Near Future Technology Trends

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HBI550/HBM520 Trends in International Business, Trends in Marketing

15th May 2008

Version 1.0

Presentation Themes

1. Trends Intelligence Framework
2. Methods Blitz
3. Technology Roadmap

1. Trends Intelligence Framework

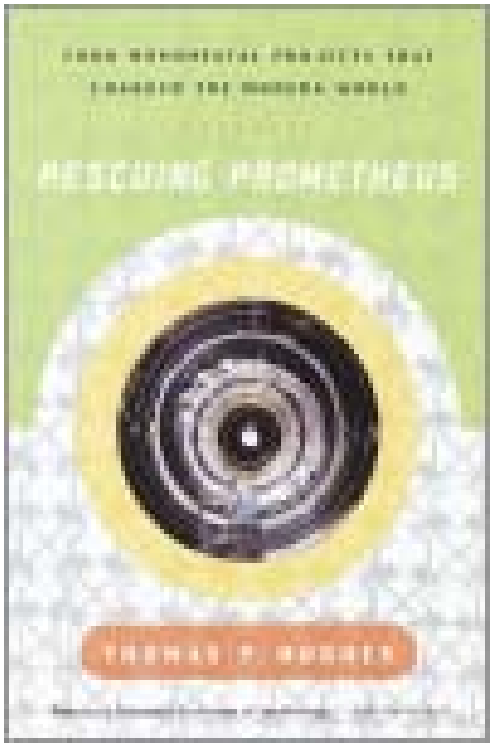
Key Question 1

What trend(s) exist?
How do we perceive them?
What is the situation's reality?

(Ontology & Phenomenology)

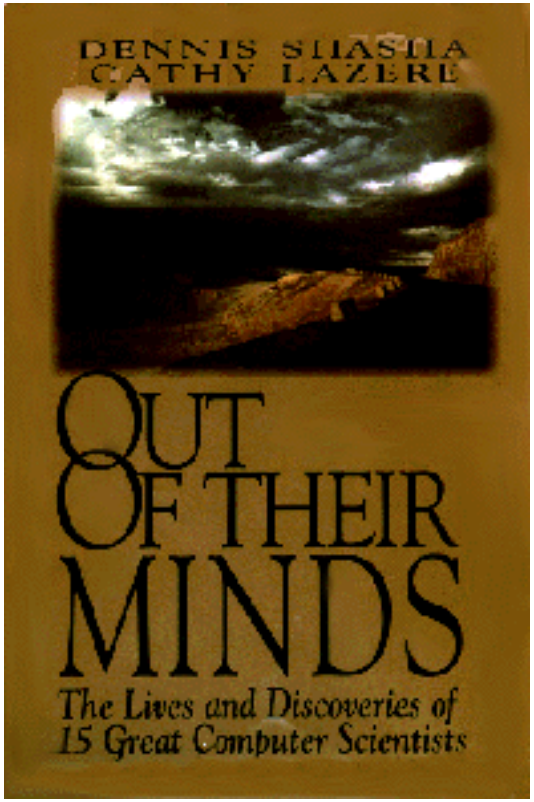
Four key projects

Complexity & risk



Multi-stakeholder coalitions

Technological coevolution



Creativity, innovation & knowledge discovery insights of 15 ICT ‘thought leaders’

Exemplars 1

Tim Berners-Lee

Rodney Brooks

Ward Cunningham

Douglas Engelbart

Exemplars 2

Dean Kamen

Steve Jobs

Michio Kaku

Ray Kurzweil

Exemplars 3

Marshall McLuhan

Nicholas Negroponte

Ted Nelson

Sherry Turkle

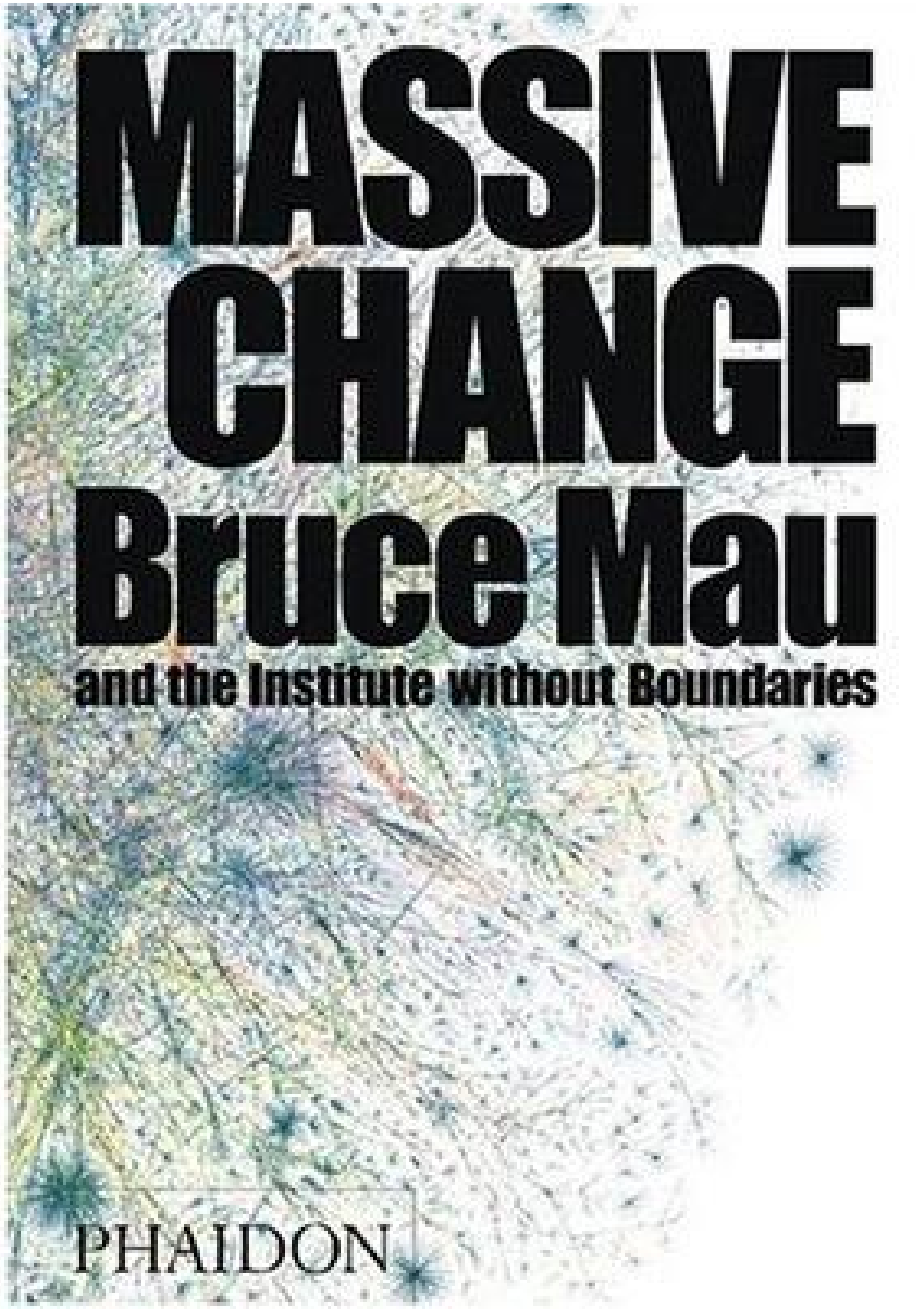
Technology Trend Watchers

John Battelle

Cory Doctorow

Ian Pearson

Mark Pesce


MASSIVE
CHANGE
Bruce Mau
and the Institute without Boundaries
PHAIDON

Key Question 2

How do we know?
What are our sources?
What are our blindspots
and unknown unknowns?

(Epistemology)

Media


WIRED


RED
HERRING


Technology
PUBLISHED BY MIT
Review


boingboing


engadget


Slashdot
News for Nerds. Stuff that matters.


BusinessWeek


MITOPENCOURSEWARE


VALLEYWAG


Techcrunch

Conferences

WIRED NEXTFEST

O'REILLY®

OECD

ICT Outlook Forum

TED Ideas worth spreading

Communications Policy & Research Forum

Technology Clusters (Porter)

Denmark

Finland (Nokia)

Ireland

South Korea

Technology Foresight

Foresight.gov.uk

MSC Malaysia

Singapore's Intelligent Nation 2015

US National Nanotechnology Initiative

Famous R&D Labs

Bell Labs

Xerox PARC

IBM R&D

Google Research

Australian R&D Labs

Australasian CRC for Interaction Design

National ICT Australia

Smart Internet Technology CRC

Blindspots:

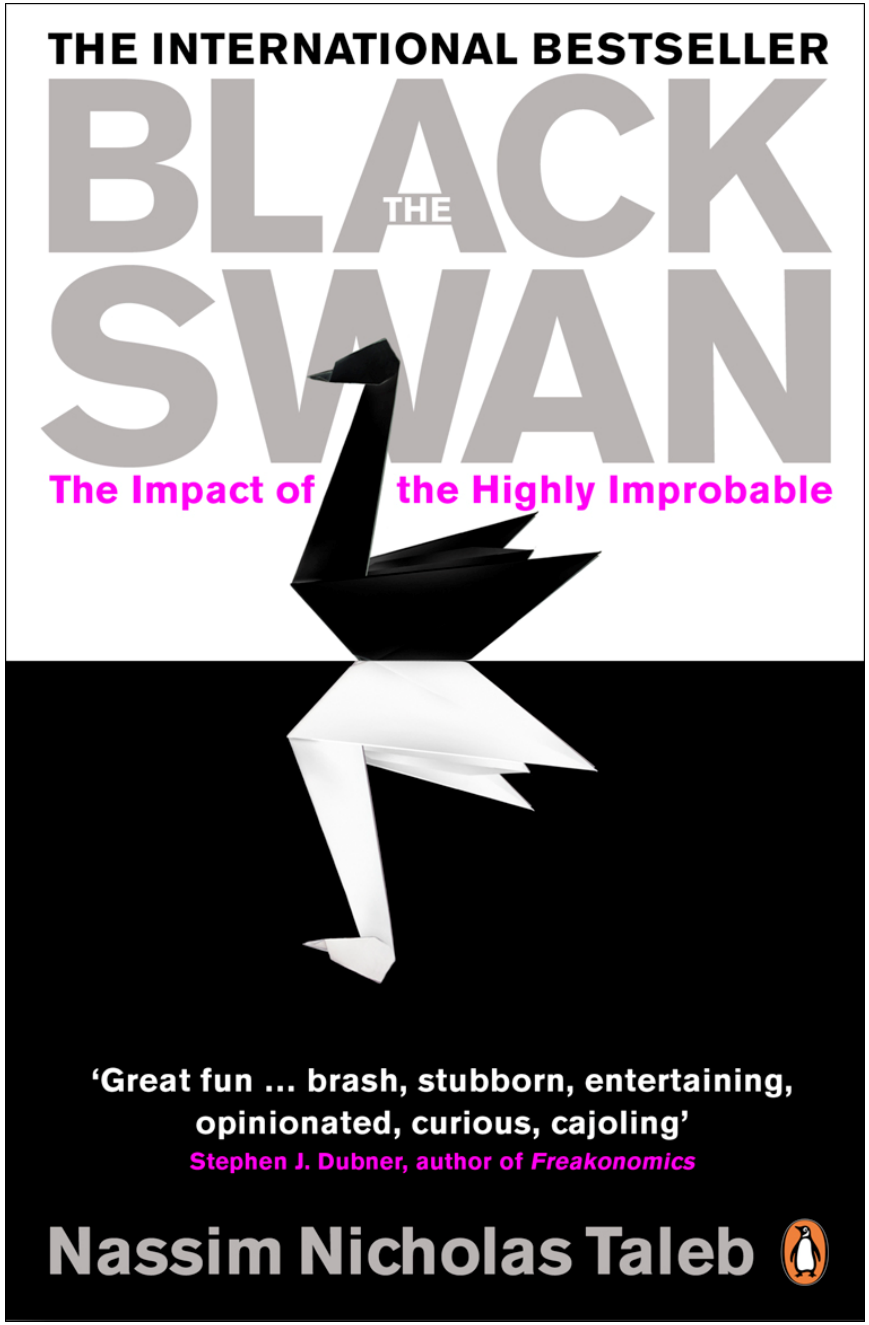
Mysteries vs. Puzzles

Gregory Treverton

Professor Trevor Barr on why telcos failed to predict the popularity of SMS

“I think there is a world market for maybe 5 computers.”

- Wrongly attributed to IBM Chairman Thomas J. Watson

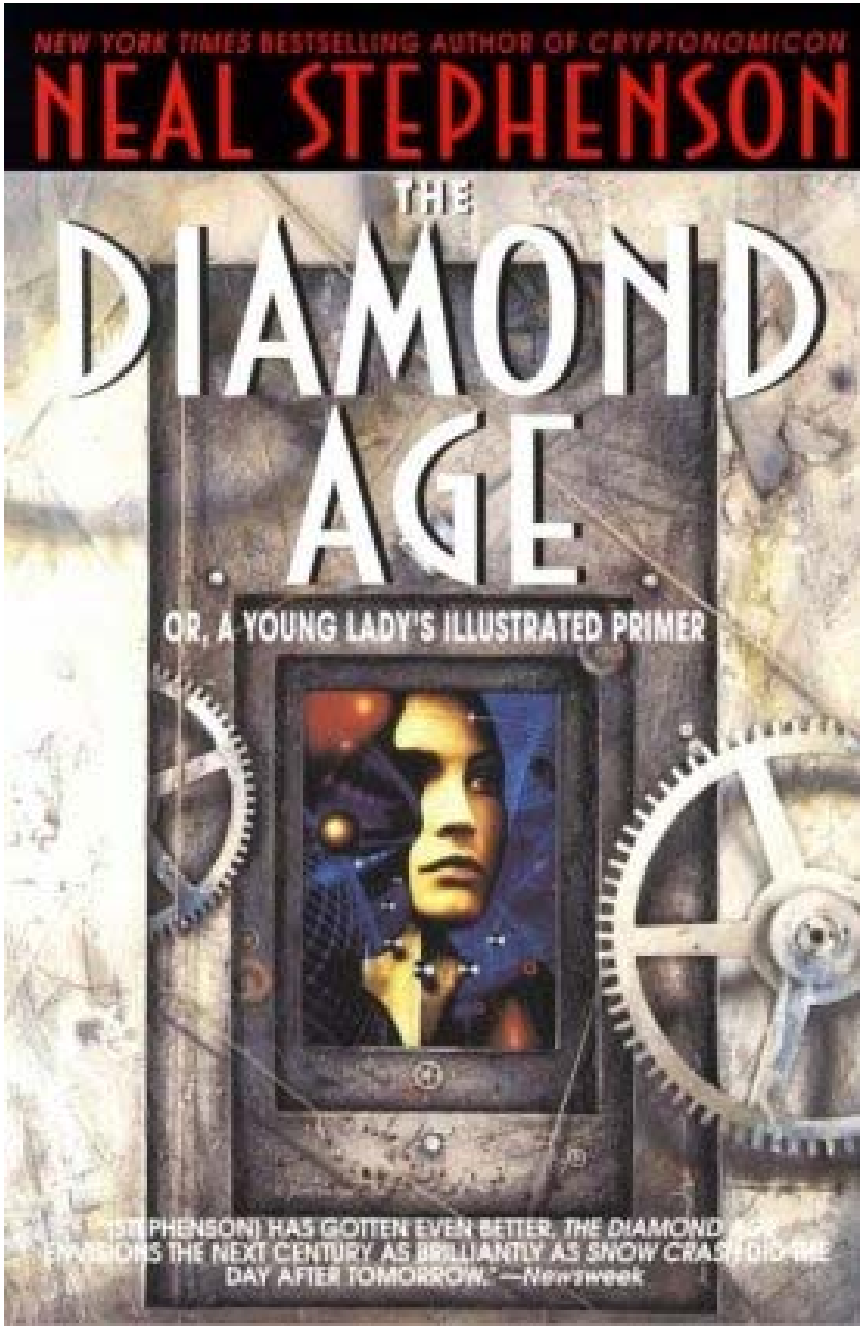

THE INTERNATIONAL BESTSELLER
THE BLACK SWAN
The Impact of the Highly Improbable
'Great fun ... brash, stubborn, entertaining, opinionated, curious, cajoling'
Stephen J. Dubner, author of Freakonomics
Nassim Nicholas Taleb

"Trying to model something that escapes modelization is the heart of the problem."

- Nicholas Taleb, "Fear of a Black Swan", *Fortune* Magazine (14th April 2008), pp. 60-61

“The street finds its own use for things – uses the manufacturers never imagined.”

- William Gibson on the Law of Unintended Consequences


NEW YORK TIMES BESTSELLING AUTHOR OF CRYPTONOMICON
NEAL STEPHENSON
THE
DIAMOND
AGE
OR, A YOUNG LADY'S ILLUSTRATED PRIMER
STEPHENSON HAS GOTTEN EVEN BETTER. THE DIAMOND AGE
ENVISIONS THE NEXT CENTURY AS BRILLIANTLY AS SNOW CRASH DID THE
DAY AFTER TOMORROW." —Newsweek

Key Question 3

What decisions & actions do we make?

(Praxis)

Dashboards

Decision Support Systems

Management Science

Monte Carlo simulations

Polaris missile/submarine project (1958): source of Program Evaluation & Review Technique (PERT), project teams have forgotten the original context

Pre-September 11 Views on Al Qaeda

FBI

- Agent John O'Neill
- Law enforcement view
- Criminal organisation
- Criminal prosecution using racketeering laws

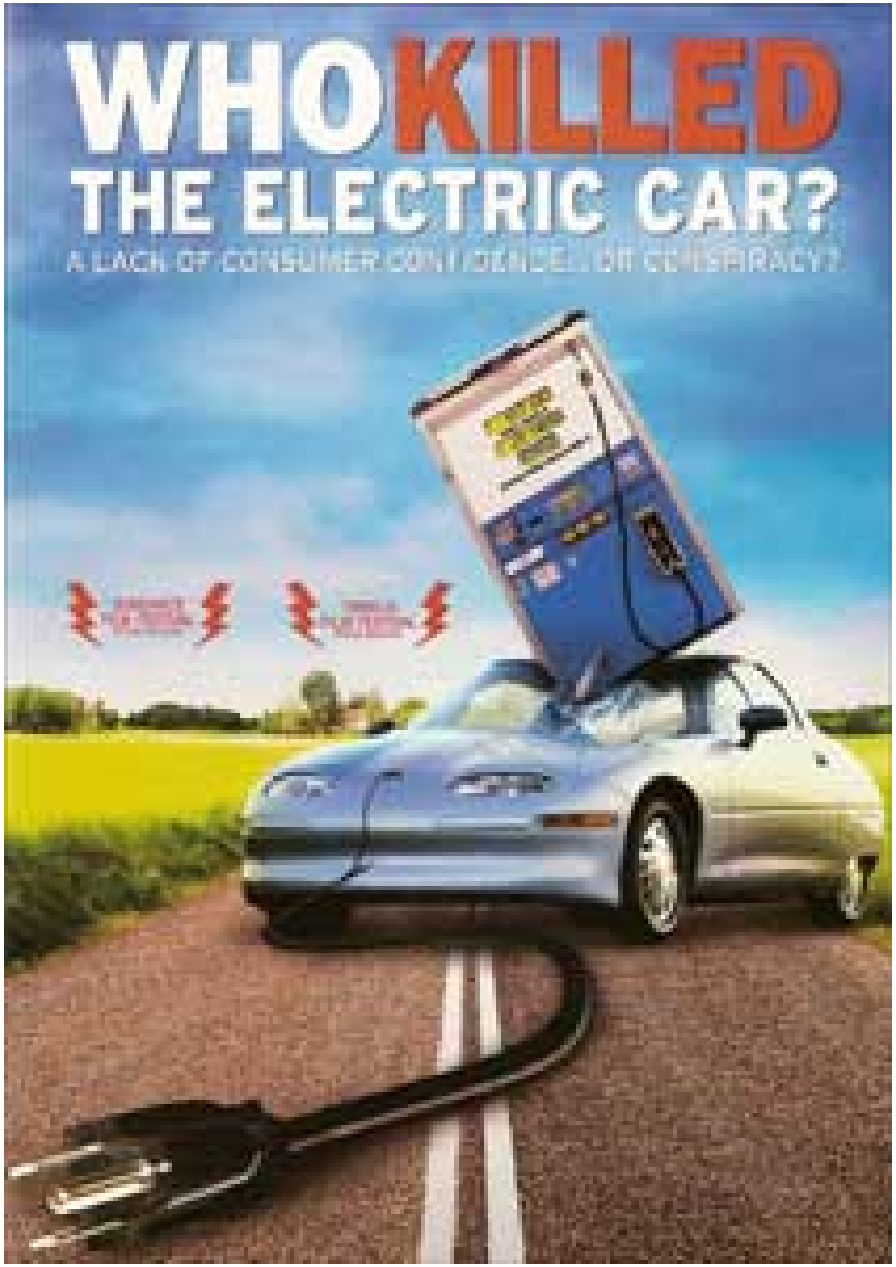
CIA

- Analyst Michael Schueur
- Intelligence view
- Trans-national network
- Grand strategy, threat preparedness, & covert operations

Key Question 4

What are the consequences? Why?
Who is affected?
What is our ethics of use?

(Axiology)


WHO KILLED
THE ELECTRIC CAR?
A LACK OF CONSUMER CONFIDENCE... OR CONSPIRACY?

Dean Kamen's Segway vs. US Regulators

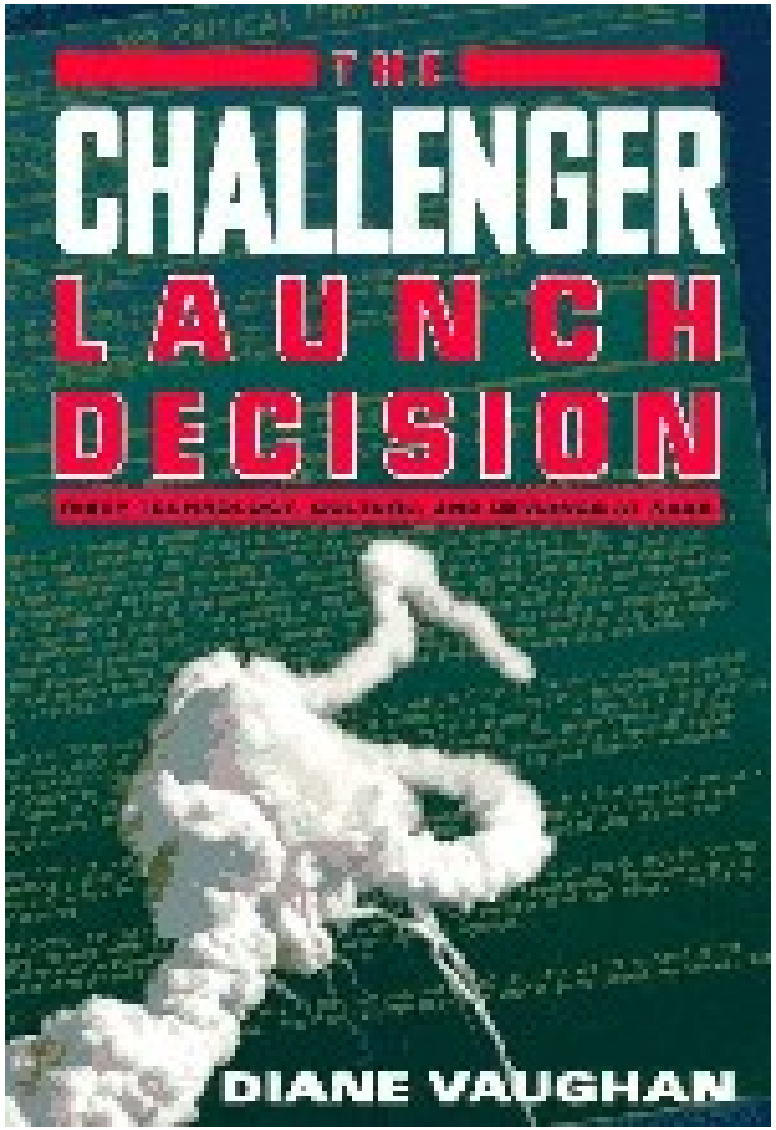
Failure Mode Effects Analysis

ISO Quality Assurance

Six Sigma

Organisational Sociology

Tightly Coupled Systems


THE
CHALLENGER
LAUNCH
DECISION
DIANE VAUGHAN


Normal
Accidents
Living with High-Risk Technologies
Charles
Perrow

De Simone “Reality Check”

So What?

How does this add value?

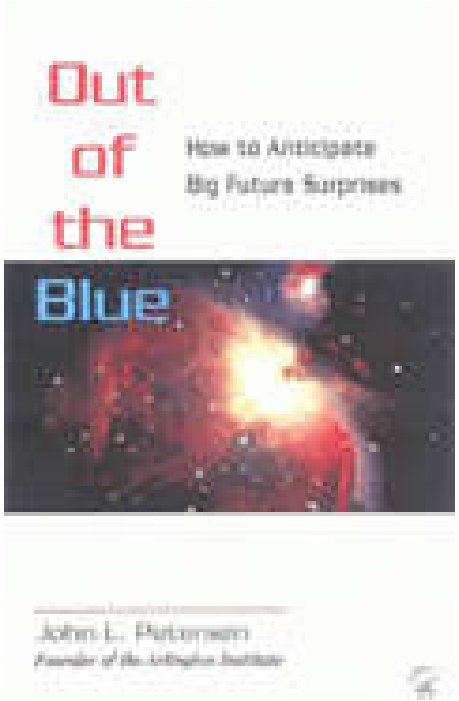
2. Methods Blitz

Trend Sub-types

Cross-impacts

Side-swipes

Technical Analysis patterns



Arlington Impact Index

(John Petersen, Arlington Institute)

Macro Patterns

Convergence

Disintermediation

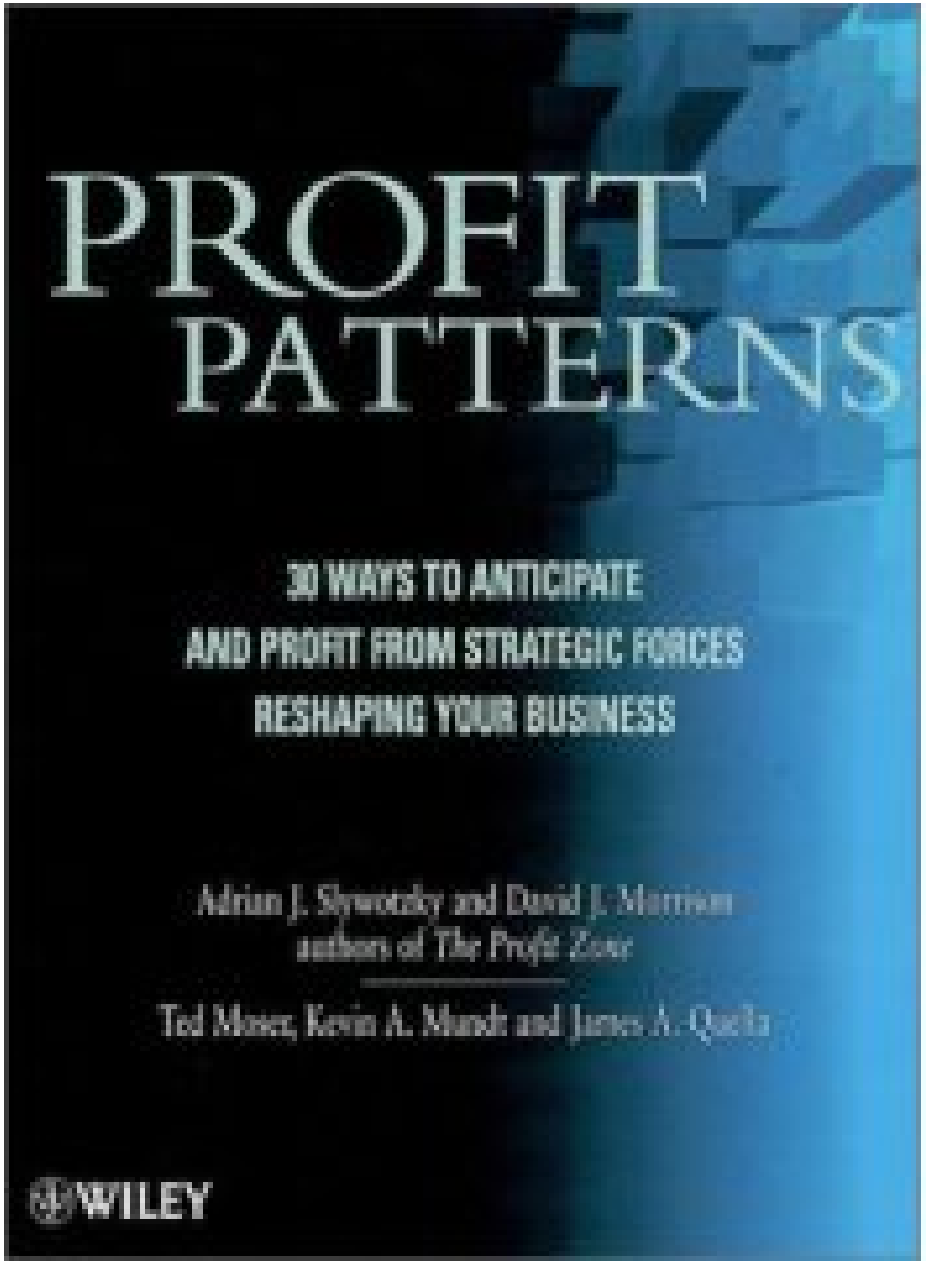
Value Migration

Positioning School of Strategy

Killer App

First Mover Advantage
(Bertrand & Cournot)

Fast Second (Stackelberg)


PROFIT
PATTERNS
30 WAYS TO ANTICIPATE
AND PROFIT FROM STRATEGIC FORCES
RESHAPING YOUR BUSINESS
Adrian J. Slywotzky and David J. Morrison
authors of The Profit Zone
Ted Moore, Kevin A. Mundt and James A. Quella
WILEY

Don Beck & Chris Cowan's Life Conditions (1996)

Historic Times

Geographic Place

Human Problems

Social Circumstances

Popular Culture

Social Images (Fred Polak)

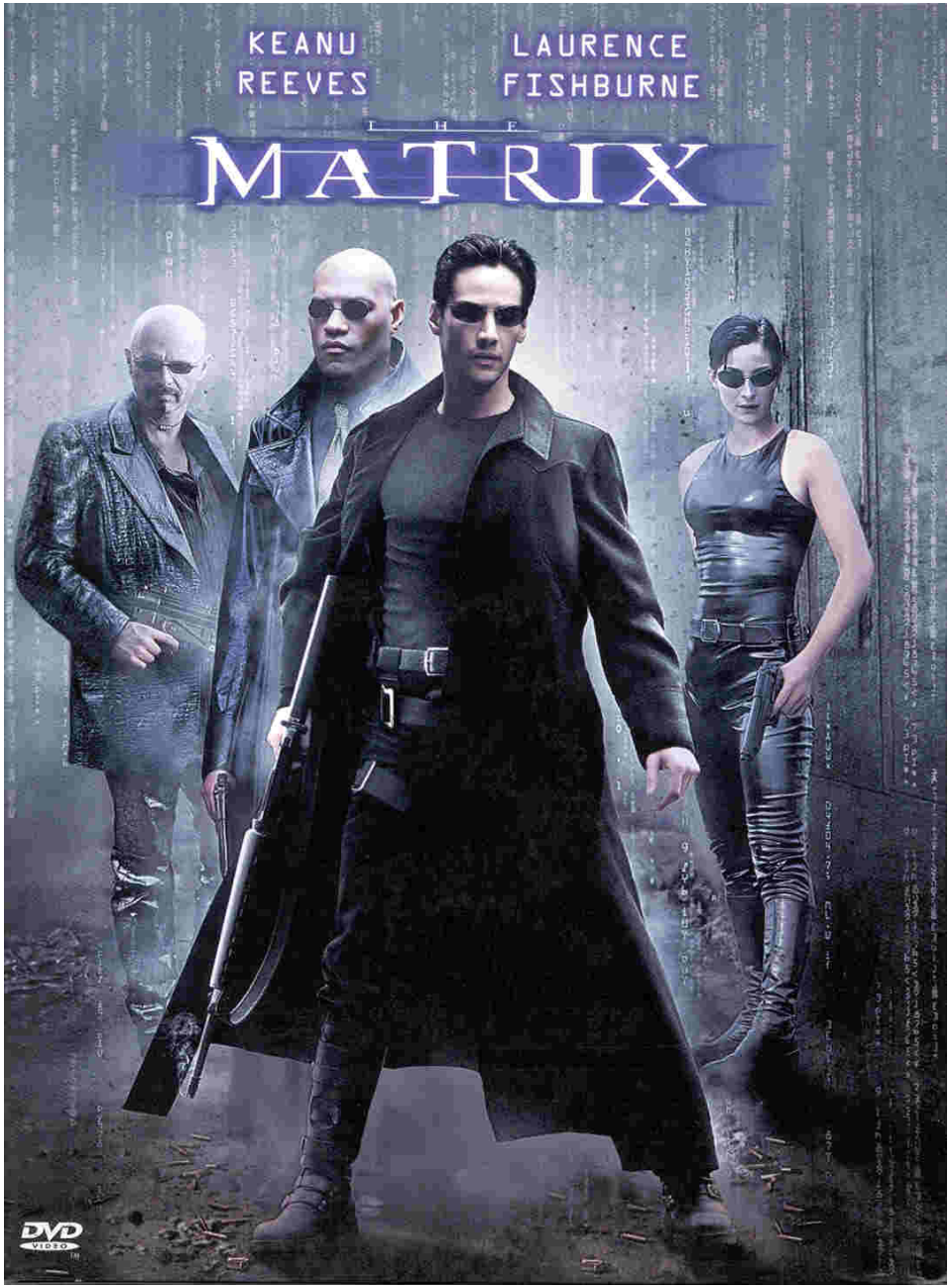

MARVEL
05.02.08
IronmanMovie.com

Technology Entrepreneurship

Unintended Effects

Exoskeletons & Robotics

Rapid Prototyping


KEANU
REEVES
LAURENCE
FISHBURNE
THE
MATRIX
DVD
VIDEO

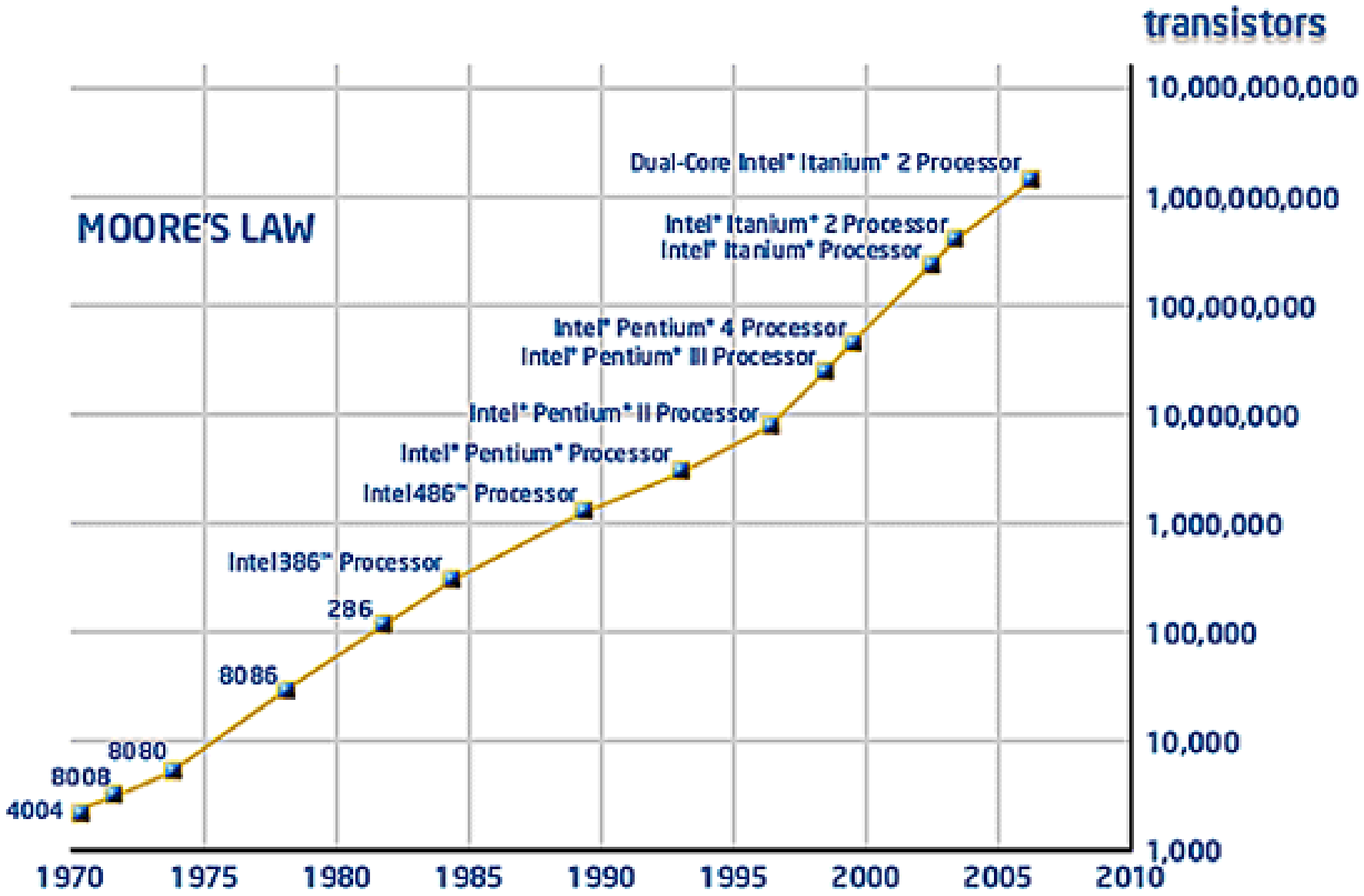
Cyberpunk

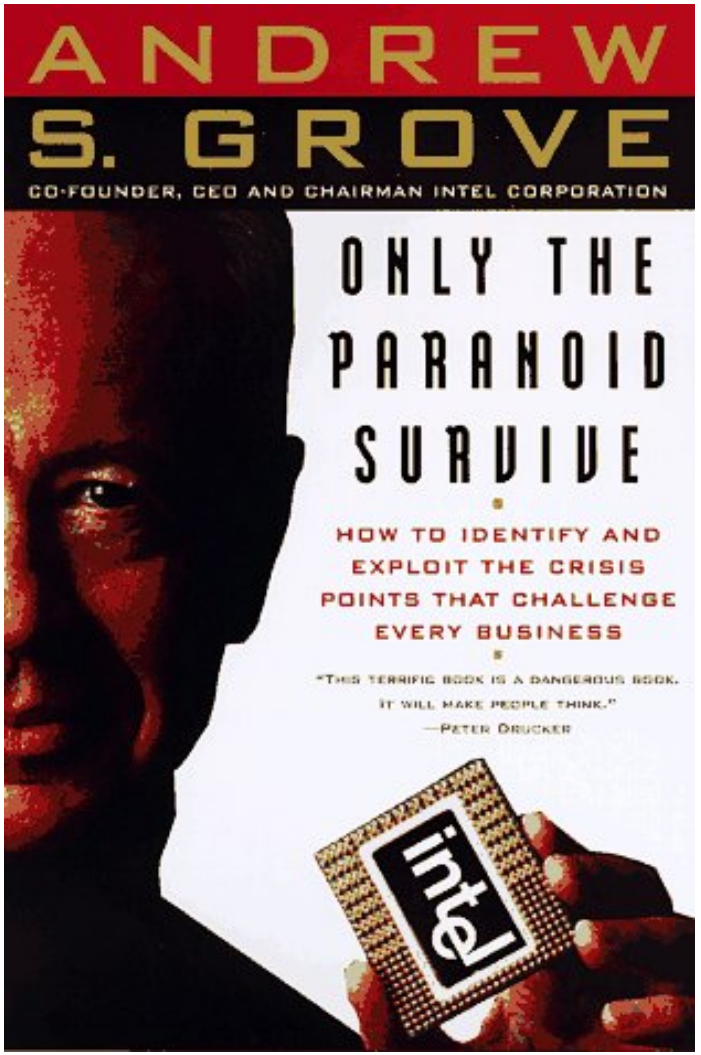
Cool-hunting

Subculture aesthetics

Virtual Reality

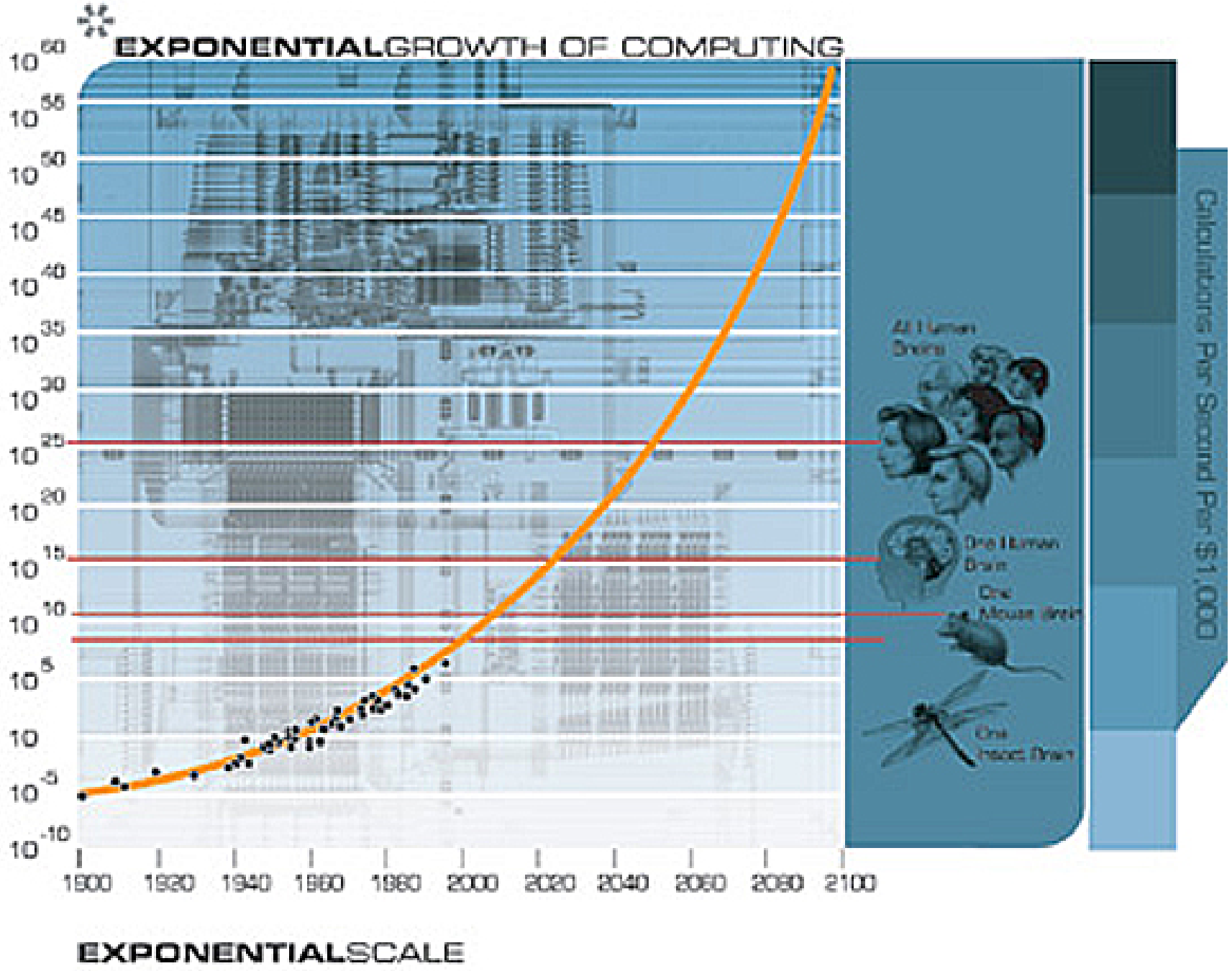
Gordon Moore's Law (1965)


transistors
MOORE'S LAW
Dual-Core Intel® Itanium® 2 Processor
Intel® Itanium® 2 Processor
Intel® Itanium® Processor
Intel® Pentium® 4 Processor
Intel® Pentium® III Processor
Intel® Pentium® II Processor
Intel® Pentium® Processor
Intel486™ Processor
Intel386™ Processor
286
8086
8080
8008
4004
10,000,000,000
1,000,000,000
100,000,000
10,000,000
1,000,000
100,000
10,000
1,000
1970
1975
1980
1985
1990
1995
2000
2005
2010

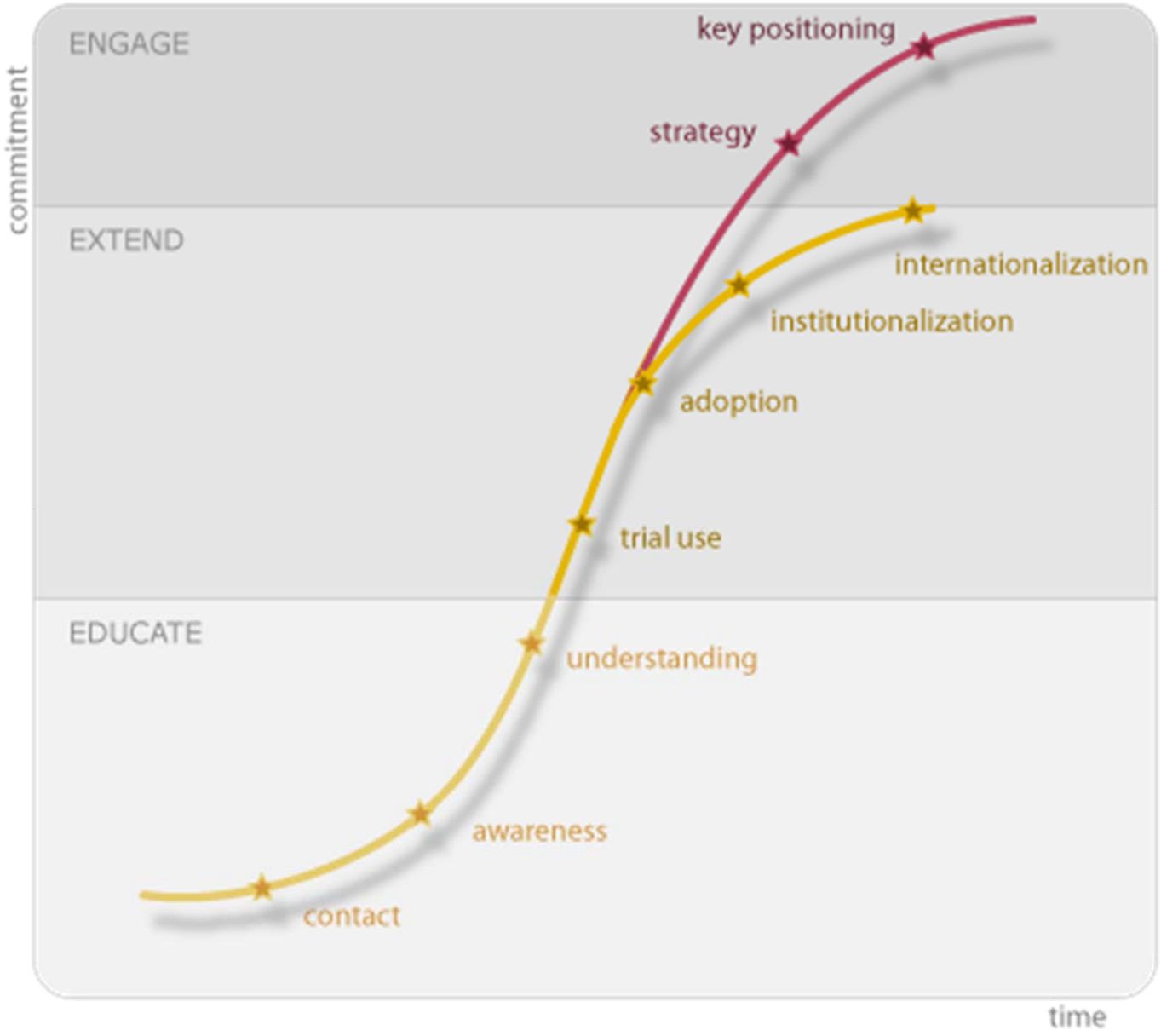


Strategic Inflection Points

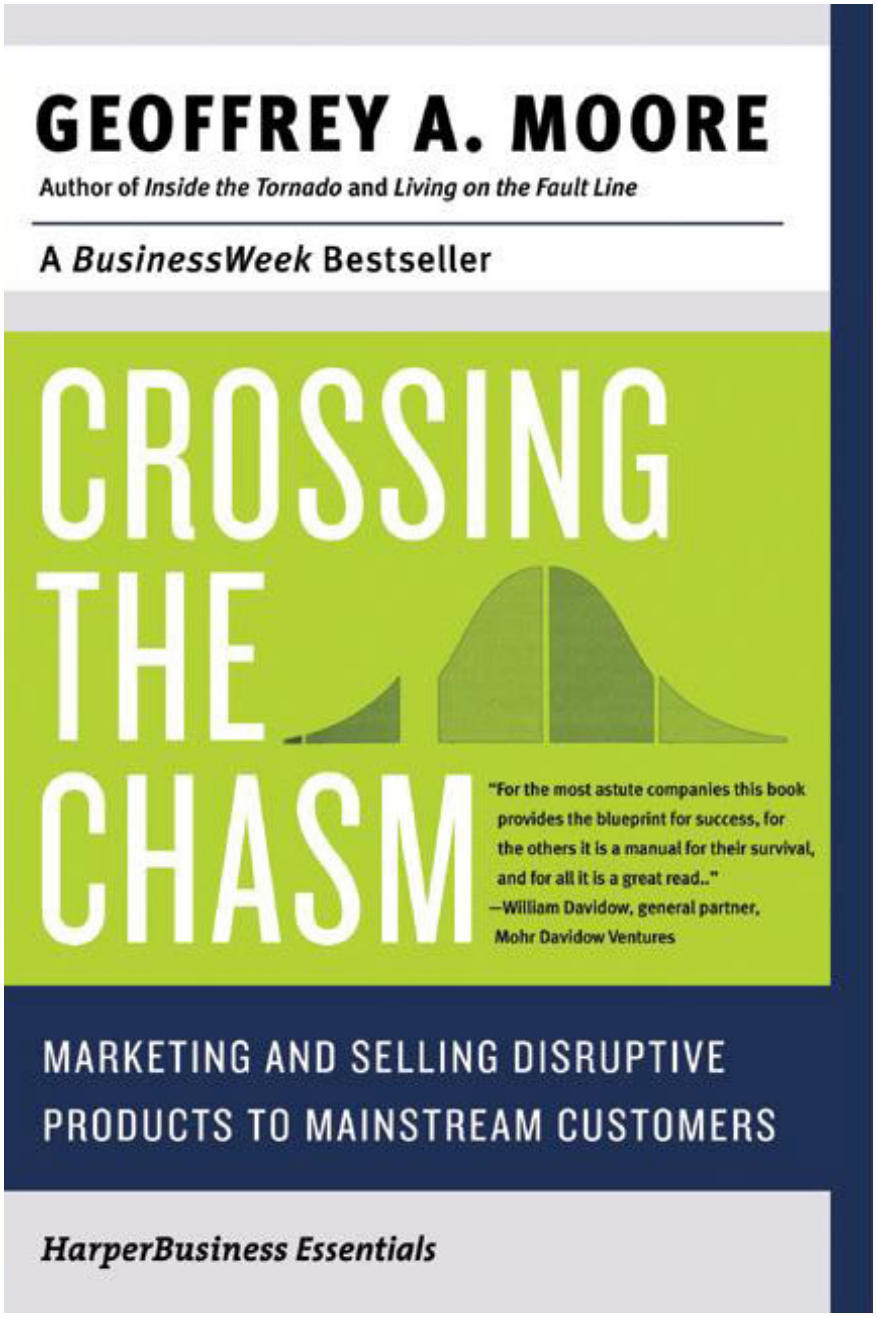
Ray Kurzweil's Law of Increasing Returns (2005)


EXPONENTIAL GROWTH OF COMPUTING
10^{60}
10^{55}
10^{50}
10^{45}
10^{40}
10^{35}
10^{30}
10^{25}
10^{20}
10^{15}
10^{10}
10^{5}
10
10^{-5}
10^{-10}
1900
1920
1940
1960
1980
2000
2020
2040
2060
2080
2100
All Human Brains
One Human Brain
One Mouse Brain
One Insect Brain
Calculations Per Second Per $1,000
EXPONENTIAL SCALE

Richard Foster's Technology S-Curve (1982)

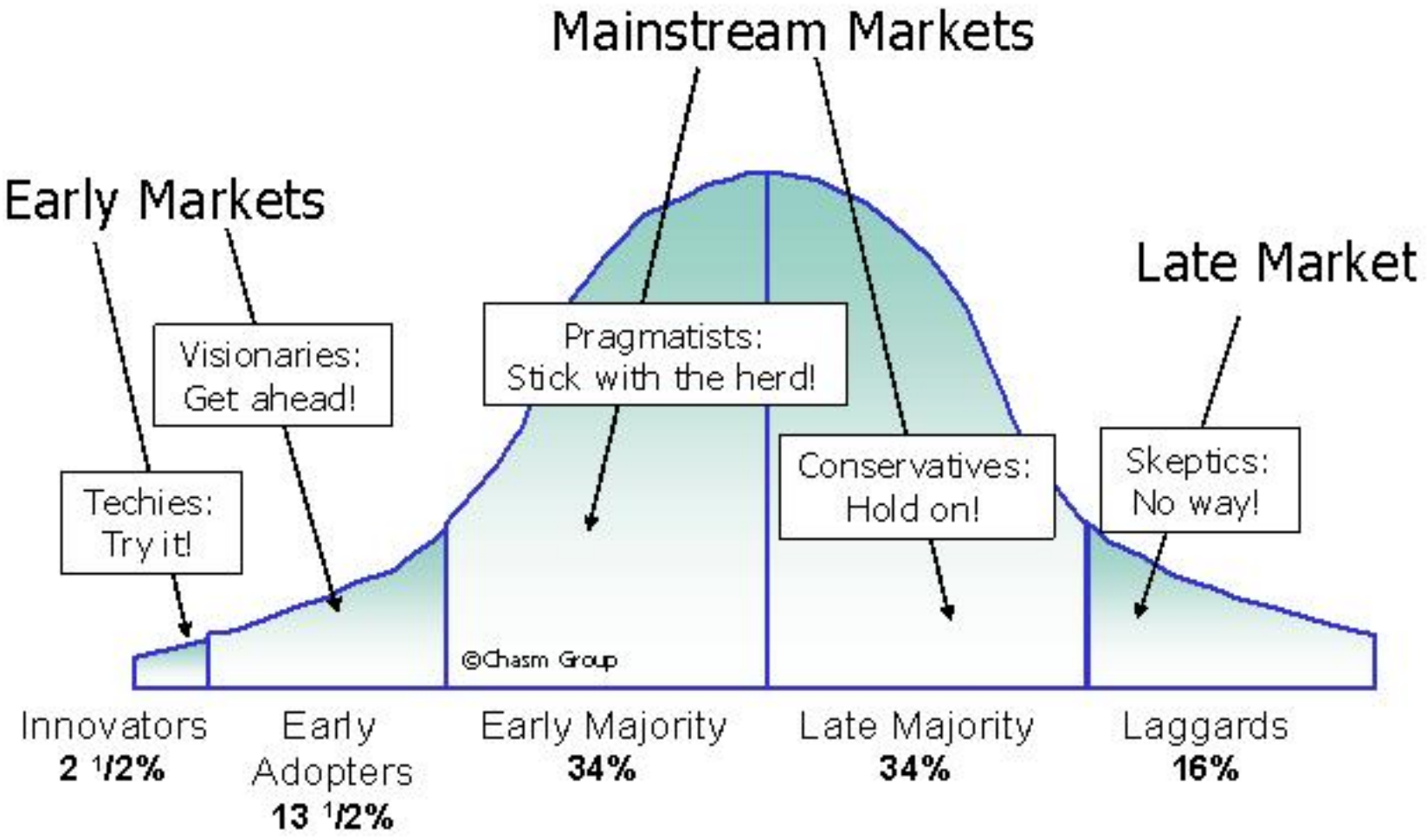

ENGAGE
EXTEND
EDUCATE
commitment
time
key positioning
strategy
internationalization
institutionalization
adoption
trial use
understanding
awareness
contact

Geoffrey Moore's
Technology Adoption
Life Cycle (1991)


GEOFFREY A. MOORE
Author of Inside the Tornado and Living on the Fault Line
A BusinessWeek Bestseller
CROSSING THE CHASM
"For the most astute companies this book provides the blueprint for success, for the others it is a manual for their survival, and for all it is a great read.."
—William Davidow, general partner, Mohr Davidow Ventures
MARKETING AND SELLING DISRUPTIVE PRODUCTS TO MAINSTREAM CUSTOMERS
HarperBusiness Essentials

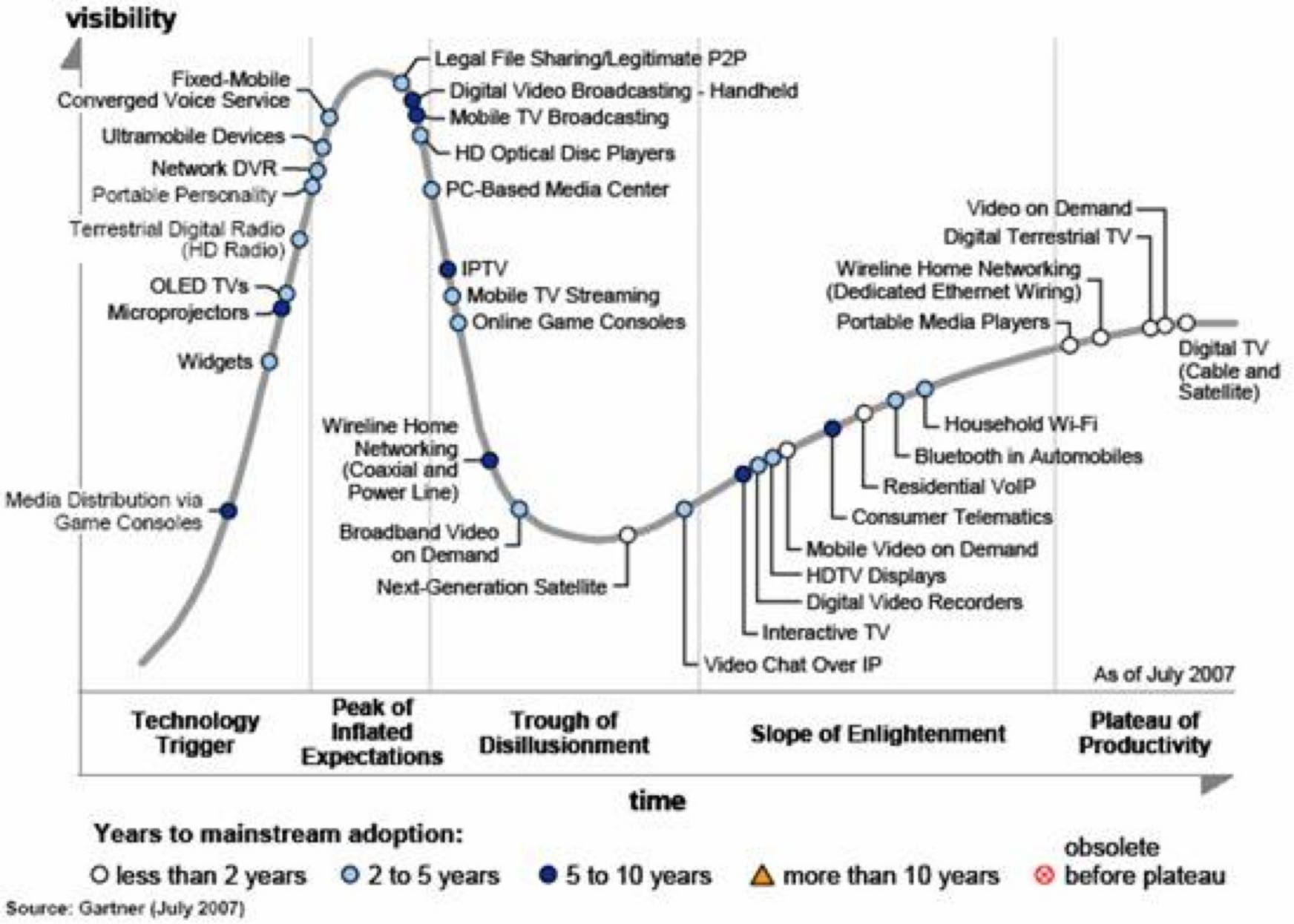
Technology Adoption Life Cycle

Groups are distinguished form each other based on their characteristic response to discontinuous innovations created by new technology



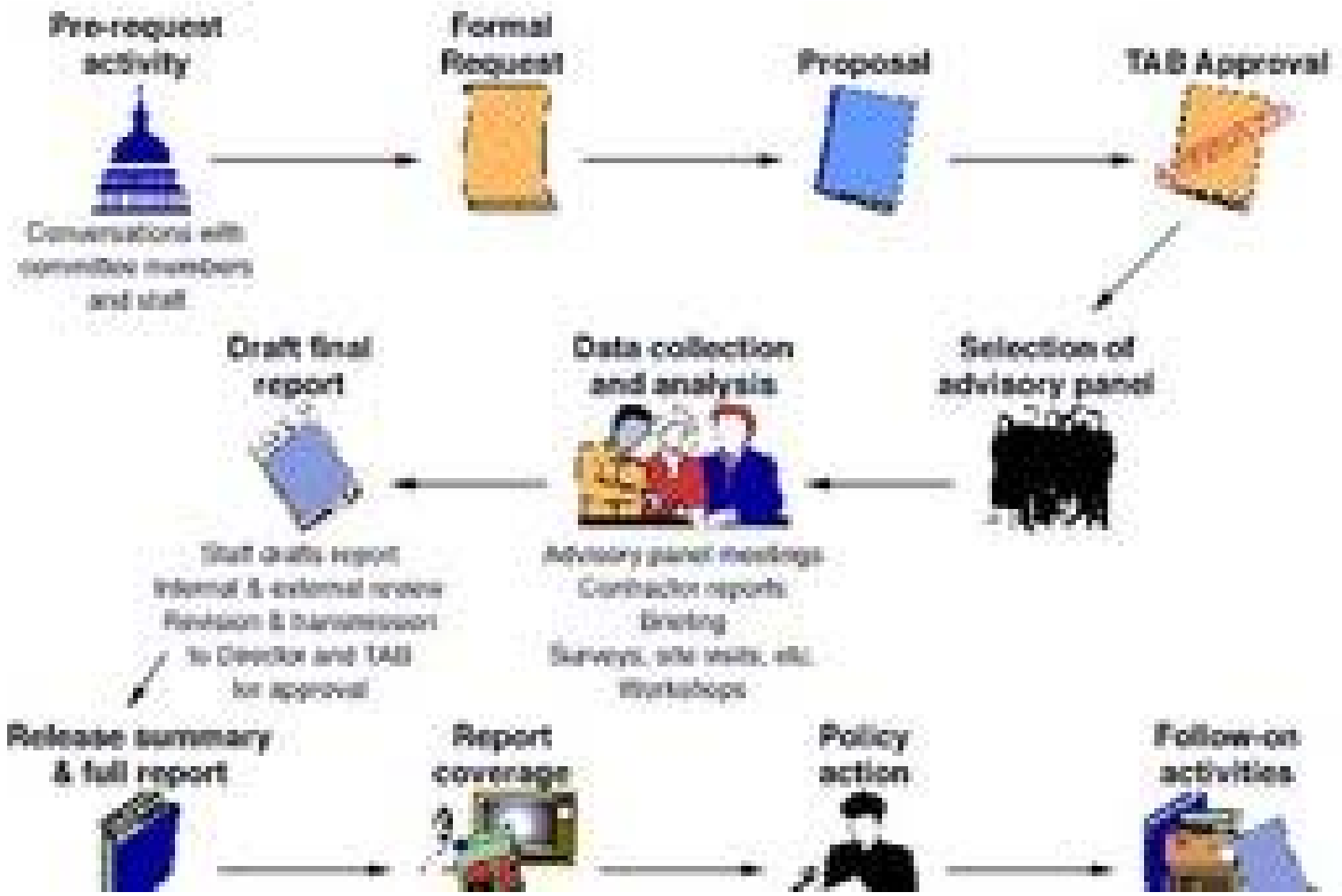
Gartner's Hype Cycle (July 2007 version)

Figure 1. Hype Cycle for Consumer Technologies, 2007



Source: Gartner (July 2007)

US Office of Technology Assessment's Technology Assessment (1974-1995)


Pre-request activity
Conversations with committee members and staff
Formal Request
Proposal
TAB Approval
Selection of advisory panel
Data collection and analysis
Advisory panel meetings
Contractor reports
Briefing
Surveys, site visits, etc.
Workshops
Draft final report
Staff drafts report
Internal & external review
Revision & transmission to Director and TAB for approval
Release summary & full report
Report coverage
Policy action
Follow-on activities

Schools of Thought

Smart Internet 2010 Report (2005)

(Professor Trevor Barr, Alex Burns & Darren Sharp, Smart Internet CRC)

Rich Media

Not the Smart Internet

Adaptive User Environments

Chaos Rules

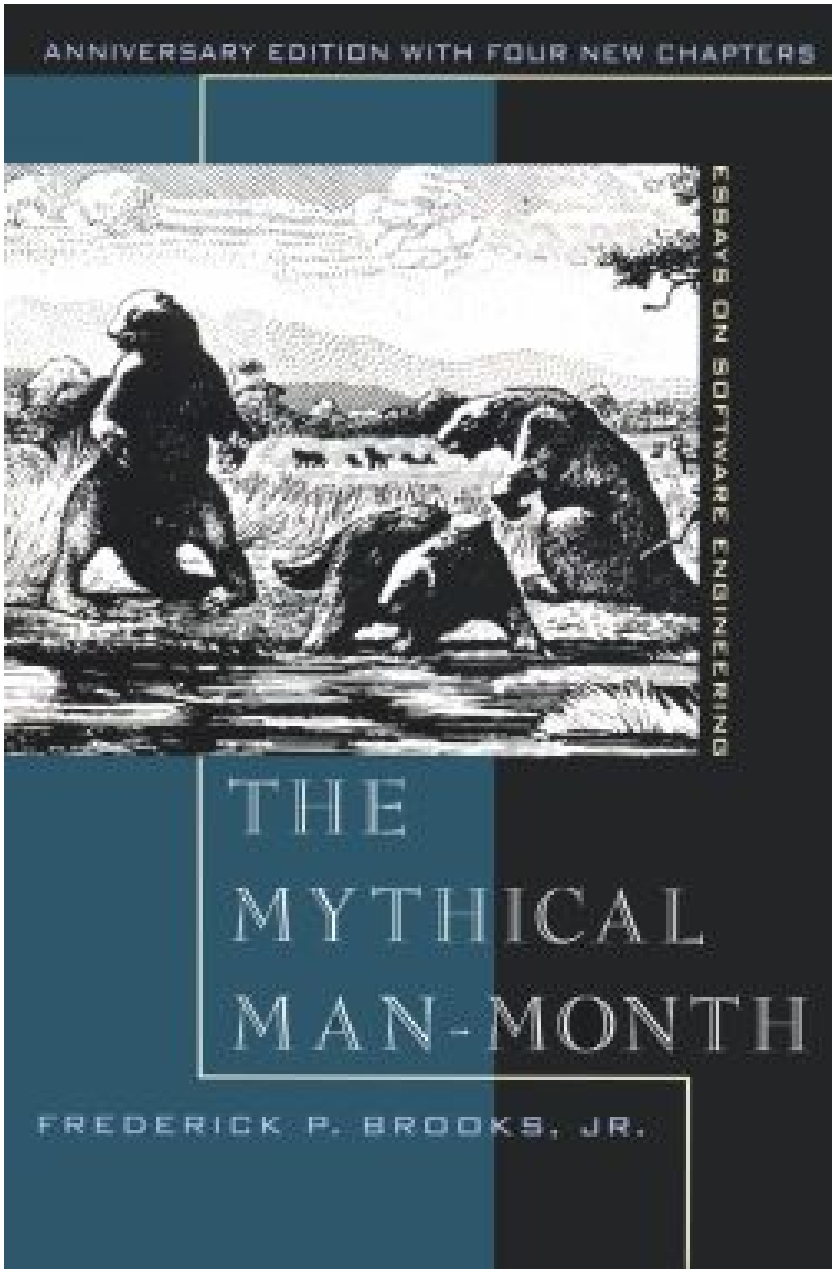
Dead Media

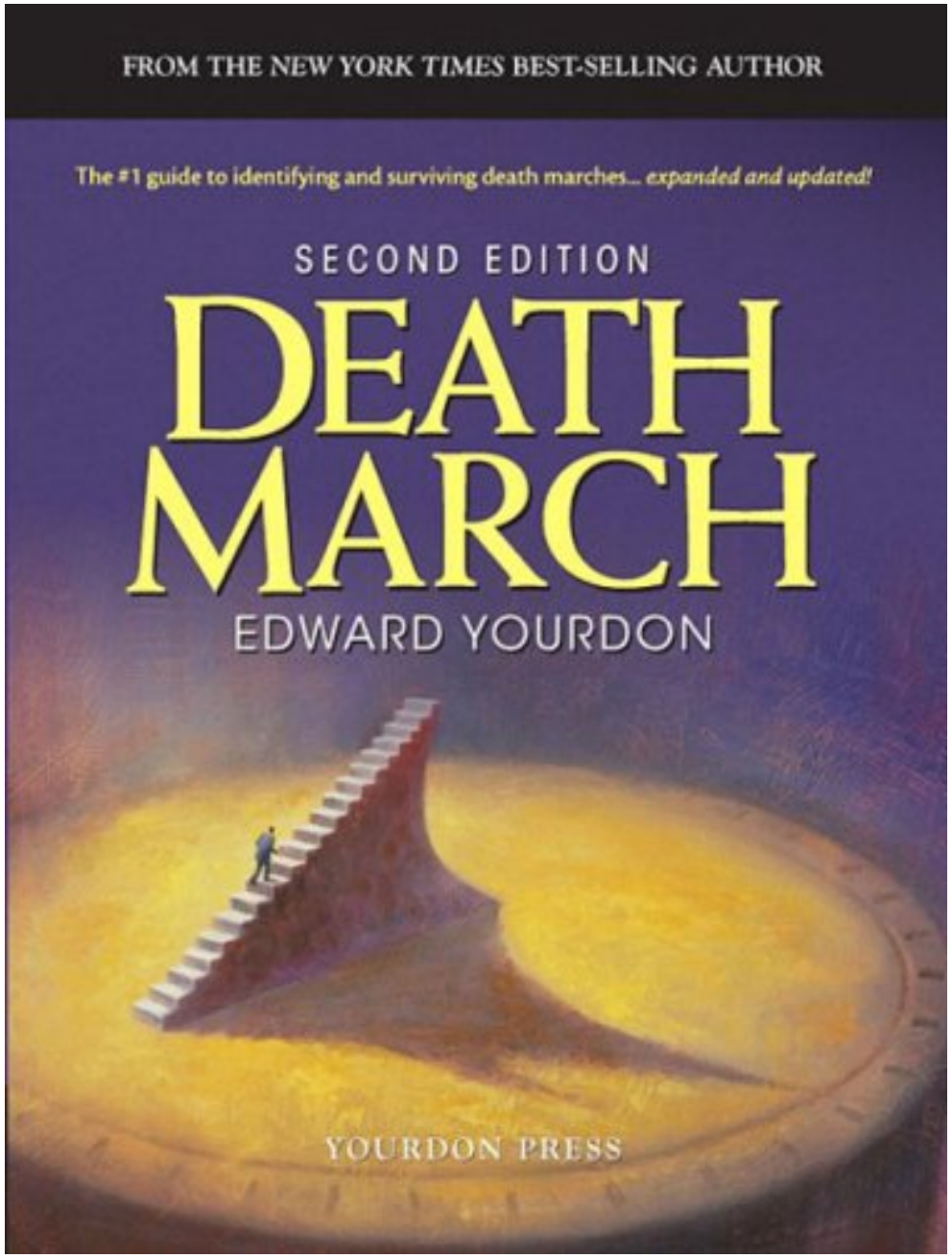
Vapourware

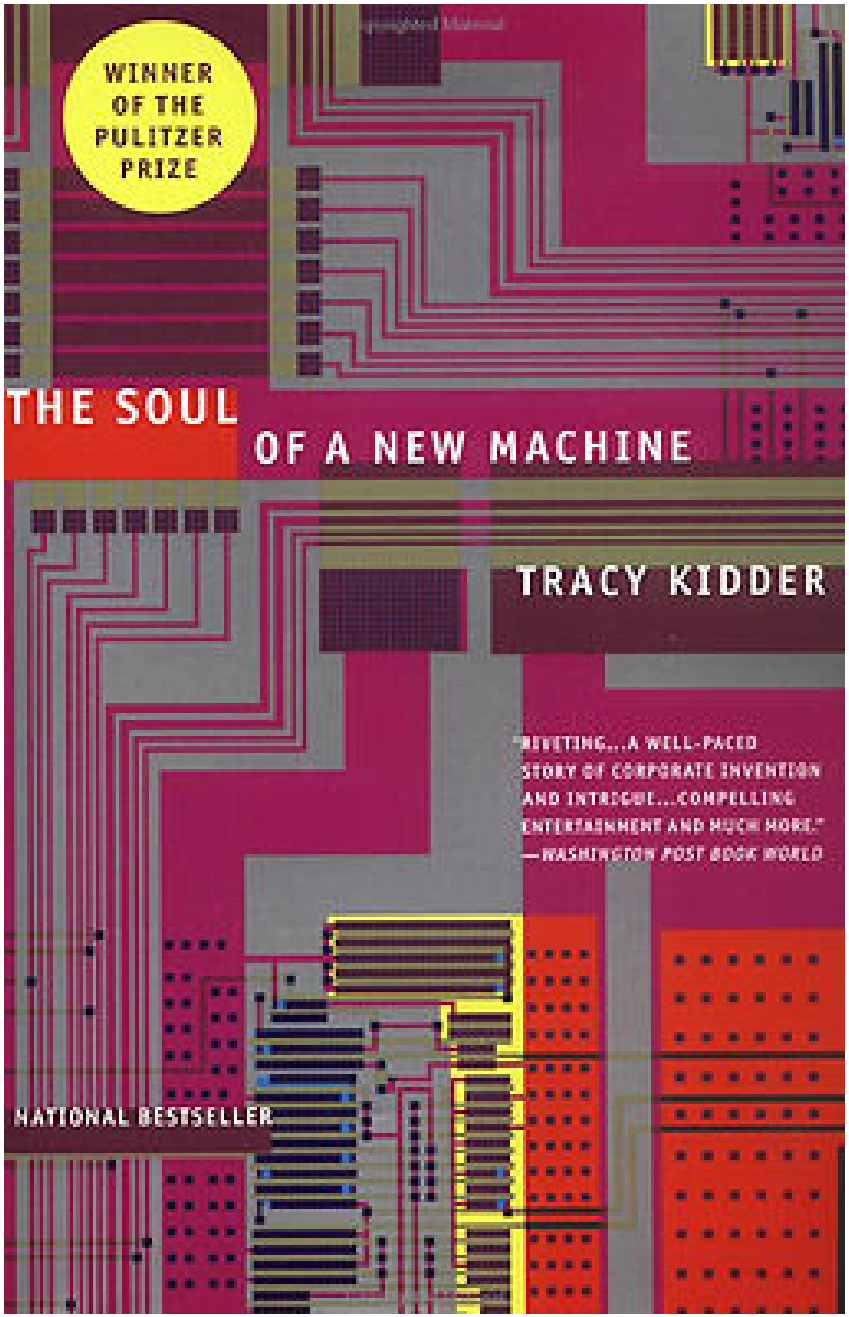
Silver Bullets

Death March Projects

“No Silver Bullet” (1987)

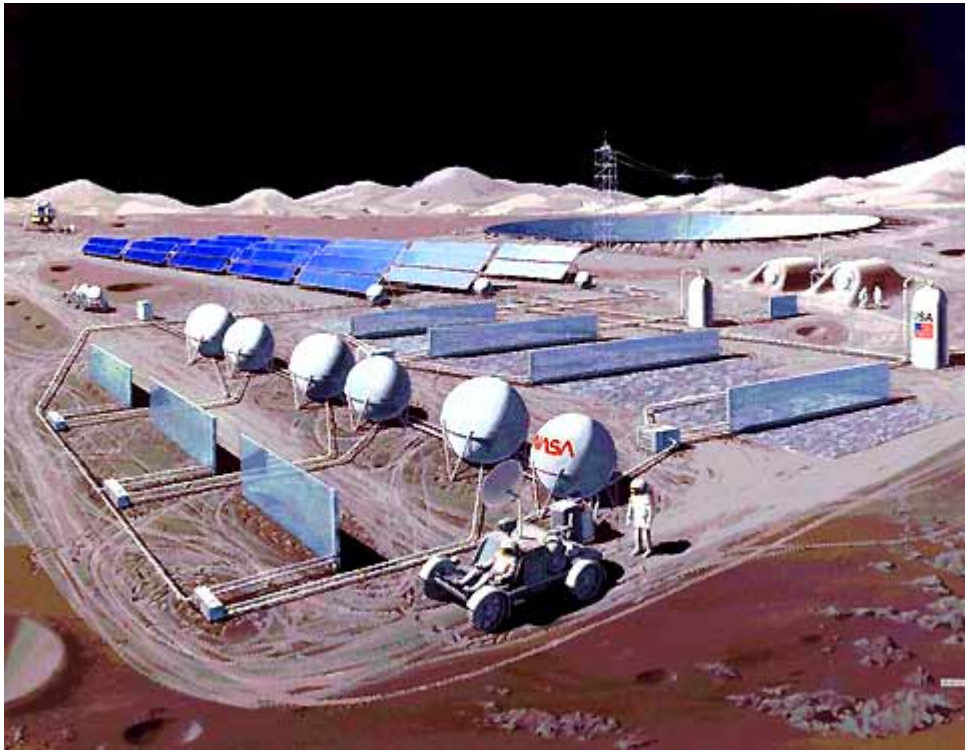

ANNIVERSARY EDITION WITH FOUR NEW CHAPTERS
ESSAYS ON SOFTWARE ENGINEERING
THE MYTHICAL MAN-MONTH
FREDERICK P. BROOKS, JR.


FROM THE NEW YORK TIMES BEST-SELLING AUTHOR
The #1 guide to identifying and surviving death marches... expanded and updated!
SECOND EDITION
DEATH MARCH
EDWARD YOURDON
YOURDON PRESS


WINNER OF THE PULITZER PRIZE
THE SOUL OF A NEW MACHINE
TRACY KIDDER
"RIVETING...A WELL-PACED STORY OF CORPORATE INVENTION AND INTRIGUE...COMPELLING ENTERTAINMENT AND MUCH MORE."
—WASHINGTON POST BOOK WORLD
NATIONAL BESTSELLER

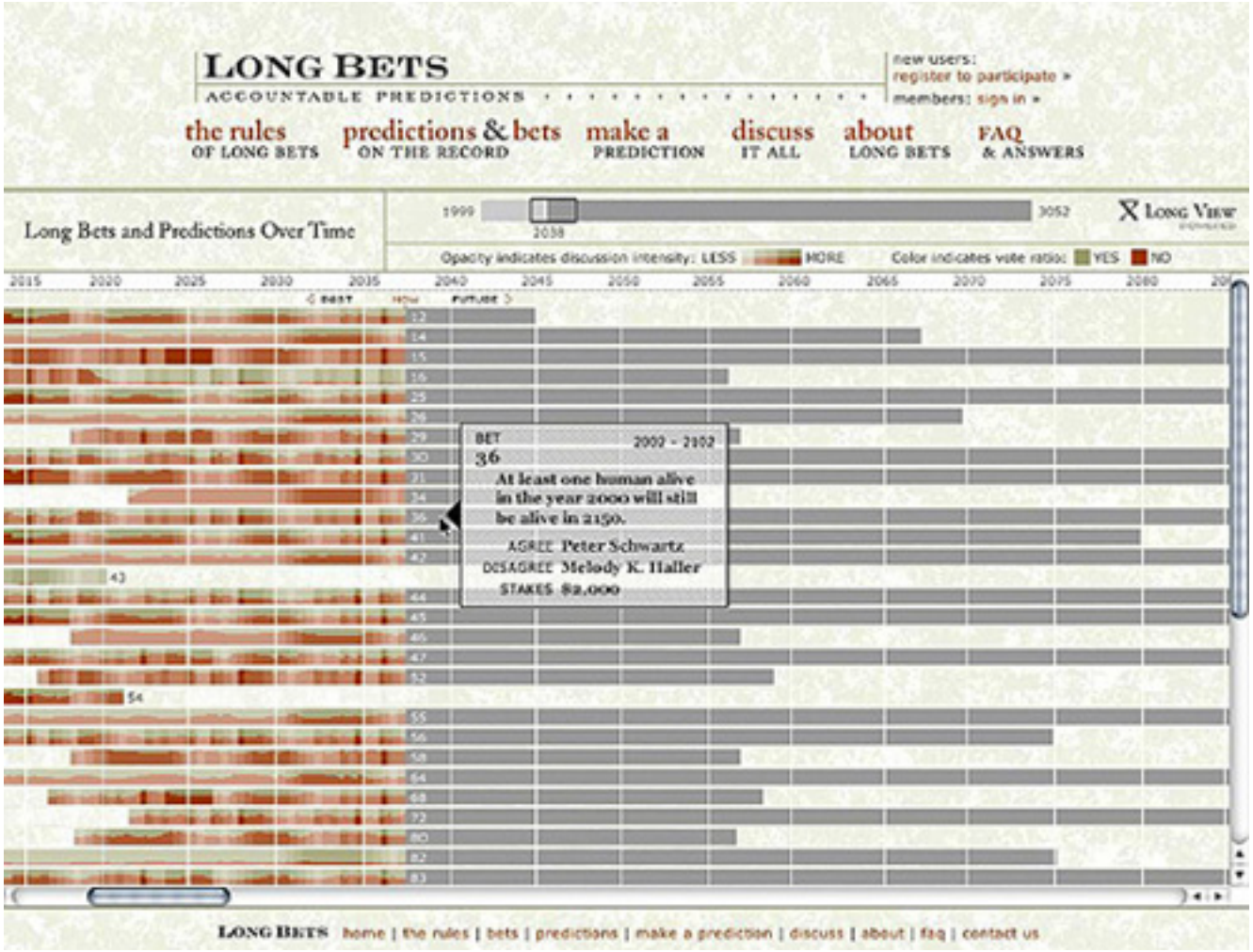
3. Technology Roadmaps

The Danger of “Long Bet” Extrapolation



Late 1960s forecasts of moonbases & undersea cities

Social Technologies near-term outlook for the Kondratieff Wave 'long cycle' forecast: "an economic decline in 2008–2010, followed by a decade-long upswing from roughly 2010 through 2020."



LongBets.org Prediction Market

Missing the Forest for the Trees

Radiohead & NIN: “Disruptive Innovation” in digital media?

What the “disruptive” analysts missed:

Both were in negotiations with their major labels (venture firm Terra Firmer had acquired EMI, Radiohead’s label, for $A5.73 billion in 2007)

Both had a loyal fan-base, touring and recording studios

Release decisions: (1) improved their “bargaining” power with labels; (2) reinforced their image as innovators; (3) meant they avoided the marketing budgets under “standard” contracts that artists must pay; and (4) created a new “just in time” market

Emerging Technologies

Nanotechnology

- **Vision:** Atomic and molecular scale engineering at a billionth of a meter (Richard Feynmann, Norio Taniguchi & K. Eric Drexler)

- **Key Drivers:**
  - US National Nanotechnology Initiative & National Science Foundation and similar initiatives in Australia, EU and Russia

- **Near-Future Value Proposition:**
  - “First generation” products in energy, quantum computing, heavy industry and consumer goods

Predictive Analytics

- **Vision:** Use data-driven decisions to discover future trends, emerging markets & new consumer behaviours

- **Key Drivers:**
  - "Competing on Analytics (Babson's Thomas Davenport)
  - The growth of unstructured information & complexity
  - Methods such as statistics, data mining & machine learning

- **Near-Future Value Proposition:**
  - Greater sophistication in analytics and tools
  - Domain applications in finance, marketing, operations & corporate strategy

The Semantic Web

- **Vision:** “I have a dream for the Web [in which computers] become capable of analyzing all the data on the Web – the content, links, and transactions between people and computers.” (Tim Berners-Lee, 1999)

- **Key Drivers:**
  - Development of interoperable and open data standards

- **Near-Future Value Proposition:**
  - “Smarter” World Wide Web for large data sets
  - Domain applications in health informatics, life sciences, risk management

Utility Computing

- **Vision:** Delivery of packaged computer services as a metered service similar to electricity (Nicholas Carr)

- **Key Drivers:**
  - Cheap data storage and modular designed hardware
  - Amazon.com, Google, Facebook & Salesforce.com
  - Globally integrated supply chain management

- **Near-Future Value Proposition:**
  - Leveraging “data clouds” for competitive advantage
  - New service “bundling” and mid-tier “challengers”

Smart Vehicles

- **Vision:** “the provision of new services to vehicle users such as context-aware navigation and traffic congestion avoidance.” (Professor Michael Fry, University of Sydney & Smart Services CRC)

- **Key Drivers:**
  - Convergence of data, in-vehicle sensors, mobile, and wireless networks technologies
  - Investments by AutoCRC, BMW, GM, Microsoft & Siemens

- **Near-Future Value Proposition:**
  - Vehicle-roadside communication and emergency services
  - New services in automotive and tourism industries

One Laptop Per Child

- **Vision:** "To provide children around the world with new opportunities to explore, experiment and express themselves." – MIT Media Lab's Nicholas Negroponte

- **Key Drivers:**
  - "Constructionism" philosophy or "learning learning"
  - "Open Source" knowledge commons - MIT OCW & Wikipedia
  - Mesh networks rollout in OLPC partner countries

- **Near-Future Value Proposition:**
  - "Blue ocean market" for ASUS, Intel, HP & others
  - Macro-scale intervention to bridge the "Digital Divide" and support the "bottom of the pyramid" (C.K. Prahalad)

Cradle to Cradle Manufacturing

- **Vision:** Materials are recycled or reused at the end of the product lifecycle – Architect William McDonough

- **Key Drivers:**
  - Preserving the global commons through creative innovation
  - "Ecologically intelligent design" rather than industrial waste

- **Near-Future Value Proposition:**
  - Applications in architecture, manufacturing, textiles
  - 21st century model for strategy and operations

Digital Media Innovation

- **Vision:** Apply practice-based insights from creative industries and digital media to innovation, operational transformation and valuation

- **Key Drivers:**
  - Innovations in creativity, methodology, processes & projects
  - Investment in creative industries & digital media

- **Near-Future Value Proposition:**
  - Knowledge transfer of innovation capabilities to other sectors
  - Large-scale implementation of practice-based insights
  - Development of new valuation methods for creative industries

Co-Creation Markets

- **Vision:** End users revive existing industries in partnership with firms and co-create new markets

- **Key Drivers:**
  - "Bottom of the Pyramid" strategies (C.K. Prahalad)
  - "Commons-based peer production" (Yochai Benkler)
  - User-driven innovation by "lead users" (Eric von Hippel)

- **Near-Future Value Proposition:**
  - Diffusion from "early adopter" to "mainstream" niches
  - Development of new collaborative frameworks and tools
  - Emergence of new industry configurations, markets & global networks

Patient-centred E-Health

- **Vision:** "Empower patients through health informatics to provide universal, accessible and affordable care." (University of Tasmania's Paul Turner & Liz Cummings)

- **Key Drivers:**
  - Consumer-centred solutions to improve health outcomes
  - Digital home and mobile technologies for tele-presence

- **Near-Future Value Proposition:**
  - Design and delivery of new intervention strategies
  - Self-management and self-efficacy
  - Culture-aware e.g. Japanese robotics industry for aged care

Space Tourism

- **Vision:** "Is a planetary surface the right space for an expanding technological civilisation?" (Gerard K. O'Neill, Princeton, 1969)

- **Key Drivers:**
  - Ansari X Prize for suborbital flight (won 4th October 2004)
  - Seed funding by Sir Richard Branson, Amazon.com's Jeff Bezos and Microsoft co-founder Paul Allen

- **Near-Future Value Proposition:**
  - Virgin Galactic sub-orbital flights in 2009
  - Potential speculative "bubble" in private spaceflight and "space tourism" . . . if Virgin Galactic launch is successful

Questions?