

Tuesday 14: Why quantify? Quantification and trust

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PhD-course

Numbers for policy: Practical problems in quantification

Bergen, March 13–17, 2017

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NEVER PARIBUS

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21/11



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@AndreaSaltelli

Lovely (also in the sense of 'of love') piece by an Italian scholar [@robertocalasso](https://twitter.com/robertocalasso):

[nybooks.com/articles/2016/...](https://nybooks.com/articles/2016/)



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sensitivity analysis, sensitivity auditing, science for policy, impact assessment

Andrea
Saltelli

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= more material on my web site



= discussion time

Problematic
quantifications?



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Topics: Agriculture & Food | Food Security | Health

Pathways Leading to a More Sustainable and Healthy Global Food System

Volume 7 | Issue 5 | Page 10-12 | September 2016

By Krishna Bahadur KC, Evan D.G. Fraser, Samantha Pascoal, Goretty Dias, Trudi Zundel

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“What follows is a hypothetical executive summary from an imagined Food and Agriculture Organization (FAO) report on the state of the world’s food systems, written from the perspective of the 2050s”

Executive Summary: FAO State of World Agriculture in 2050 Draft Report


“[...]this FAO report presents evidence that the international food system of the second half of the 21st century is more sustainable than the food system of the late 20th or early 21st centuries.



[...] today more people are being fed on less land and agriculture is requiring fewer inputs”

Executive Summary: FAO State of World Agriculture in 2050 Draft Report

Three digits



“[...] despite there being 10 billion people on the planet, today agriculture requires 438 million hectares* less land than it did in 2015, yet produces more adequate nutrition for all.”

*Authors' estimate

This [438 Mha] figure was arrived at by assuming that:

- Agriculture shifts away from over production of cereals, oils, and sugars, but increases fruit and vegetables;
- Agricultural yields increase $\sim 1\%/y$ between now and 2050.
- Protein consumption shifts from 86% animals and 14% plants to 50% animal and 50% plant.

“Please contact the authors for references etc. pertaining to these calculations”



Speaking of Science

107 Nobel laureates sign letter blasting Greenpeace over GMOs

By Joel Achenbach June 29

<https://www.washingtonpost.com/news/speaking-of-science/wp/2016/06/29/more-than-100-nobel-laureates-take-on-greenpeace-over-gmo-stance/>



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 Noble 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 Noble 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**"?"

Opposing evidence

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>

See also Tiziano Gomiero, Andrea Saltelli and Mario Giampietro, The complexity of science for policy: the case of the delayed commercialization of the Golden Rice, Submitted October 2016.

Evidence based
policy or its
opposite?

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.

...



Shakespeare, the
Taming of the
Shrew, Act IV.

The expression ‘Policy based evidence’ has entered the public discourse.

Warring parties accuse one another of the sin.

“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.

Critiques of evidence based policy

“This need [for evidence] has been reified in the UK and elsewhere, as routines of 'evidence-based policy'-making have been hardwired into the business of Government.

[...]such approaches are fundamentally flawed [because] Government [...] seeks to capture and control the knowledge producing processes to the point where this type of 'research' might best be described as 'policy-based evidence'.”

Boden, R. and Epstein D., 2006, Managing the Research Imagination? Globalisation and Research in Higher Education. *Globalisation, Societies and Education*, 223-236.

Accepted Manuscript

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

Authors: Andrea Saltelli, Mario Giampietro

DOI: <http://dx.doi.org/doi:10.1016/j.futures.2016.11.012>

Reference: JFTR 2195



EBP = arbitrary framing (closure, → PBE),
rhetorical use of mathematics, reductionism &
hypocognition, power asymmetries, ... need to
explore wider set of frames

Discussion points



- Are we (my team, my organization) into evidence based policy or policy based evidence?

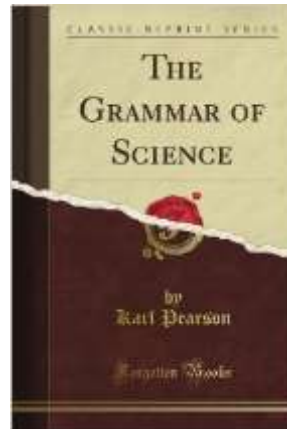
Trust in science,
trust in
quantification

Is science always right? Karl Pearson (a social Darwinist) suggests not wasting resources on social programs as:

“No degenerate and feeble stock will ever be converted into healthy and sound stock by the accumulated effects of education, good laws, and sanitary surroundings”



Karl Pearson



Pearson, K., 1892, *The Grammar of Science*, Walter Scott Publisher, London, p.32.

Think Tank Scholar or Corporate Consultant? It Depends on the Day

Acting as independent arbiters to shape government policy, many researchers also have corporate roles that are sometimes undisclosed.

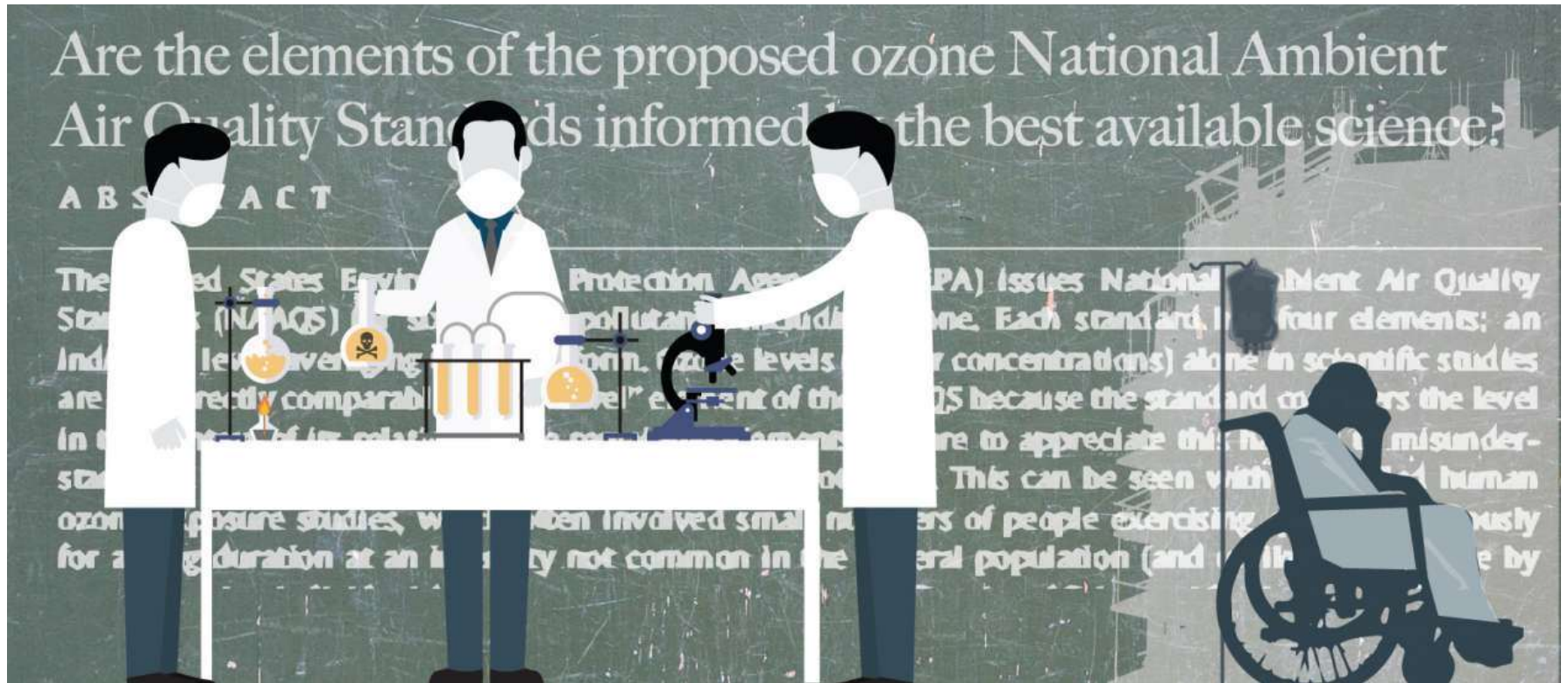
By ERIC LIPTON, NICHOLAS CONFESSORE and BROOKE WILLIAMS AUG. 8, 2016

The New York Times

http://www.nytimes.com/2016/08/09/us/politics/think-tank-scholars-corporate-consultants.html?_r=0

Lobbyists recruit laws firms which in turn recruit scientific services for their customer;

<http://www.publicintegrity.org/2016/02/08/19223/meet-rented-white-coats-who-defend-toxic-chemicals>



“Nearly half of Gradient’s articles that are peer-reviewed are published in two journals with strong ties to industry, *Critical Reviews in Toxicology* and *Regulatory Toxicology and Pharmacology*” [Gradient is the research services company enrolled by law firms]



<http://www.publicintegrity.org/2016/02/08/19223/meet-rented-white-coats-who-defend-toxic-chemicals>

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Special Communication | September 12, 2016

Sugar Industry and Coronary Heart Disease Research

A Historical Analysis of Internal Industry Documents **FREE**

ONLINE FIRST

Cristin E. Kearns, DDS, MBA^{1,2}; Laura A. Schmidt, PhD, MSW, MPH^{1,3,4}; Stanton A. Glantz, PhD^{1,5,6,7,8}

[+] Author Affiliations

JAMA Intern Med. Published online September 12, 2016. doi:10.1001/jamainternmed.2016.5394

Text Size: A A A

See also <https://www.theguardian.com/society/2016/apr/07/the-sugar-conspiracy-robert-lustig-john-yudkin>, and the story of US President Dwight Eisenhower heart attack,...

“our findings suggest the industry sponsored a research program in the 1960s and 1970s that successfully cast doubt about the hazards of sucrose while promoting fat as the dietary culprit in CHD [coronary hearth disease]”

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JAMA Intern Med. Published online September 12, 2016. doi:10.1001/jamainternmed.2016.5394

Text Size: [A](#) [A](#) [A](#)

Voices of concern:

“science has taken a turn towards darkness” (Richard Horton, editor-in-chief of *The Lancet*, 2015)

“If Donald Trump were to trigger a crisis in Western democracy, scientists would need to look at their part in its downfall” (Macilwain, 2016)

Horton, R., 2015, Comment, Offline: What is medicine's 5 sigma? *The Lancet*, 385, 1380.

Macilwain, C., 2016, The elephant in the room we can't ignore, *Nature*, 531, 277.

Economics?

The Mathiness discussion in Economics

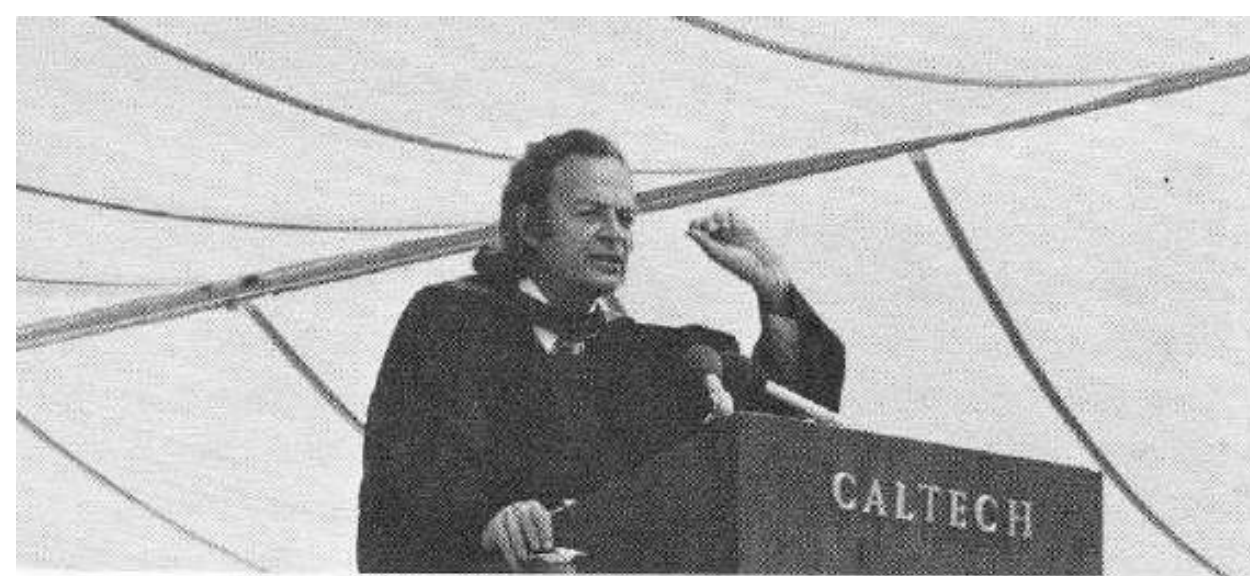
“The style that I am calling mathiness lets academic politics masquerade as science. Like mathematical theory, mathiness uses a mixture of words and symbols, but instead of making tight links, it leaves ample room for slippage between statements in natural versus formal language and between statements with theoretical as opposed to empirical content.”



Paul Romer
Since July 18
2016 Chief
Economist of
the World Bank

<https://paulromer.net/mathiness/>

See also <https://paulromer.net/feynman-integrity/>



Cargo Cult Science

by RICHARD P. FEYNMAN

**Some remarks on science, pseudoscience,
and learning how to not fool yourself.
Caltech's 1974 commencement address.**



Appeals to
Richard
Feynman's
famous speech
<https://paulromer.net/feynman-integrity/>



The Trouble With Macroeconomics

PAUL ROMER
Stern School of Business
New York University

Wednesday 14th September, 2016

2 Post-Real Models

6 Questions About Economists, and Physicists

7 Loyalty Can Corrode The Norms of Science

9.1 The Norms of Science

10 The Trouble Ahead For All of Economics

A different diagnosis for a diseased economics: for Erik Reinert's: economics has reverted to scholasticism

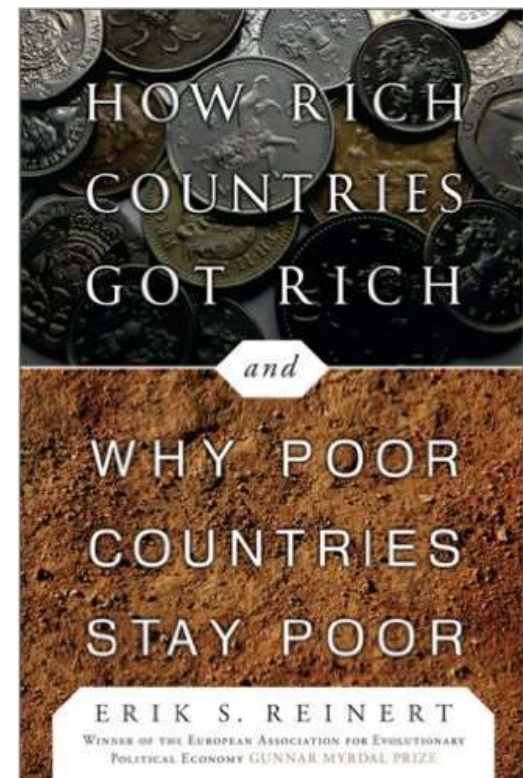
... forgetting an important continental tradition

... implications for developments

http://www.andreasaltelli.eu/file/repository/Full_Circle_scholasticism_2.pdf



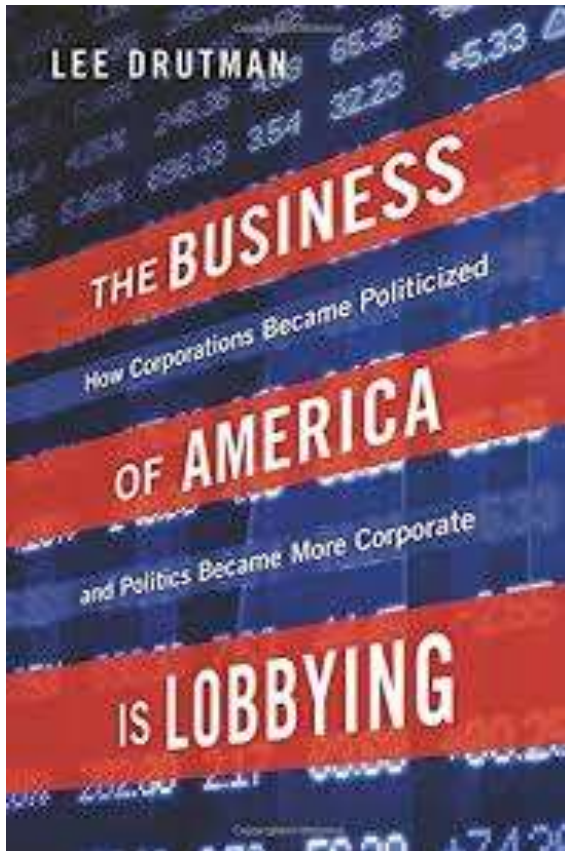
Erik Reinert



Should natural sciences
enroll economics in
their advocacy to save
the planet?



Evidence as the
currency of
lobbies



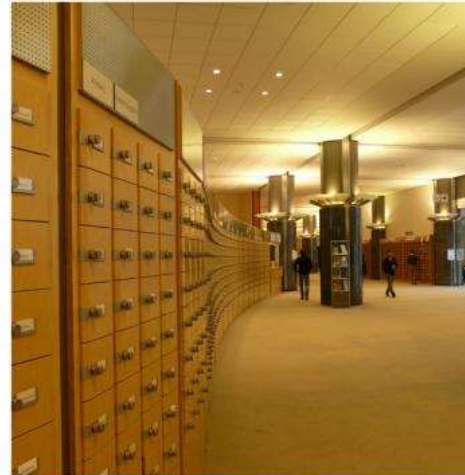
Sylvain Laurens

Les courtiers du capitalisme

**Milieus d'affaires
et bureaucrates à Bruxelles**



Lee Drutman



l'ordre des choses

AGONE



Sylvain Laurens

Some quick read:

<http://www.nybooks.com/articles/2016/04/07/how-lobbyists-win-in-washington/>

<http://www.contretemps.eu/lectures/lire-extrait-courtiers-capitalisme-sylvain-laurens>

Both works (resp. US, EU) make the point that evidence is the currency of lobbies

In the use of evidence actors with deepest pockets may prevail. A worrying asymmetry

A truly black pearl: a candid admission in a book written for the lobbyists: The regulation game, Owen & Braeutigam, 1978



“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”

Book written for the lobbyists: The regulation game, Owen & Braeutigam, 1978



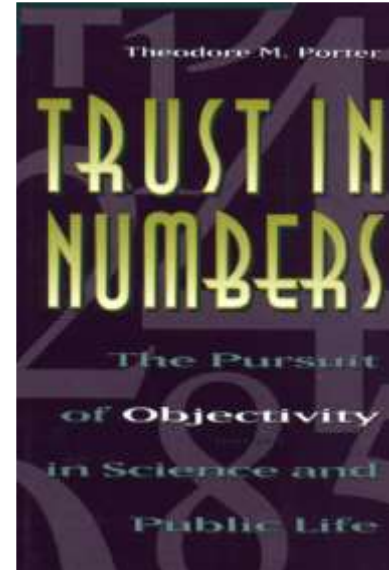
“This activity requires a modicum of finesse; it must not be too blatant, for the experts themselves must not recognize that they have lost their objectivity and freedom of action”

Owen B. M. and Braeutigam, R., Regulation Game: Strategic Use of the Administrative Process, page 7, Harper Business (1978)

Trust and quantification.

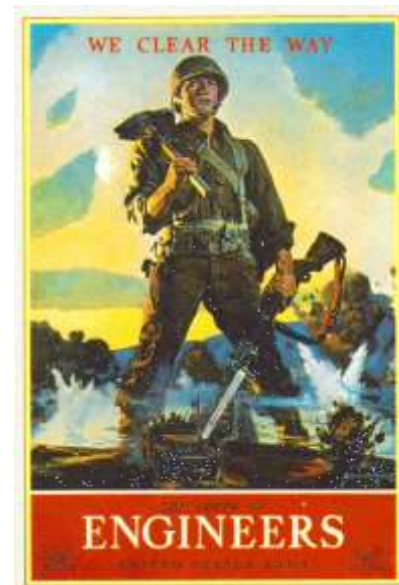
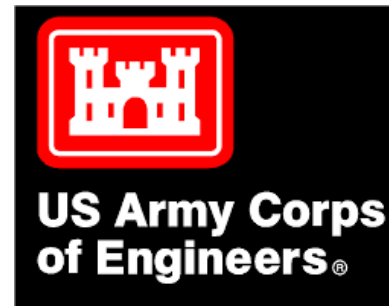


Theodor M. Porter

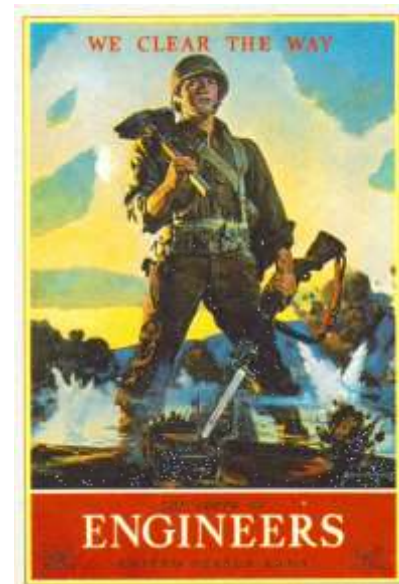


Theodore M. Porter, *Trust in Numbers, The Pursuit of Objectivity in Science and Public Life*, Princeton 1995

Trust, authority and styles of quantification: two different stories



Porter's story: Quantification needs judgment which in turn needs trust ...without trust quantification becomes mechanical, a system, and systems can be played



The myth of scientific quantification via risk or cost benefit analyses, including of the impact of new technologies, has been at the hearth of the critique of the ecological moment (e.g. Schumacher, 1973; Winner, 1986; Funtowicz and Ravetz, 1994)

E. F. Schumacher, 1973, *Small Is Beautiful. Economics as if People Mattered*, Penguin Perennial,

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.

Funtowicz, S.O. and Ravetz, J.R. (1994). The worth of a songbird: Ecological economics as a post-normal science. *Ecological Economics* 10(3), 197-207.

[...] quality is much more difficult to 'handle' than quantity, just as the exercise of judgment is a higher function than the ability to count and calculate.



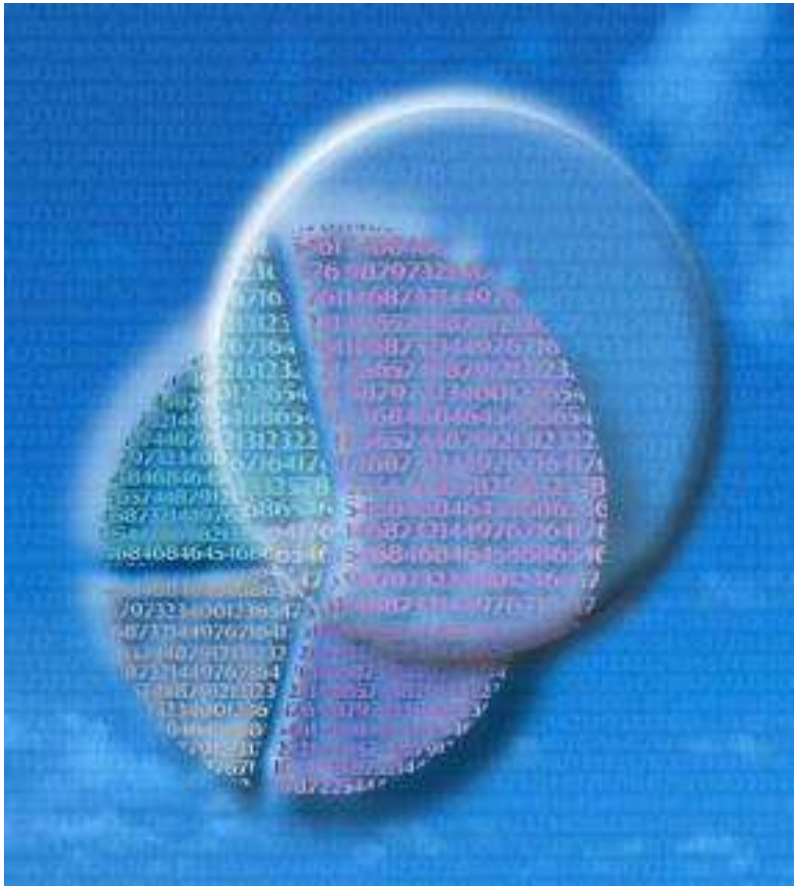
Ernst Friedrich
"Fritz"
Schumacher

Quantitative differences can be more easily grasped and certainly more easily defined than qualitative differences: their concreteness is beguiling and gives them the appearance of scientific precision, even when this precision has been purchased by the suppression of vital differences of quality.

Discussion points



- Do I see a relationship between trust and quantification?
- Are we (my team, my organization) more like the 'corps des ingénieurs des ponts et chaussées' or the US Army corps of Engineers?



END

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