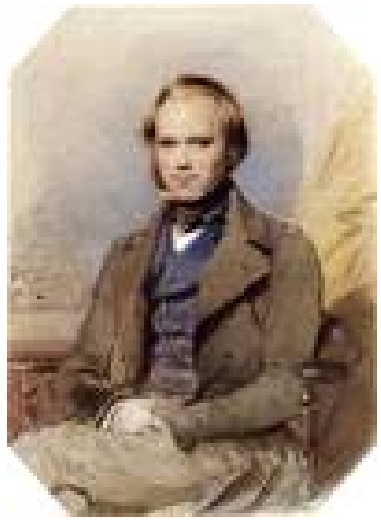


Who Inherits the Earth?

Smithsonian Institution
May 22, 2004

David Rejeski
Director, Foresight and Governance Project
Woodrow Wilson International Center for Scholars

Woodrow Wilson International Center for Scholars
Foresight and Governance Project

Complexity Changes Mental Models

Imagine a world where:

- **Change is predictable, i.e., linear with respect to cause and effect**

- **System are neatly bounded**

- **Unintended consequences are minimal (or such consequences are controllable)**

- **System feedback is low or negative (damping effects)**

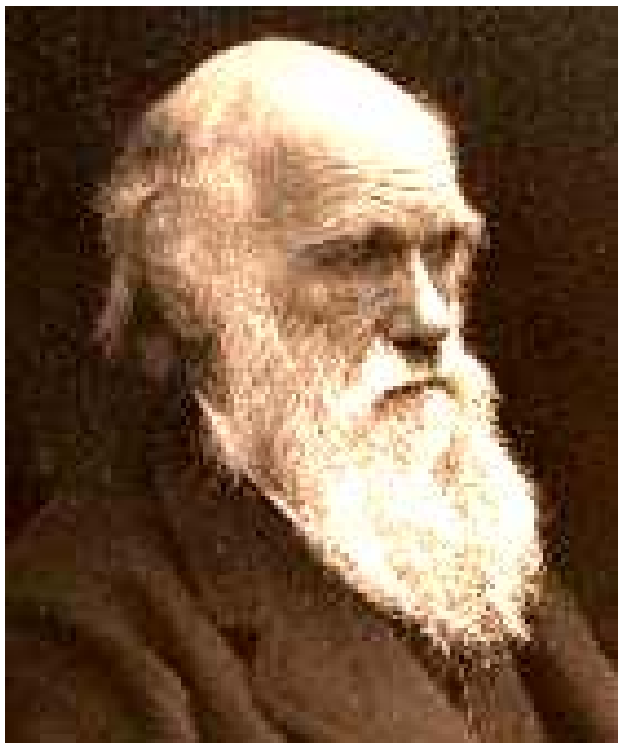
- **The rate of change in the environment does not exceed the rate at which institutions can change and adapt**

“The essence of the independent mind lies not in *what* it thinks, but in *how* it thinks.”

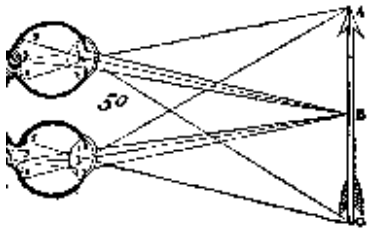
Letters to a Young Contrarian

Christopher Hitchens

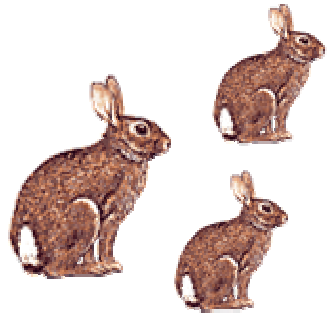
So, Who Inherits the Earth?

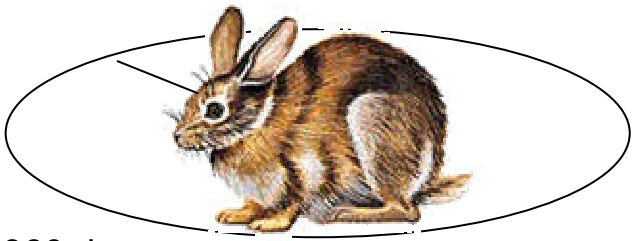


When Rabbits Inherit the Earth



Foveal Vision
Cone-based
“Tunnel vision”
Sympathetic nervous system





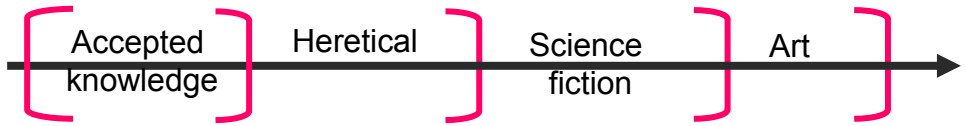
360 degrees

Peripheral vision
Rod-based
“The whole picture”
Parasympathetic nervous system

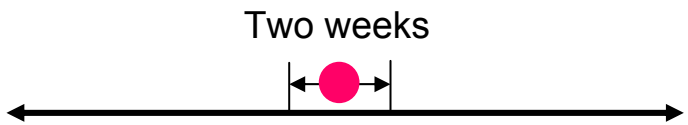
Without Peripheral Vision
No Early Warning
Loss of Context or “topsight”, resulting in
- Unintended Consequences
- Lost Levers

Different Peripheries

Idea Space



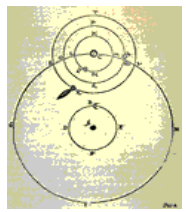
Temporal



Intellectual

Verbal-Linguistic

Logical-Mathematical



Spatial Musical

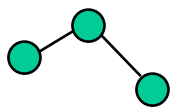
Bodily-Kinesthetic

Intra-personal

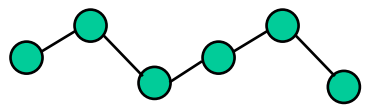
Inter-personal

Existential

Social



2º Space



6º Space

6 Ways to Kill Peripheral Vision

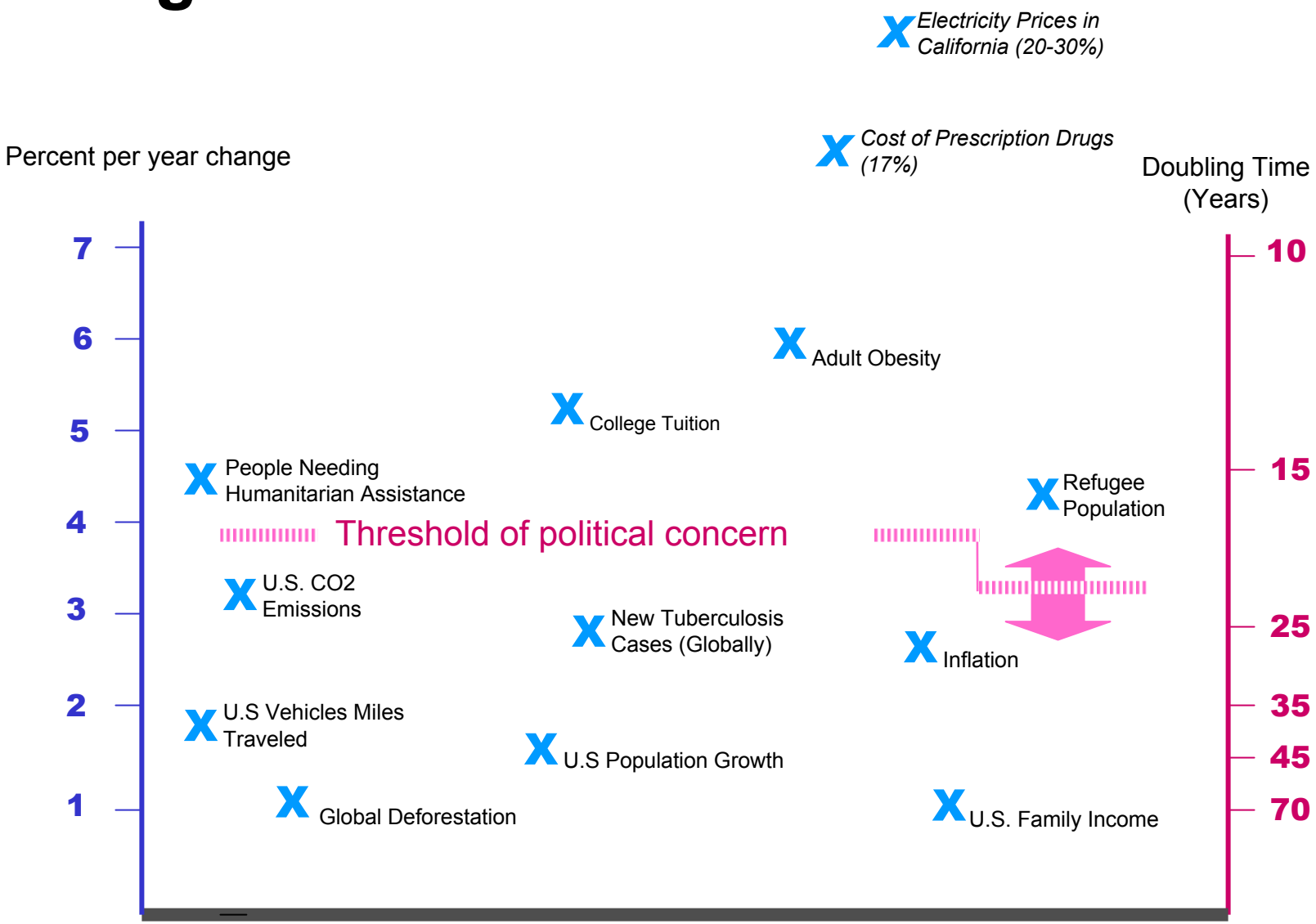
- Leadership gap
- Not-Invented-Here (vs. Steal-Ideas-Shamelessly)
- Goal Obsession
- Workforce Monoculture (No Requisite Variety)
- Impermeable Boundaries
- Ineffective social search strategies

Stretching the Time Horizon

People take the long view when:

- They have a deep understanding of system dynamics, and can see the connections between actions and consequences.
- They feel a commitment to those who come after them.
- They feel the rules of the game are fair.
- They perceive leaders as trustworthy.

Long View Failure

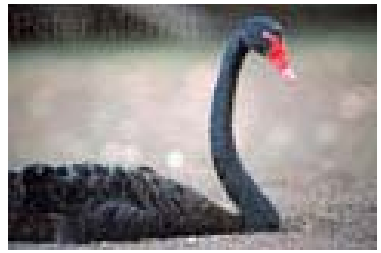


Wake Me When the Crisis Is Over

Slow trends often lead people to believe that a problem is solved or has disappeared.

- **In most cases, problems simply do not go away and a high degree of vigilance is required.**
- **Expect surprises, tipping points.**
- **Look for a re-emergence of problems in other contexts or geographic areas.**

The Black Swan



- Probability cannot be calculated *ex ante*
- Large impacts, catastrophic costs
- Surprise effect
- Characteristic of large, complex social systems

See: www.fooledbyrandomness.org

Highly Reliable Organizations (HRO's)

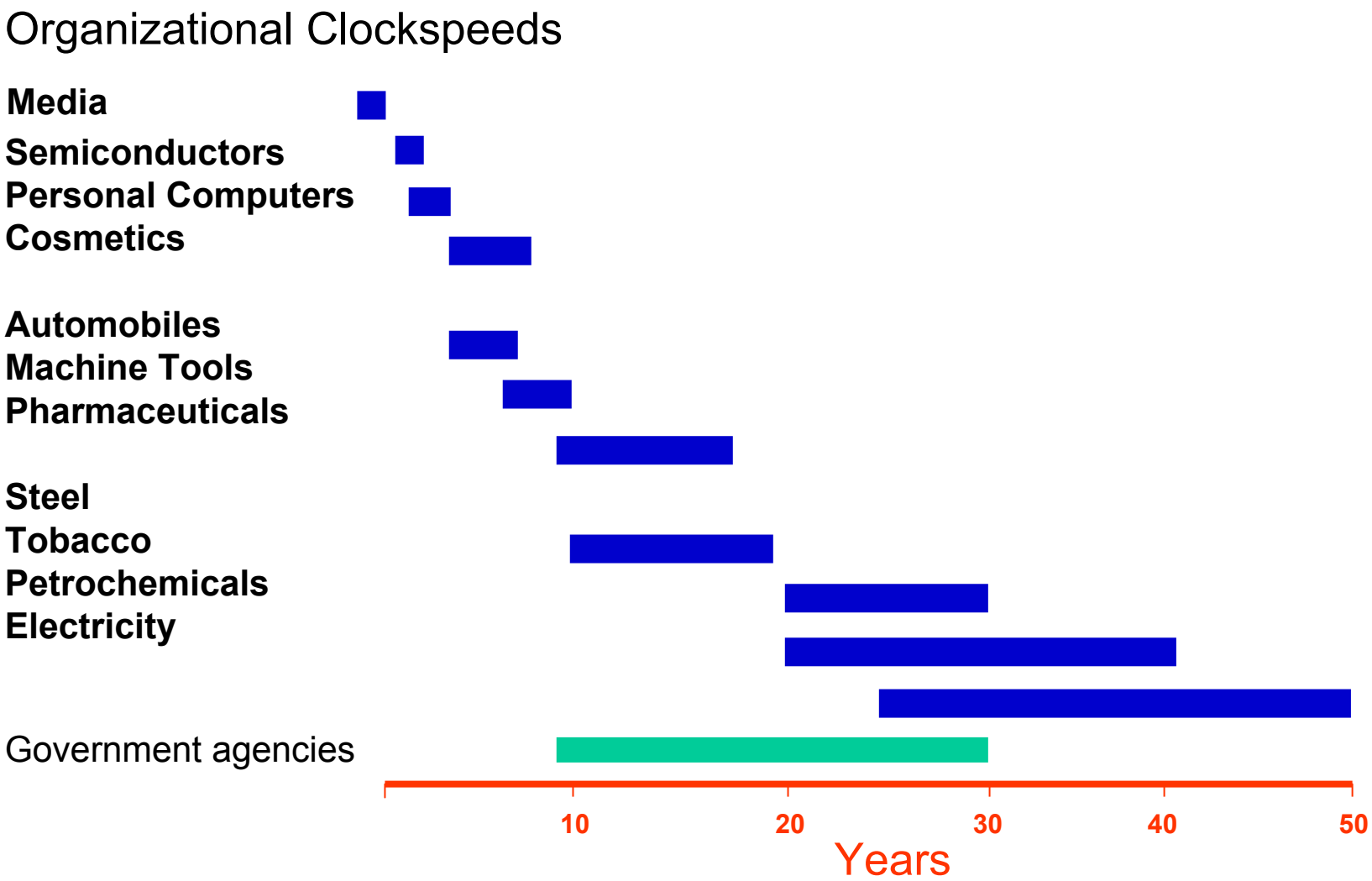
- Sensitivity to operations (mindfulness, peripheral vision)
- Preoccupation with failure
- Reluctance to simplify (it's complex!)
- Commitment to resilience
- Deference to expertise

See: Weick, K. & Sutliffe, K. (2001): Managing the Unexpected

When the Mongoose Inherits the Earth

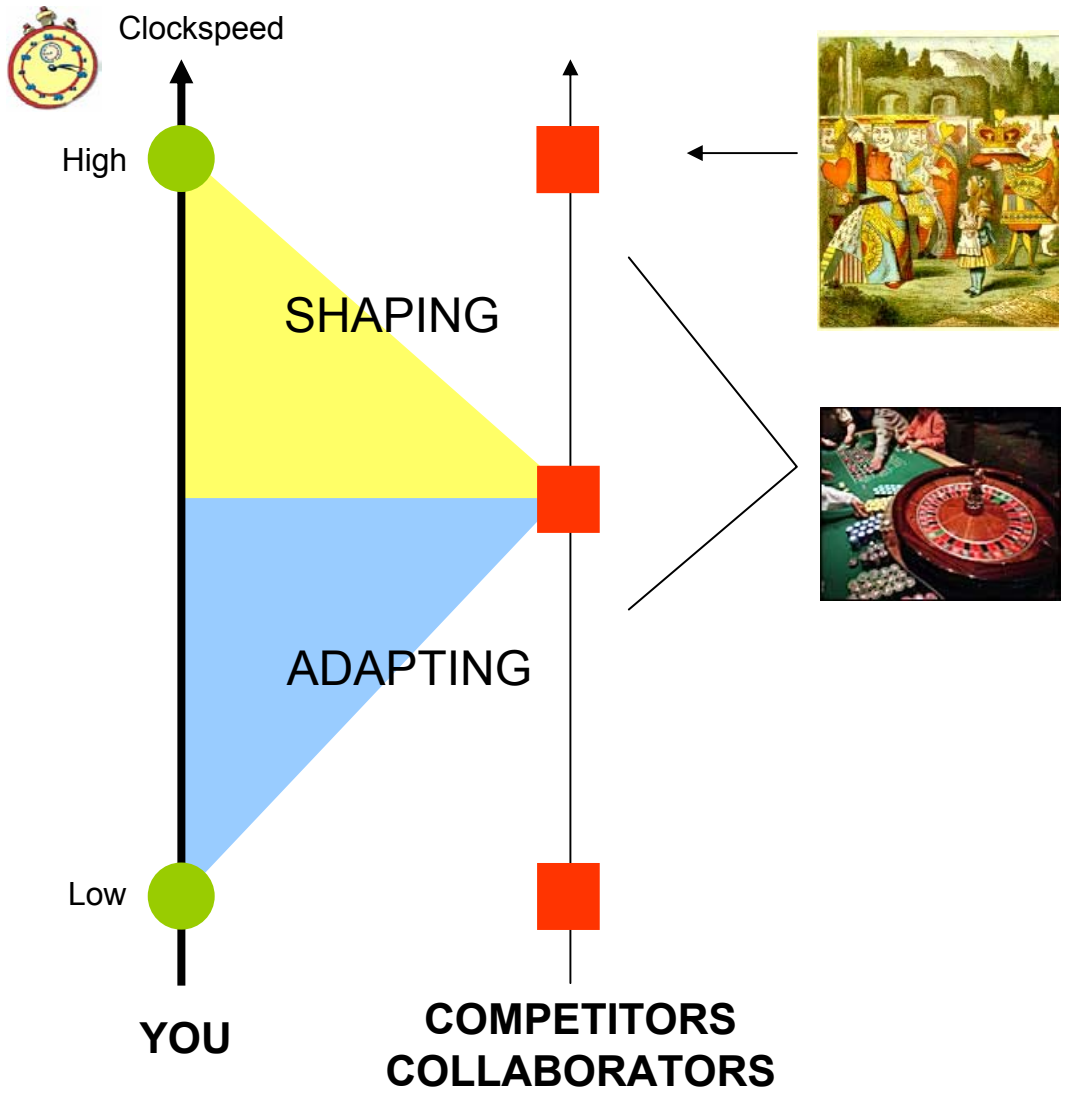
It is not what you think, but how you think, and, increasingly, how fast you can think (and act).

Tempo Increases



See: Fine, Charles: Clockspeed: Winning Industry Control in the Age of Temporary Advantage

Time Matters



RED QUEEN EFFECT
- Reduce uncertainty
- Increase flexibility
- Experiment
- Improvise

HEDGING
- Place multiple bets
- Be vigilant, proactive

Some Lessons from Whitewater

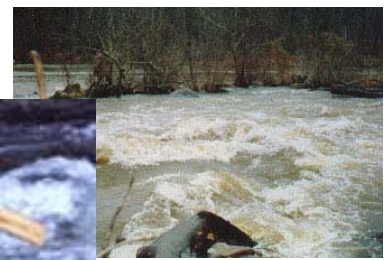
Don't Die

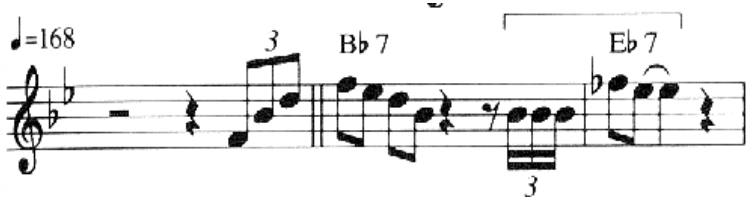
Threat Assessment
Protection
Create Slack

Build Skills

"What if" Planning
Simulation/Games

Learn Continuously
Stay Humble



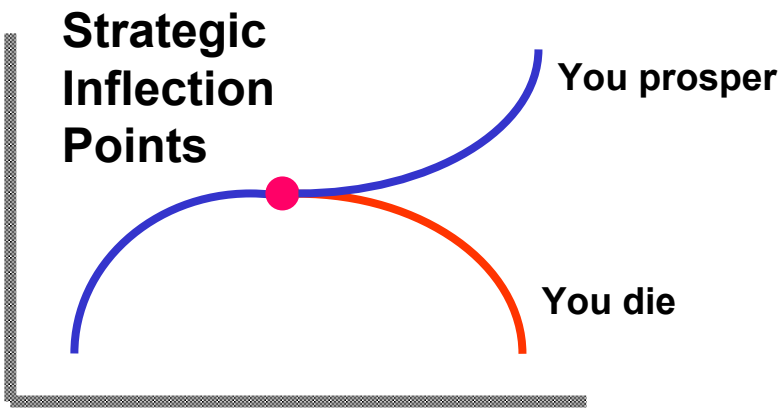


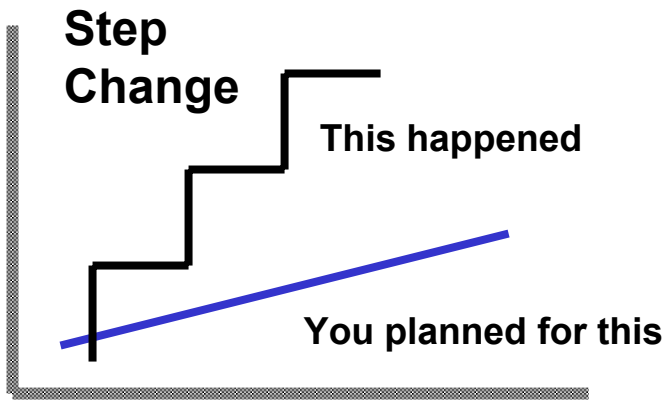
Some Lessons From Jazz

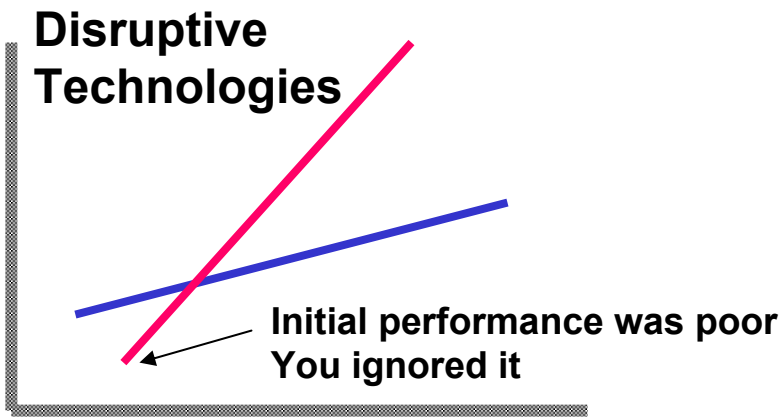
- At any given time, know who the leader (soloist) is and where you are in the piece (intense “real time” communication).
- Identify and agree upon minimal structures for embellishing and be open to reassembly of and departures from routines.
- Develop high confidence to deal with non-routine events.
- Experiment as a group (change or eliminate structure…)
- Do not play the same solo over and over, practice new approaches and styles in familiar pieces. Incorporate the unexpected.

See: Sabatella, Mark (1992): *A Whole Approach to Jazz Improvisation;* Berliner, Paul: *Thinking in Jazz;* and Weick, Karl (2001): *Making Sense of the Organization.*

When Beavers Inherit the Earth

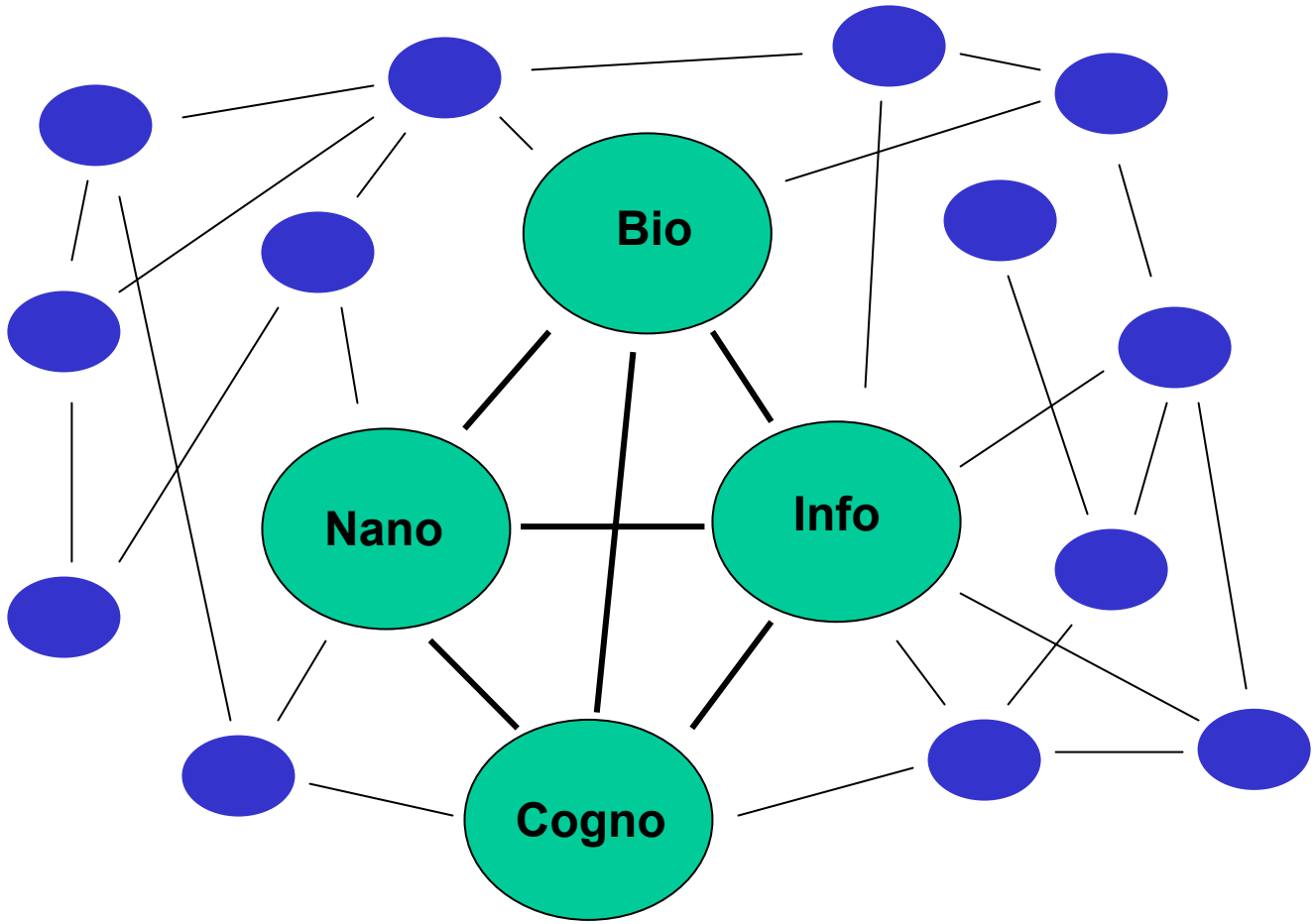






See: Grove, Andy: Only the Paranoid Survive; and Christensen, Clayton: The Innovator's Dilemma

Convergence and Synergies



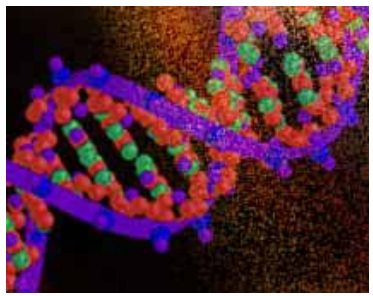
The Big BANG: **B**its-**A**toms-**N**eurons-**G**enes

Technological Disruption Happens

Moore's Law

The logic density of silicon integrated circuits doubles every 18 months

Displays = Moore's Law
Storage = 1.5X's Moore's Law
Bandwidth = 2X's Moore's Law
GPU's = 2-3X's Moore's Law



Monsanto's Law

The amount of useful genetic information doubles every 18-24 months.

Metcalfe's Law

Connect any number "n"of machines - whether computers, phones or even cars - and you get "n" squared potential value.

Dawkin's Law

The cost of sequencing DNA base pairs halves every 27 months.

Two Scenarios

Asleep at the Wheel Scenario

Slow Learning/Adaptation

Social/Ethical/Environmental impacts are unintended consequences of technology development and deployment
and
Regulation must be applied to reduce/correct impacts

Vulcan Scenario

Fast Learning/Shaping

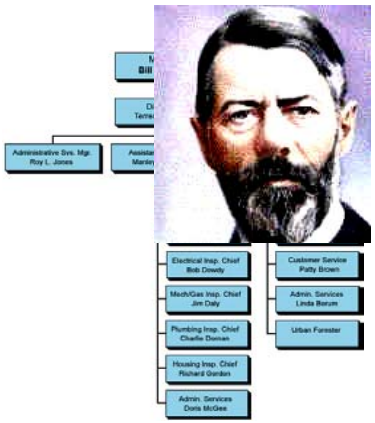
Social benefit/public good is co-optimized as a part of technology development and deployment, or is the primary goal

When Spiders Inherit the Earth

GOVERNANCE STRUCTURES

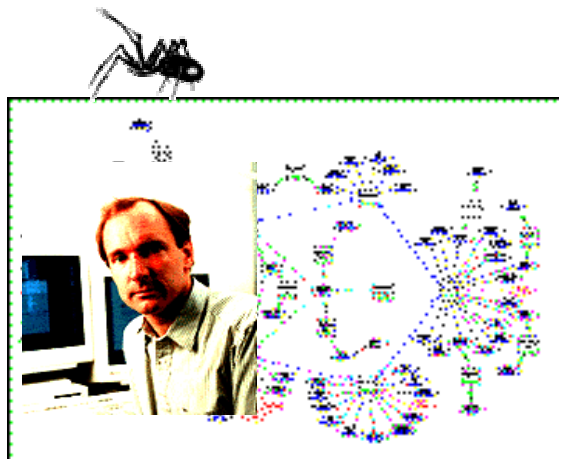
EMERGING THREATS/RISKS/OPPORTUNITIES

HIERARCHIES



MARKETS

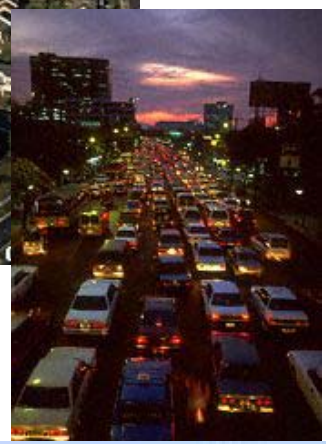
NETWORKS

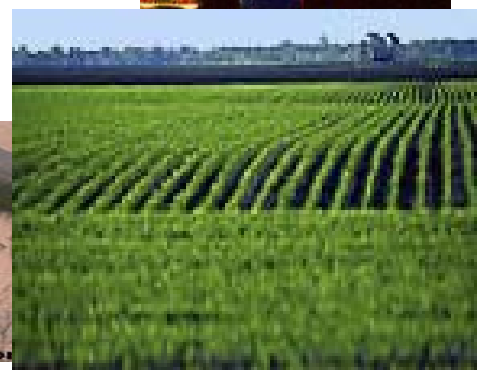


See, for example:Powell, W.W. (1990): "Neither Market nor Hierarchy: Network Forms of Organization," *Research in Organizational Behavior*, Vol. 12, pp. 295-336.

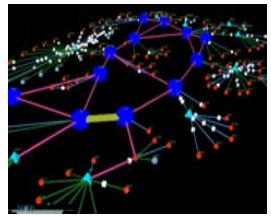
Problem Structure has Changed

- **Key Problems are Becoming:**
  - Diffuse (non-point)
  - Chronic
  - Low-Level
  - Spatially Dynamic (moving targets)
  - Non-Linear (surprise effects)





Why Networks?



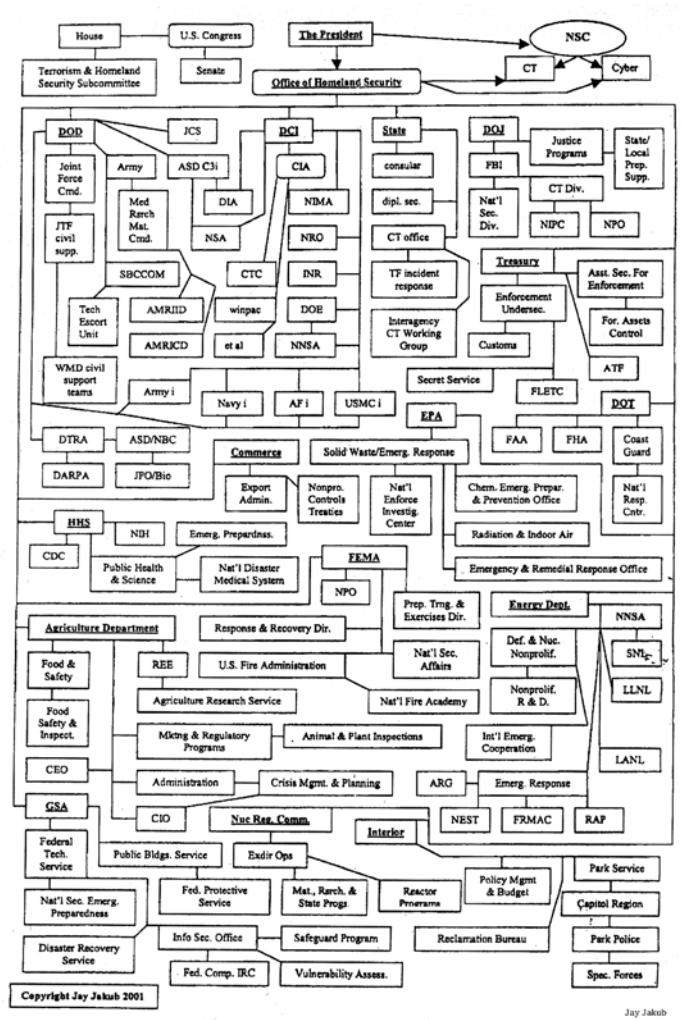
- **When no single individual can solve a problem**
- **When we do not have enough information or cannot process the information we have**
- **When things/actions cannot be valued**
- **When issues cross boundaries** (geographic, intellectual, organizational)
- **When there is a premium on collective action**
- **When there is a premium on adaptiveness and flexibility**

But: **Issues with perception, accountability, defining success, surprise.**

Which Structure Wins?

QuickTime™ and a
GIF decompressor
are needed to see this picture.

Or



Hierarchies have a difficult time fighting networks; it often takes networks to fight networks.

Networked Behaviors

- Alternative Remittance Systems
  (Hawala/Hundi, BMPE, etc.)

- Internet-based Systems
  Moveon.org, PetitionsOnline.org
  Monster Networking, Friendster

- Cellphone-based Systems
  Flash mobs, Movie text messaging

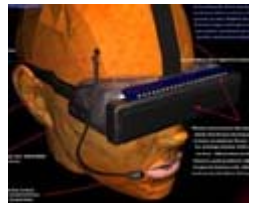
- GPS-based Systems
  Lovegtys, Geocaching

- Other
  Warchalking, Critical Mass

See: www.emergingbehaviors.org

Survival in the a Complex World

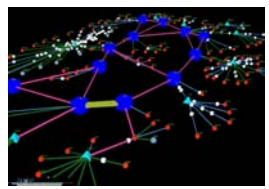
Continual situational awareness



Ability to learn and move rapidly

Ability to shape technological systems

Capacity to utilize emergent networks



Our world is changing and it is changing with an ever-increasing violence. An old world dies about us. A new world struggles into existence. But it is not developing the brain and the sensitiveness and delicacy necessary for its new life.

H.G. Wells, *World Brain*, 1938

For more information:

http://www.wilsoncenter.org/foresight

Also: www.foresightandgovernance.org

or: rejeskidw@wwic.si.edu

or: http://rejeski.blogspot.com