

Máster Universitario en Administración y Dirección de Empresas Full Time MBA

Crunching numbers for sustainability

Professor Andrea Saltelli

Crunching numbers for sustainability

In this set of slides:

2 Impact assessment

2.

Impact assessment

Definitions; Impact assessment at the European Commission. Cochrane; Rachel Carson and the birth of the environmental movement; Lyotard, Shapin, Latour; from evidence based policy to policy based evidence; Collingridge, Majone, Beck. A case in class on tobacco and another on exoskeletons; Disputes on genetically modified organisms.

Impact assessment

Evidence based policy

... where does this comes from?

Social Impact Assessment, Environmental Impact Assessment, Health Impact Assessment, Economic Impact Assessment ...

- Ex ante impact assessment (before a policy/intervention is selected and/or implemented)
- Monitoring (during implementation)
- Ex-post analysis (valuation, after the implementation)

All belong to **evidence based policy**

Better Regulation: why and how

The Better Regulation agenda ensures evidence-based, transparent EU law-making based on the views of those impacted. The Commission evaluates and improves EU laws, focusing on delivering where it matters the most.

PAGE CONTENTS:

Objectives of the Better
Regulation agenda

What the Commission is
doing

Objectives of the Better Regulation agenda

- Ensure EU policymaking is based on evidence
 - Making EU laws simpler and better, and avoiding unnecessary burdens
 - Involving citizens, businesses and stakeholders in the decision-making process
-
- Ensure EU policymaking is based on evidence
 - Making EU laws simpler and better, and avoiding unnecessary burdens
 - Involving citizens, businesses and stakeholders in the decision-making process

https://commission.europa.eu/law/law-making-process/planning-and-proposing-law/better-regulation_en

Better regulation: guidelines and toolbox

General principles

The better regulation guidelines set out the principles that the European Commission follows when preparing new initiatives and proposals and when managing and evaluating existing legislation.

The guidelines apply to each phase of the law-making cycle.

	3 NOVEMBER 2021 Better regulation guidelines English (983.75 KB - PDF)	Download 
	20 JULY 2023 Better regulation toolbox English (6.45 MB - PDF)	Download 



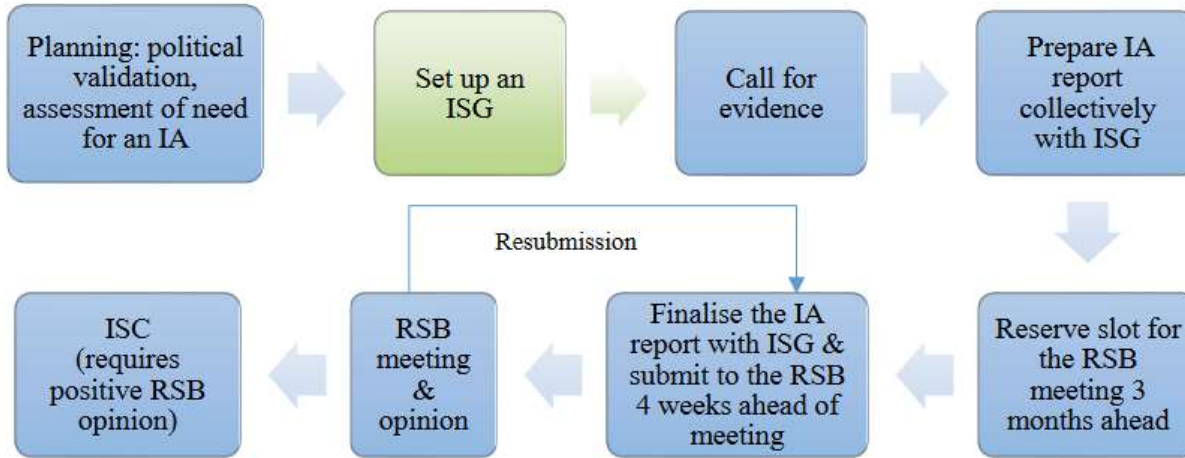
← 614 pages of tools

https://commission.europa.eu/law/law-making-process/planning-and-proposing-law/better-regulation/better-regulation-guidelines-and-toolbox_en

Impact assessment in the European Commission

LEGEND

Box 1. Process to prepare a typical impact assessment



IA=Impact assessment
ISF = interservice groups (directorates of the European Commission such as Competition, Internal Market...)

RSB= Regulatory Scrutiny Board

ISC=inter-service consultation

Source: 'Better regulation' toolbox 2023, p. 50

Impact assessment seen as a process (EC model)

1. Problem Definition

2. Objective Setting

3. Identification of Policy Options: (including status quo)

4. Analysis of Impacts: (costs and benefits, potential effects on different stakeholder groups)

Impact assessment seen as a process (EC model)

5. Comparison of Options: identify the most effective and efficient approach.

6. Consultation: stakeholders, including the public, industry representatives, and experts.

7. Decision-Making: Presenting the results

Evidence based medicine came first!

Evidence Based Medicine was born when clinical decision making was set to integrate clinical expertise with external evidence (e.g. randomized trials) and patient values and preferences

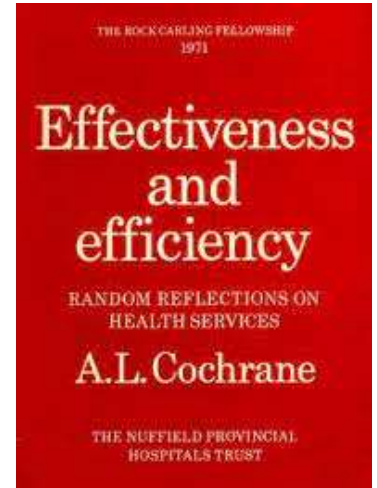


Archie Cochrane,
1909 –1988



This led to the Cochrane collaboration (now simply Cochrane), involving health professionals, patients and policy makers

Runs major systematic reviews. Maintains a library



“A NEW paradigm for medical practice is emerging. Evidence-based medicine de-emphasizes intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision making and stresses the examination of evidence from clinical research”



This Issue

Article

November 4, 1992

Evidence-Based Medicine

A New Approach to Teaching the Practice of Medicine

Gordon Guyatt, MD, MSc; John Cairns, MD; David Churchill, MD, MSc; Deborah Cook, MD, MSc; Brian Haynes, MD, MSc, PhD; Jack Hirsh, MD; Ian Irvine, MD, MSc; Mark Levine, MD, MSc; Mitchell Levine, MD, MSc; Jim Nishikawa, MD; David Sackett, MD, MSc; Patrick Brill-Edwards, MD; Hertzell Gerstein, MD, MSc; Jim Gibson, MD; Roman Jaeschke, MD, MSc; Anthony Kerigan, MD, MSc; Alan Neville, MD; Akbar Parjoo, MD; Allan Detsky, MD, PhD; Murray Enkin, MD; Pamela Frid, MD; Martha Gerrity, MD; Andreas Laupacis, MD, MSc; Valerie Lawrence, MD; Joel Menard, MD; Virginia Moyer, MD; Cynthia Mulrow, MD; Paul Links, MD, MSc; Andrew Ozman, MD, MSc; Jack Sinclair, MD; Peter Tugwell, MD, MSc

▶ Author Affiliations

JAMA. 1992;268(17):2420-2425. doi:10.1001/jama.1992.03490170092032



JAMA. 1992;

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[@AndreasSaltelli@mstdn.social](https://www.instagram.com/AndreasSaltelli)

<https://www.youtube.com/channel/UCz26ZK04xchekUy4GevA3DA>

SERIES: DAVID SACKETT – A YEAR LATER | VOLUME 73, P82-86, MAY 2016

 Download Full Issue

Evidence-based medicine has been hijacked: a report to David Sackett

John P.A. Ioannidis  

Published: February 28, 2016 • DOI: <https://doi.org/10.1016/j.jclinepi.2016.02.012> •  Check for updates



“Under market pressure, clinical medicine has been transformed to finance-based medicine” (2016)

Early milestones in the development of impact assessment was the National Environmental Policy Act (NEPA) in the United States, enacted in 1969



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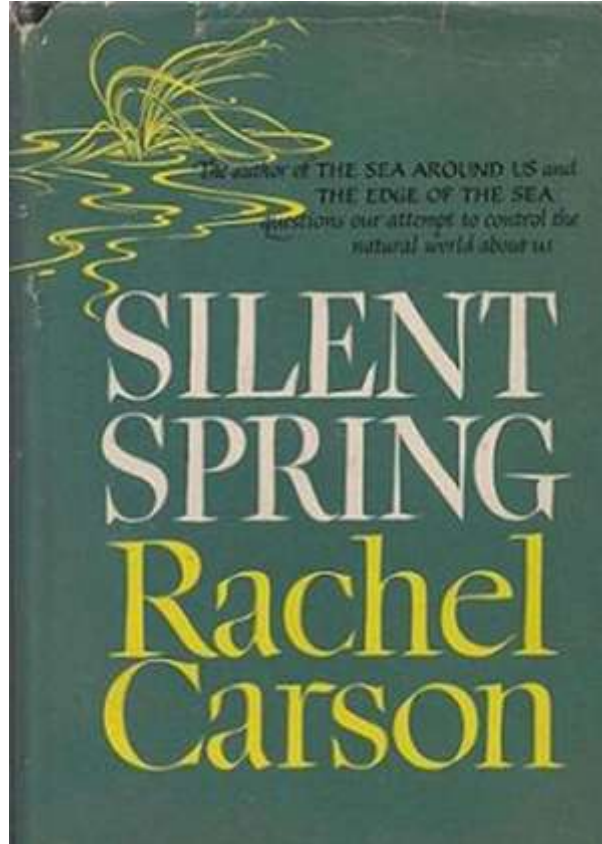
Log In

Bills & Resolutions / S.1075 (91st) / Text

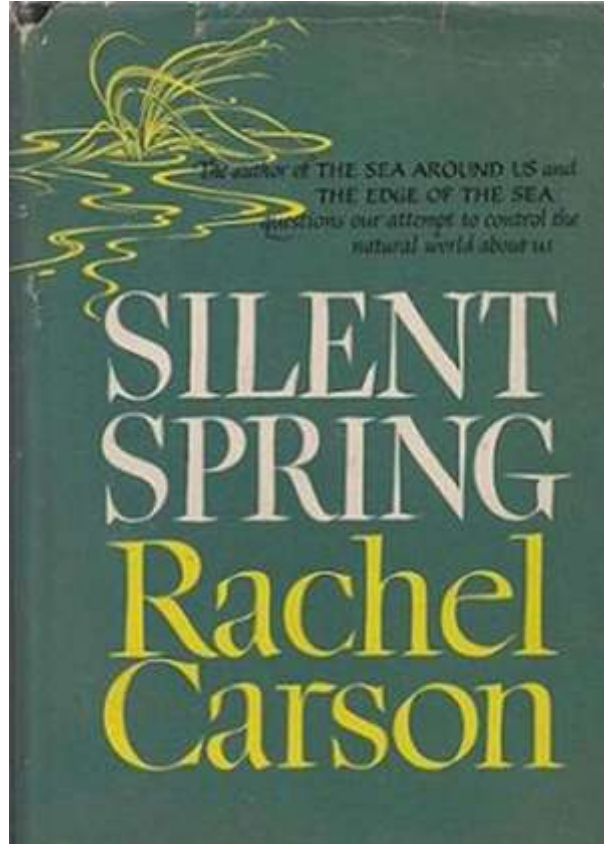
S. 1075 (91st): An Act to establish a national policy for the environment; to authorize studies, surveys, and research relating to ecological systems, natural resources, and the quality of the human environment; and to establish a Board of Environmental Quality Advisers

… NEPA came into being as a result … of a book (1962)!

The book kickstarted the environmental movement worldwide. Led to the creation of the US Environmental Protection Agency (EPA) …



... it also led in the US to a ban of DDT, to the Endangered Species Act (1973), to the Clean Air (1970) and Clean Water (1972) acts



Digging deeper on this question of where evidence based policy comes from...

Chapter 2, Le probleme: La legitimation

‘C’est depuis Platon que la question de la **légitimation de la science** se trouve indissociablement connexe de celle de la **légitimation du législateur**. Dans cette perspective, le droit de décider de ce qui est vrai n’est pas indépendant du droit de décider de ce qui est juste [...] **savoir et pouvoir sont les deux faces d’une même question**: qui décide ce qu’est savoir, et qui sait ce qu’il convient de décider? La question du savoir à l’âge de l’informatique est plus que jamais la question du gouvernement.’

Liotard, J.-F. 1979. La Condition postmoderne. Rapport sur le savoir, Paris : Minuit.



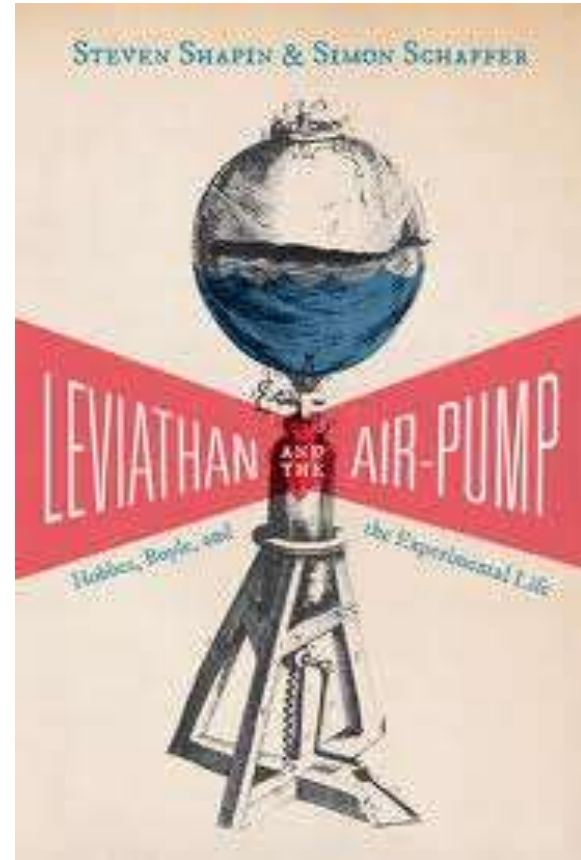
Jean-François Lyotard



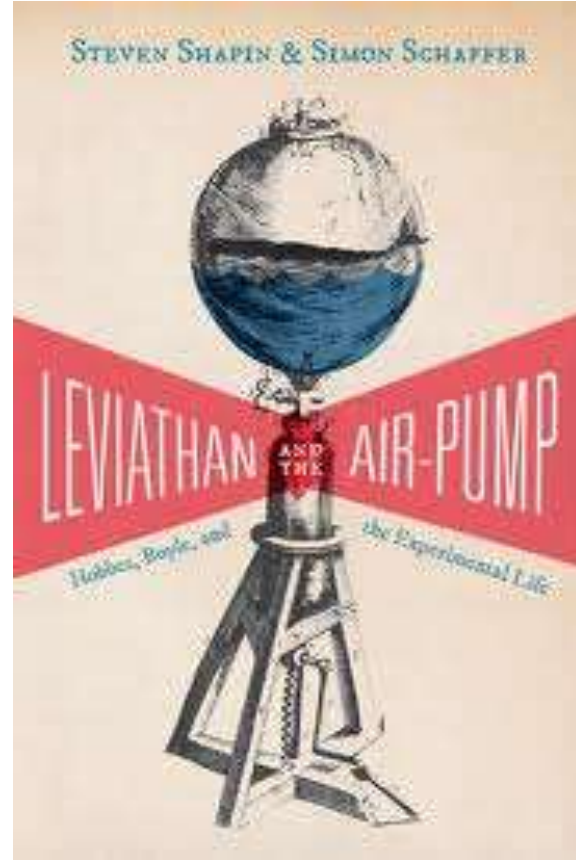
“Solutions to the problem of knowledge are solutions to the problem of social order.

[...] Trust in Science and trust in the prevailing social order are linked”

Shapin, S., Schaffer, S., 1985, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*, Princeton, 2011 Edition



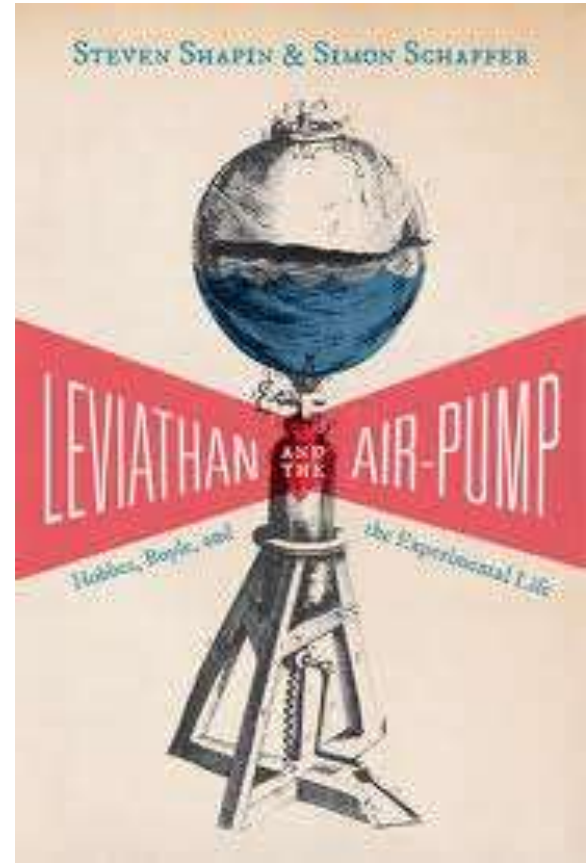
Shapin and Schaffer discusses how establishing 'matter of facts' under controlled 'laboratory' experiments before witnesses, was a way to subtract the discourse about knowledge from religious squabbles ...



Shapin and Schaffer's book inspired Bruno Latour's 'Nous n'avons jamais été modernes', 1991, and was 'hot' during the 'science wars'.



Bruno Latour

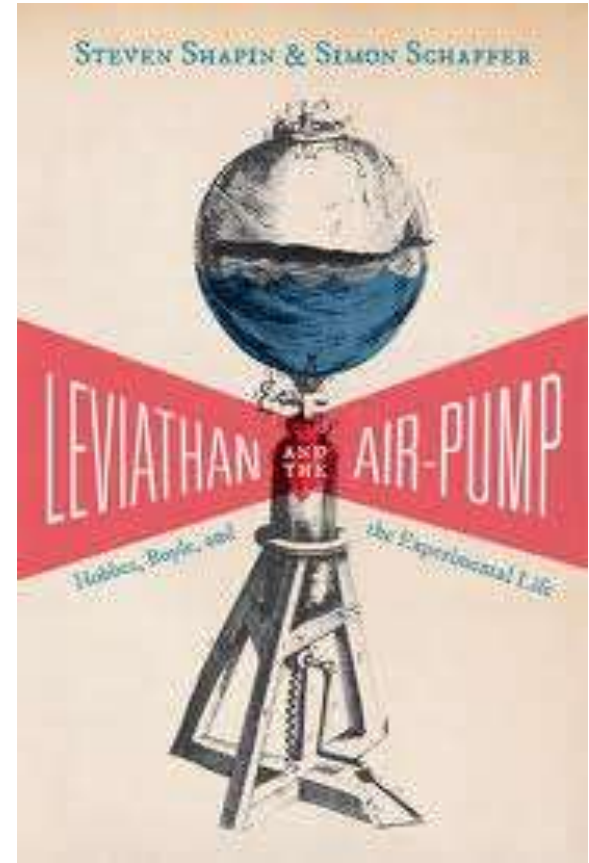


But what does it mean that we “have never been modern?”

The theory in a nutshell: we have never been good at separating facts from values

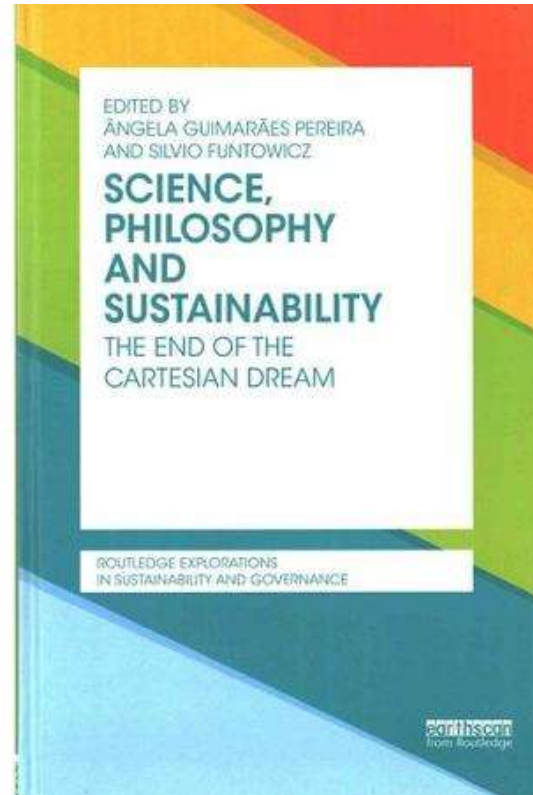
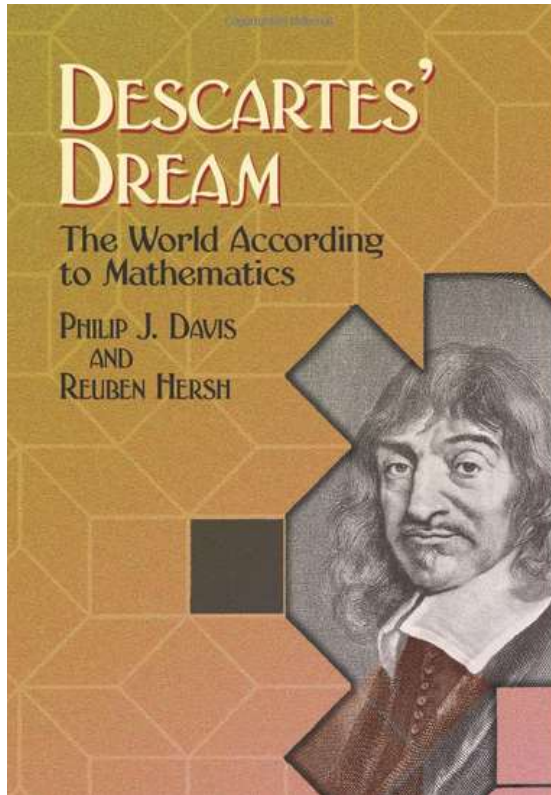


Bruno Latour



If we dig even deeper in this culture
of evidence at the root of the
governance of human affairs: the
Cartesian Dream discussed with
some of you

Quantification as a key element of the Cartesian Dream





Francis Bacon
(1561–1626)

We call Cartesian dream the idea of man as master and possessor of nature, of prediction and control, of Bacon's wonders of science and of Condorcet's mathématique sociale...



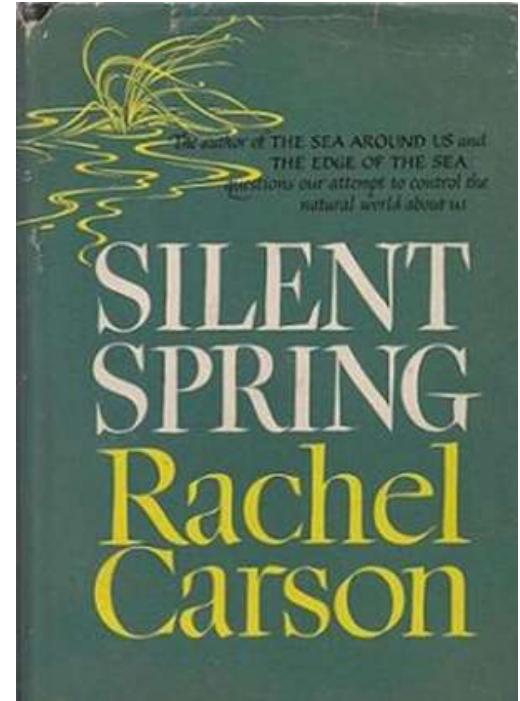
René Descartes
(1596–1650)



Nicolas de Caritat, marquis de
Condorcet
(1743– 1794)

The end of the Cartesian dream?

The ‘control of nature’ is a phrase conceived in arrogance, born of the Neanderthal age of biology and philosophy, when it was supposed that nature exists for the convenience of man. The concepts and practices of applied entomology for the most part date from that Stone Age of science. It is our alarming misfortune that so primitive a science has armed itself with the most modern and terrible weapons, and that in turning them against the insects it has also turned them against the earth.”



← How the book ends

Why is this story of evidence based policy (EBP) so important?

- Because it is a key component of the policy cycle and is enshrined in standards and guidelines
- It is a conflicted topic (like evidence based medicine)
- Many say it has become its opposite (policy based evidence), also as part of New Public Management theories and movement
- Some highlight power differentials (industry-regulators-citizens) and see EBP as a vehicle for regulatory capture
- Some take issue with its purported neutrality

A perplex economist



John Kay [+ Add to myFT](#)

ECONOMICS & BUSINESS COMMENTATOR

John Kay has been writing a column on economics and business since 1995. He is currently a visiting professor at the London School of Economics. He also had a career in the policy world which established the Institute for Fiscal Studies as one of the most respected think tanks, and a business career.

[ES](#) Email John Kay



“And so we have a large consultancy business of transport modellers, environmental experts, risk managers and impact assessment modellers, the front line of an army that has turned evidence-based policy into policy-based evidence. These procedures cloak often casual instinctive assessments in an appearance of objective justification”, Kay, 2014.

Kay, J., 2014, The wisest choices depend on instinct and careful analyses, Financial Times, September 2, available at <https://www.johnkay.com/2014/09/03/the-wisest-choices-depend-on-instinct-and-careful-analysis/>

What is New Public Management (NPM)?

- Gained traction in the 1980s and 1990s
- Market-oriented reforms, privatization, deregulation
- Origin in public choice theory (James M. Buchanan)
- Neoliberal revolution (UK, both Tories and New Labour)
- US: reinventing Government Movement (1990s); NPM principles applied to federal agencies (Al Gore)
- World Bank and the International Monetary Fund (IMF)

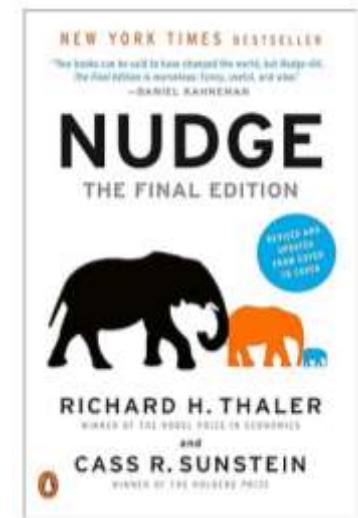
What is public choice theory?

Economists in the room to answer

- Rational choice
- Actors maximizing their utility
- Fighting bureaucracy thanks to market incentives (see later Thaler and Sunstein's 'nudging')
- Tackles rent seeking and voting behaviour



Cass Sunstein



See Timms, A. (2019, June). The Sameness of Cass Sunstein | The New Republic. New Republic. <https://newrepublic.com/article/154236/sameness-cass-sunstein>

The most widely used technique: Cost Benefit Analysis

Pros: Efficiency, simplicity, ease of communication, *prima facie* impersonality

Cons: Dependence of the outcome upon what is included or excluded (what are the externalities?); monetization

Exercise in class (20m + 10 reporting)

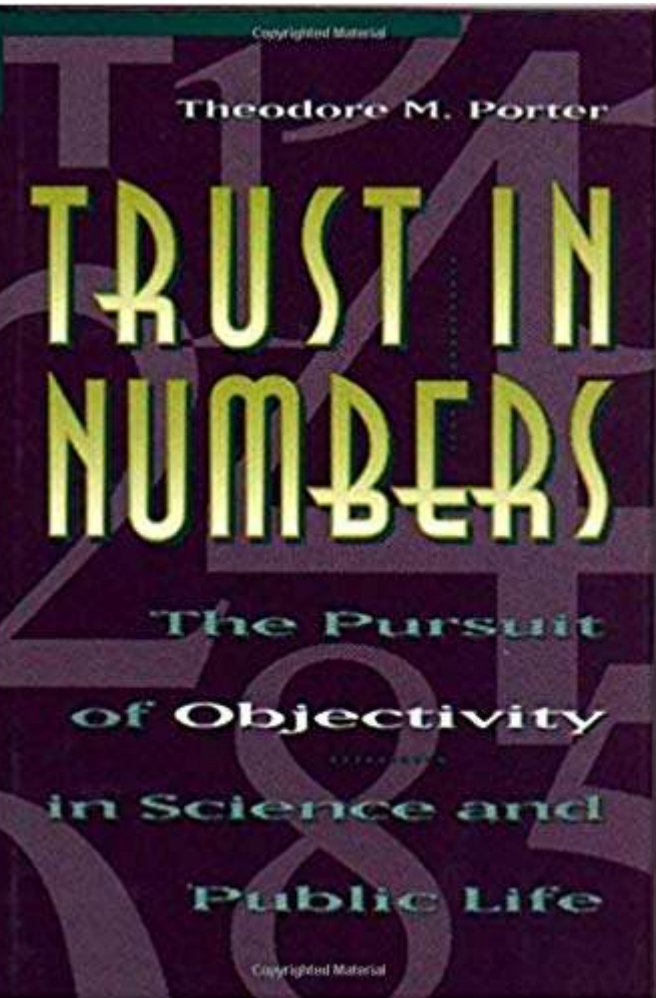
Imagine you work for the health ministry and need to find analytic arguments to judge the desirability and feasibility of policies aimed to reduce smoking habits in the population.



Source: The Simpsons, Smoke on the Daughter

- 1) What policies to consider?
- 2) What other ministries should participate to the discussion?
- 3) What factors should be considered in the analysis?
- 4) What costs should be included? What benefits?
- 5) Indicate whether the selected cost and benefits are amenable to quantification.

Back to our discussion of cost benefit analysis



History of cost benefit analysis. See Chapter 7: “U.S. Army Engineers and the Rise of Cost–Benefit Analysis” or this paper in eCampus

Porter, T. M. Objectivity as Standardization: The Rhetoric of Impersonality in Measurement, Statistics, and Cost–Benefit Analysis. in *Rethinking objectivity* (ed. Megill, A.) 197 –237 (Duke University Press, 1994).

Frames

Most analyses offered as input to policy are framed as cost benefit analysis or risk analyses, but some environmentalists disagree

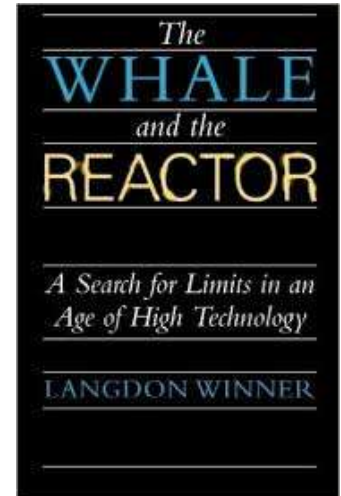


Langdon Winner

8

ON NOT HITTING
THE TAR-BABY

Winner, L., 1986. *The Whale and the Reactor: a Search for Limits in an Age of High Technology*. The University of Chicago Press, 1989 edition.



Alternative to Cost Benefit Analysis?

Multi-criteria analysis

Social multi-criteria/Ethical matrices

Use of different ‘Lenses’?



Original research article

What is wrong with evidence based policy, and how can it be improved?





















Andrea Saltelli ^{a,b,c}, , , , Mario Giampietra ^{a,c,d}



Environmental Science & Policy

Volume 106, April 2020, Pages 87-98

The technique is never neutral. How methodological choices condition the generation of narratives for sustainability

Andrea Saltelli ^{a,b}, , , , , , , , , , , , , , , , , , ,  

Taking issue with non-neutrality –
what social have scientists to say




Environmental Science & Policy

Volume 186, April 2020, Pages 87–98



The technique is never neutral. How methodological choices condition the generation of narratives for sustainability

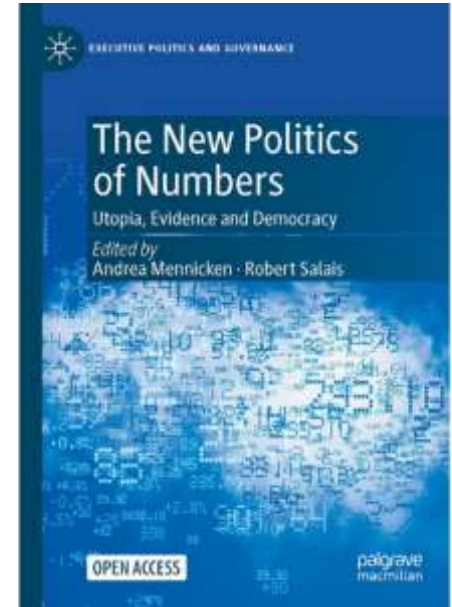
Andrea Saltelli ^{a,b},   Lorenzo Benini ^c, Silvia Funtozowicz ^d, Mario Giampietra ^{e,f},
Matthias Kaiser ^g, Erik Reinert ^{h,i}, Jansen P. van der Shuer ^{j,k}

A technical proof of quality is illusory without a parallel investigation of normative quality

Technical Quality

Normative quality

How the numbers of neoliberalism (New Public Management) constitute a regime of a-democracy; the example of indicators of employment



Salais, R. (2022). “La donnée n’est pas un donné”: Statistics, Quantification and Democratic Choice. In *The New Politics of Numbers: Utopia, Evidence and Democracy*, Andrea Mennicken and Robert Salais, Palgrave Macmillan, pp. 379–415.

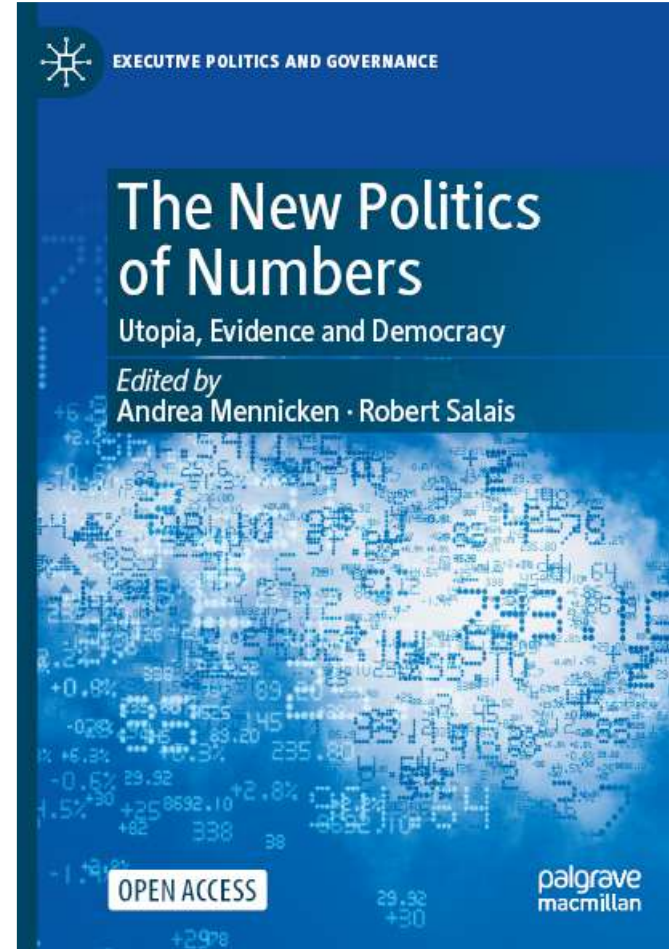
Evidence based policy

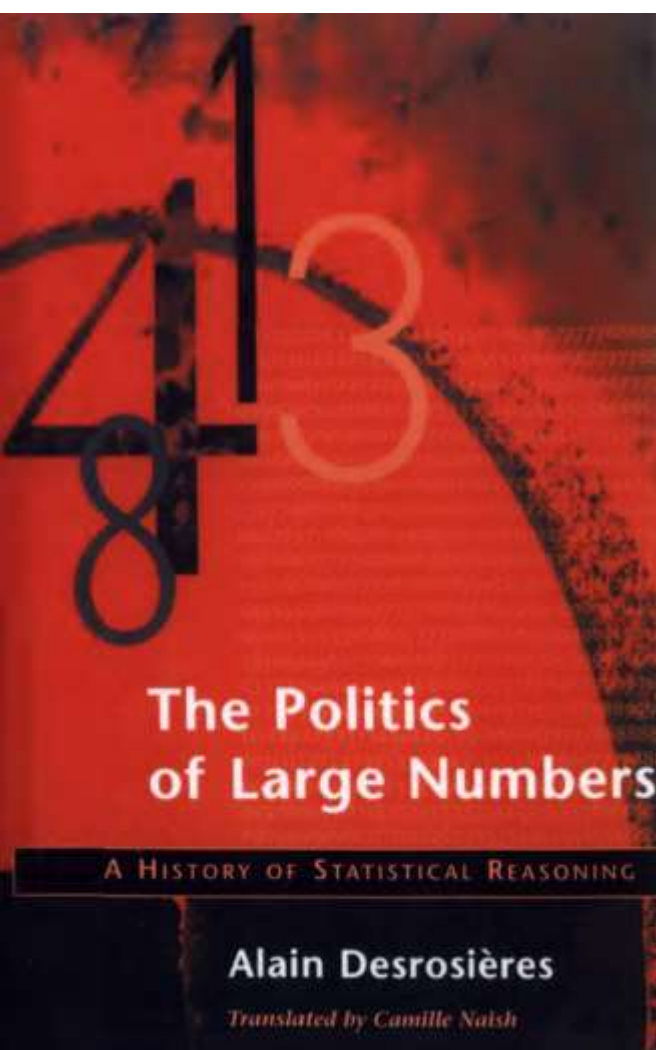
Statistics (creating things that hold together (Desrosières) for the solution of practical problems)

Policy based evidence

Governance driven quantification (a reversal of the statistical pyramid)

CHAPTER 12, “La donnée n’est pas un donné”: Statistics, Quantification and Democratic Choice, *Robert Salais*





Alain Desrosières: “Making things that hold”

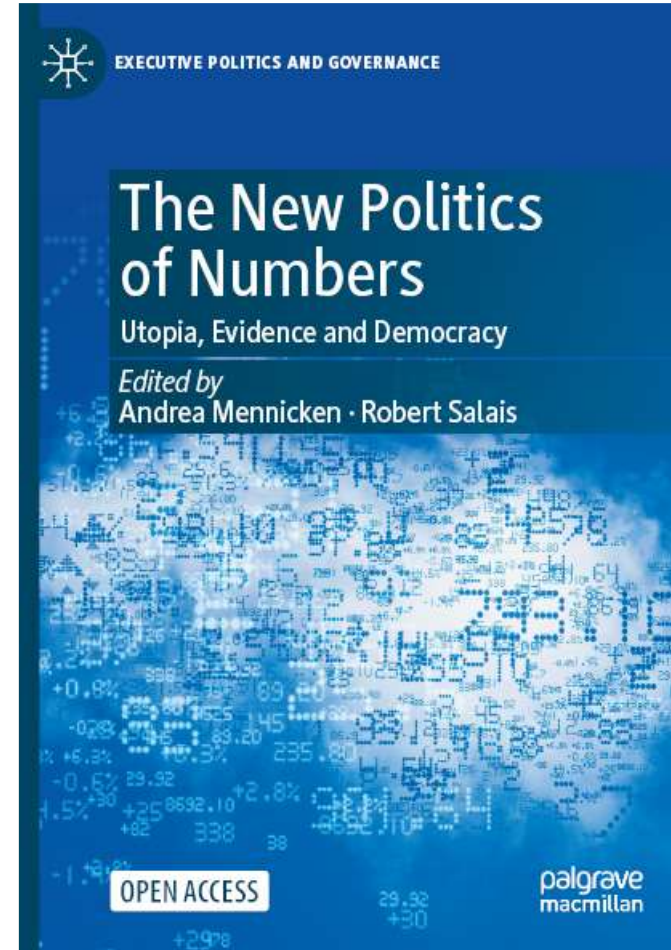
The construction of statistical concepts and categories that can serve for action

BUT

“It is because the moment of objectification can be made autonomous that the moment of action can be based on firmly established objects”

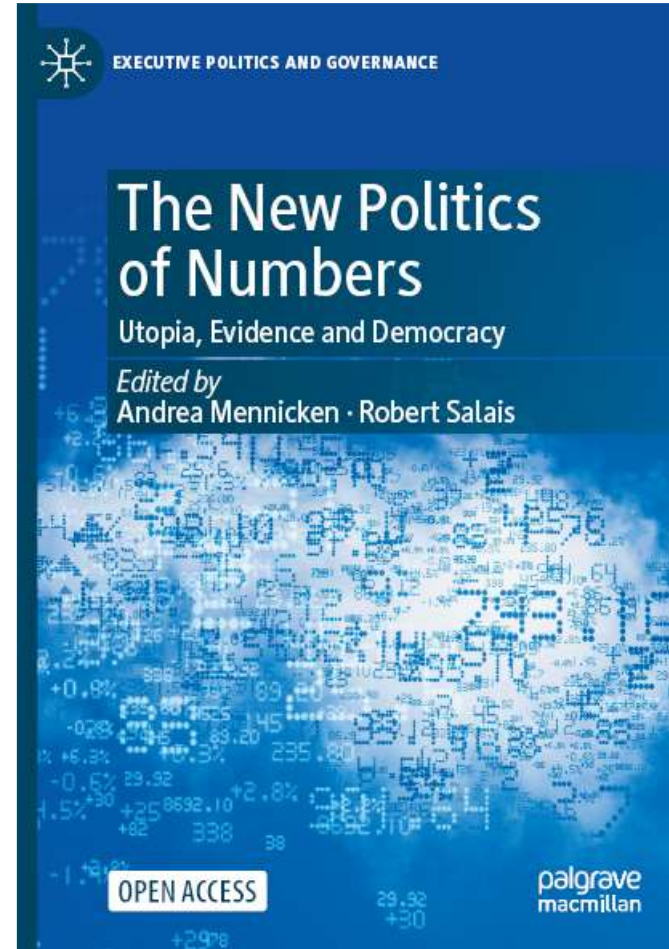
Governance driven quantification is based on pretended objectivity (neutrality), reductionism and justificationism that contribute to a loss of democratic agency (a-democracy)

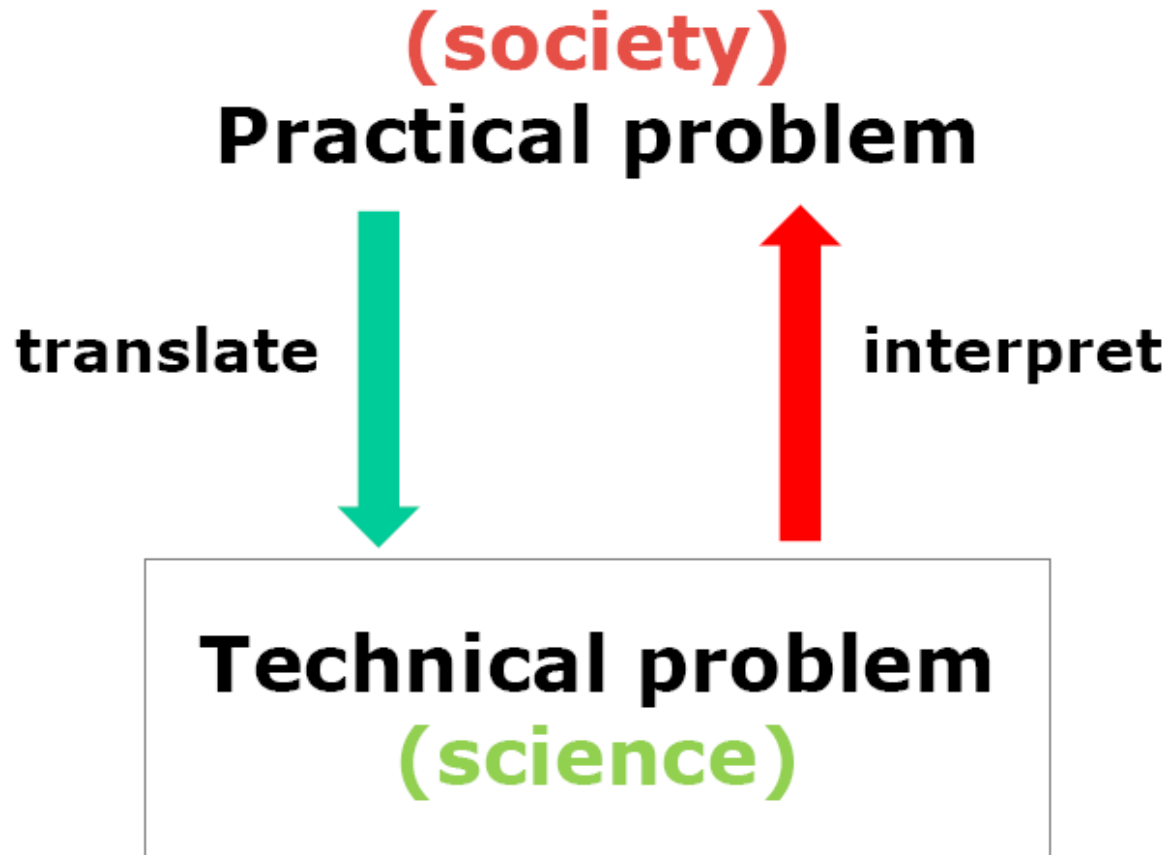
CHAPTER 12, “La donnée n’est pas un donné”: Statistics, Quantification and Democratic Choice, *Robert Salais*



Contesting unjust/unfair governance arrangement is impossible without producing alternative constructions of evidence – that requires muscles not easily available to the lay citizen

CHAPTER 12, “La donnée n’est pas un donné”: Statistics, Quantification and Democratic Choice, *Robert Salais*





Courtesy of Jeroen
van der Sluijs



Drawn after Ravetz,
J., 1971, *Scientific
Knowledge and its
Social Problems*,
Oxford University
Press.

Evidence based
policy versus policy
based evidence

PETRUCHIO: I say it is the moon.

KATHERINE: I know it is the moon.

PETRUCHIO: Nay, then you lie. It is
the blessèd sun.

KATHERINE: Then God be blessed, it is the
blessèd sun.

But sun it is not, when you say it is not,
And the moon changes even as your mind



W. Shakespeare,
the Taming of the
Shrew, Act IV.

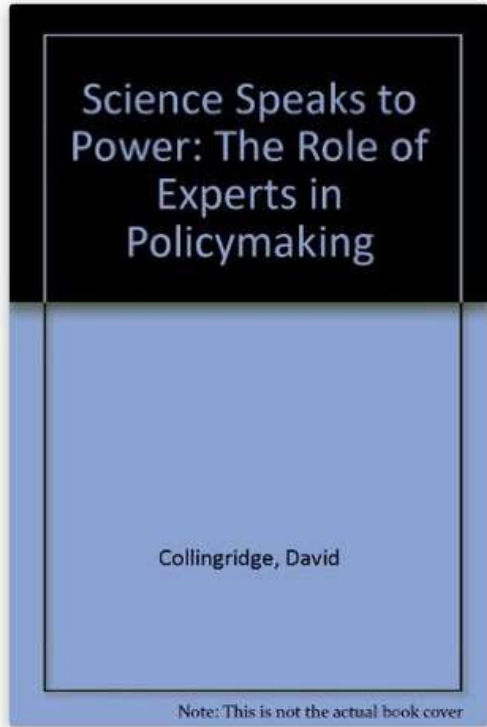
‘Policy based evidence’ has entered the public discourse

Warring parties accuse one another of the sin

“[...] what Greenpeace wants is policy-based evidence making not evidence-based policy making” (Sanderson, 2015) ...

Wilkes, G., 2015, Free Lunch: Policy-based evidence-making, Financial Times, July 3.
Sanderson, A.B., 3 Feb 2015, Breitbart, see <http://www.breitbart.com/london/2015/02/03/academic-attacks-greenpeace-for-ignoring-the-evidence-on-gm-crops/>; the politician is UKIP Energy Spokesman Roger Helmer MEP.

Hold on a second: who said that
policies should be based on science?



Science Speaks to Power: The Role of Experts in Policymaking

Hardcover – 31 Dec 1986

by [David Collingridge](#) (Author), [Colin Reeve](#) (Author)

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from £999.11

1 Used from £999.11

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... since it is so expensive you can find a study copy ...

Collingridge and Reeve advocate as model for policy decision one of least dependence on science.

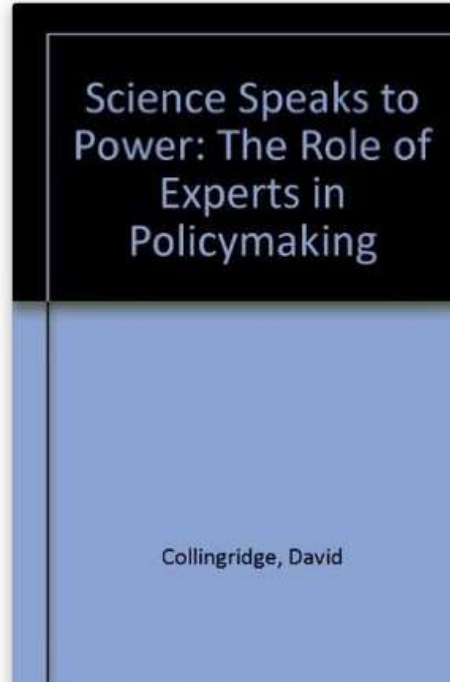
Collingridge, D. and Reeve, C., 1986, *Science Speaks to Power: The Role of Experts in Policy Making*. London: Frances Pinter.

Collingridge and Reeve (1986) twin myths of rationality

1. policy action is predicated on the accumulation of facts and the taming of uncertainty and
2. the power of science (whereby science is there to provide dispassionate facts to adjudicate controversies).

Collingridge, D. and Reeve, C., 1986, *Science Speaks to Power: The Role of Experts in Policy Making*. London: Frances Pinter.

Aim: to deconstructs these myths based on a number of historical test cases (views of 1986)

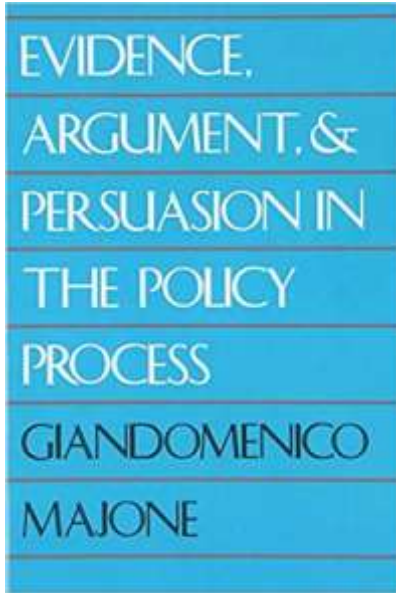


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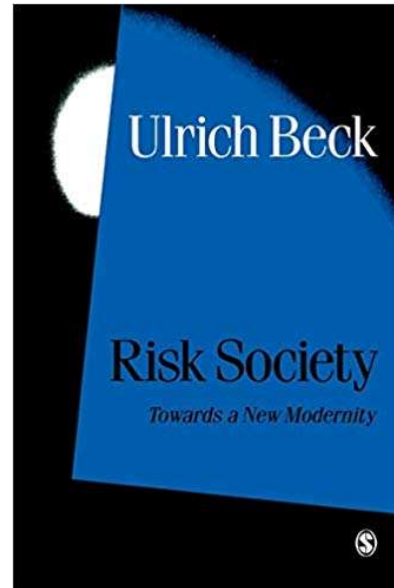
From Ulrich Beck to Giandomenico Majone: the technique is never neutral



Ulrich Beck
(1944 –2015)



1989



1992 (1986)



Environmental Science & Policy

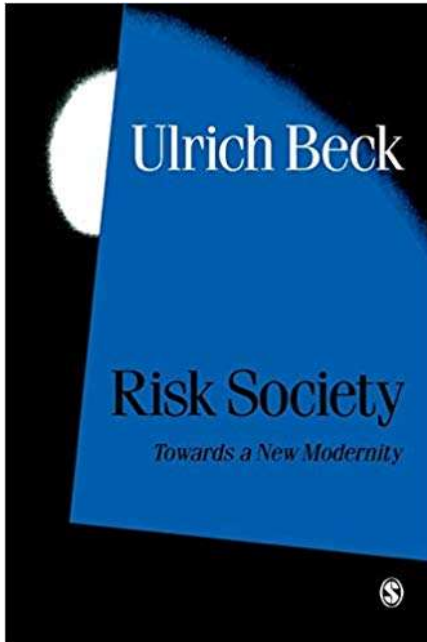
Volume 106, April 2020, Pages 87-98



The technique is never neutral. How
methodological choices condition the
generation of narratives for sustainability

Andrea Saltelli ^{a, b, R, BB}, Lorenzo Benini ^c, Silvio Funtowicz ^a, Mario Giampietro ^{d, e}, Matthias Kaiser ^a,
Erik Reinert ^{h, f}, Jeroen P. van der Sluijs ^{h, B, h}

Science as a self-service shop for financially well-endowed customers in need of arguments
(Beck 1992)

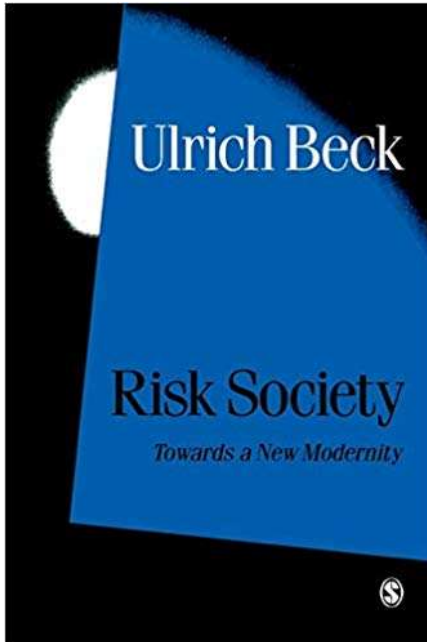


1992 (1986)



Ulrich Beck
(1944 –2015)

“... from the experts and the fundamental controversies they have fought out (or not fought out) one can learn how unwelcome results can be blocked professionally (by methodological criticism, for instance).”(Beck 1992)



1992 (1986)



Ulrich Beck
(1944 –2015)

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

Since to say anything of importance in public policy requires value judgment, this artificial separation between values and rational capacity is a threat to all notions of public deliberation and defensible policy choices (p. 8)

Multiple policy evaluation should also be possible. It would recognize the legitimacy of the different perspectives ... the objective is not to construct a grand model that would combine all the partial perspectives into...a weighted average ...of equity, effectiveness, legality ... (p.9)

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

The pretended distinction between facts and value is used instrumentally

In the policy process fact and values cannot be separated in the making of an argument

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

“When science, technology, and public policy intersect, different attitudes, perspectives, and rules of argument come into sharp conflict. Scientific criteria of truth clash with legal standards of evidence and with political notions of what constitutes sufficient ground for action”

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

“the technique is never neutral”

<https://arxiv.org/ftp/arxiv/papers/1712/1712.06457.pdf>

Majone: “In any area of public policy the choice of instruments, far from being a technical exercise that can be safely delegated to the experts, reflects as in a microcosm all the political, moral, and cultural dimensions of policy-making”

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS

GIANDOMENICO

MAJONE

“ [my suggestion is to view a] policy analyst as a producer of arguments, capable of distinguishing between good and bad rhetoric, rather than as a “number cruncher” ...



ARISTOTLE 'RHETORIC', C.4TH BCE

'THE ART OF PERSUASION'

ETHOS

AN APPEAL TO PROVE THE AUTHORITY OF THE SPEAKER AND THEIR CREDIBILITY

- PROOF OF EXPERTISE
- YOU'VE GOT THE RECEIPTS!



ARISTOTLE EXPLAINS THERE ARE THREE MODES (PISTEIS) OF PERSUASION IN RHETORIC

PATHOS

AN APPEAL TO EMOTIONS

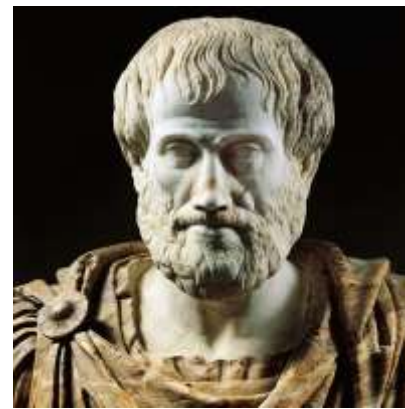
- PASSIONATE DELIVERY
- PERSONAL ANECDOTES
- METAPHOR AND SIMILE



LOGOS

A LOGICAL APPEAL (WHICH ENHANCES **ETHOS**)

- FACTS AND FIGURES
- DEDUCTIVE REASONING ENDING IN CONCLUSION (SYLLOGISM)
- A BODY OF PROOF... SORT OF... (ENTHYMEME)



Source: Getty images

Persuasion = logos + pathos + ethos

Aristotle's "Rhetoric"

Something impact assessment also needs to consider: standards and their impact ... what leads to the issue of regulatory capture



Source: <https://techliberation.com/2011/01/20/toles-cartoon-on-regulatory-capture/>, cartoon of Tom Toles



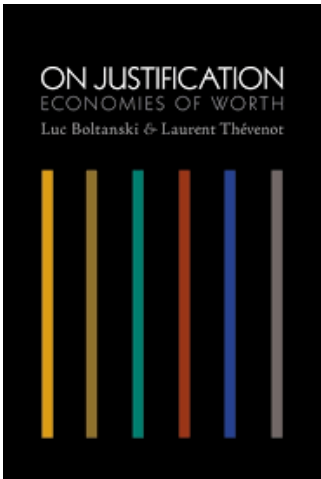
A New Calculable Global World
in the Making: Governing Through
Transnational Certification Standards

Laurent Thévenot

**critical public debates between
conceptions of the common good**



**individual consumers' choices
between certified market goods**



Power asymmetries in the framing of issues:
those who have the deepest pockets marshal
the best [foremost 'scientific'] evidence

Sylvain Laurens

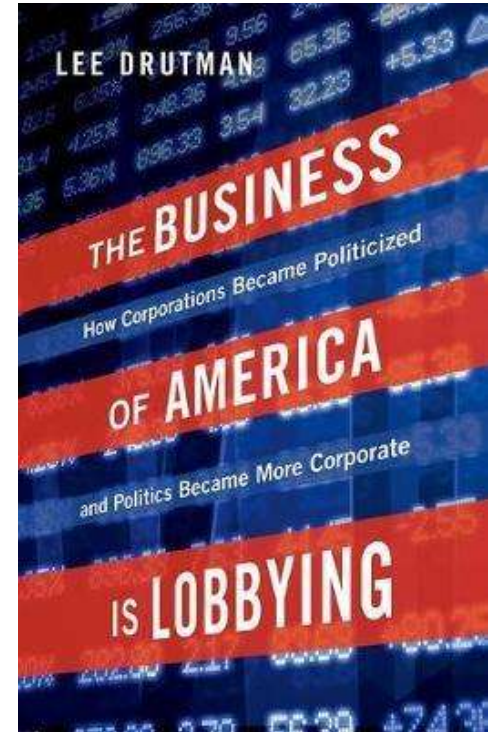


**LOBBYISTS AND
BUREAUCRATS IN BRUSSELS**
CAPITALISM'S BROKERS

Sylvain Laurens

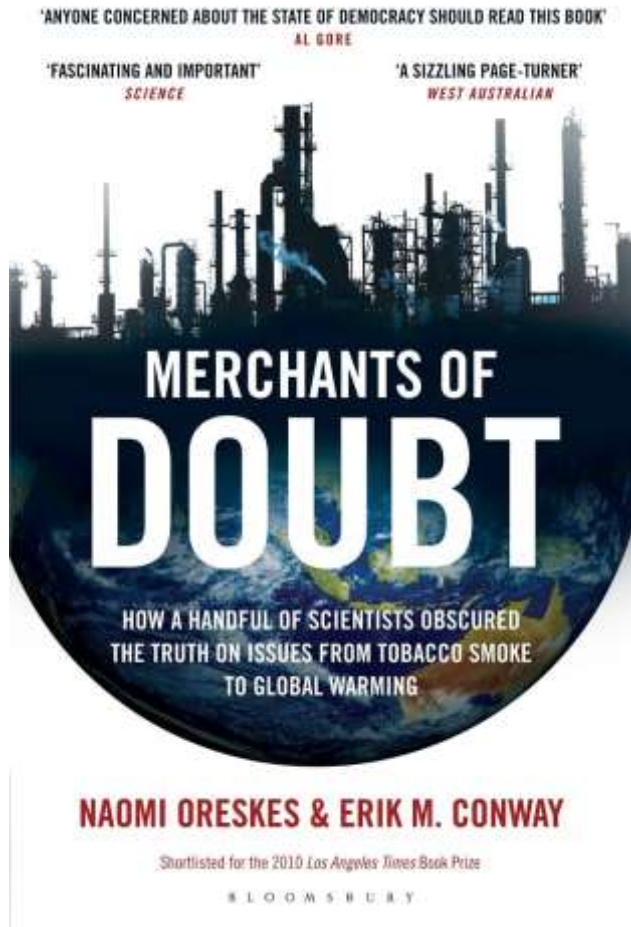


Lee Drutman



For both Laurens and Drutman a salient aspect of this power is lobbyists' access to more and better disseminated knowledge/science

What regulatory
capture has to do
with all that



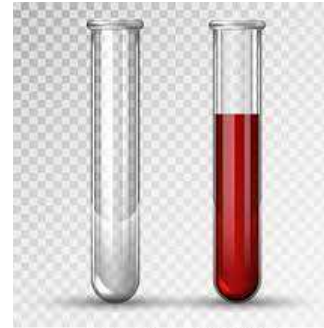
Naomi Oreskes and Erik M. Conway

‘sound science’ and
‘good epidemiology’
against ‘junk science’

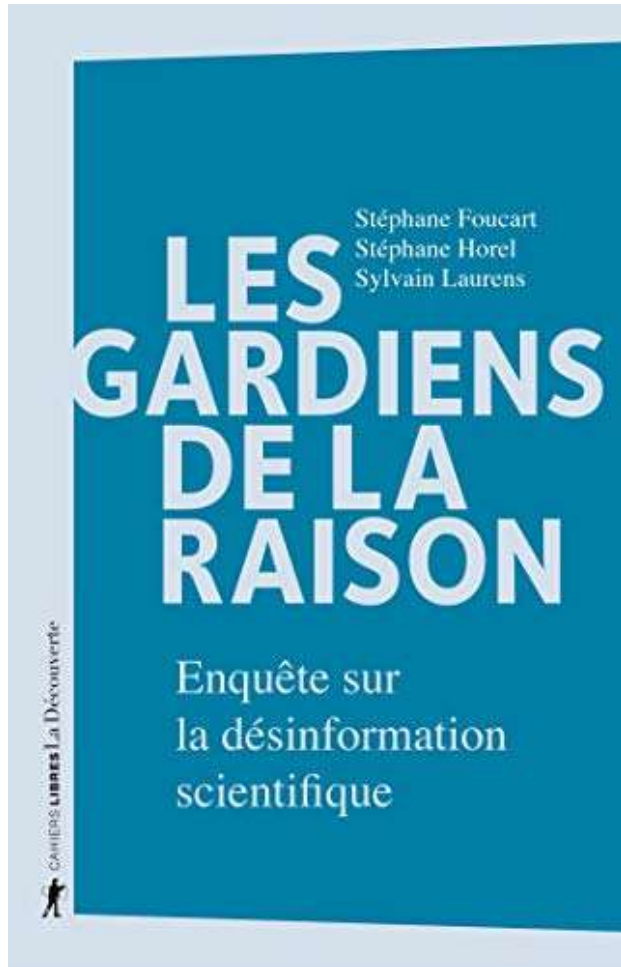
Guardians of reason



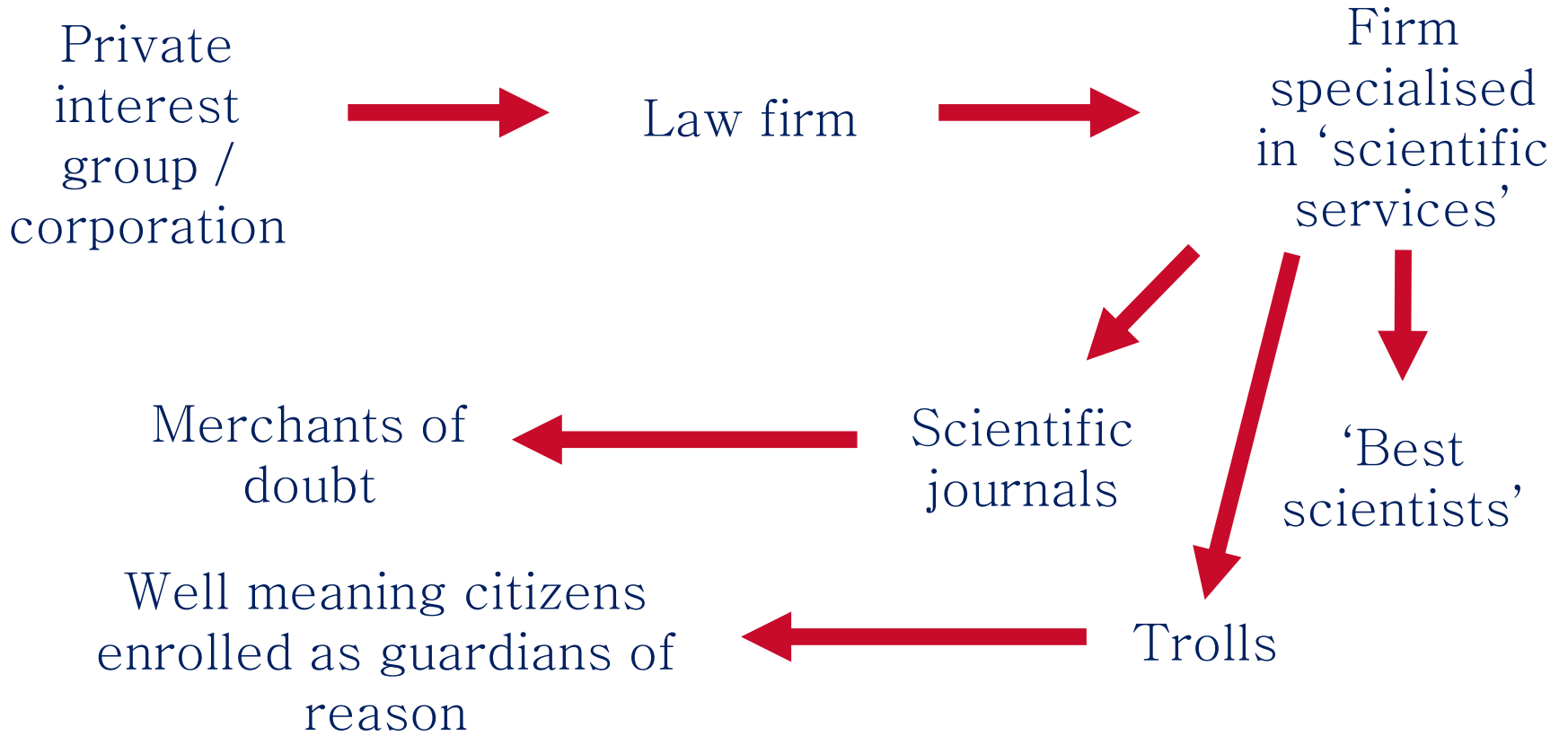
Guardians of sound science



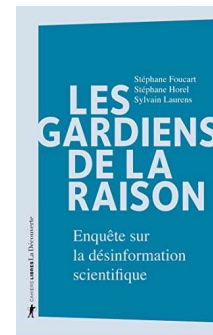
shutterstock.com · 408560539



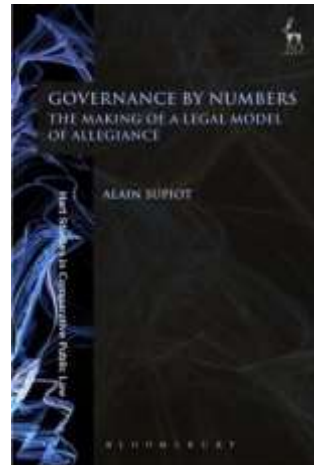
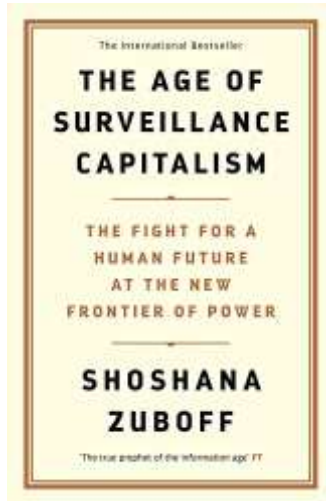
An army of self-proclaimed ‘fact checkers’ becomes mobilized in the defence of a neoliberal and conservative credo, posing as victims of an assault on science perpetrated by the purported enemies of reason



Strategies so *rapides et inédites*



New powerful instruments such as the use of AI and algorithms in combination with cognitive psychology and the new social media to influence the behaviour of consumers / voters

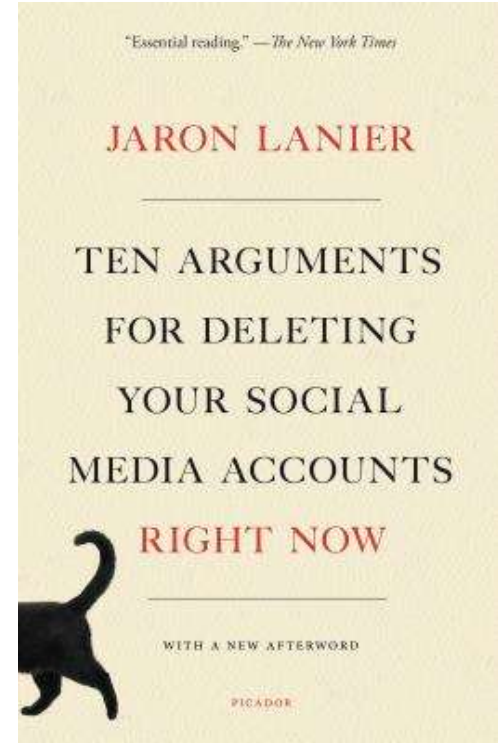
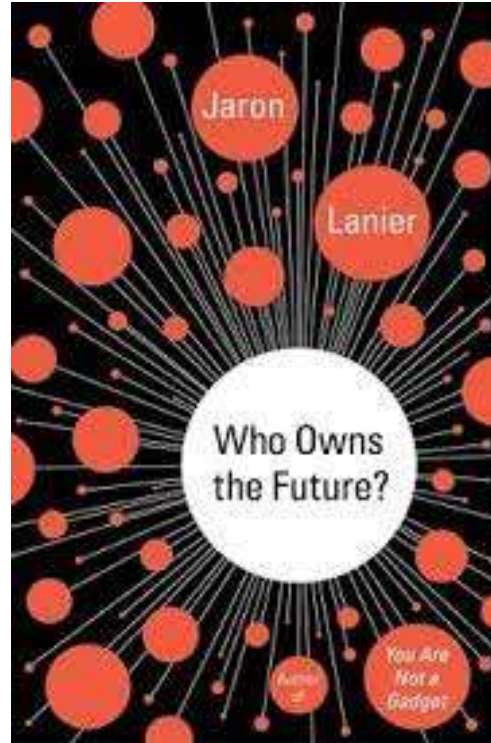


Digressing now ... the existential reading of Jaron Lanier



Source: <https://svauthorsfest.org/authors/jaron-lanier/>

Jaron Lanier: “The new media make us ... worse persons”



An epistemic ladder for regulatory capture

- Epistemic. Invalidating the inference or the methods
- Institutional. Delegitimising and/or 'colonising' institutions
- Political. Promoting a worldview where the very idea of regulation is undesirable

Science, the endless frontier of regulatory capture

Andrea Sahali ^{a, B}, Dorothy J. Dankel ^{b, c}, Monica Di Fiore ^d, Nina Holland ^e, Martin Pigeon ^f



Some cases

Chemicals pollution and biodiversity and ecosystem services: the case of neonicotinoid insecticides and entomofauna collapse (insectageddon)

Based on: Andrea Saltelli, Lorenzo Benini, Silvio Funtowicz, Mario Giampietro, Matthias Kaiser, Erik Reinert, Jeroen P. van der Sluijs, 2020, The technique is never neutral. How methodological choices condition the generation of narratives for sustainability, Environmental Science and Policy, Volume 106, Pages 87–98, <https://www.sciencedirect.com/science/article/pii/S1462901119304721>. **OPEN ACCESS**

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[@AndreaSaltelli@mstdn.social](https://twitter.com/AndreaSaltelli)

<https://www.youtube.com/channel/UCz26ZK04xchekUy4GevA3DA>

Late lessons from early warnings:
science, precaution, innovation

Pollinators decline has been a policy
issue for some time now ... see this
2013 report from the European
Environment Agency



ISSN 1725-9177



Decline of pollinators

Insects Opinion

Insectageddon: farming is more catastrophic than climate breakdown

George Monbiot

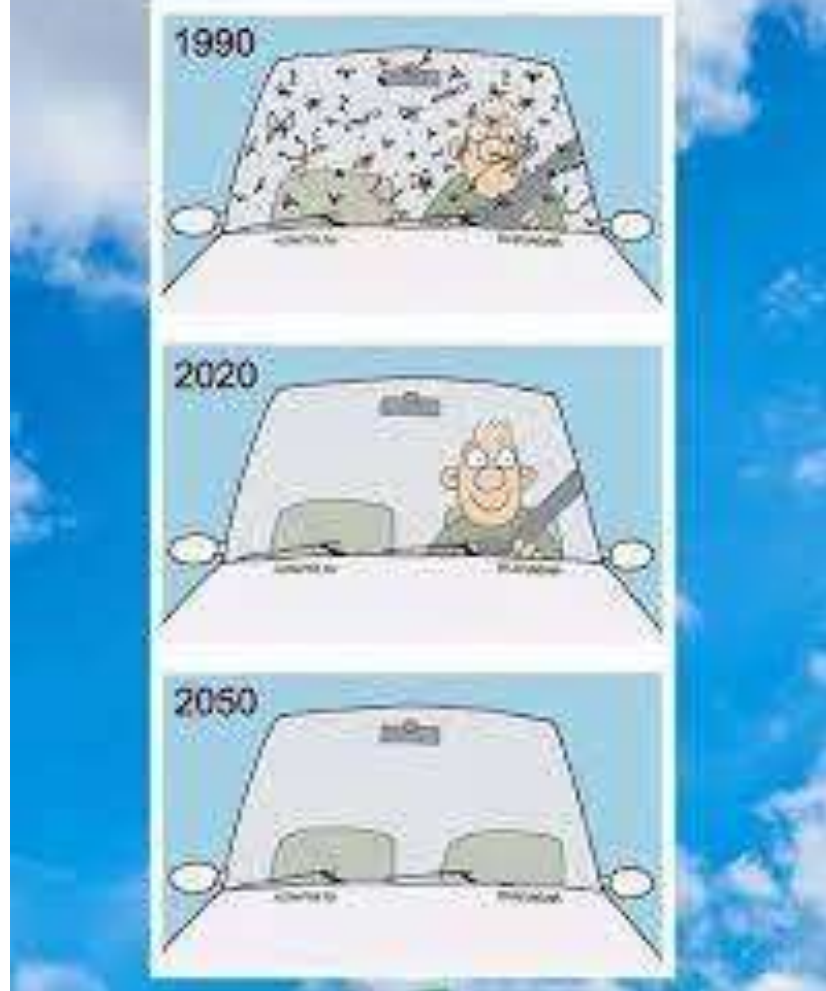
The shocking collapse of insect populations hints at a global ecological meltdown

🐦 @GeorgeMonbiot

Fri 20 Oct 2017 12.11 BST



Windshield effect



While the foraging area of bees may extend over up to 9 km away from the honeybees, and the impact of insecticides implies bioaccumulation and hence long term effects, **the prevailing measuring techniques held valid in regulation fail to detect the toxicity of these insecticides**



Jeroen van der Sluijs

Van der Sluijs, Jeroen P., Noa Simon-Delso, Dave Goulson, Laura Maxim, Jean-Marc Bonmatin, and Luc P Belzunces. 2013. “Neonicotinoids, Bee Disorders and the Sustainability of Pollinator Services.” *Current Opinion in Environmental Sustainability* 5 (3-4): 293-305.



Robinson, Claire, et al. 2018.
“Ensuring a Higher Level of Protection from Pesticides in Europe: The Problems with Current Pesticide Risk Assessment Procedures in the EU – and Proposed Solutions. A White Paper Prepared for the Coalition Citizens for Science in Pesticide Regulation.”

<https://doi.org/10.5281/ZENODO.2543743>



The white paper reveals a jungle of conflicts of interests, loopholes, and sloppy regulation in the way pesticides are regulated in the EU

At the level of the narratives, one side insist to a plurality of factors that might explain the decline (including climate change), the other the specific and determinant role of pesticides

Some cases

A biophysical analysis of the circular economy

(Next lesson)

Based on: Andrea Saltelli, Lorenzo Benini, Silvio Funtowicz, Mario Giampietro, Matthias Kaiser, Erik Reinert, Jeroen P. van der Sluijs, 2020, The technique is never neutral. How methodological choices condition the generation of narratives for sustainability, *Environmental Science and Policy*, Volume 106, Pages 87–98, <https://www.sciencedirect.com/science/article/pii/S1462901119304721>. **OPEN ACCESS**

Some cases

The variety of values of seafood production and value chains

Seafood is to a large part traded in long value chains across the globe;

Increased seafood productions → polluting effects or other potential harms (fish diseases, diminishing stocks) → societal value conflicts and intense political debate

Based on: Andrea Saltelli, Lorenzo Benini, Silvio Funtowicz, Mario Giampietro, Matthias Kaiser, Erik Reinert, Jeroen P. van der Sluijs, 2020, The technique is never neutral. How methodological choices condition the generation of narratives for sustainability, Environmental Science and Policy, Volume 106, Pages 87–98, <https://www.sciencedirect.com/science/article/pii/S1462901119304721>. **OPEN ACCESS**

The variety of values of seafood production and value chains

Conflicted scientific evidence produced by different stakeholders as to existing quotas; the issue of illegal or unreported activities

Conflicted evidence in aquaculture and its impact as well – different models/cultures:

- extensive small-scale production units, regulated by strict certification schemes and legal regimes
- intensive large-scale (and GMO based?) production to feed an increasing global population, and to meet expectations of the global markets

The variety of values of seafood production and value chains

An ethical matrix approach

- identify the relevant stakeholders
- identify potentially affected organisms
- Identify ethical principles

Table 1. Ethical matrix for a genetically modified fish species.

Ethical matrix for gm-fish:	Do avoid doing any harm	Do try to do some good	Dignity / autonomy	Justice / fairness
Small producers	Dependencies on nature and corporations	Adequate income and work security	Freedom to adopt or not to adopt	Fair treatment in trade
Consumers	Safe food	Nutritional quality Food security	Respect for consumer choice (labelling)	General affordability of food product
Treated fish	Proper animal welfare	Improved disease resistance	Behavioural freedom	Respect for natural capacities (telos)
Biota	Pollution and strain on natural resources	Increasing sustainability Improved resilience	Maintenance of biodiversity	No additional strain on regional natural resources

One more case for you:
legislating on
exoskeletons
(20m + 10 discussion)



Source: <https://james-camerons-avatar.fandom.com/>

We are in a near future. An impact assessment should be prepared to support a regulation/directive/communication on a new class of medical devices: exoskeletons. While these exoskeletons can be used for medical purpose to enhance mobility and general functionality for disabled people, recent anecdotal evidence suggest they can be used for mischief by mobsters, burglars, mercenaries.

The regulation sets limit on the exoskeletons' power and establishes a system of authorization for users.

The industry claims that the power limitation may endanger the life of their customers (who might need an extra boost of energy in danger situations) and that the system of registration for users will depress demand. Further the machineries' power is an important element of the industry's advertising strategy.

Users (association covering the interests of disabled peoples) want them safe and cheap, and are less sanguine about the regulation system provided is not too burdensome.

Some NGO's complain that these enhancement are as dangerous as weapons, and that as such their use should be discouraged. Other stakeholders observe that they risk becoming fashionable to the point of redefining humanity.

The industry puts forward data showing that indeed this is a very high-innovation field (impressive share of high skill workers in the sector's labour force) and that the market size – puny at present – is quickly growing in importance in several member states. The evidence of improper use is sketchy but very vivid. Some tabloids run scare stories



Evaluating the Potential for Green Growth in a context of Technology Optimism and Technology Pessimism

A different way to look at transitions; adopting renewables and cleantech, not just for emission reduction, but because these embody technological change, manufacturing, learning curve effects, and are thus capable of capturing increasing returns. In contrast, fossil fuels are a typical diminishing returns activity.



Erik S. Reinert
(image Wikipedia Commons)

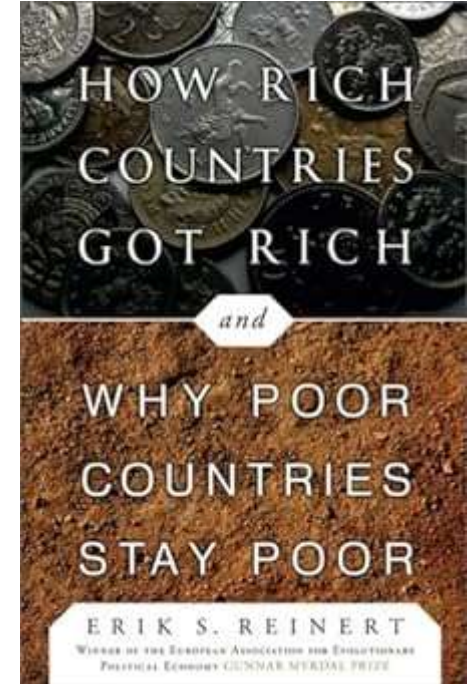
Based on: Andrea Saltelli, Lorenzo Benini, Silvio Funtowicz, Mario Giampietro, Matthias Kaiser, Erik Reinert, Jeroen P. van der Sluijs, 2020, The technique is never neutral. How methodological choices condition the generation of narratives for sustainability, *Environmental Science and Policy*, Volume 106, Pages 87–98, <https://www.sciencedirect.com/science/article/pii/S1462901119304721>. **OPEN ACCESS**

Evaluating the Potential for Green Growth in a context of Technology Optimism and Technology Pessimism

Putting renewable energies at the core of a country's industrial policy will drive down costs as the country moves along the learning curve...

With renewable power energy can be harvested, which at present is only practiced in hydropower, while with fossil fuels it needs to be extracted under diminishing returns...

As for the past, a period of protection will be needed to let these “infant industries” gain speed. At present, the case for renewables is opposed by vested interest of the fossil fuel sector as well as by the so called “neutral” economists who insist that markets should be allowed to function “free of interference”.



Some cases II (to be expanded)

Climate, energy, and Sámi herders (next lesson)

Climate and water security (next lesson)

Lessons learned from COVID-19



Source: <https://www.nationalgeographic.com/>

Based on: Saltelli, Andrea, Marta Kuc-Czarnecka, Samuele Lo Piano, Máté János Lőrincz, Magdalena Olczyk, Arnald Puy, Erik Reinert, Stefán Thor Smith, and Jeroen P. van der Sluijs. 2023. Impact assessment culture in the European Union. Time for something new? *Environmental Science & Policy* 142: 99–111. <https://doi.org/10.1016/j.envsci.2023.02.005>, <https://www.sciencedirect.com/science/article/pii/S1462901123000382>. **OPEN ACCESS**

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<https://www.youtube.com/channel/UCz26ZK04xchekUy4GevA3DA>

Some cases III
Business Risk and Climate Analytics (next lesson)

Fiedler, Tanya, Andy J. Pitman, Kate Mackenzie, Nick Wood, Christian Jakob, and Sarah E. Perkins-Kirkpatrick. 2021. "Business Risk and the Emergence of Climate Analytics." *Nature Climate Change* 11 (2): 87–94. <https://doi.org/10.1038/s41558-020-00984-6>.



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Perspective | [Published: 08 February 2021](#)

Business risk and the emergence of climate analytics

[Tanya Fiedler](#), [Andy J. Pitman](#) , [Kate Mackenzie](#), [Nick Wood](#), [Christian Jakob](#) & [Sarah E. Perkins-Kirkpatrick](#)

Nature Climate Change **11**, 87–94 (2021) | [Cite this article](#)

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Use of frames in the social disputes about technology: the case of GMO

Speaking of Science

107 Nobel laureates sign letter blasting Greenpeace over GMOs

By Joel Achenbach



While Greenpeace and other organizations oppose genetically engineered food, more than 100 Nobel laureates are taking a stand on the side of GMOs. Here's a look at each side's arguments. (Jenny StARRS/The Washington Post)

“While Greenpeace and other organizations oppose genetically engineered food, more than 100 Nobel laureates are taking a stand on the side of GMOs. Here's a look at each side's arguments. (Jenny StARRS/The Washington Post)”

From the Nobel laureates' letter:

“Greenpeace has spearheaded opposition to Golden Rice, which has the potential to reduce or eliminate much of the death and disease caused by a vitamin A deficiency (VAD), which has the greatest impact on the poorest people in Africa and Southeast Asia.

[...] a total of one to two million preventable deaths occur annually as a result of VAD, [...] VAD itself is the leading cause of **childhood blindness globally affecting 250,000 – 500,000 children each year. Half die within 12 months of losing their eyesight”**

From the Nobel laureates' letter:

“[...] Opposition based on emotion and dogma contradicted by data must be stopped.

How many poor people in the world must die before we consider this a "**crime against humanity**"?”

http://supportprecisionagriculture.org/nobel-laureate-gmo-letter_rjr.html

Opposing evidence on Golden Rice

Nutritionally: not enough beta carotene

Golden rice not authorized yet

More politically viable alternative successful

Dangerous colour

Low yield of the modified variety ...

<http://www.ecowatch.com/greenpeace-to-nobel-laureates-its-not-our-fault-golden-rice-has-failed-1896697050.html>

<https://theconversation.com/forcing-consensus-is-bad-for-science-and-society-77079>.

More on the conflict on Genetically Modified Organism



Source: <https://www.pinterest.es/pin/396879785889002121/>



GMO opponents as ‘New-Agers’

The Economist, Vermont v science, The little state that could kneecap the biotech industry, May 10th 2014

An old (2001) report: The PABE study

Public Perceptions of Agricultural Biotechnologies in Europe

Final Report of the PABE research project

funded by the Commission of European Communities
Contract number: FAIR CT98-3844 (DG12 - SSMI)



Claire Marris



Brian Wynne

Main authors

Claire Marris, Brian Wynne, Peter Simmons and Sue Weldon

With contribution from (in alphabetical order):

Johanna Cárceres

Bruna De Marchi

Andreas Klinke

Louis Lemkow

Luigi Pellizzoni

Uwe Pfenning

Ortwin Renn

Ramon Sentmartí

Myth 1: The primordial cause of the problem is that lay people are ignorant about scientific facts

Myth 2: People are either 'for' or 'against' GMOs

Myth 3: Consumers accept medical GMOs but refuse GMOs used in food and agriculture

Myth 4: European consumers are behaving selfishly towards the poor in the Third World

Myth 5: Consumers want labelling in order to exercise their freedom of choice



Myth 6: The public thinks – wrongly – that GMOs are unnatural

Myth 7: It's the fault of the BSE crisis: since then, citizens no longer trust regulatory institutions

Myth 8: The public demands 'zero risk' – and this is not reasonable

Myth 9: Public opposition to GMOs is due to "other – ethical or political– factors“

Myth 10: The public is a malleable victim of distorting sensationalist media



Against these presumed myths what the respondent had to say?



Why do we need GMOs? What are the benefits?

Who will benefit from their use?

Who decided that they should be developed and how?



Marris, C., Wynne, B., Simmons P., and Weldon, S. 2001. Final Report of the PABE research project funded by the Commission of European Communities, Contract number: FAIR CT98-3844 (DG12 - SSMI), December 2001.

Why were we not better informed about their use in our food, before their arrival on the market?

Why are we not given an effective choice about whether or not to buy and consume these products?

Do regulatory authorities have sufficient powers and resources to effectively counter-balance large companies who wish to develop these products?



Can controls imposed by regulatory authorities be applied effectively?

Have the risks been seriously assessed? By whom? How?

Have potential long-term consequences been assessed? How?



How have irreducible uncertainties and unavoidable domains of ignorance been taken into account in decision-making?

What plans exist for remedial action if and when unforeseen harmful impacts occur?

Who will be responsible in case of unforeseen harm? How will they be held to account?



US National Academy of Sciences report on genetically engineered crops: “Products of new technologies should be regulated not only on the basis of their benefit–risk profiles, but also on their societal context and need”



Hunter, J., Duff, G., GM crops—lessons from medicine, *Science*, 353, 1187 (2016)

Hints for more debates

Academia as a pillar of evidence based policy?

http://www.andreasaltelli.eu/file/repository/ESOF2022_Saltelli.pdf

What is problem shifting ?

<https://www.problemshifting.directory/>

Thank you