

Numbers for Policy

Practical problems in quantification

Andrea Saltelli, Centre for the Study of the Sciences and the Humanities,
SVT – University of Bergen (UIB) and Open Evidence Research,
Universitat Oberta de Catalunya (UOC), Barcelona.

Presentation at ISGlobal, Campus Mar, PRBB,
Barcelona, February 7th 2020



Where to find this talk: www.andreasaltelli.eu

Andrea
Saltelli

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... and these are 6 m worth watching from Slavoj
Žižek [youtube.com/watch?v=TVwKjG...](https://www.youtube.com/watch?v=TVwKjG...)

YouTube @YouTube



Jul 26, 2019



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- Evidence based policy and its problems
- What is the role of quantification ?
- Ethics of quantification
- NUSAP
- Sensitivity auditing
- Post truth
- Orwell or Huxley? Techno-split
- Science and lobbying

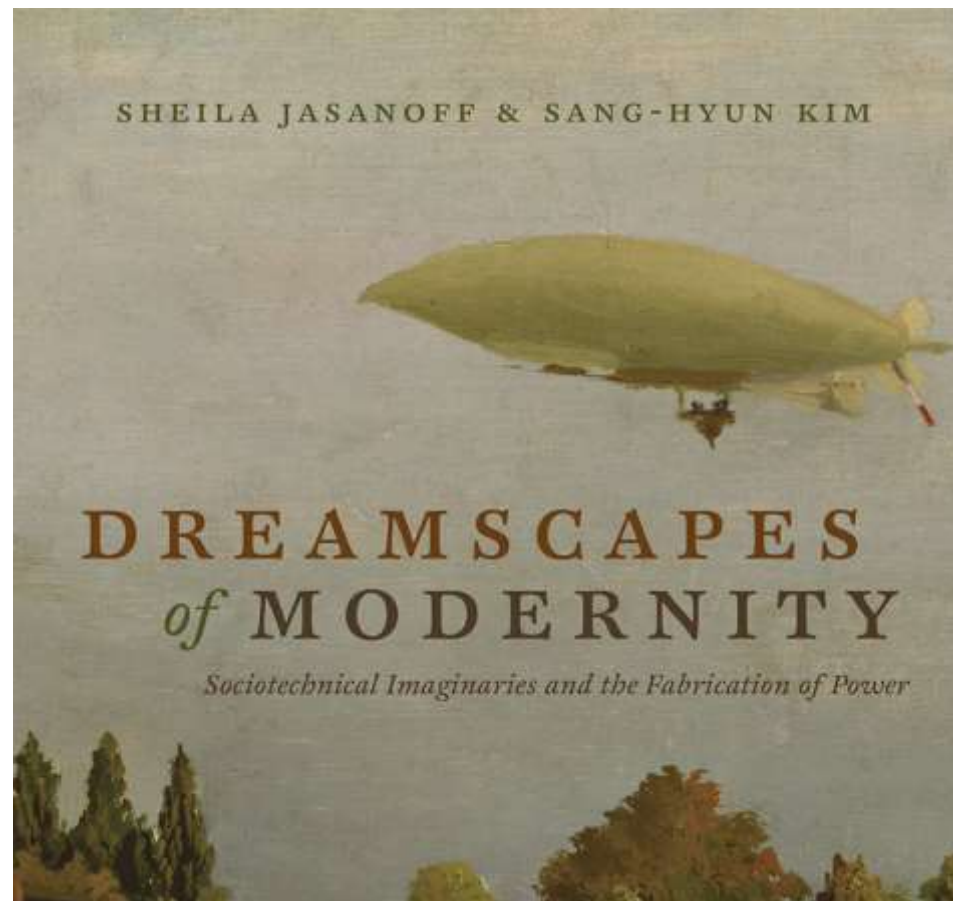
Evidence-based
policy, expertise, use of
quantification

“People in this country have had enough of experts” (M. Gove)

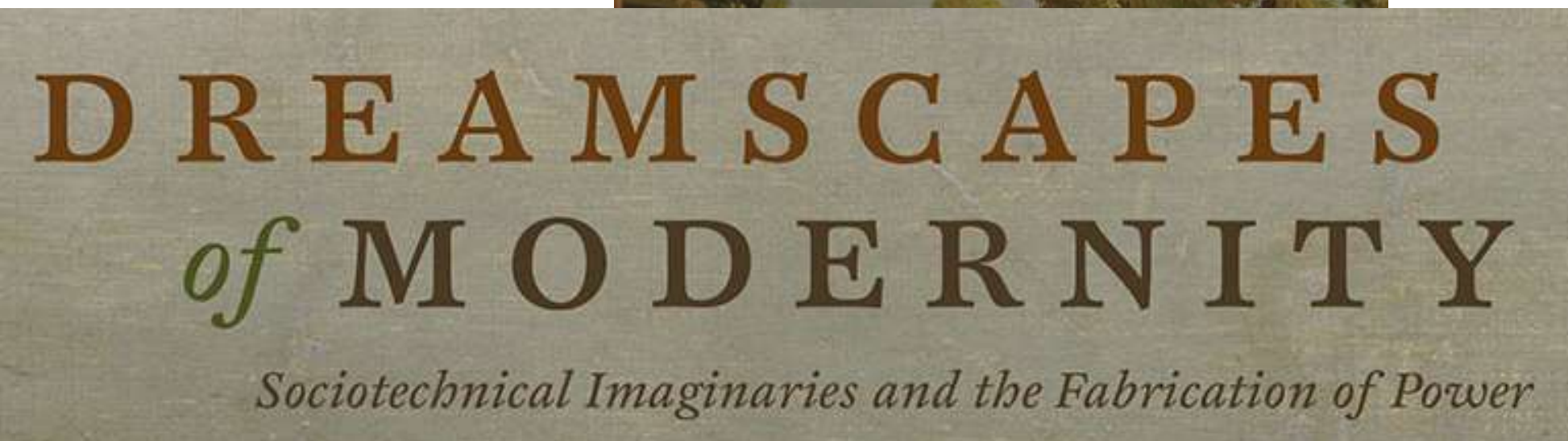


P. Stephens, Financial Times, June 23 2016, <https://www.ft.com/content/bfb5f3d4-379d-11e6-a780-b48ed7b6126f>

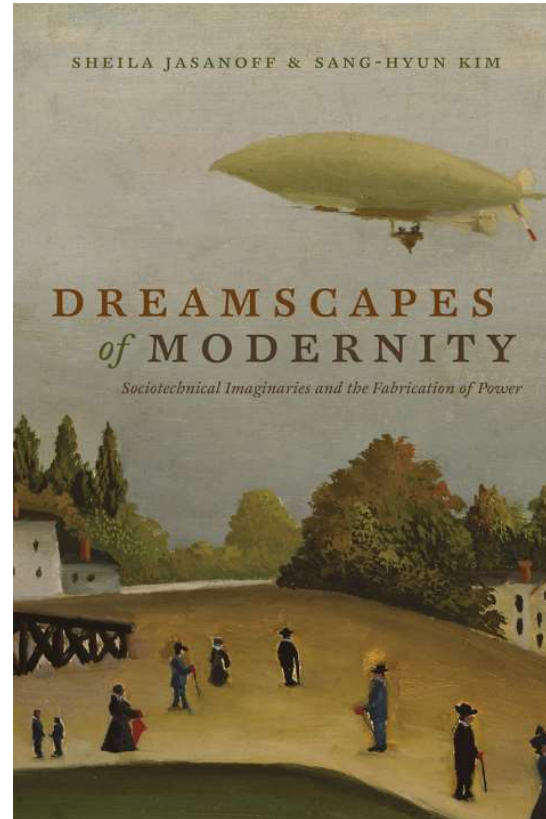
Sociotechnical Imaginaries



Sheila Jasanoff



How visions of scientific and technological progress carry with them implicit ideas about public purposes, collective futures, and the common good



Sheila Jasanoff

Which is the prevailing
sociotechnical imaginary?

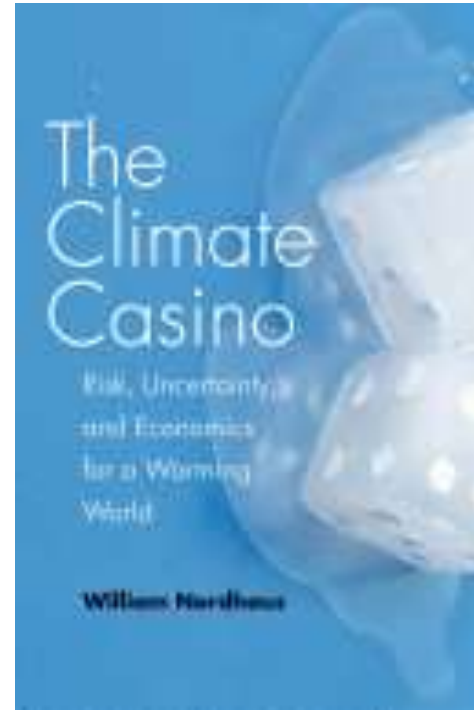
One where policy can be
neatly designed given the
right amount of
computation?

“Often, immersion in the facts makes value disagreements feel much less relevant” (Cass Sunstein, winner of the 2018 Holberg Prize)



One of the winner of Nobel prize for economics 2018 is **Willem Nordhaus**, for his work on the economics of climate change.

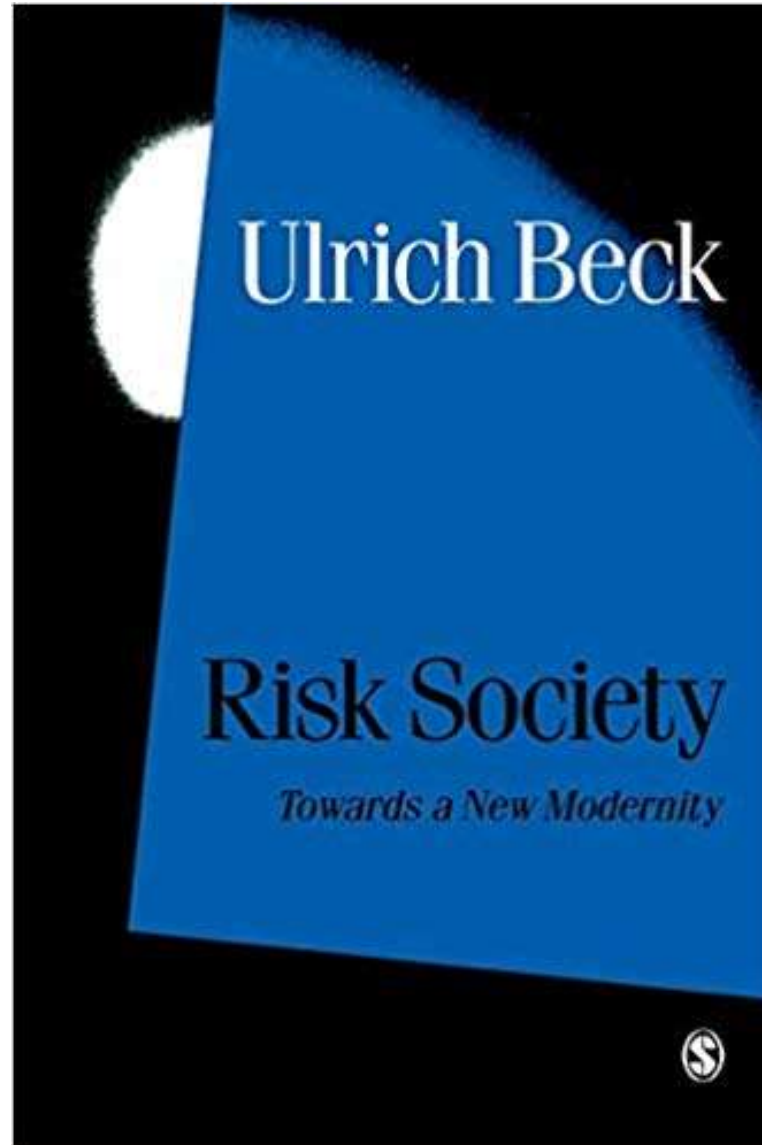
Cost benefit analysis to the year 2100



Critical voices



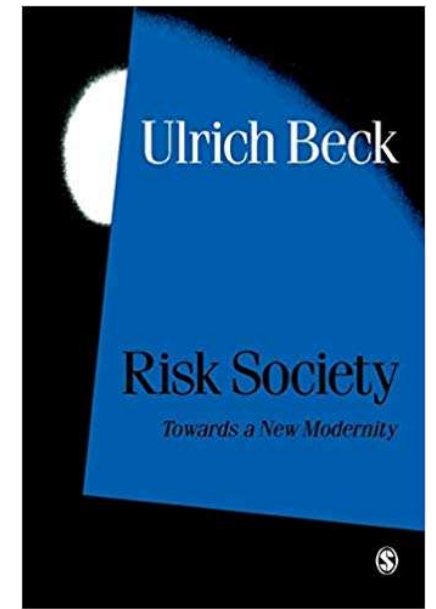
Ulrich Beck
(1944 –2015)



1992 (1986)

Chapter 7 Science beyond truth and enlightenment

- “The differentiation and complexification of the sciences transforms it into a “self service shops for financially well endowed customers in need of arguments.”
- “It is not uncommon for political programs to be decided in advance simply by the choice of what expert representatives are included in the circle of advisers.”
 - ➔ The technique is never neutral



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

“The technique is never neutral”

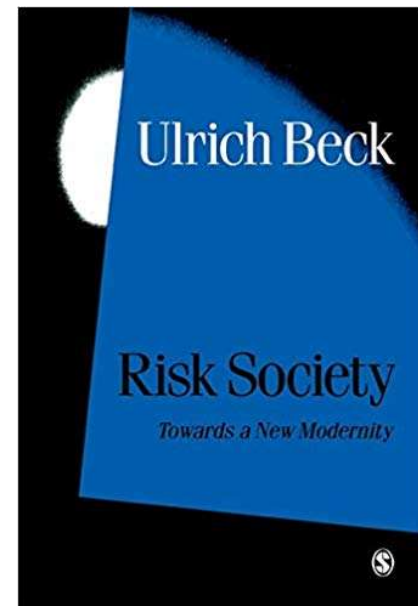
Majone: “In any area of public policy the choice of instruments, far from being a technical exercise that can be safely delegated to the experts, reflects as in a microcosm all the political, moral, and cultural dimensions of policy-making”

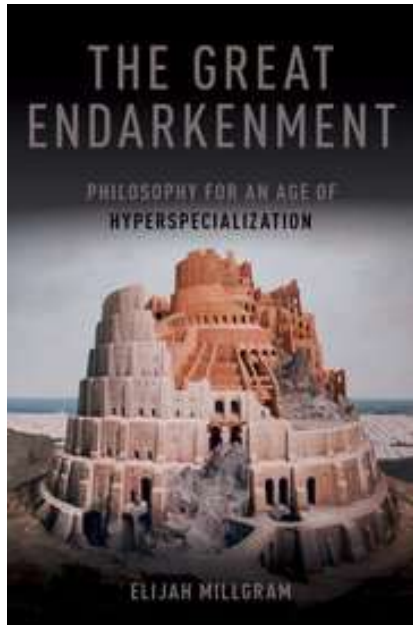
Chapter 7 Science beyond truth and enlightenment

- Feudalization of cognitive practices

“In developed civilizations, scientific cognitive practice becomes an *implicit, objectivized manipulation of latently political variables, hidden behind the pretence of elective decision not subject to justification.*”

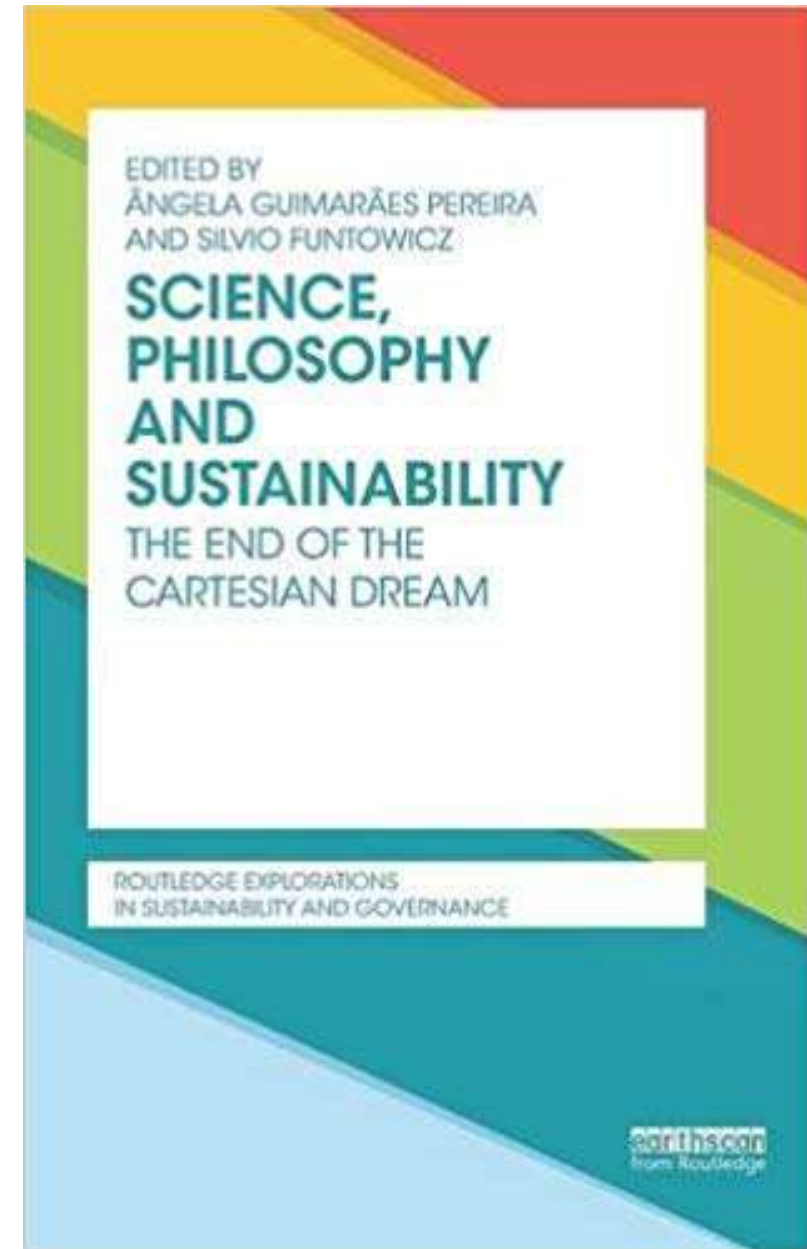
➔ On transforming a political problem into a technical one





Elijah Millgram: warns against “procedural utopia”, a machinery to take the right decision based on a set of logical rules and methods.

A Cartesian dream?



EDITED BY
ÂNGELA GUIMARÃES PEREIRA
AND SILVIO FUNTOWICZ

SCIENCE, PHILOSOPHY AND SUSTAINABILITY

THE END OF THE
CARTESIAN DREAM

ROUTLEDGE EXPLORATIONS
IN SUSTAINABILITY AND GOVERNANCE

earthscan
from Routledge

Descartes and the
rediscovery of
ignorance, Jerome
Ravetz, p. xv–xviii



<https://bit.ly/20BelmN>

<<[...] rhetoric clamour [surrounds]
'expected utility', 'decision theory',
'life cycle assessment', 'ecosystem
services' 'sound scientific decisions'
and 'evidence-based policy'



Andrew Stirling

Each technique routinely delivers its
answers with formidable levels of
precision. Yet the resulting impression
of accuracy is deeply misplaced >>

<https://steps-centre.org/blog/how-politics-closes-down-uncertainty/>



Futures

Volume 91, August 2017, Pages 62–71



Original research article

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

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

Highlights

- The closure of any issue in a pre-established frame used for quantification may correspond to normative and political stances.
- The use of mathematical modelling and indicators conveys a spurious impression of precision, prediction and control.
- Better styles of evidence based policy should flag the existence of 'uncomfortable knowledge' usually avoided in policy discussions.

“Uncomfortable knowledge” can be used test for Ancien Régime (Silvio Funtowicz and Jerome R. Ravetz, EMERGENT COMPLEX SYSTEMS, Futures 1994 26(6) 568–582)



More on quantification

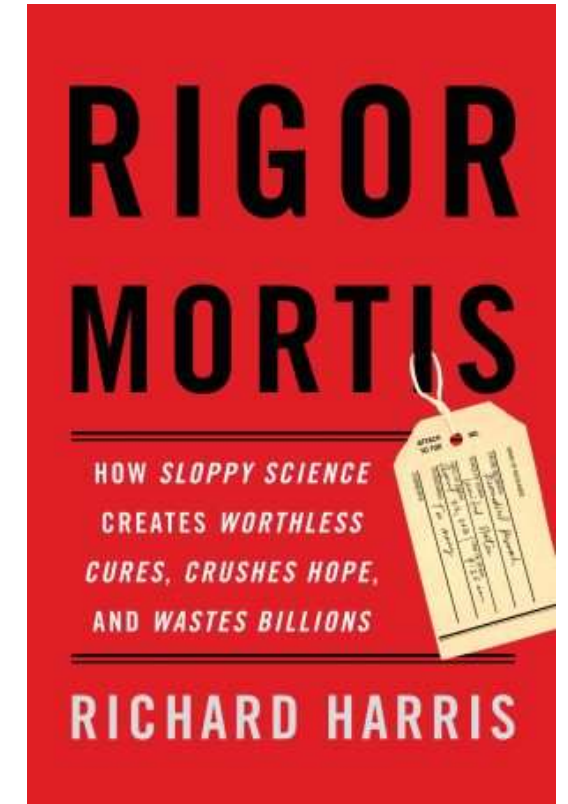
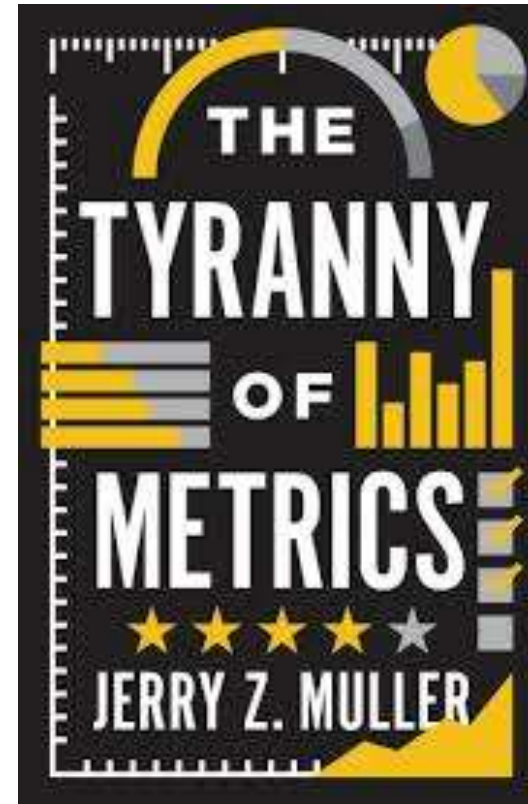
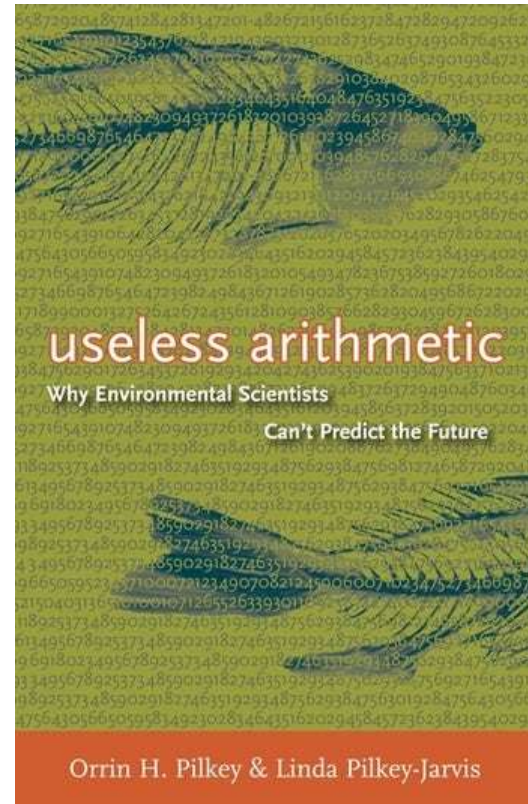
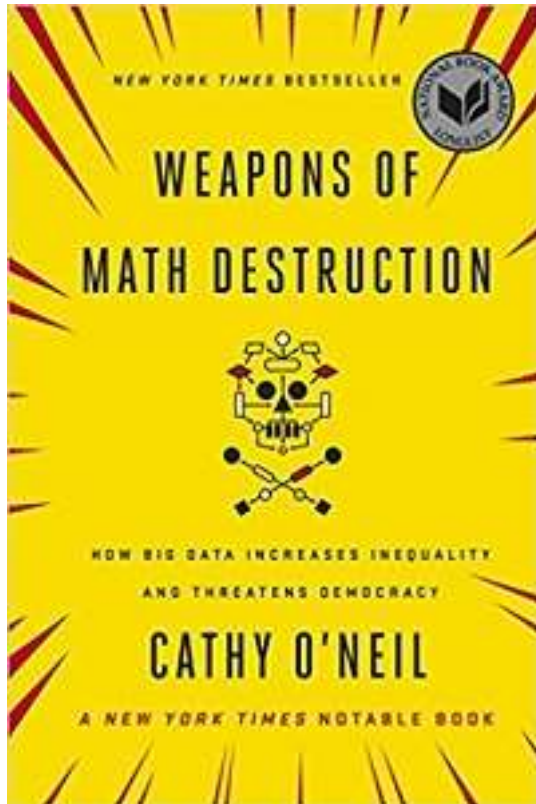
“What qualities are specific to rankings, or indicators, or models, or algorithms?”



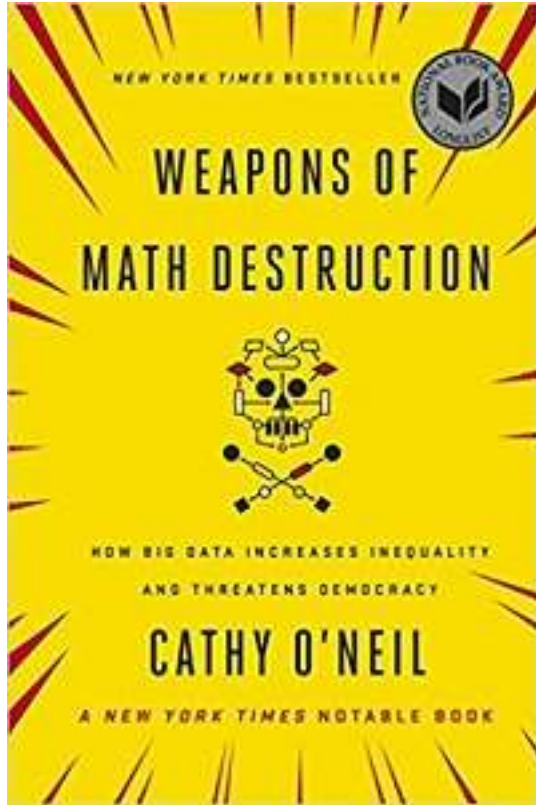
E. Popp Berman

Popp Berman, E. & Hirschman, D. The Sociology of Quantification: Where Are We Now? *Contemp. Sociol.* 47, 257–266 (2018).

Algorithms, models, metrics, statistics



Common root causes?



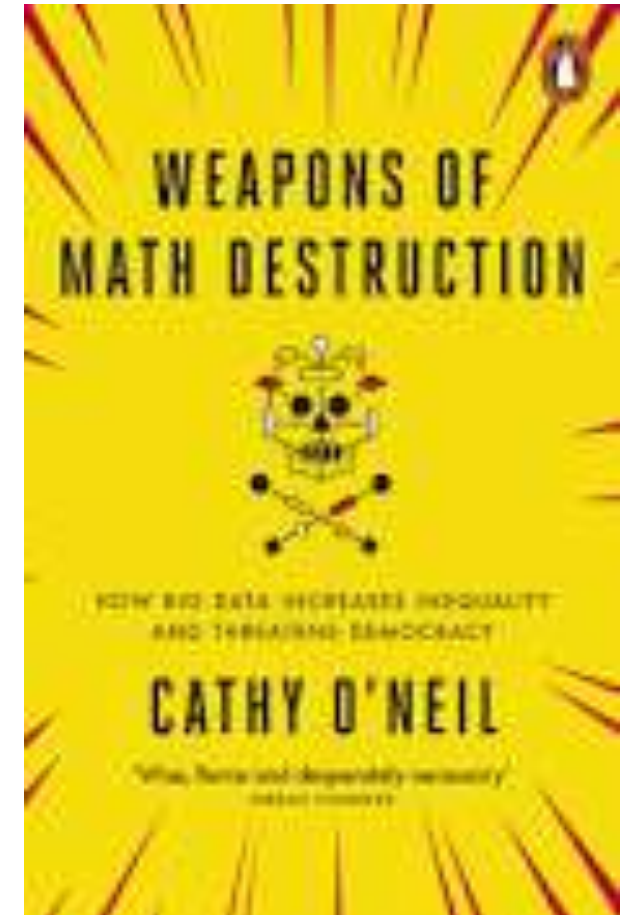
Cathy O'Neil

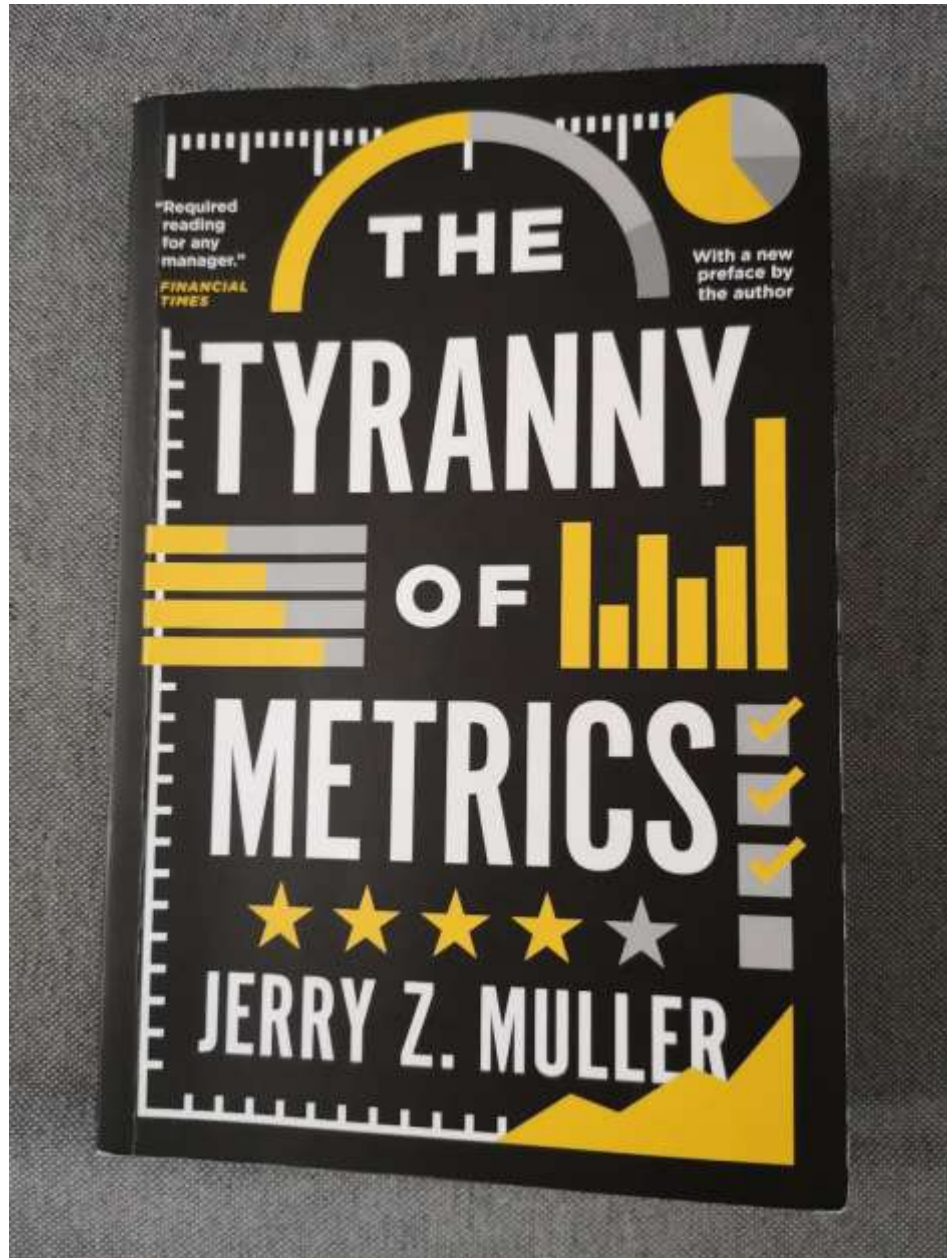
Algorithms taking decisions about hiring and careers; adjudicating the custody of minors; approving or denying credits; choosing which neighbourhoods to patrol; whom to free on parole, and more

Weapons of math destruction: opaque, do harm, do scale



Cathy O'Neil



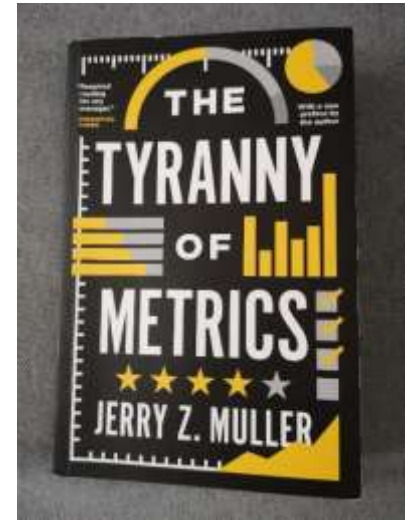


The case against metrics

J. Z. Muller, The tyranny of metrics.
Princeton University Press , 2018.

Metric fixation, or the irresistible pressure to measure performance

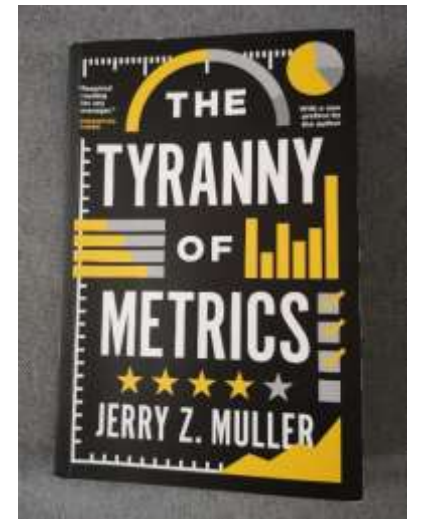
A wealth of case studies from education to war to medicine to foreign aid..



Critiques of metrics

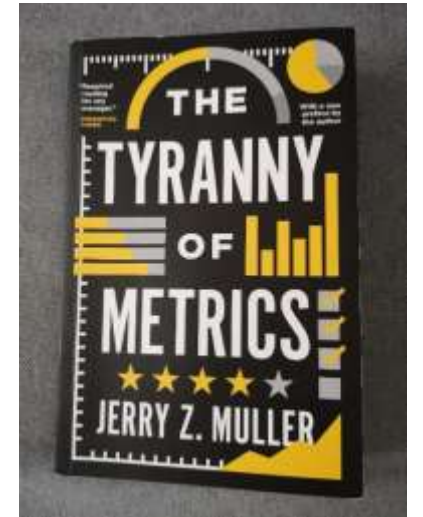
From the left: metric fixation promotes deskilling; “The calculative is the enemy of the imaginative”

From the right (Friedrich Hayek):
metric fixation reproduces features of
the soviet system (See Alain Supiot)



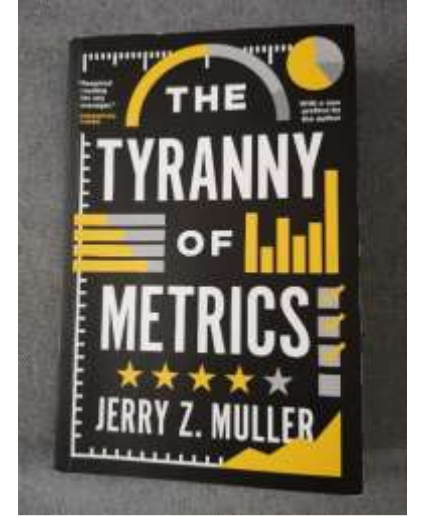
Critiques of metrics

An epistemological critique: metrics privilege abstract and formulaic knowledge against practical and tacit knowledge (Michael Polanyi)



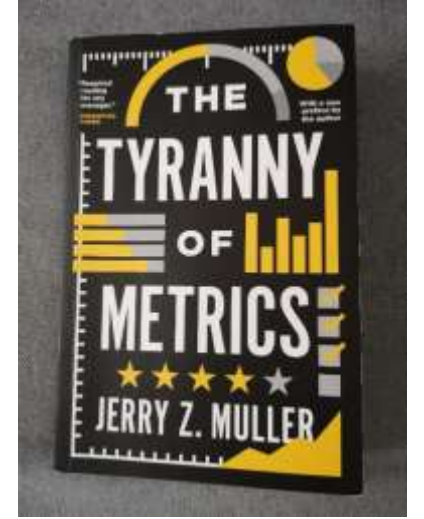
(Greek concept of metis)

Unintended consequences: a litany (1)



- Goal displacement
- Short termism
- Diminishing utility
- Rewarding luck
- Discouraging cooperation and common purpose

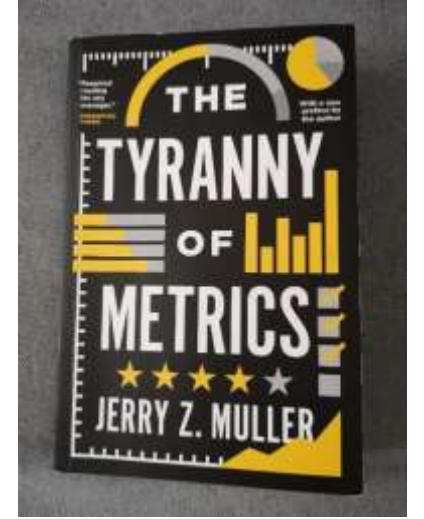
Unintended consequences: a litany (2)



- Rule cascade
- Discouraging risk taking
- Discouraging innovation
- Degrading work
- Time waste
- Loss of productivity

A concluding remarks of Muller

Considering all of the above keep in mind at every step that “the best use of metrics may be not to use it at all”



Ethics of quantification
or quantification of
ethics?



Futures

Volume 116, February 2020, 102509



Essays

Ethics of quantification or quantification of ethics?

Andrea Saltelli

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<https://doi.org/10.1016/j.futures.2019.102509>

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Theodore M. Porter

TRUST IN NUMBERS

The Pursuit
of Objectivity
in Science and
Public Life

Alain Supiot

La Gouvernance
par les nombres

*Cours au Collège de France
(2012-2014)*



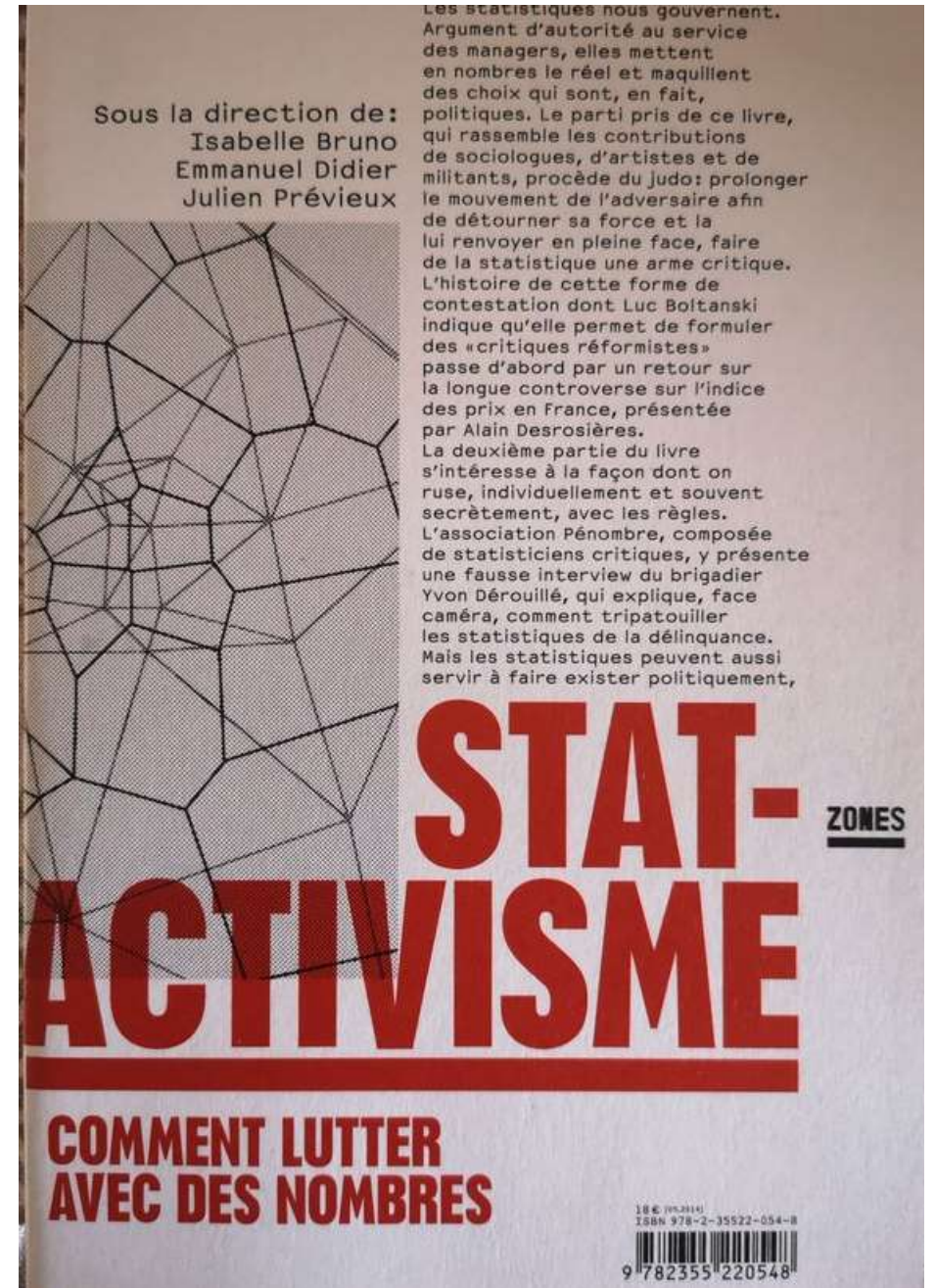
FAYARD
POIDS ET MESURES
DU MONDE

Can we learn
something from
sociology of
numbers?

From law?

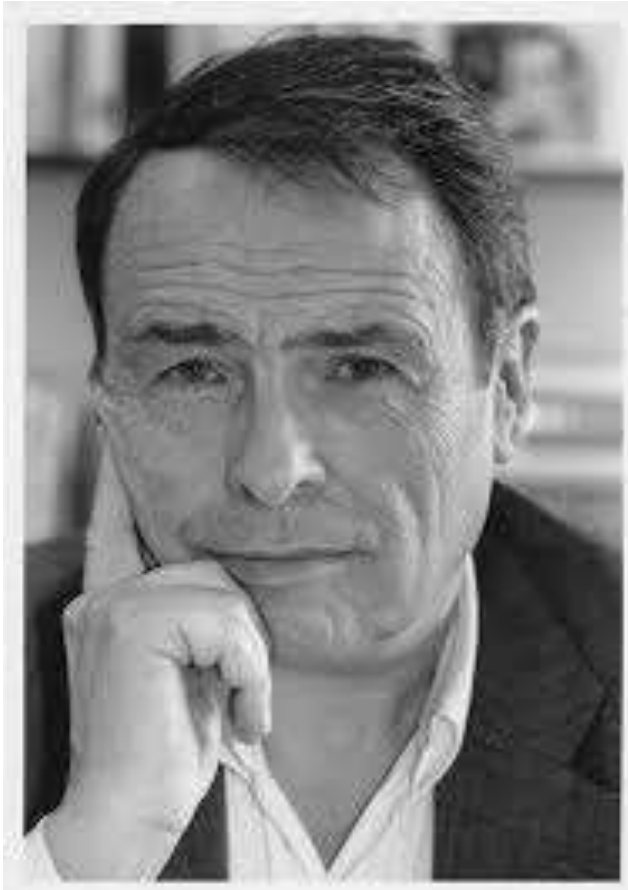
Do we need a movement of resistance?

I. Bruno, E. Didier, and J. Prévieux, Stat-activisme. Comment lutter avec des nombres. Paris: Zones, La Découverte, 2014



How to be a "statactiviste"?

1. Deconstruct existing metrics, including using irony (Pierre Bourdieu, *Les héritiers*)



La sociologie,
ça doit être
rigolo

(Sociology must be fun)



How to be a "statactiviste"?

2. Gaming metrics (statistical judo) – use Goodhart's law to your advantage – or make the ruse public

- Police statistics in NY



How to be a "statactiviste"?

3. Bring to the surface what is hidden / unsaid/ excluded – new social classes, marginalization, minorities:

- ‘Creative class’ or ‘precarious intellectuals’?



How to be a "statactiviste"?

4. Measure something different

- Suicides at France Telecom;
- BIP 40, a new French measure of poverty/inequality

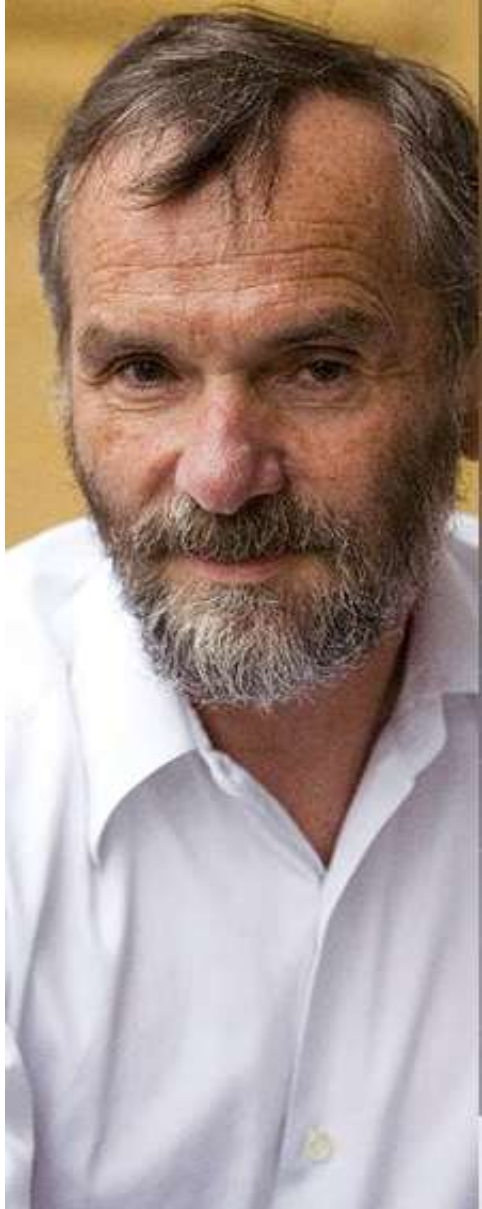


Important:

“Quantification should not be abandoned to the advantage of exalting qualities, singularities, and the incommensurable. Such an abandon would be a tactical error”

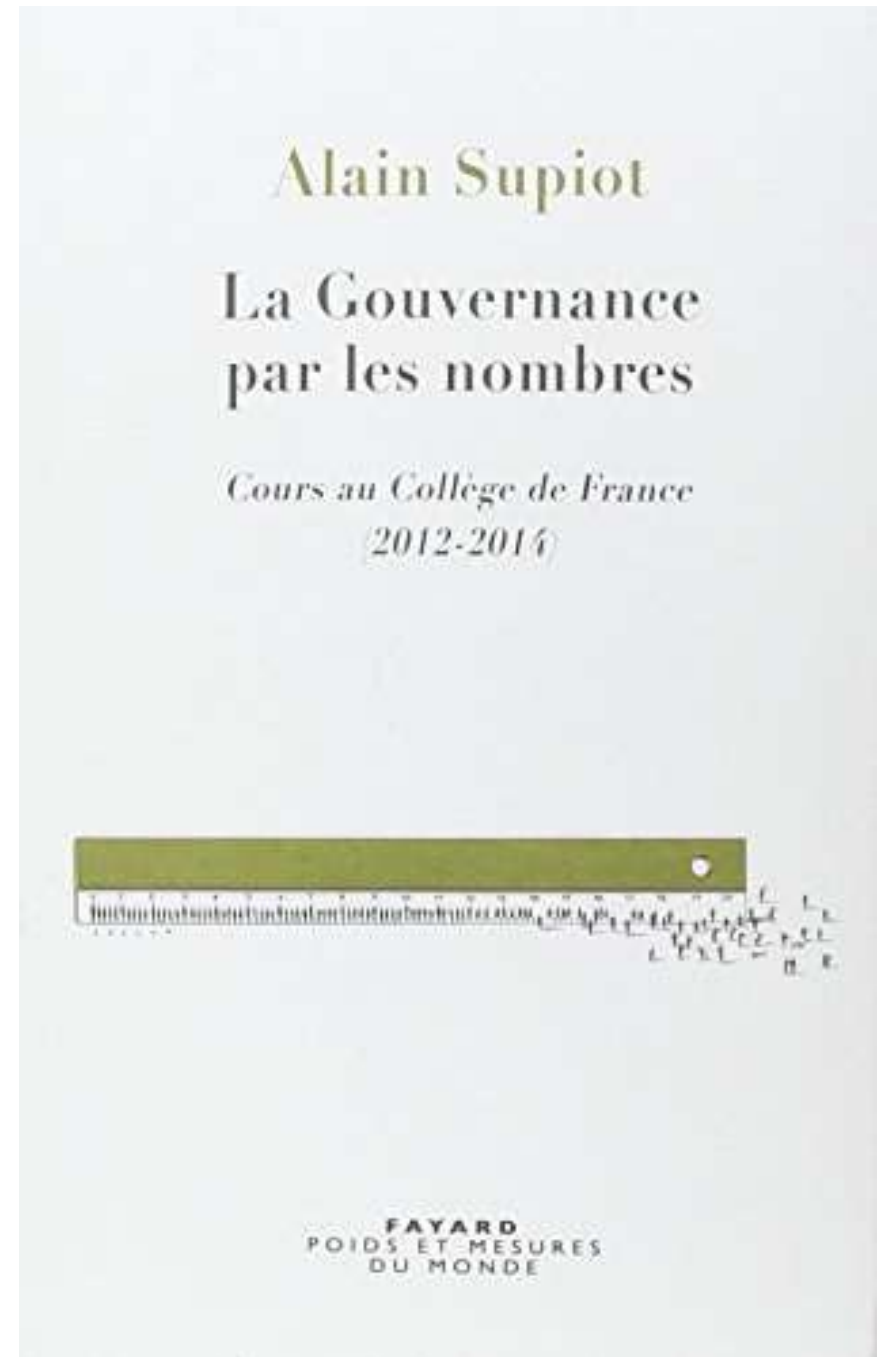


Alain Supiot

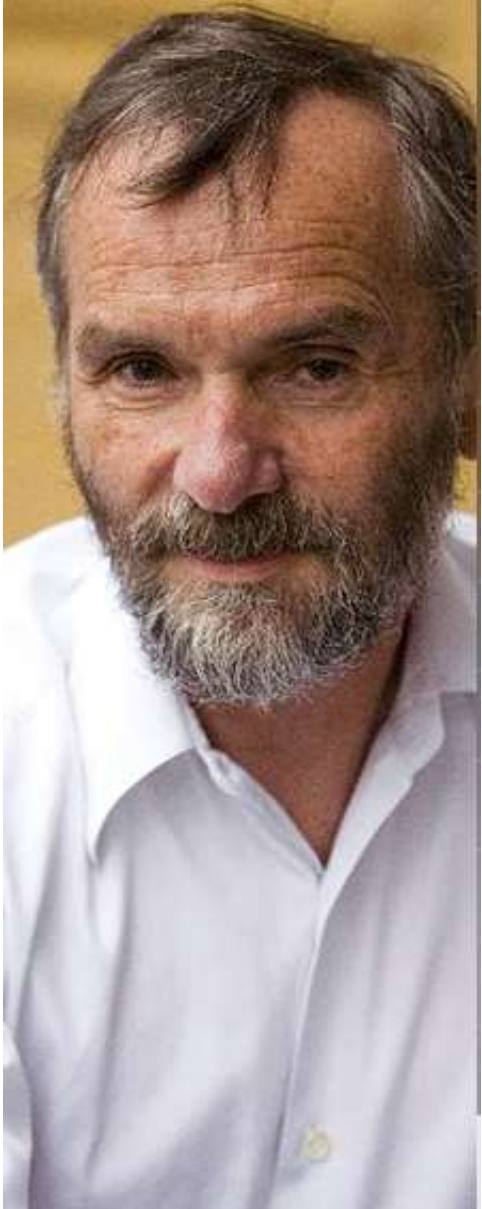


An indictment of
the Total Market
and the normative
uses of economic
quantification

<https://www.college-de-france.fr/site/en-alain-supiot/Governance-by-Numbers-Introduction.htm>

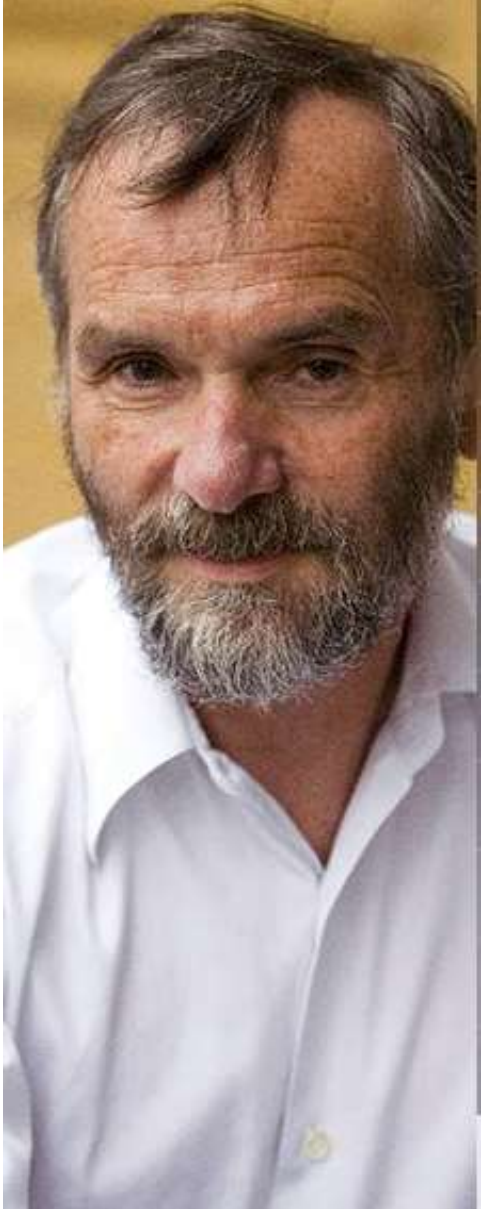


Alain Supiot



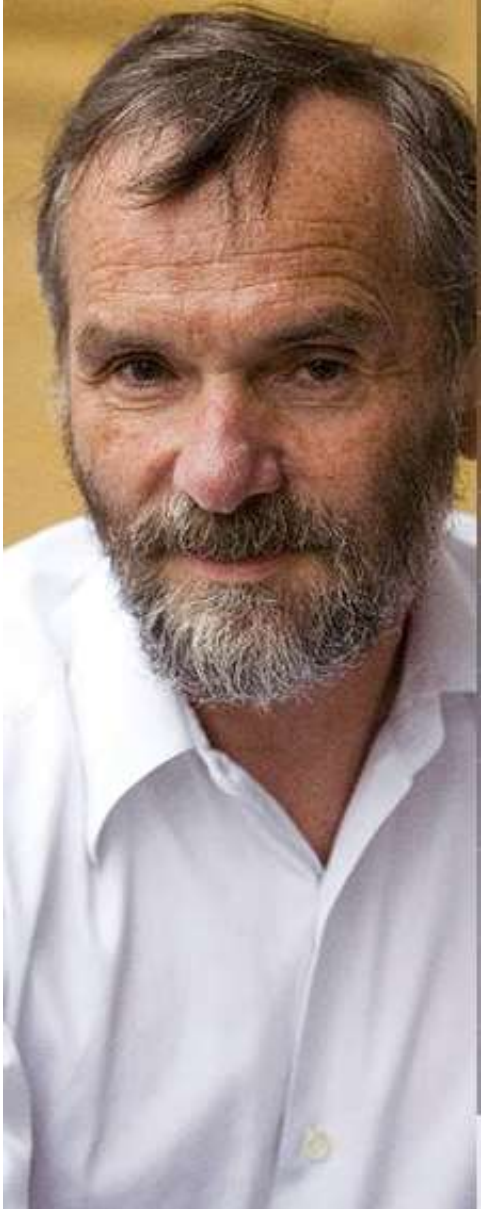
...we have entered the era of the cybernetic imaginary, which revives the West's age-old dream of grounding social harmony in calculations

Alain Supiot



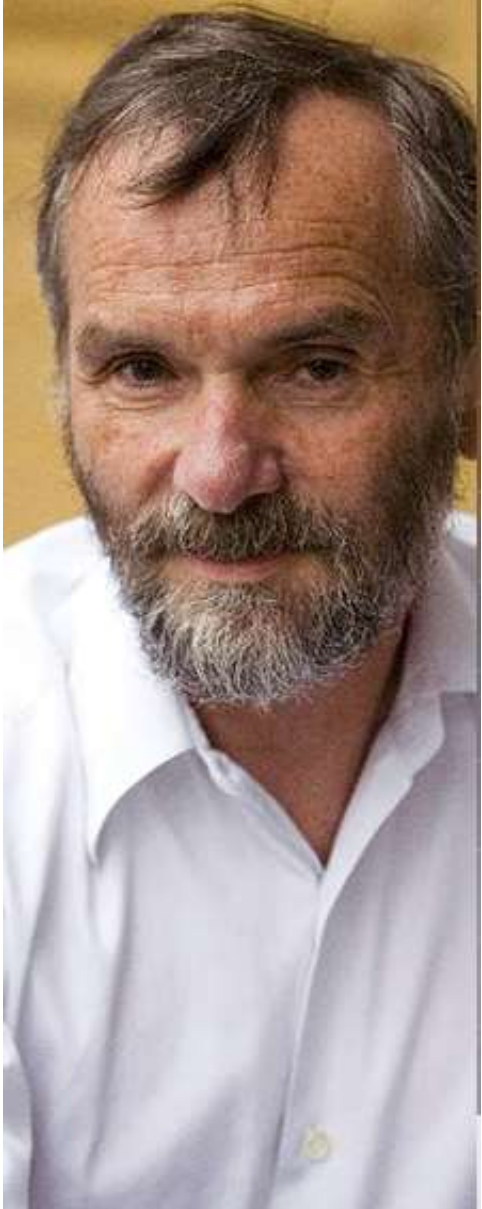
...In this passage from the mechanical (Taylorian) imaginary to the cybernetic lies the origin of multiple interconnected crises

Alain Supiot



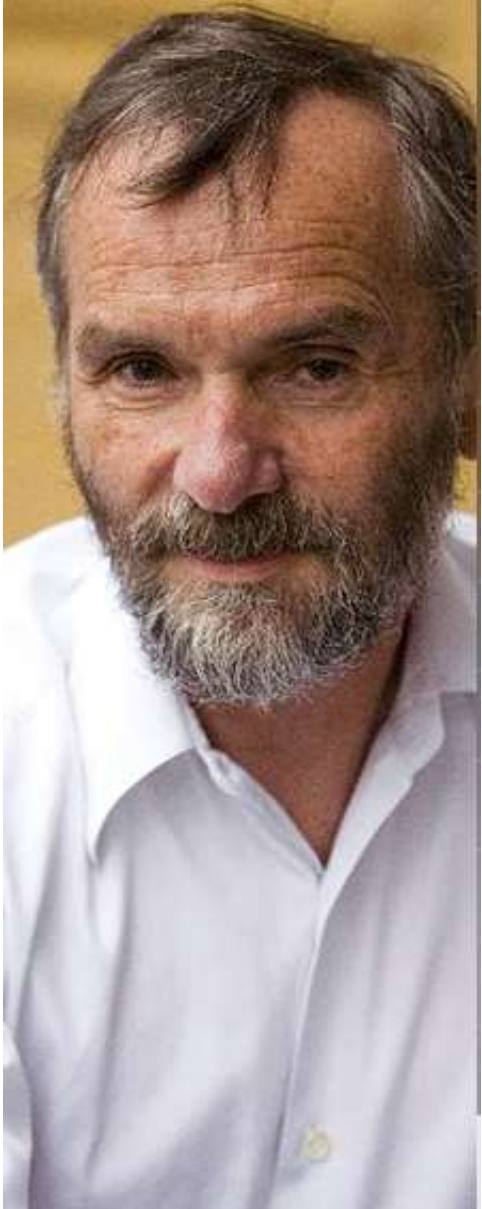
Repudiating the goal of governing by just laws, this new discourse advocates in its stead the attainment of measurable objectives ...

Alain Supiot

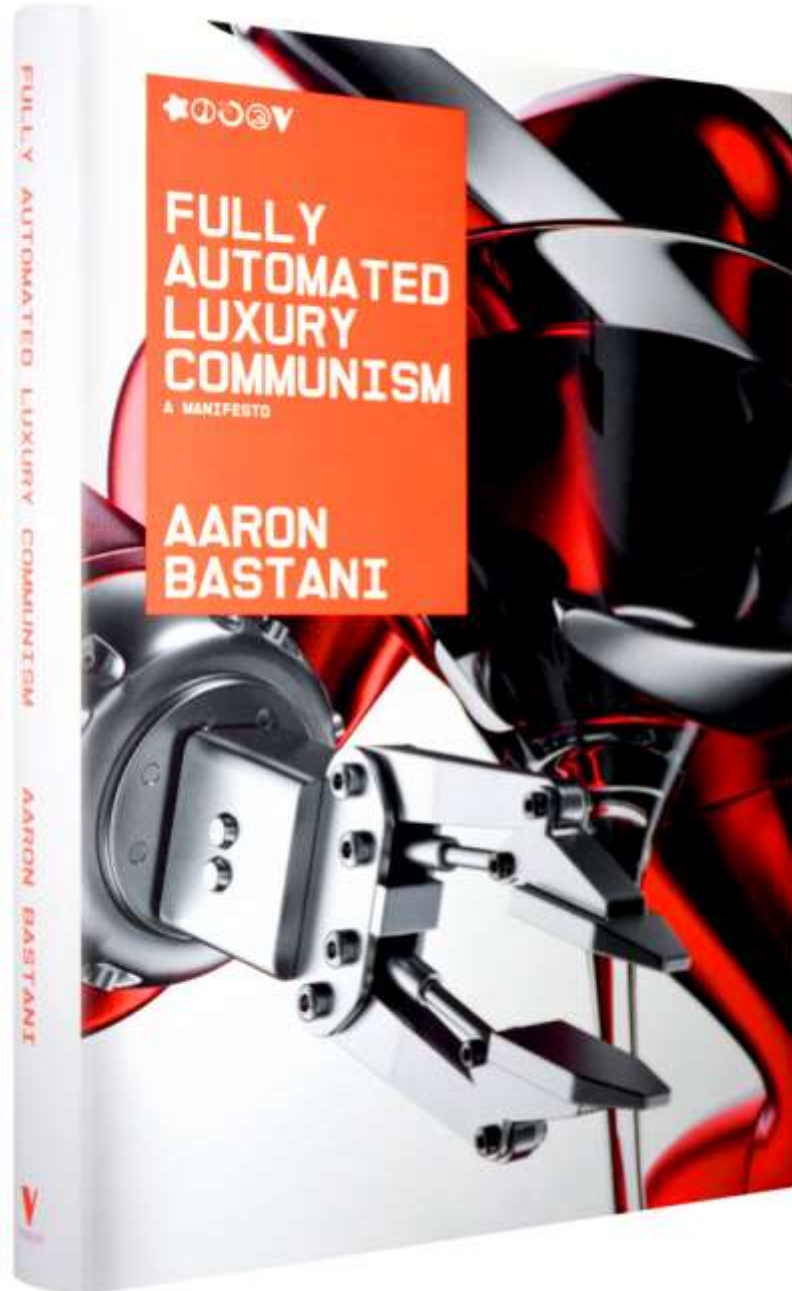


... law is subjugated to a
computation of utility

Alain Supiot



... This leaves no option open to populations or countries than to ride roughshod over social legislation, and pledge allegiance to those stronger than they are



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EVGENY MOROZOV

DIGITAL SOCIALISM?

The Calculation Debate in the Age of Big Data

The debate rages on ...

Ethics of quantification or
quantification of ethics?



Also in the paper:

What issues for an ethics of quantification?

- Trust (Porter, legitimacy, the OECD PISA example)



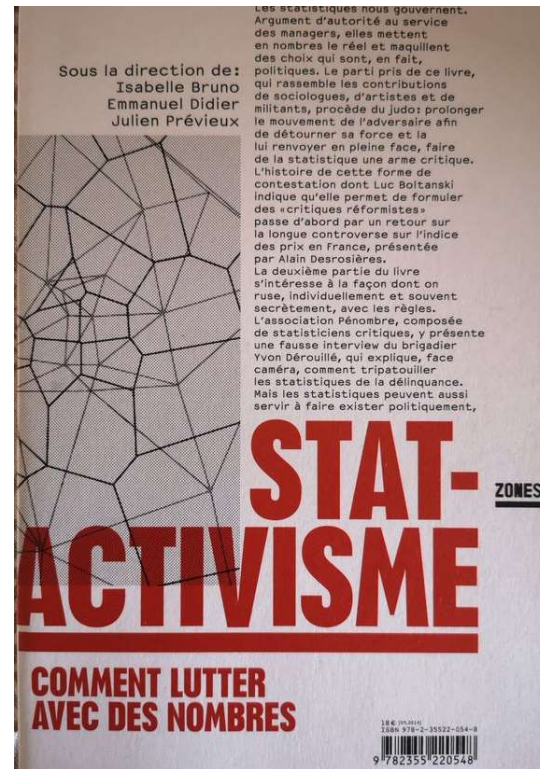
Ethics of
quantification or
quantification of
ethics?

Andrea Saltelli, 2020?



What issues for an ethics of quantification?

–Defence against abuse (statactivism)



Ethics of
quantification or
quantification of
ethics?

Andrea Saltelli, 2020?



What issues for an ethics of quantification?

- Consequentialism (Ecological Footprint)



Mathis Wackernagel



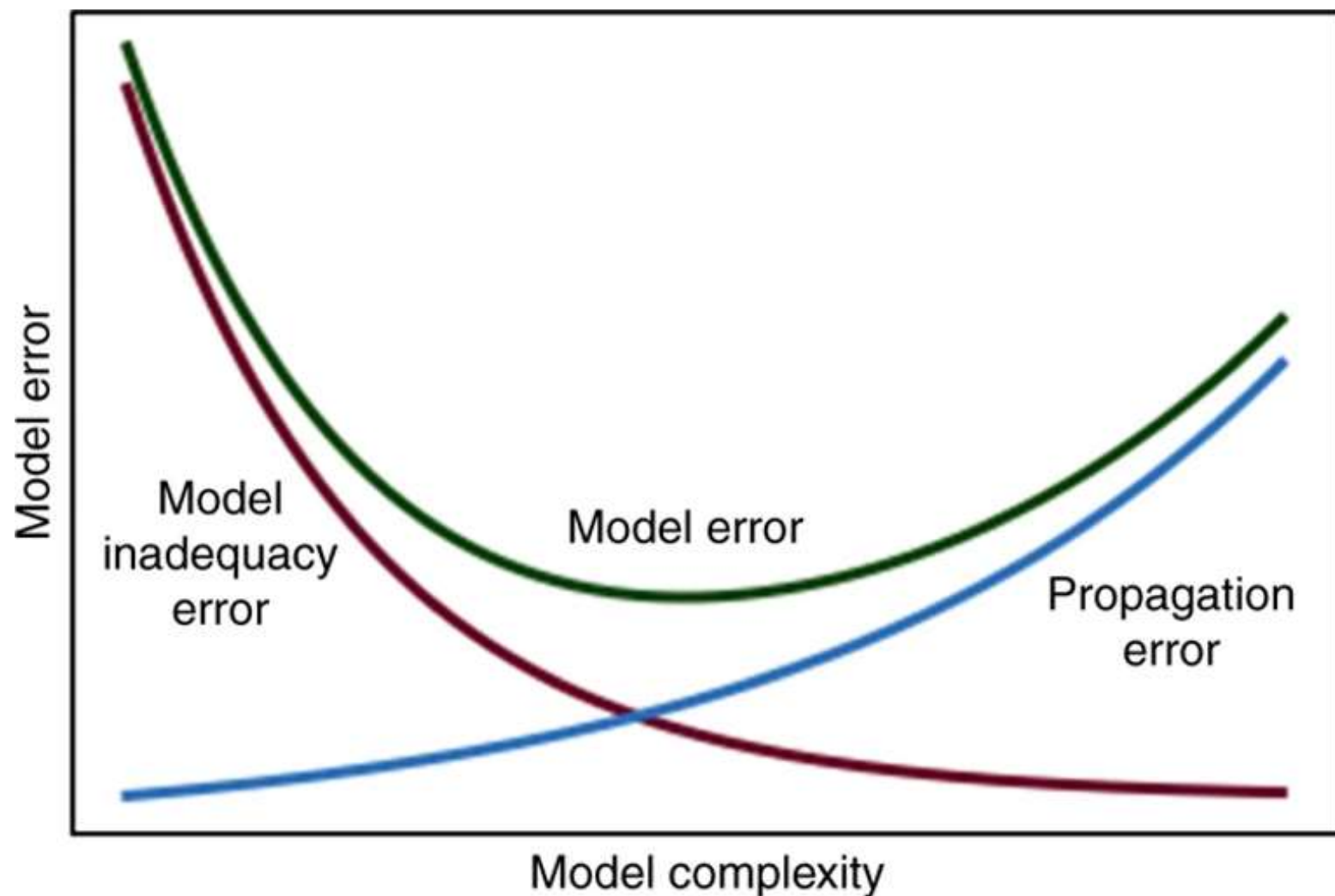
Ethics of
quantification or
quantification of
ethics?

Andrea Saltelli, 2020?



What issues for an ethics of quantification?

–Optimism/Hubris



Ethics of
quantification or
quantification of
ethics?

Andrea Saltelli, 2020?



What issues for an ethics of quantification?

–Purported neutrality of the technique
(Beck, Majone, Funtowicz and Ravetz;
Romer, Reinert...)

Ethics of
quantification or
quantification of
ethics?

Andrea Saltelli, 2020?



What issues for an ethics of quantification?

- Quality of a quantitative research → “relational validity”, how it corresponds to its **context and purpose**



Issues ▾

For authors ▾

Statistics ▾

Home > 22 (3), 6

Different Modelling Purposes



Bruce Edmonds^a, Christophe Le Page^b, Mike Bithell^c, Edmund Chattoe-Brown^d, Volker Grimm^e, Ruth Meyer^f,
Sales^g, Paul Ormerod^h, Hilton Rootⁱ and Flaminio Squazzoni^j

Ethics of
quantification or
quantification of
ethics?

Andrea Saltelli, 2020?



What recipes for an ethics of quantification?

- Use tools such as NUSAP and sensitivity auditing to tame hubris, to make quantifications interpretable, conveyable in plain English, and context/purpose specific

NUSAP

Numeral, Unit, Spread

+

Assessment (qualitative judgement on quantification)

Pedigree (qualitative assessment of mode of production and anticipated use)

THEORY AND DECISION LIBRARY

SERIES A: PHILOSOPHY AND METHODOLOGY
OF THE SOCIAL SCIENCES

SILVIO O. FUNTOWICZ AND JEROME R. RAVETZ

UNCERTAINTY AND QUALITY
IN
SCIENCE FOR POLICY

KLUWER ACADEMIC PUBLISHERS



Jeroen
van der Sluijs

Example Pedigree matrix parameter strength

Code	Proxy	Empirical	Theoretical basis	Method	Validation
4	Exact measure	Large sample direct mmts	Well established theory	Best available practice	Compared with indep. mmts of same variable
3	Good fit or measure	Small sample direct mmts	Accepted theory partial in nature	Reliable method commonly accepted	Compared with indep. mmts of closely related variable
2	Well correlated	Modeled/derived data	Partial theory limited consensus on reliability	Acceptable method limited consensus on reliability	Compared with mmts not independent
1	Weak correlation	Educated guesses / rule of thumb est	Preliminary theory	Preliminary methods unknown reliability	Weak / indirect validation
0	Not clearly related	Crude speculation	Crude speculation	No discernible rigour	No validation

<http://www.nusap.net/>



Sensitivity Auditing

What do I make of your latinorum? Sensitivity auditing of mathematical modelling

Saltelli, A., Guimarães Pereira, Â.,
Van der Sluijs, J.P. and Funtowicz, S.



Ângela Guimarães Pereira

The rules of sensitivity auditing

1. Check against rhetorical use of mathematical modelling;
2. Adopt an “assumption hunting” attitude; focus on unearthing possibly implicit assumptions;
3. Check if uncertainty been instrumentally inflated or deflated.

4. Find sensitive assumptions before these find you; do your SA before publishing;
5. Aim for transparency; Show all the data;
6. Do the right sums, not just the sums right;
7. Perform a proper global sensitivity analysis.

What recipes for an ethics of quantification?

–Improve existing disciplinary arrangements



AMERICAN STATISTICAL ASSOCIATION RELEASES STATEMENT ON STATISTICAL SIGNIFICANCE AND *P*-VALUES

*Provides Principles to Improve the Conduct and Interpretation of Quantitative
Science*

March 7, 2016

Wasserstein, R.L. and Lazar, N.A., 2016. 'The ASA's statement on p-values: context, process, and purpose', The American Statistician, Volume 70, 2016 – Issue 2, Pages 129–133.

What recipes would be offered by an ethics of quantification?

–Conquer a license not-to-quantify
(Porter, Muller, ...)

Computation and post truth

The powerful agents of post-truth

Jaron Lanier

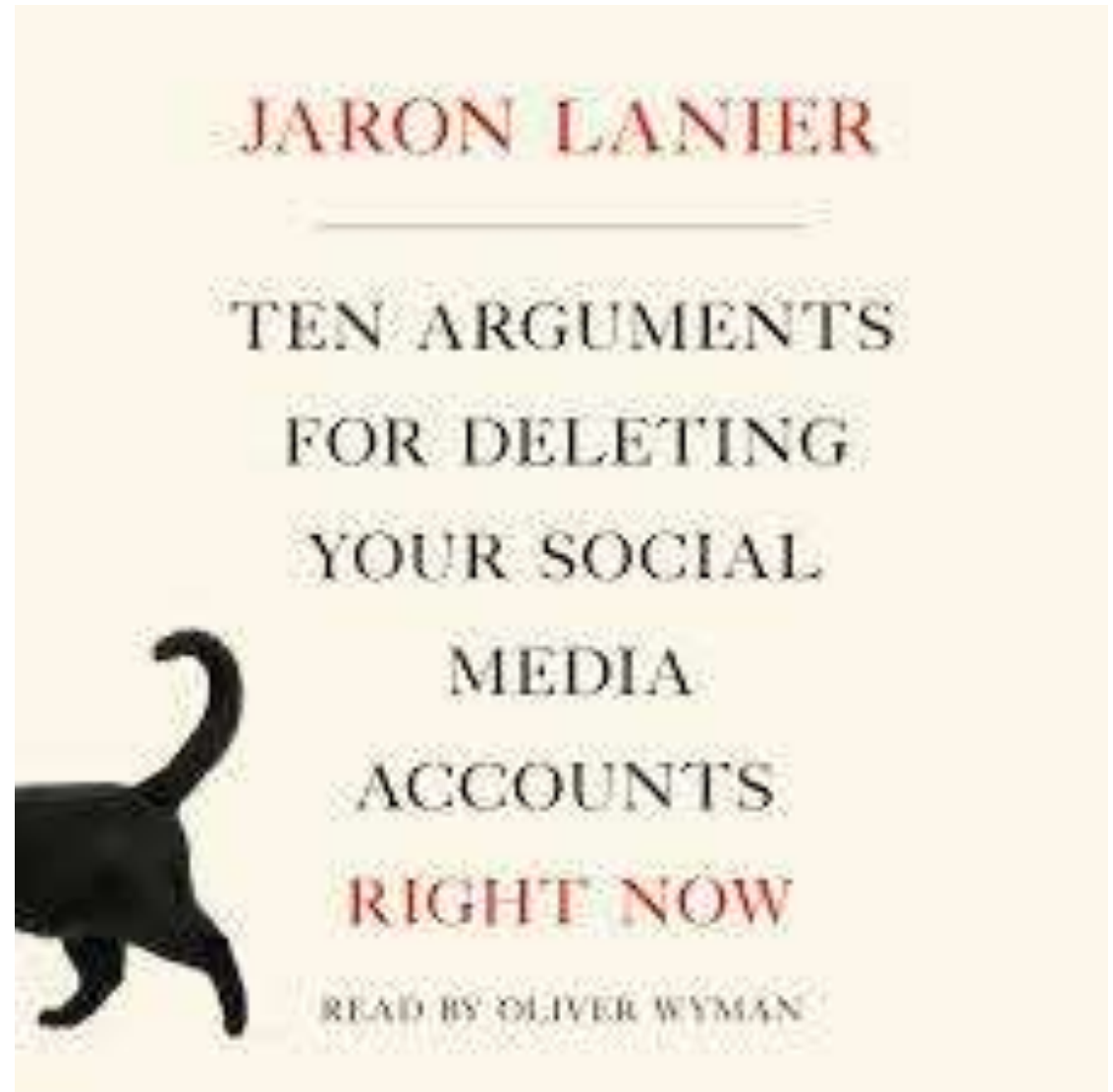
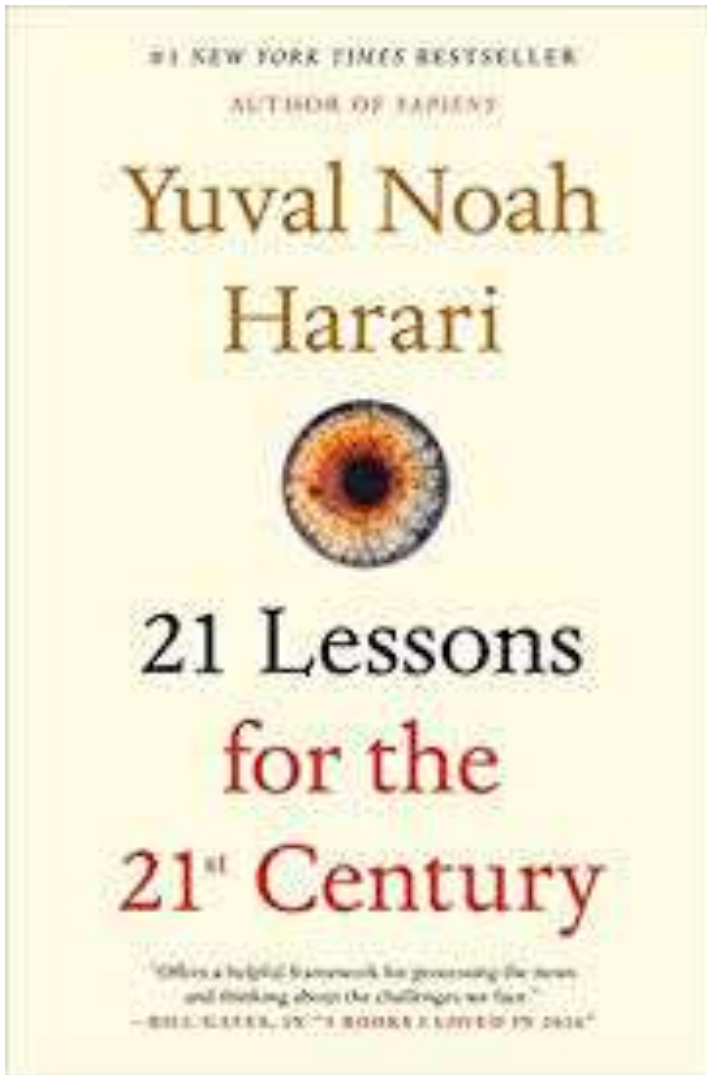


Poisonous algorithms to stoke hatred and division

Yuval Noah Harari, Homo Deus 2015 & 21 Lessons for the 21st Century, 2018.

Jaron Lanier, 2018 Ten Arguments for Deleting Your Social Media Accounts Right Now

<https://www.theguardian.com/society/2018/aug/23/russian-trolls-spread-vaccine-misinformation-on-twitter>



Poisonous algorithms to stoke hatred and division

"Have you seen those zombies who roam the streets with their faces glued to their smartphones? Do you think they control the technology, or does the technology control them?"

Yuval Noah
Harari



Yuval Harari, 21 Lessons for the 21st Century, 2018, Jonathan Cape publisher; for autopoietic technology see also W. Brian Arthur, 2010, The Nature of Technology, Free Press.

Russian trolls 'spreading discord' over vaccine safety online

Study discovered several accounts, now known to belong to the same Russian trolls who interfered in the US election, tweeting about vaccines

Jessica Glenza *in New York*

🐦 @JessicaGlenza

Thu 23 Aug 2018 21.00 BST



AJPH
A PUBLICATION OF THE
AMERICAN PUBLIC HEALTH ASSOCIATION



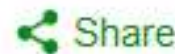
From deepfake to Cambridge Analytica, the scope for damage has expanded

Deepfake videos 'double in nine months'



Rory Cellan-Jones
Technology correspondent
@BBCRoryCJ

🕒 7 October 2019



BBC

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Donald J. Trump 
@realDonaldTrump

Trump & the Russian intelligence excel at exploiting the new technologies for soft warfare

Twitter released 9 million tweets from one Russian troll farm. Here's what we learned.

The massive data dump reveals how trolls disrupt and destabilize local and global politics.

By Aja Romano | @ajaromano | Oct 19, 2018, 12:40pm EDT

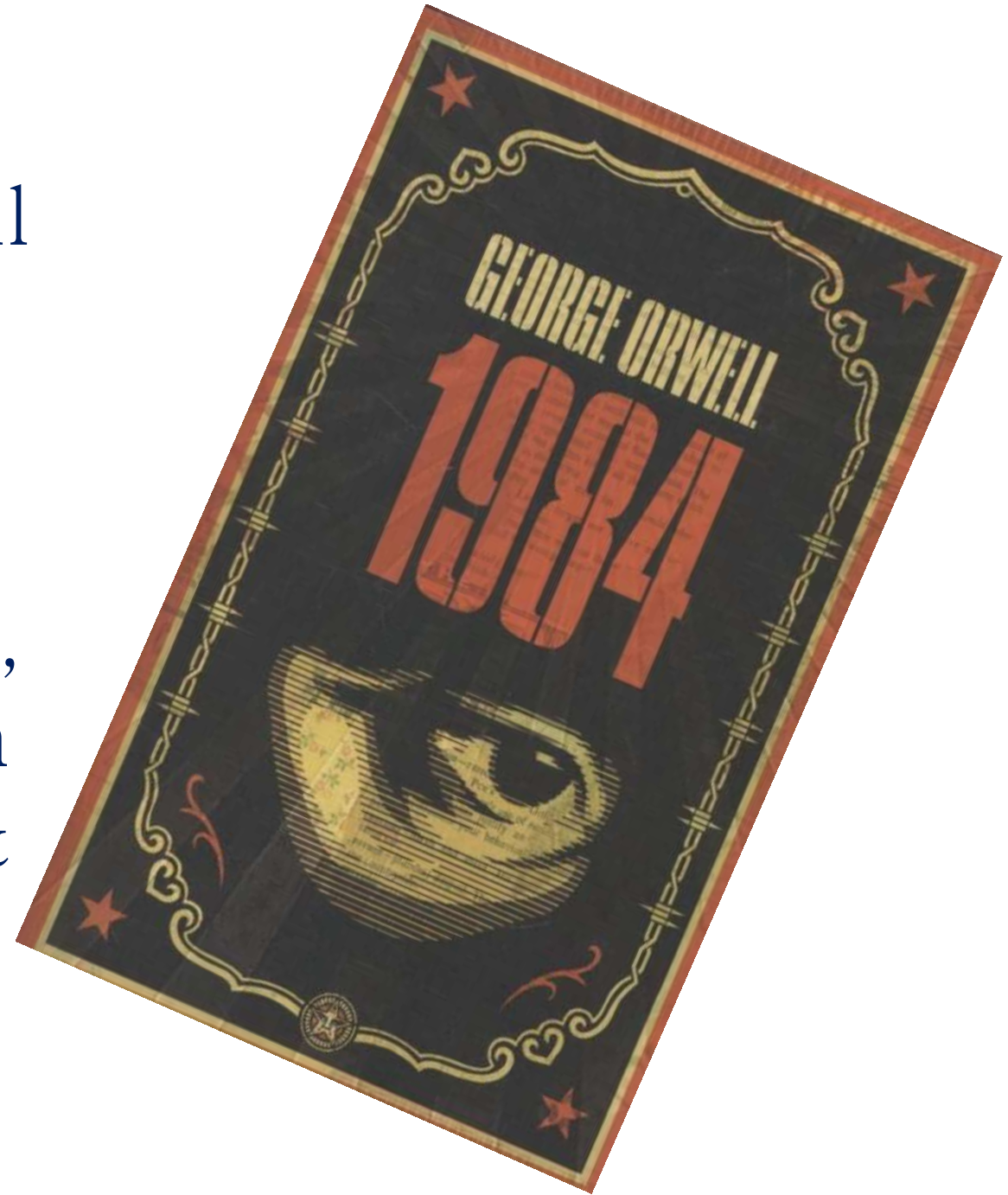
The Vox logo, featuring the word "Vox" in a stylized, black, serif font, centered on a bright yellow rectangular background.

Whose dystopia:
Huxley or Orwell?



George Orwell

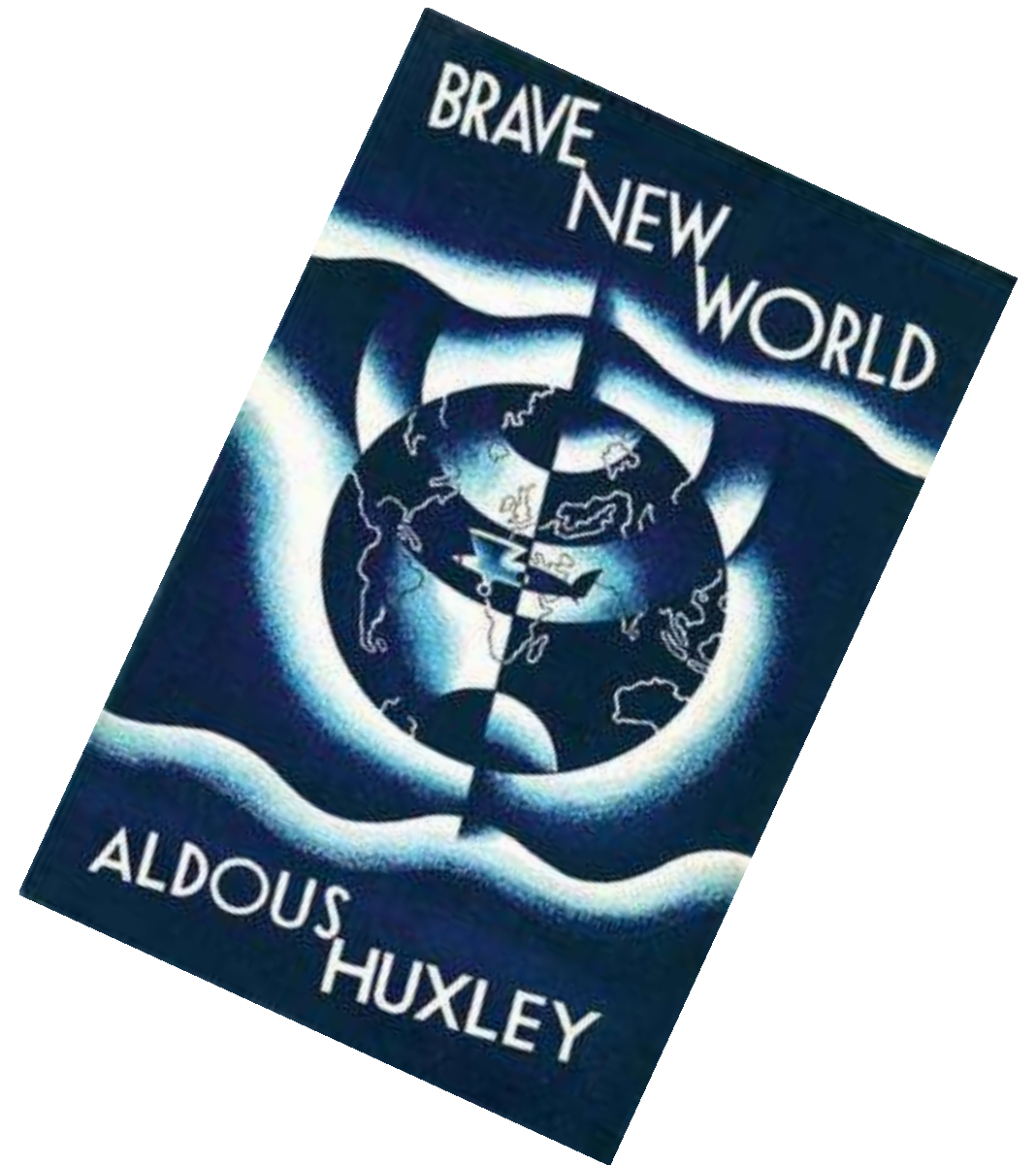
1949; a regimented society,
Big Brother in charge of an
omnipresent surveillance &
propaganda machine





Aldous Huxley

1932; a regimented
world where drug takes
care of consent

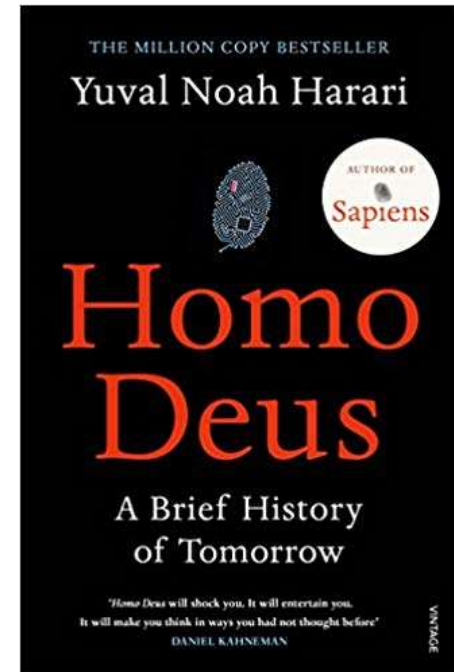


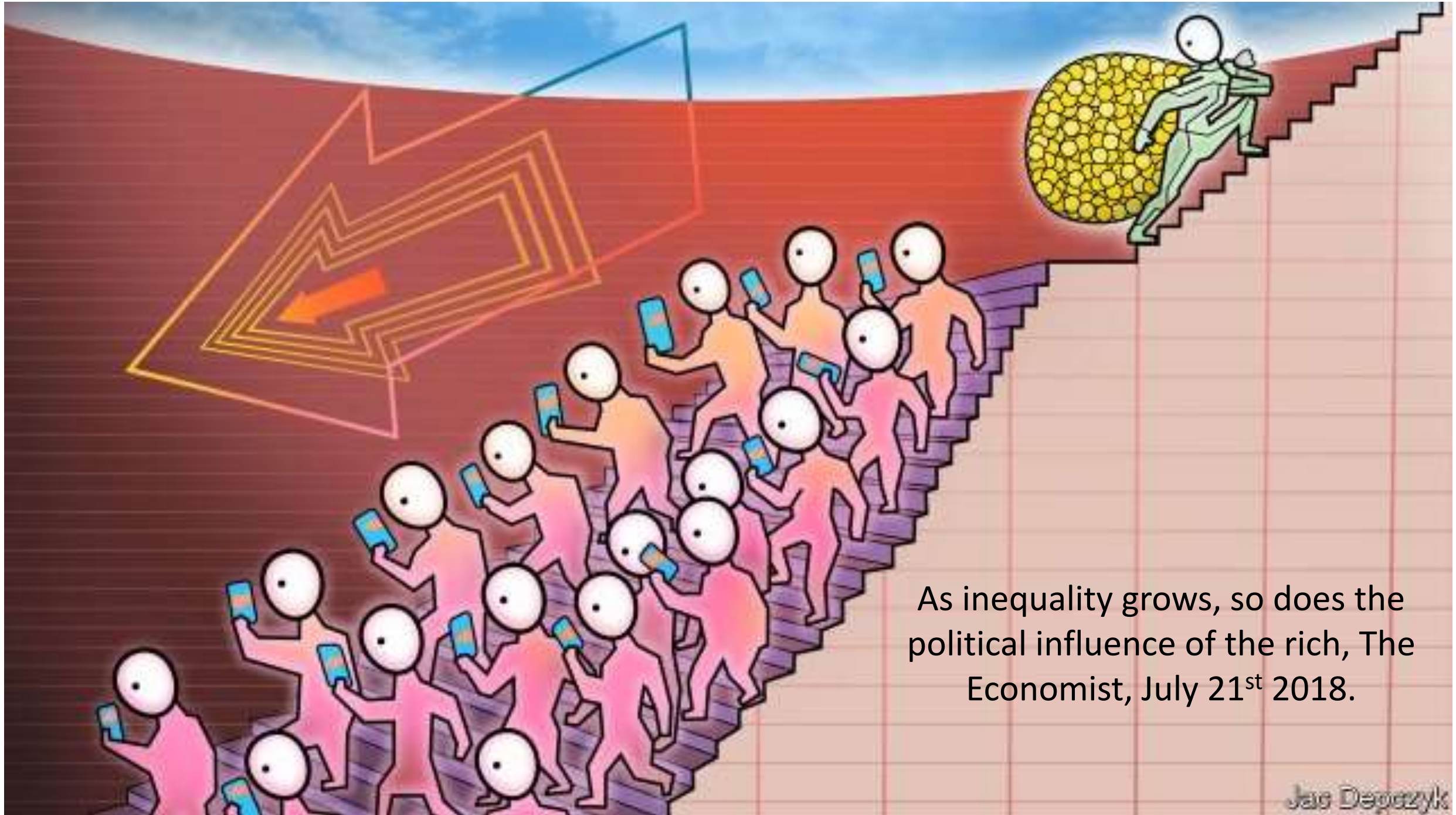
Techno-spit scenario?

An affluent super-technological and possibly trans-human/immortal minority, versus a useless and distracted majority left glued to its mobile phones and tablets

Y. N. Harari, Homo Deus : a brief history of tomorrow. Harvill Secker , 2016.

J. R. Lent, The patterning instinct : a cultural history of humanity's search for meaning. Prometheus Books, 2017.



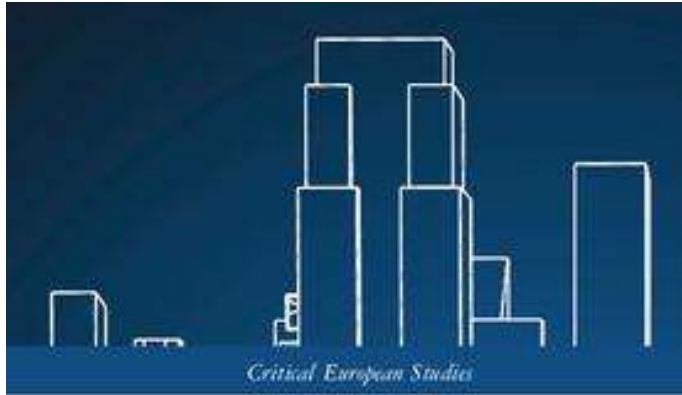


As inequality grows, so does the political influence of the rich, The Economist, July 21st 2018.

Science and lobbying

Power asymmetries in the framing of issues:
those who have the deepest pockets marshal
the best evidence → Instrumental use of
quantification to obfuscate

Sylvain Laurens

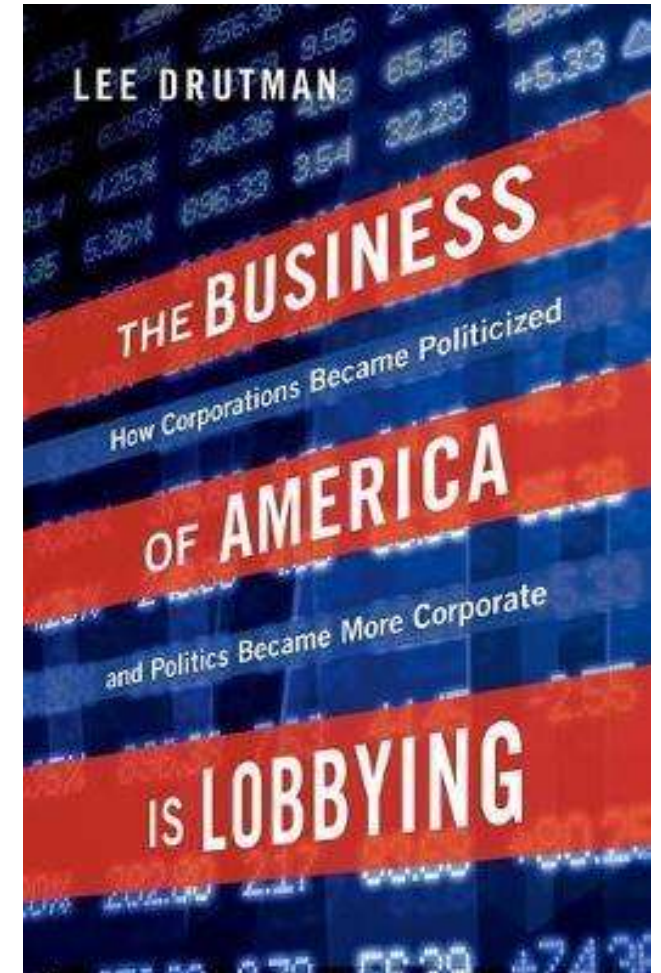


LOBBYISTS AND BUREAUCRATS IN BRUSSELS CAPITALISM'S BROKERS

Sylvain Laurens



Lee Drutman



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

“They have the data”





"HIS MASTER'S VOICE"

REG. U.S. PAT. OFF.

“Regulatory policy is increasingly made with the participation of experts, especially academics. A regulated firm or industry should be prepared whenever possible to co-opt these experts. This is most effectively done by identifying the leading expert in each relevant field and hiring them as consultants or advisors or giving them research grant or the like”

Owen, B. M., & Braeutigam, R., 1978 The regulation game, :
Strategic Use of the Administrative Process, Ballinger
Press

“This activity requires a modicum of finesse; it must not be too blatant, for the experts themselves must not recognize that they have lost their objectivity and freedom of action”

Thanks to Erik Millstone

Owen, B. M., & Braeutigam, R., 1978 The regulation game, : Strategic Use of the Administrative Process, Ballinger Press

US news

Science institute that advised EU and UN 'actually industry lobby group'

International Life Sciences Institute used by corporate backers to counter public health policies, says study

Arthur Neslen

Mon 3 Jun 2019 03.00 BST



1,256



Regulatory capture in the name of enlightenment?

Science and its institutions – especially when operating at the science – policy interface, appear vulnerable to forms of societal penetration and control where lobbyists present themselves as upholders of the values of the Enlightenment against science's (and progress') purported enemies.

Defending science from its defenders? Regulatory capture in the name of Enlightenment, work in progress (2019).

Ethics washing made in Europe By Thomas Metzinger

On Tuesday, the EU has published ethics guidelines for artificial intelligence. A member of the expert group that drew up the paper says: This is a case of ethical white-washing

“... a compromise of which I am not proud, but which is nevertheless the best in the world on the subject”

<https://www.tagesspiegel.de/politik/eu-guidelines-ethics-washing-made-in-europe/24195496.html>

A commission of 52 members, “with only four ethicists alongside 48 non-ethicists – representatives from politics, universities, civil society, and above all industry”

OK to involve industry from the start to get the sector onboard but “The guidelines are lukewarm, short-sighted and deliberately vague”

“They ignore long-term risks, gloss over difficult problems …with rhetoric, violate elementary principles of rationality and pretend to know things that nobody really knows”

Expression such as “non-negotiable” and “Red Lines” had to be dropped for the sake of a “positive vision”

<https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>



The guidelines touch on hot issues such as

- citizens scoring,
- autonomous lethal weapons,
- covert AI systems,
- tracking of individuals...

<https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>



This amounts to “ethics washing = cultivating ethical debates to buy time, distract the public and to prevent or at least delay effective regulation

… industry is building one “ethics washing machine” after another”


Since China is already embarked in “digital totalitarianism” and little hope of strong regulation from the US, Europe bears the responsibility

The EU guidelines are good by comparison, but

“Because industry acts more quickly and efficiently than politics or the academic sector, there is a risk that, as with “Fake News”, we will now also have a problem with fake ethics”

The innovation principle



English 

[Home](#) > [Research and innovation](#) > [Law and regulations](#) > [Innovation-friendly legislation](#)

Ensuring EU legislation supports innovation

What the Innovation Principle is, how it was developed, links to Innovation Deals as well as the better regulation research and innovation tool.

The innovation principle



Ensuring EU legislation supports innovation

What is the Innovation Principle?

The Innovation Principle is a tool to help achieve EU policy objectives by ensuring that legislation is designed in a way that creates the best possible conditions for innovation to flourish.

The principle means that in future when the Commission develops new initiatives it will take into account the effect on innovation.

This will ensure that all new EU policy or regulations support innovation and that the regulatory framework in Europe is innovation-friendly.

Against the principle of precaution:

“How an industry association wrote a new principle on innovation and succeeded in introducing this [innovation] principle into a number of European Union (EU) texts”

Garnett, Kathleen & Van Calster, Geert & Reins, Leonie. (2018). Towards an innovation principle: an industry trump or shortening the odds on environmental protection?. *Law, Innovation and Technology*. 10. 1-14. 10.1080/17579961.2018.1455023.

“This is the first time an industry association has successfully tried to introduce a new principle into the EU’s legal order”

Garnett, Kathleen & Van Calster, Geert & Reins, Leonie. (2018). Towards an innovation principle: an industry trump or shortening the odds on environmental protection?. *Law, Innovation and Technology*. 10. 1-14. 10.1080/17579961.2018.1455023.

The End



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