; Chronic Overfishing—no one owns the fish and that's the problem
- Public Goods—like basic research—are underproduced by the market—but are important.
- Economic Growth is critical to human welfare, improvement and growth in human rights requires markets and markets require property rights.
- Importance of uncertainty by buyers, sellers, investors, the state and asymmetries in information
- Externalities cause markets to under-perform, i.e., congestion
- Central planning doesn't work, BUT government is indispensable
- But decentralization has limits too the Internet needs some central control (e.g., domain names)
- Where is the cut-off between public and private provision of goods? (p. 161)
- The question: What are the public goods needed to make markets work well?
- Inequality and poverty are different concepts—economic growth reduces poverty (usually) but not necessarily inequality.

- The closer to equal wealth distribution a nation is, the faster its growth rate (usually).
- Growth is not the whole of the solution to poverty. But it is an indispensable part of it.
- Economic growth requires investment which leads to improvements in human welfare AND, for investments, you need markets. Technological progress helps for which you need financial institutions AND you need government. Markets don't inevitably hurt the poor.
- After Churchill—markets are the worst way to do economies we have come up with yet, except for all the other ways!—but you do need government as a partner!

→ Back to Table of Contents