The Trouble with Emerging Technologies

Marc Saner

uOttawa, May 7, 2015

Why Care?

Diffusion of New Tech: A Must

CBCnews | Health

- Federal budget 2015
- Tax season 2015
- Mike Duffy trial
- CBC investigates

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Health | Rate My Hospital

NEW | Safe surgery unavailable to 5 billion people, study finds

'Too many people are dying from common, treatable surgical conditions,' researcher says

CBC News Posted: Apr 26, 2015 6:30 PM ET | Last Updated: Apr 26, 2015 6

World Environment News

In North Korea, solar panel boom gives power to the people

Date: *22-Apr-15*
Country: SOUTH KOREA
Author: James Pearson

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Solar panels face the sun from balconies of an apartment building in Mangyongdae District, Pyongyang August 27, 2014.
Photo: REUTERS

In a country notorious for a lack of electricity, many North Koreans are taking power into their hands by installing cheap household solar panels to charge mobile phones and light up their homes.

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The New York Times

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The Use of Workplace Productivity Drugs Is the Probable Future

Anjan Chatterjee, the chairman of neurology at Pennsylvania Hospital and the Elliott professor of neurology at the University of Pennsylvania, is the author, most recently, of "The Aesthetic Brain: How We Evolved to Desire Beauty and Enjoy Art."

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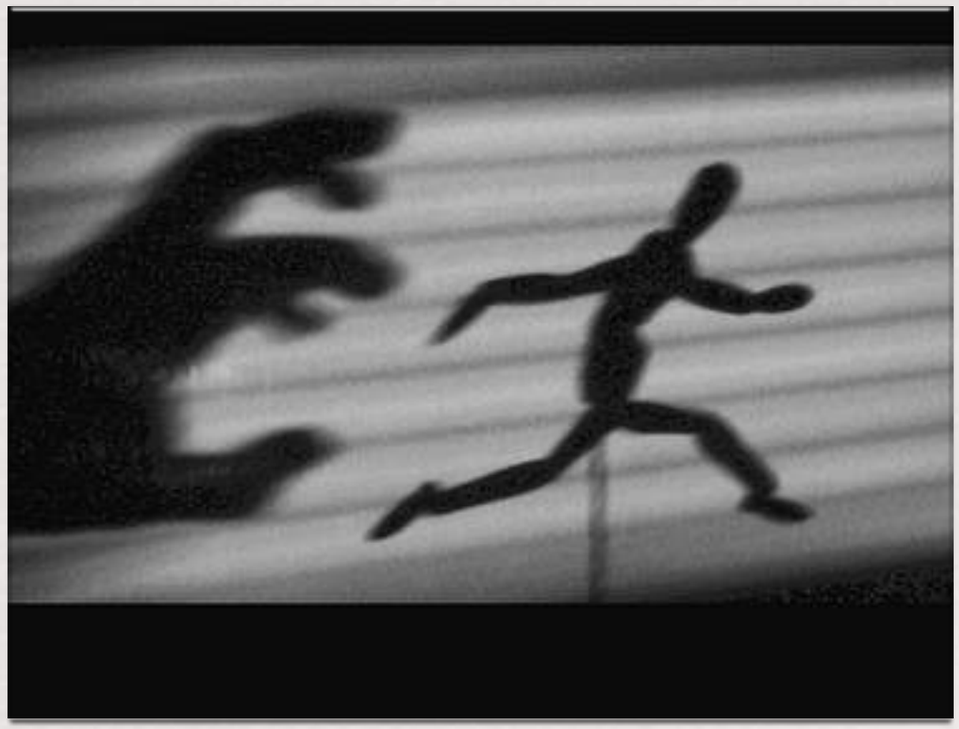
Two Fears—Two Ideologies

No emerging technologies =
no trade, no jobs, no
solutions, no justice

✣

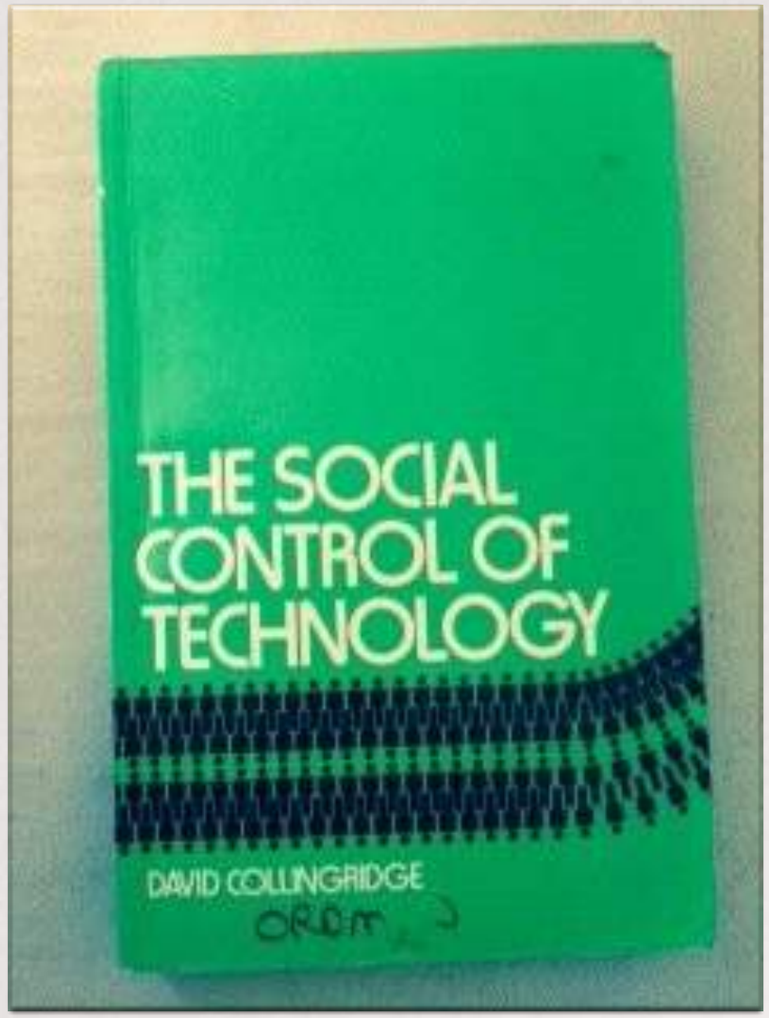
Emerging technologies =
too much power in the hands
of the reckless (few?) …
perhaps the end of the world



Another Obstacle

The Dilemma of Control

During the **early stages** (of the development of a technology), when it can be controlled, **not enough can be known** about its harmful social consequences to warrant controlling its development; but by the time these consequences are apparent, **control has become costly and slow** (or impossible)



Collingridge Dilemma

First, you don't know (how to act)

Information Deficit

✣

Then, you cannot act (on your new knowledge)

Power Deficit

Collingridge Dilemma

Critics: Therefore, precaution & moratoria

Advocates: Risk of non-action is much greater

Dilemma?
No problemo!

Enter the Experts

Scene 1: The Innovators

The pioneer spirit is still vigorous within this nation. Science offers a largely unexplored hinterland for the pioneer who has the tools for his task. The rewards of such exploration both for the Nation and the individual are great. Scientific progress is one essential key to our security as a nation, to our better health, to more jobs, to a higher standard of living, and to our cultural progress.

Respectfully yours,

(s) V. Bush, Director *1945*

Moving Forward in Science, Technology and Innovation 2014

Prime Minister's Message

Prime Minister of Canada

Stephen Harper

The success of our economy, the prosperity of our communities and the well-being of our families depend on advancing cutting-edge science, technology and innovation in Canada.

Scene 2: The Regulators

Firefighters	0.17
Actors	0.37
Health technologists	0.40
Economists	0.43
Commercial pilots	0.55
Machinists	0.65
Word processors and typists	0.81
Real estate sales agents	0.86
Technical writers	0.89
Retail salespersons	0.92
Accountants and auditors	0.94
Telemarketers	0.99

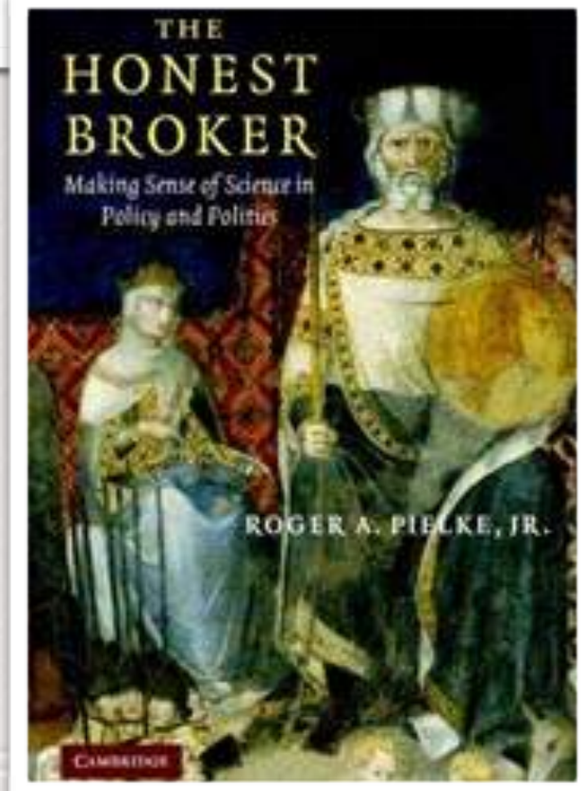
Source: "The Future of Employment: How Susceptible are Jobs to Computerisation?" by C.Frey and M.Osborne (2013)

Scene 3: The Observers

'The linear model' did not exist: Reflections on the history and historiography of science and research in industry in the twentieth century[i]

David Edgerton

in Karl Grandin and Nina Wormbs (eds), *The Science–Industry Nexus: History, Policy, Implications*. (New York: Watson, 2004)

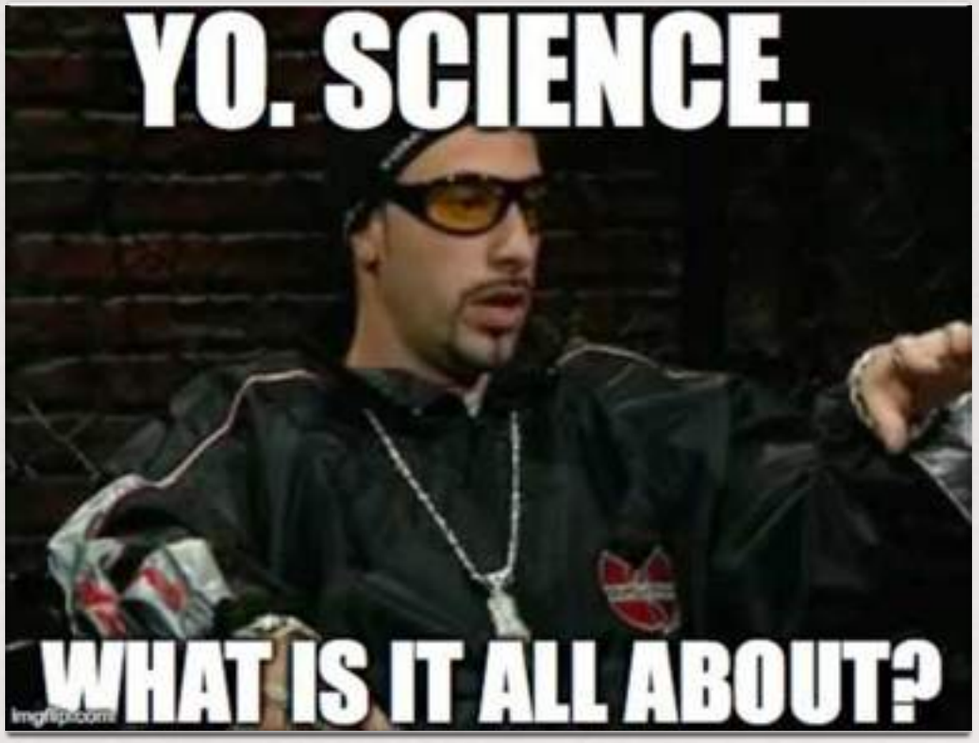


After the Experts

What was the question again?

The Succinct Ali G

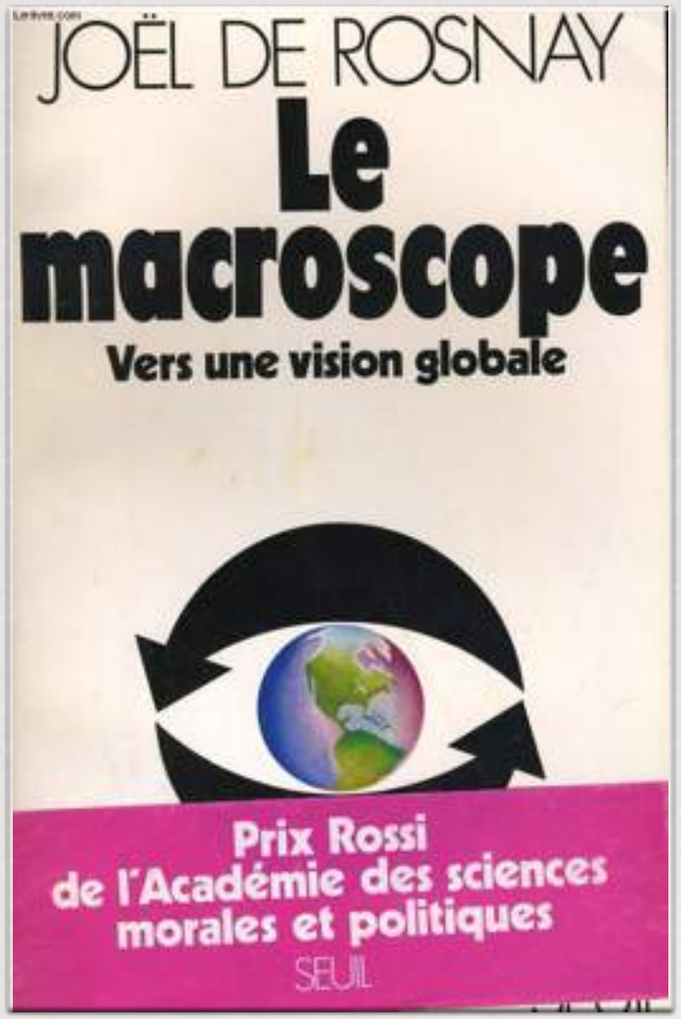
- Science, what is it all about?
- Techmology, what is that all about?
- Is it good or is it whack?



Better Try the Macroscope

Innovators, regulators and critics - all are biased

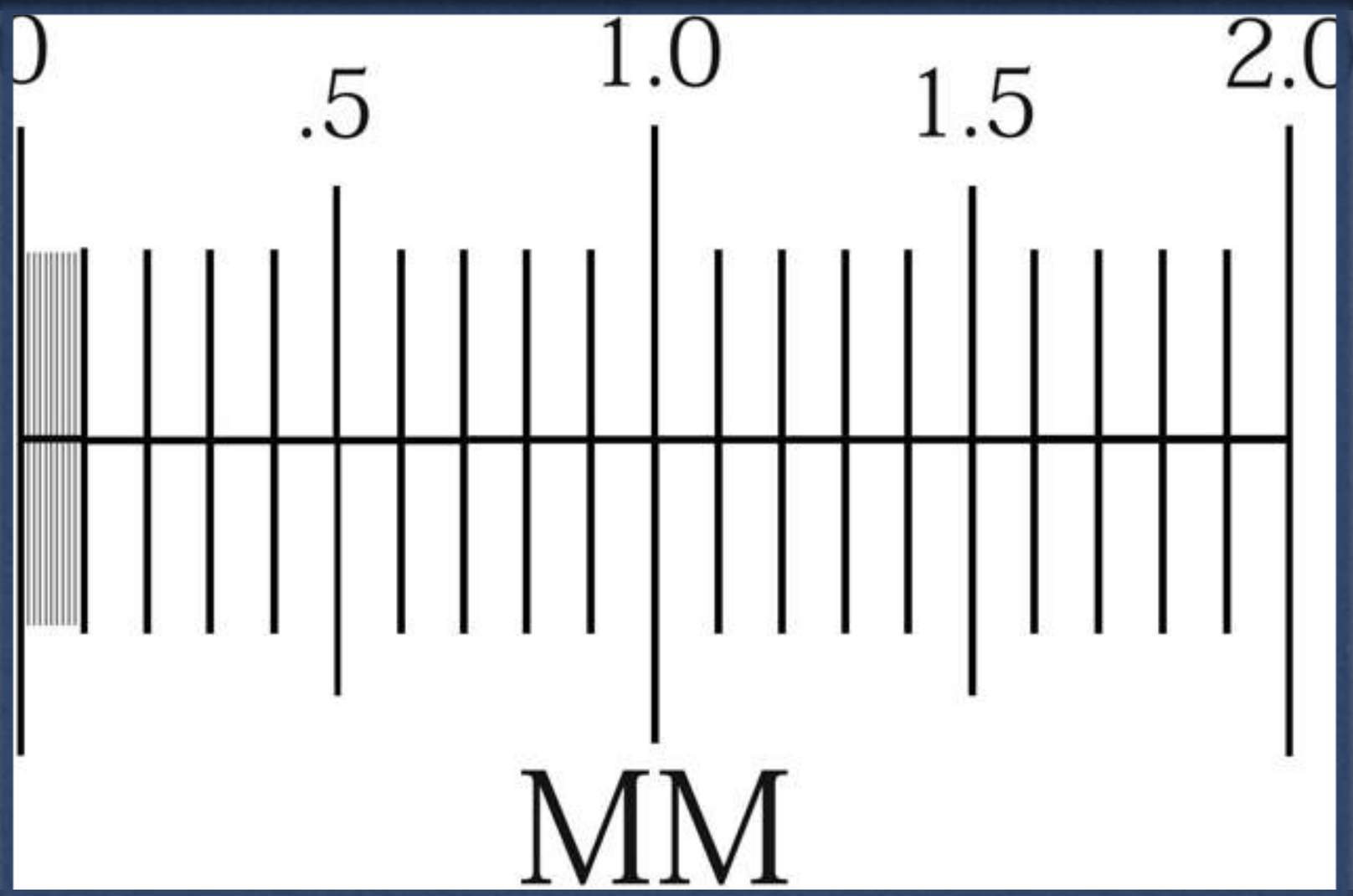
We need a total field view



(1975)

My Macroscope has Five Lenses

- Scale
- Mitigation
- Adaptation
- People
- Structures



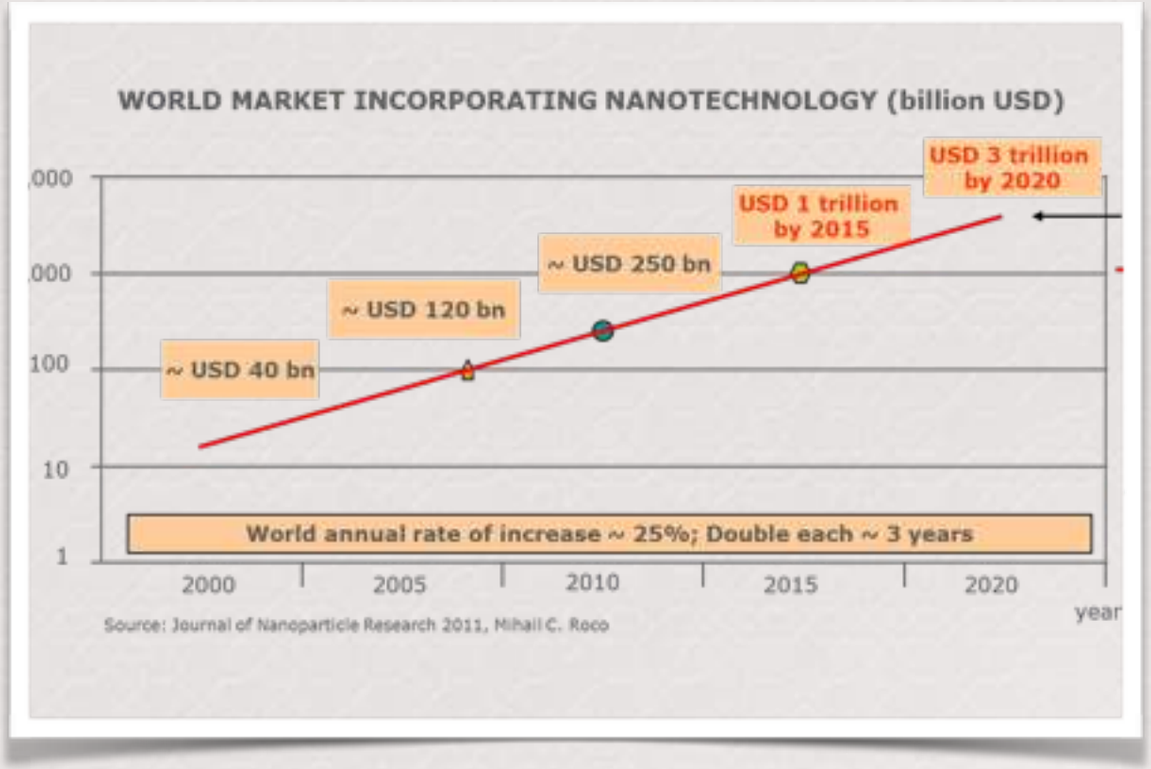
(I) The issue of scale

Where and how to look matters …

The Right Scale
The Example of Nanotech (US)

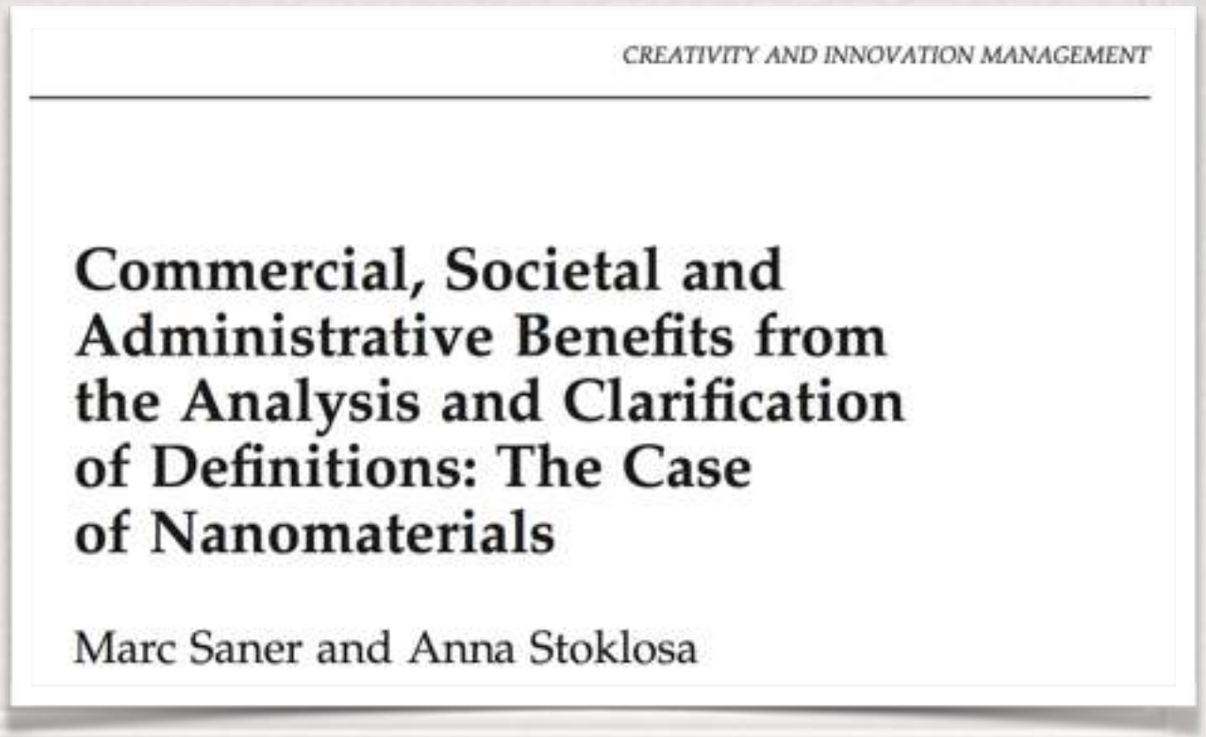
Some Background

- NNI = 1 B$/y (2000-)
- Risk research subsidies start a few years later …
- Hundreds of products already on the market …



A Simple Question: What is Nanotech?

- Innovators: technology, size + process
- Regulators: materials, activity + product
- Observers: experts do not agree: not cool!


CREATIVITY AND INNOVATION MANAGEMENT

Commercial, Societal and Administrative Benefits from the Analysis and Clarification of Definitions: The Case of Nanomaterials

Marc Saner and Anna Stoklosa

Therefore …

It rarely makes sense to say an **entire technology** is "safe" or "unsafe"

That's why **CEOs** struggle in their communications …

We need to bring **innovation strategies** and **regulatory strategies** (perspectives) together

Collingridge & Scale

First you don't know; then you cannot act

BUT

You can guess where to invest …

And you can plan for consequences of investments (e.g, regulatory capacity)

(II) Cannot Do Without Regulations

The logic of mitigation

Life-cycle Thinking

SYMPOSIUM

PROACTIVE INTERNATIONAL REGULATORY COOPERATION FOR GOVERNANCE OF EMERGING TECHNOLOGIES

Marc A. Saner and Gary E. Marchant*

ABSTRACT: This article provides a systematic checklist to guide proactive bilateral and international regulatory cooperation (in the sense of "alignment" or "harmonization") in the context of emerging technologies. The article is structured along a life-cycle starting with preregulatory activities and ending with postregulatory processes. The background research is based on a series of interviews with American and Canadian experts carried out in late 2013 as well as studies of previous international regulatory alignment examples. Our aim is to inform the regulatory debate on how to best develop proactively aligned regulatory programs for emerging technologies in bilateral (e.g., United States-Canada) and international contexts.

CITATION: Marc A. Saner and Gary E. Marchant, Proactive International Regulatory Cooperation for Governance of Emerging Technologies, 55 Jurimetrics J. 147–178 (2015).

Stages of Control

1. Early Risk Identification
2. Agenda Setting
3. Submission Requirements
4. Review Requirements
5. Enforcement and Learning

Collingridge & Mitigation

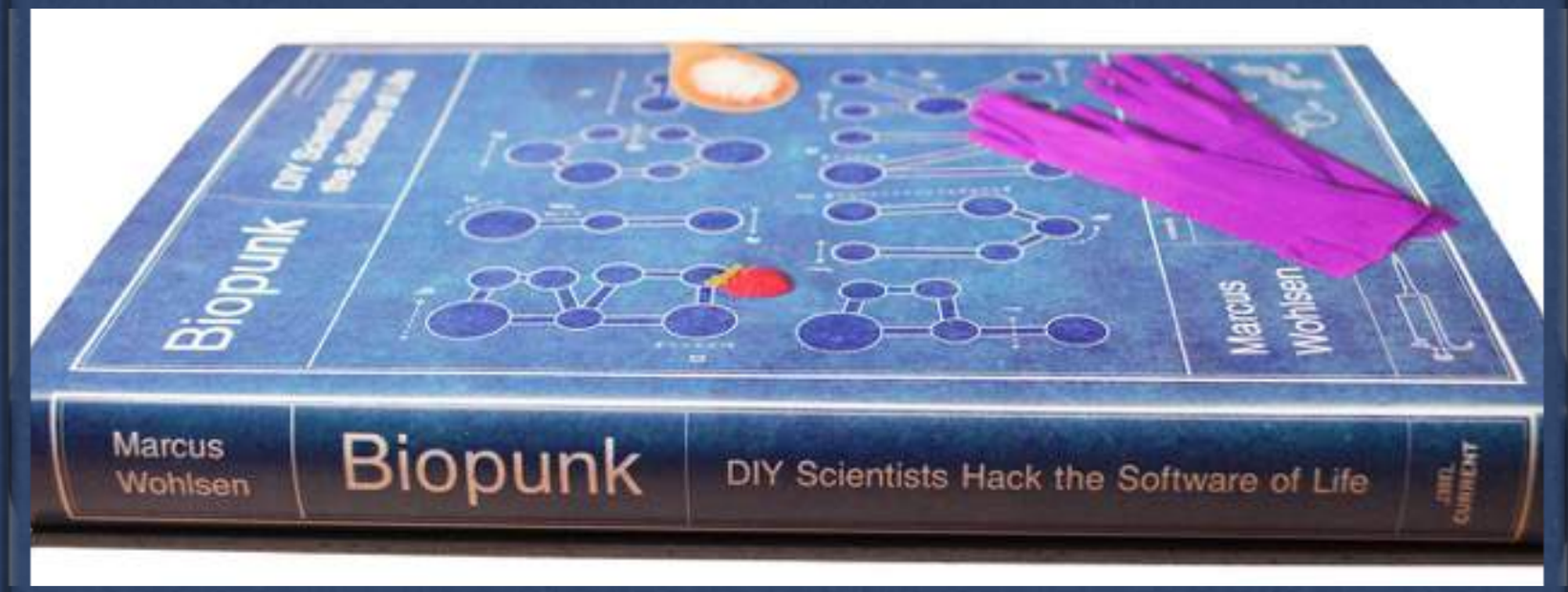
- Produce more knowledge early
- Coordinate for better use of knowledge

LEARN

- Co-produce risk and social knowledge
- Accept uncertainty: assign liabilities

ACT

- Monitor and take corrective measures



(III) What if Regulations Don't Work?

The logic of adaptation

A Lesson from Prohibition

- Prohibition of alcohol: off-shoring & moonshining

- How can you regulate diffused, exponentially accelerating knowledge and technology?

A Lesson from Climate Change

Climate change adaptation:

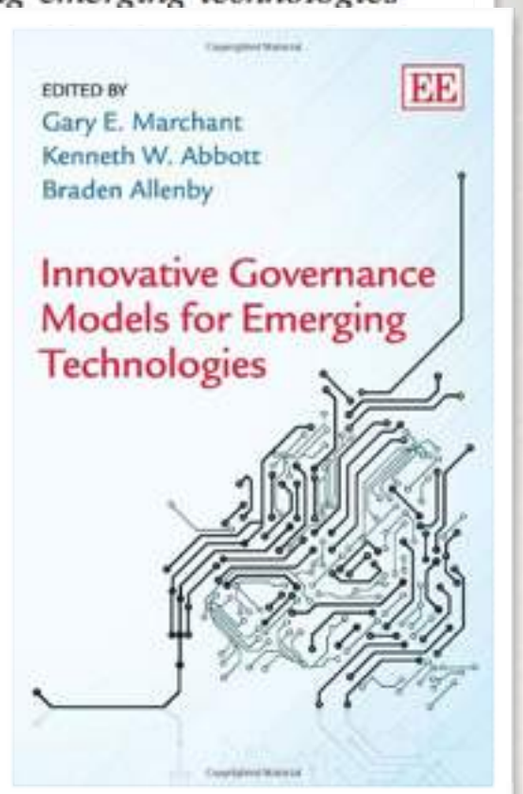
- U.N. Committee
- U.N. Framework
- U.N. Research + Fund
- Private-sector Initiative

5. The role of adaptation in the governance of emerging technologies

Marc A. Saner

5.1 THE CONTROL PARADIGM IN TECHNOLOGY GOVERNANCE

The context of this book – derived from workshops on the *pacing problem* and the *utility of soft law in governing emerging technologies* – provides a broad platform from which to c
nology governance. I argue that it is necessary
concept *governance* beyond its normal bou



Collingridge & Adaptation

We have a Dilemma of Control …

So, why don't we have …

- Technology Adaptation Committee
- Technology Adaptation Framework
- Technology Adaptation Research Fund
- Technology Adaptation Private-sector Initiative?

UNCCD SPI Science - Policy Interface

(IV) People Matter

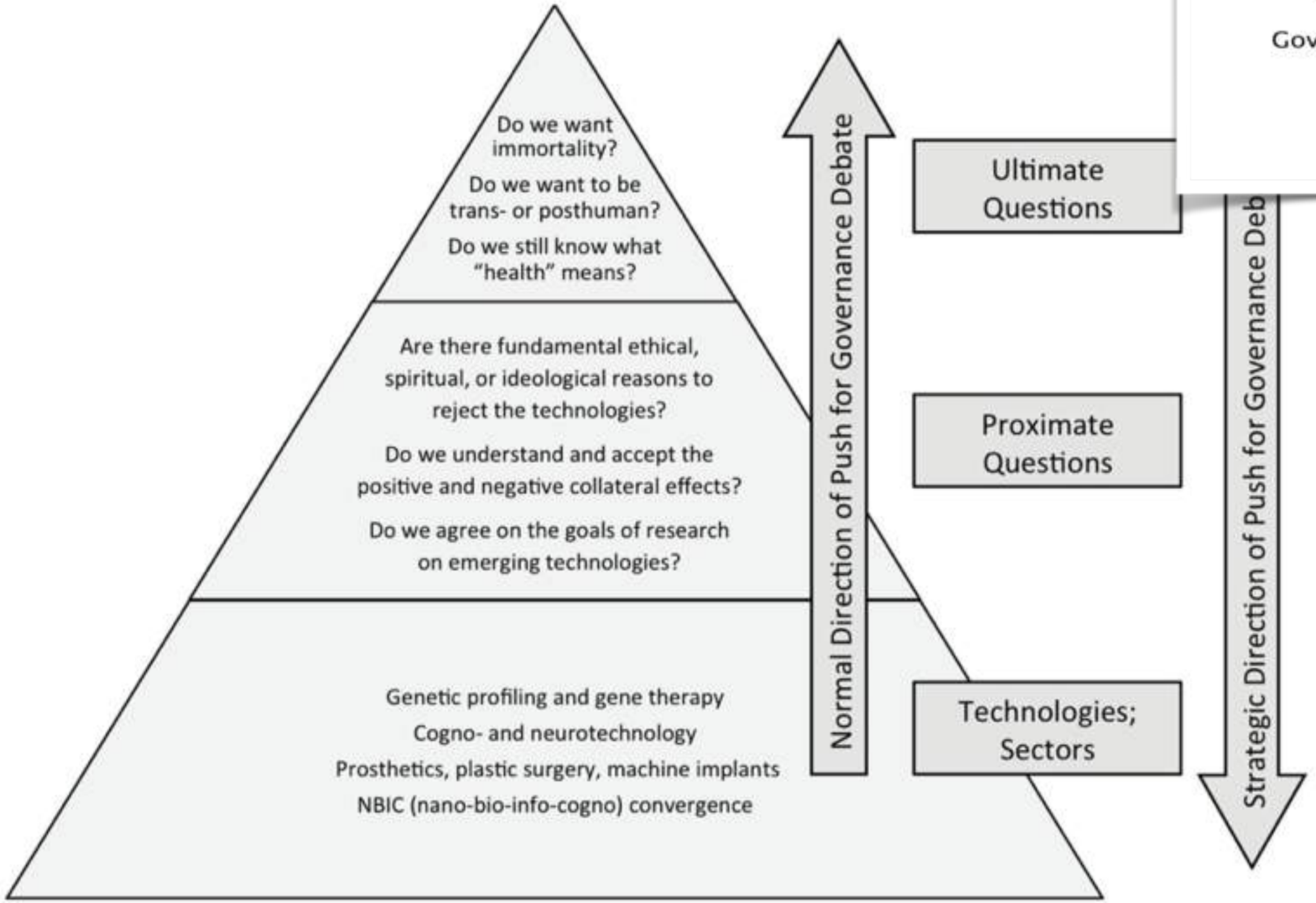
Manage the Science/Policy Interface

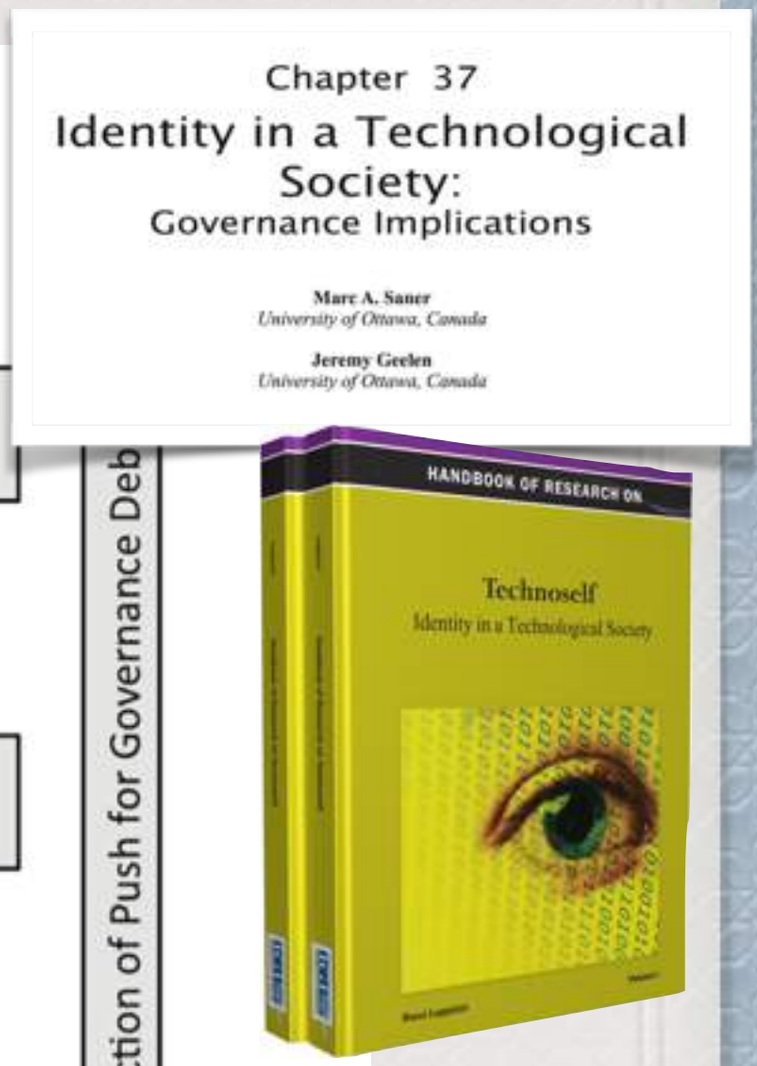
Knowledge-Decision Disconnect

- You do not govern a technology, you govern people
- But it's hard to connect the labs to the decision-makers
  - responsible innovation (RRI)
  - upstream engagement
  - science/policy interface

Helps to Manage the Debate

Figure 1. Emerging enhancement technologies and their implications




Chapter 37

Identity in a Technological Society:

Governance Implications

Marc A. Saner
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Collingridge & People

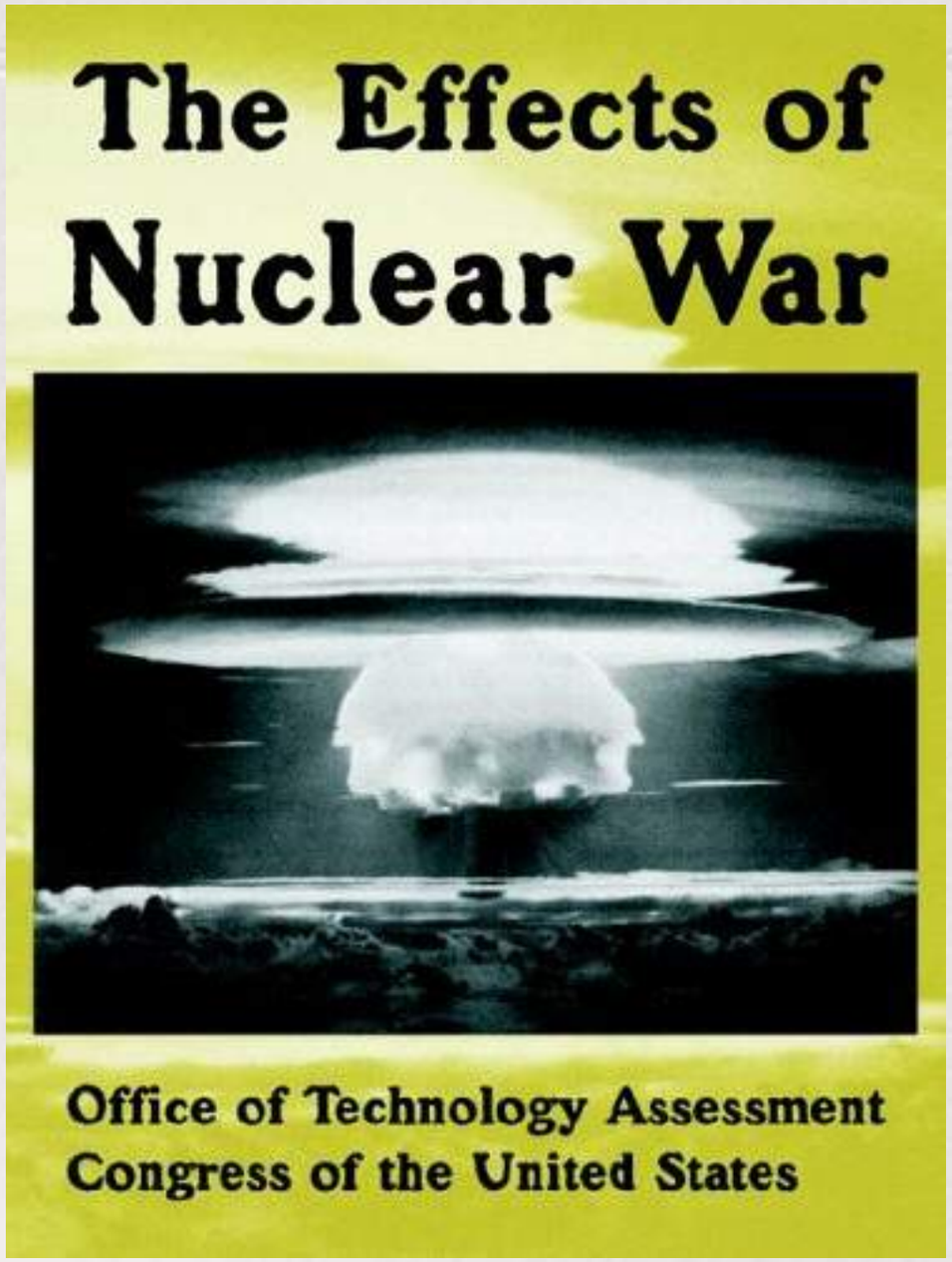
First you don't know; then you cannot act, therefore:

- Know more by connecting upstream
- Educate everybody for life at the **science/policy interface**
- Entwine power and accountability
- Integrate the push from the **market of ideas** with the push from goal setting and **strategic planning**

(V) New Structures

International Technology Assessment Facility

The Much Regretted OTA and SCC



Collingridge & Structures

- The stakes are high …
- The analytic challenges are complex …
- S&T are accelerating …

SEE THE CHALLENGE

International Technology Assessment Facility

protected from partisan politics

appropriate, international scope

PLAN & LEARN

What happened here?

Collingridge : Proactive Governance

First, you don't know (how to act)

- There is lots you can do to know better (research, education, coordination, communication, …)

✣

Then, you cannot act (on your new knowledge)

- That's why you have to act all-along (and use the entire toolkit, mitigation, planning for adaptation, at all scales)

The Macroscope : Seven Recommendations

- Think broadly, respect both critics and advocates
- Bring innovation, regulation and social concerns together
- Select the right scale in your debates
- Many solutions for mitigation throughout the life-cycle
- Better planning once you take adaptation seriously
- People - train at the science/policy interface
- Structures - we liked the ones we once had ...

Thanks!

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