

The Trouble with Emerging Technologies

(Solutions to the Collingridge Dilemma)



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Critical Conversation on Innovation & Regulations

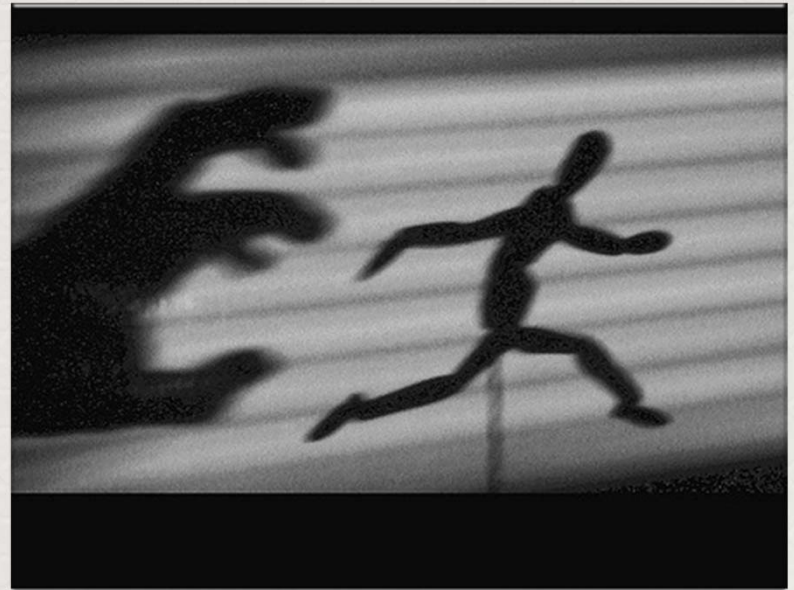
Carleton University, April 16, 2018

1. Two Fears, Two Ideologies

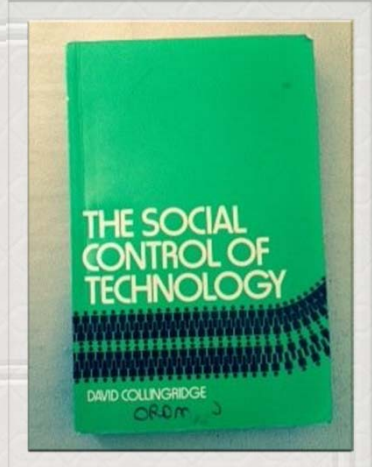
No emerging technologies = **no trade, no jobs, no solutions, no justice**



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



2. Another Obstacle: Collingridge Dilemma



(1980)

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

Information Deficit



Then, you cannot act (on your new knowledge)

Power Deficit

Ideology & Collingridge Dilemma

Ideology	Dilemma	
	First, information deficit	Then, power deficit
Technology = Solution	<p>No sound reason to stop innovation; risk of non-action is greater</p> <p>> GO</p>	<p>Too bad, but technology cannot be stopped (collective action dilemma)</p> <p>> GO, GO</p>
Technology = Problem	<p>Insufficient certainty to justify new technology (precaution)</p> <p>> STOP</p>	<p>Told you! What now? Salvage what you can and learn from this disaster</p> <p>> STOP, STOP</p>

Ideology Fills Info Vacuum

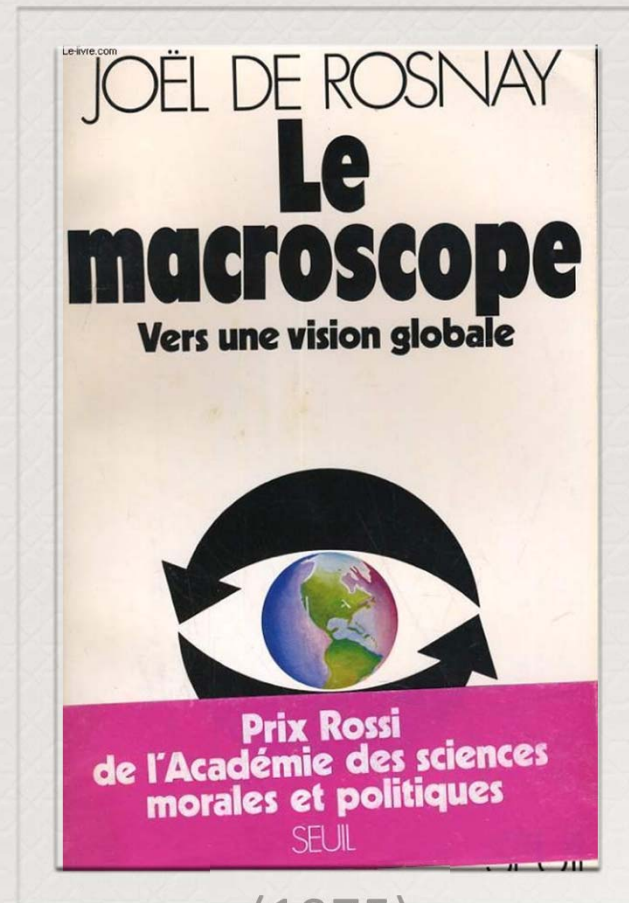
Critics: Therefore, **precaution & moratoria**



Advocates: Risk of **non-action** is much greater

Better Try the Macroscope

We need a **total field view**

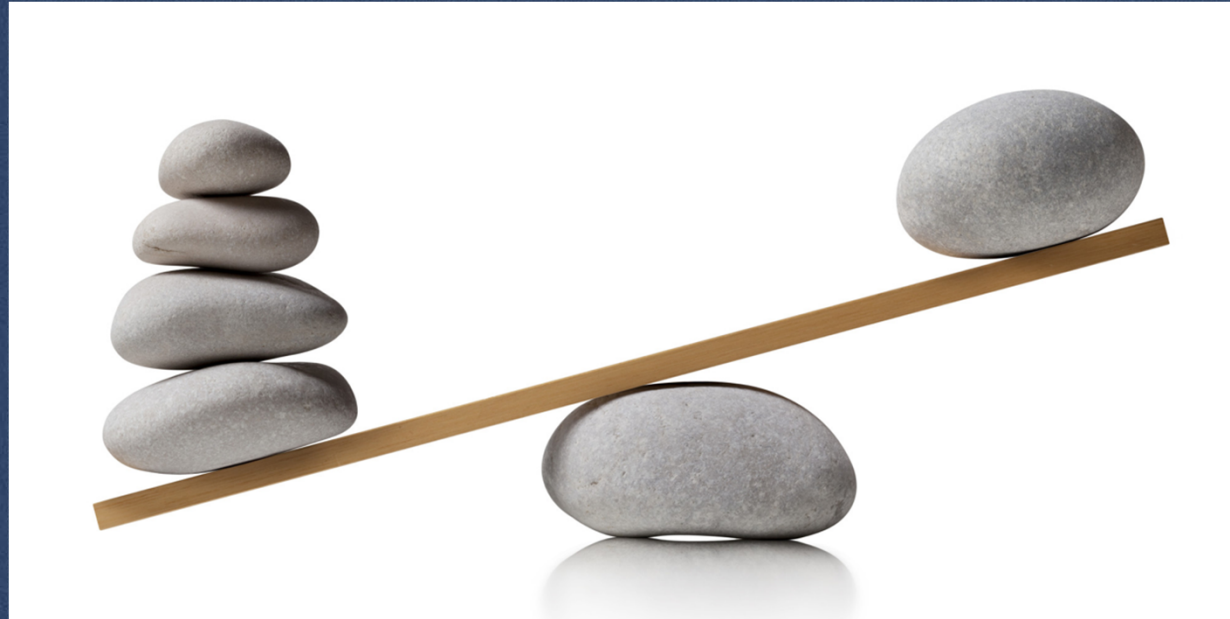


(1975)

My Macroscope has Five Lenses

- ✿ Balance
- ✿ Mitigation
- ✿ Adaptation
- ✿ People
- ✿ Structures





(I) Balance of Investments

Invest in innovation AND in risk management

Balance: Nanotech (US), Synbio (Canada)

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

THE HILL TIMES, MONDAY, SEPTEMBER 14, 2015



Marc Saner writes, 'The bottom line we must not only invest in innovation but also in regulatory capacity building and planning. Let's drive this car with two pedals. Suspension and a sound system would also be nice.'

Hacking goes squishy, revisited

We must not only invest in innovation but also in regulatory capacity building and planning.



MARC SANER

hard to regulate. Moonshining 2020?

The dual sides of dual-use: First the good: Any technology that is cheap, fast, versatile, and powerful promises tantalizing benefits. Canada is internationally strong in the field of genomics and a do-it-yourself (DIY) technology requires little critical mass or geographical clustering. DIY biotechnology is definitely "small and medium enterprise (SME) friendly." It can even be community friendly—take Biospace, Canada's first bio-tech community lab, based in Victoria, B.C. But now the bad, the inevitable dark side of power. Our neighbours to the south pay a lot of attention to so-called "dual-use" (the potential weaponization of synthetic biology). The

Collingridge & Balance

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**)

ACT ON WHAT
YOU DO KNOW



(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.

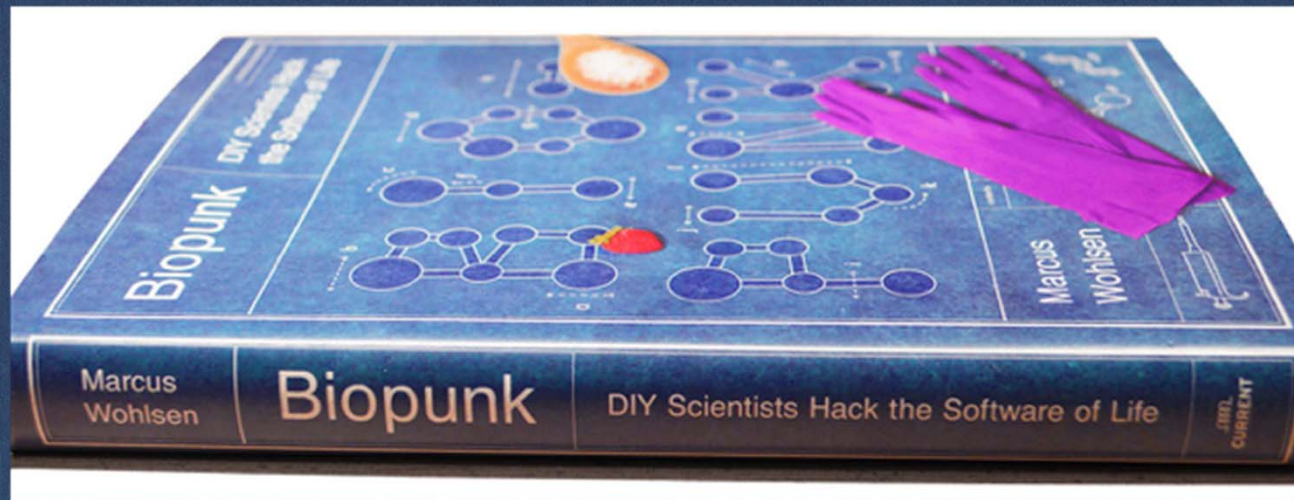
CITATION: Marc A. Saner and Gary E. Marchant, Proactive International Regulatory Cooperation for Governance of Emerging Technologies, 55 *Jurimetrics J.* 147–178 (2015).

Collingridge & Mitigation

- Produce more knowledge early
- Coordinate for better use of knowledge
- Co-develop risk and social knowledge
- Accept uncertainty: assign liabilities
- Monitor and take corrective measures

LEARN

ACT



(III) What if Regulations Don't Work?

The logic of adaptation

A Lesson from Prohibition

- Prohibition of alcohol: off-shoring & moonshining



- Can you really regulate diffused, exponentially accelerating S&T?



A Lesson from Climate Change

Climate change adaptation:

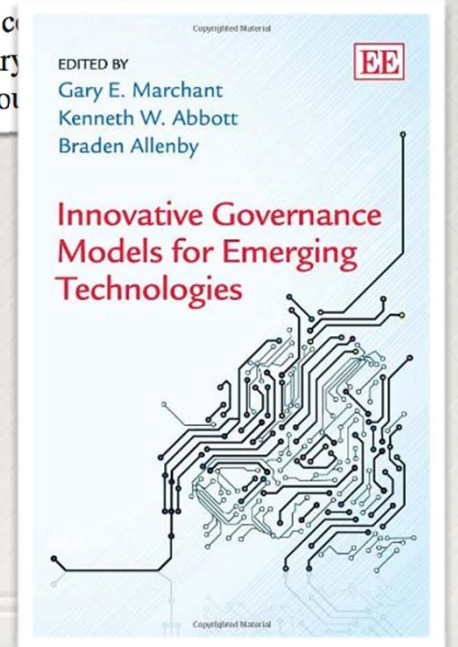
- U.N. Committee
- U.N. Framework
- U.N. Research + Fund
- Private-sector Initiative

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 consider technology governance. I argue that it is necessary to develop a concept *governance* beyond its normal boundaries.



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

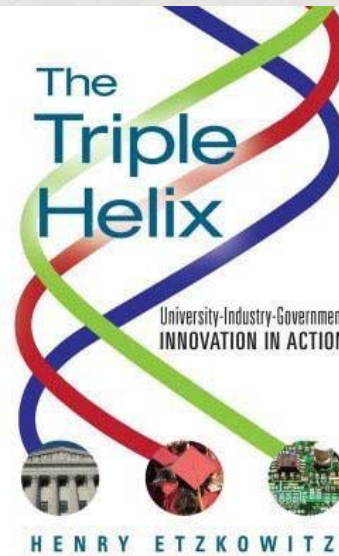
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INGSA Manifesto for 2030
Scientific Advice for the Global Goals



Policy Brief Series
Science/Policy Interface
6
June 2014

A Map of the Interface Between Science & Policy

Marc Saner
University of Ottawa

(Edited version)
First published January 2007 at the Council of Canadian Academies)

Collingridge & People

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

INTEGRATE

- Know more by connecting **upstream**
- Educate everybody for life at the **science/policy interface**
- Entwine **power** and **accountability**



(V) New Structures

International Technology Assessment Facility ?

Collingridge & Structures

- The stakes are high ...
- The analytic challenges are complex ...
- S&T are accelerating ...
- OTA and SCC are gone ...

SEE THE
CHALLENGE

Bilateral/International Technology Assessment Facility ?

protected from partisan politics

appropriate, international scope

PLAN &
LEARN



Macroscope Condensed

Five Lenses, Five Recommendations

- **Balance:** Include risk and regulatory research
- **Mitigation:** Life-cycle perspective
- **Adaptation:** Climate change model
- **People:** Network & capacity building
- **Structures:** International technology assessment



Thank you!

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The logo for the Institute for Science, Society and Policy (ISSSP) features the acronym 'ISSSP' in a bold, red, sans-serif font. The letters are stylized, with the 'I' and 'S's having a blocky, geometric appearance.

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