Big Data Forecasting with a Wanted Outcome: Advocacy versus Accuracy

Erik Olson and Auke Hunneman

BI Norwegian Business School

Personal information

Auke Hunneman

Associate Professor @ BI Oslo

Associate Dean Msc in Business Analytics @BI Oslo

Adjunct Associate Professor @ UiS

Contact Information

Phone: +47 4641 0573

Email: auke.hunneman@bi.no

Big data everywhere

- Big data (BD) and AI have enormous potential to enhance our understanding of a wide range of phenomena.
- Despite the hope among scientists, policy makers and managers for more effective decisions, BD has not yet delivered on its promise of more 'rational' and data-driven management:
  - Too much focus on the data and less on the business context/problem (De Langhe & Puntoni 2024)
  - General overconfidence in BD techniques and capabilities (e.g., less is more by Gigerenzer)
  - Biases in the (training data) and algorithms
  - Different ways/perspectives on data handling/analyzing procedures
  - Reflexivity – previous policies will impact the data generating process

Advocacy bias

- The biggest source of big data accuracy problems are advocacy biases of scholars and practitioners.
- Advocacy bias is defined by a researcher's devotion to a status quo changing 'good cause'
- Big data techniques may lead to a conscious or subconscious desire to use big data to generate cause affirming forecasts (and ignore or suppress cause falsifying data and analyses).
- This practice is **bad for research** (e.g., b/c of advocay bias); may harm the **credibility** of management research.

Existing research is inadequate to address societal crises

- Humanity faces several **deep crises** that current management theory cannot address, handle (partly b/c of complicity in these)

- We need **new management theory** which isn't merely an incremental addition to existing theory—management theory needs to be **"reset."**

- Often added: As scholars, we should embrace **activism** (as the new theory must be "performative").

- This thinking has moved from the **fringe** to the **mainstream** in management research—endorsed by **leading scholars**, captured **leading journals**, highlighted by the leading **associations**.

* Academy of Management Learning & Education, 2011, Vol. 10, No. 2, 298–321.

Leveraging the Financial Crisis to Fulfill the Promise of Progressive Management

WITOLD J. HENISZ
University of Pennsylvania

Journal of International Business Studies (2023) 54, 1151–1169

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POINT

International business is contributing to environmental crises

Haitao Yu[1], Pratima Bansal[2] and Diane-Laure Arjaliès[2]

Abstract
All business contributes to environmental crises because of its focus on profit. We argue that international business (IB) contributes more than its fair share.

ELSEVIER
European Management Journal
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The great reset of management and organization theory. A European perspective

Steffen Roth

So, world-bettering activism is called for

Journal of Management Inquiry

Impact Factor: 3.1
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Free access | Editorial | First published online April 20, 2023

A Call for Activist Scholarship in Organizational Theorizing

Barbara Gray | View all authors and affiliations

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Contents | PDF / ePub

In this essay, I elaborate on my 2022 OMT Distinguished Scholar address to reflect on the field of organizational theory and, in particular, about our role as scholars in the years ahead. Over the last eight years, we have heard an increasing clamor for organizational scholars to focus our research efforts on addressing the "grand challenges" that confront our world. With that work, as well as some dealing with

Answering the crisis with intellectual activism: Making a difference as business schools scholars

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Alessia Contu
University of Massachusetts, Boston, USA

X and Organization Studies

(Un)Sustainability and Organization Studies: Towards a Radical Engagement

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Seray Ergene
University of Rhode Island, USA

Subhabrata Bobby Banerjee

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Management Scholars of the World, Unite!

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BI

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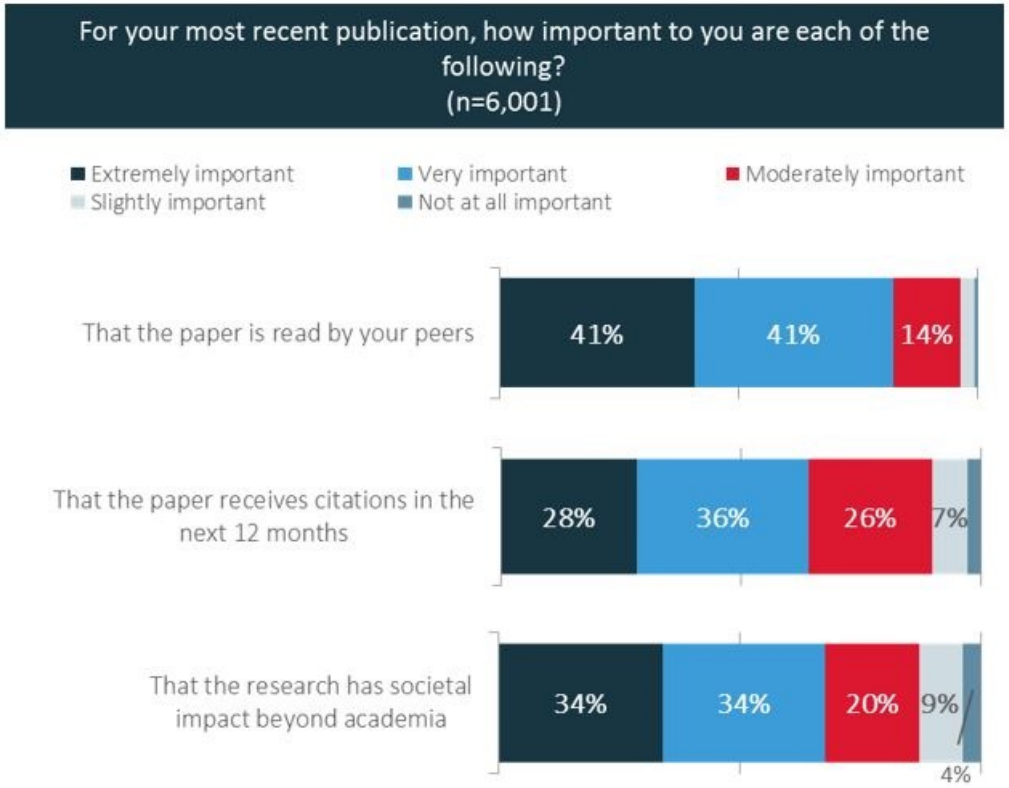
What do scholars think?

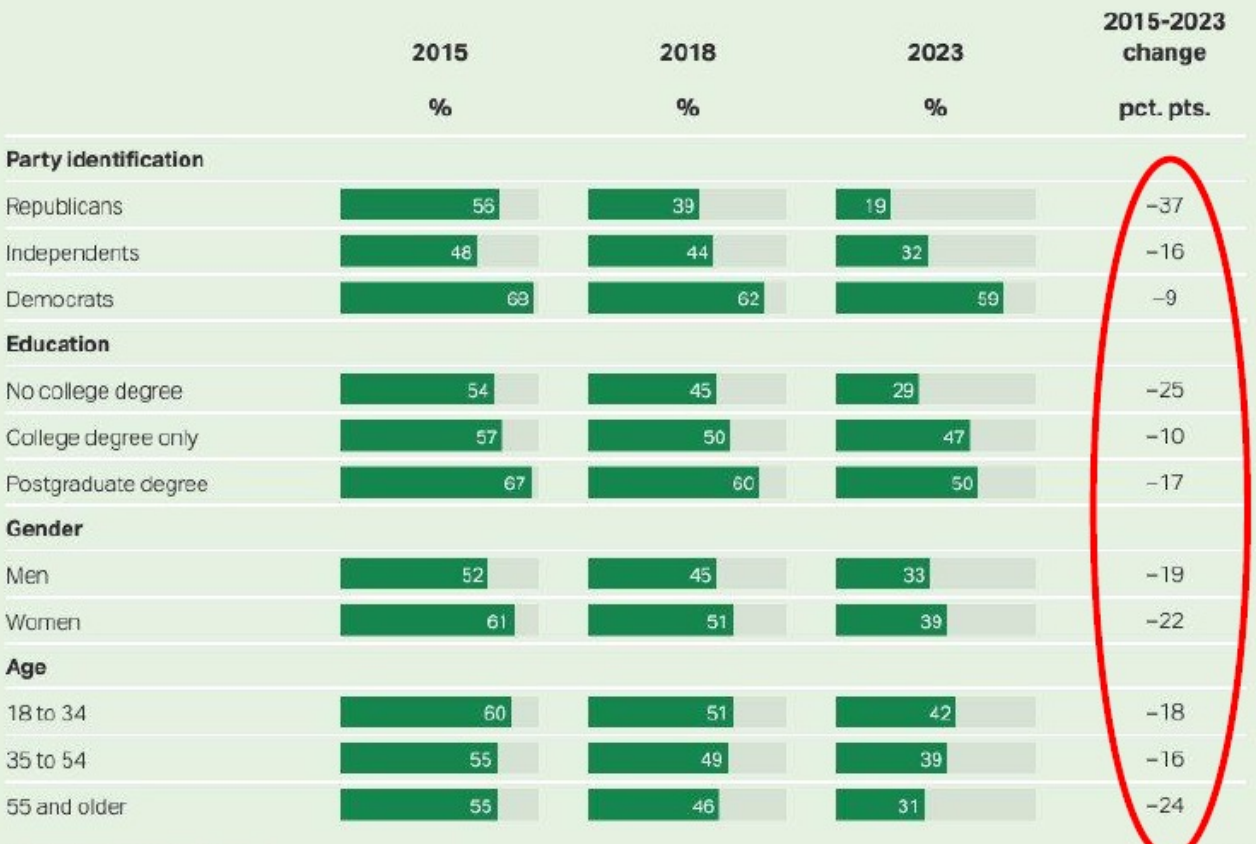


- Societal impact is valued most in India, followed by the U.S. and Europe.
- It is seen as highly significant in social sciences and medicine.
- Young researchers prioritize societal impact more than older counterparts.
- Public funding often motivates researchers to focus on impact.

Source: Springer survey on SDG impact

Shifting Confidence in Higher Education Among Demographic Groups, 2015-2023

% of U.S. adults with "a great deal" or "quite a lot" of confidence in higher education



	2015 %	2018 %	2023 %	2015-2023 change pct. pts.
Party identification				
Republicans	56	39	19	−37
Independents	48	44	32	−16
Democrats	68	62	59	−9
Education				
No college degree	54	45	29	−25
College degree only	57	50	47	−10
Postgraduate degree	67	60	50	−17
Gender				
Men	52	45	33	−19
Women	61	51	39	−22
Age				
18 to 34	60	51	42	−18
35 to 54	55	49	39	−16
55 and older	55	46	31	−24

Get the data • Download image

GALLUP

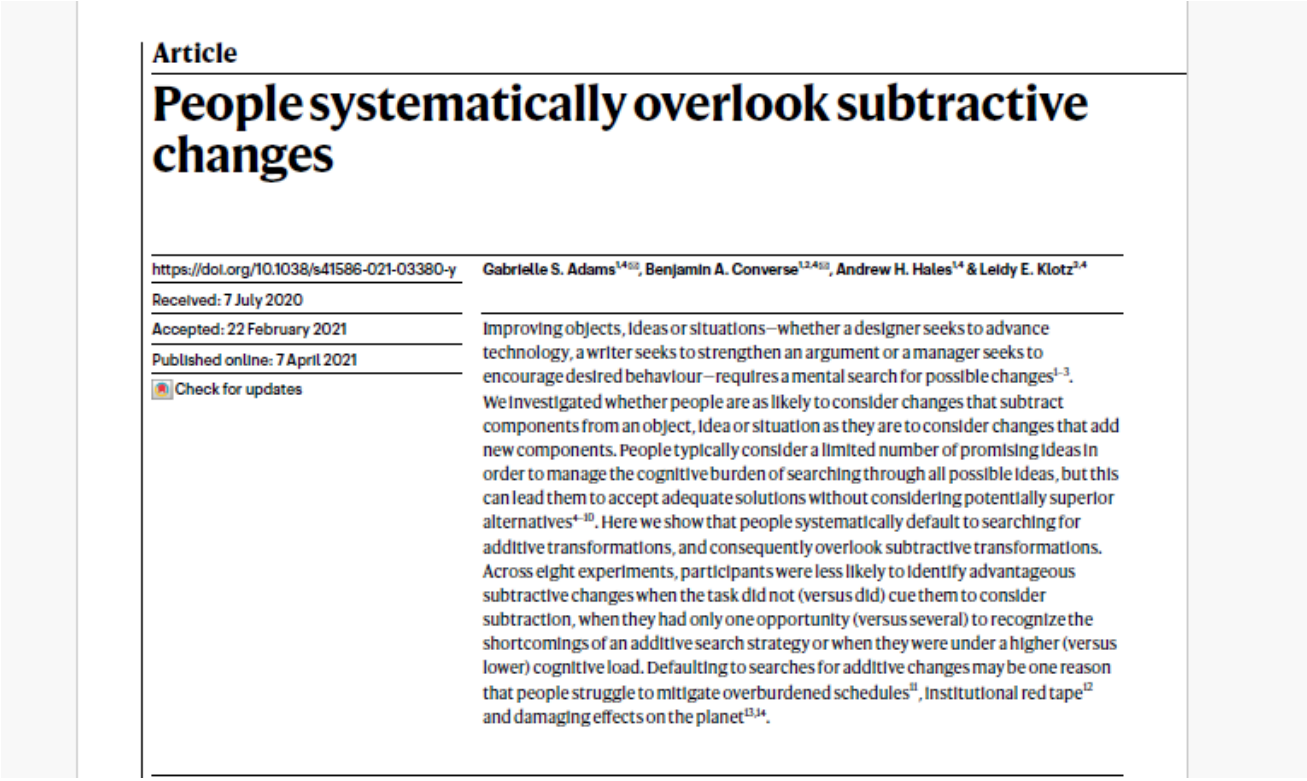
Four quadrants: Mapping the limits of statistics

	Limited payoff (true or false)	Payoff matters
Normal distribution	**Known-knowns** Things we are aware of and understand Domain of risk: Dice, casino bets.	**Known-unknowns** Things we are aware of but do not understand Stats work: Life expectancy, credit scores
Fat-tail or unknown distribution	**Unknown-knowns** Things we understand but are not aware of Modeling works: SAT scores	**Unknown-unknowns** Things we are not aware of and do not understand Black swans: Climate modeling

adapted from Taleb 2007, 2008

Scale-Free Causes of Power Laws in Organizations (adapted from Andirani & McKelvey 2009)	
Ratio imbalances	Surface-volume law
	Random walk
	Hierarchical modularity
	Event bursts
Multiple distributions	Combination theory
	Interactive breakage theory
	Interacting fractals
Positive feedback	Least effort
	Preferential attachment
	Spontaneous order creation
	Irregularity generated gradietns
Contextual effects	Phase transition
	Contagion bursts
	Self-organized criticality
	Niche proliferation

We often think complexification helps…



Article

People systematically overlook subtractive changes

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Check for updates

Gabrielle S. Adams[1,4✉], Benjamin A. Converse[1,2,4✉], Andrew H. Hales[1,4] & Leidy E. Klotz[3,4]

Improving objects, ideas or situations—whether a designer seeks to advance technology, a writer seeks to strengthen an argument or a manager seeks to encourage desired behaviour—requires a mental search for possible changes[1–3]. We investigated whether people are as likely to consider changes that subtract components from an object, idea or situation as they are to consider changes that add new components. People typically consider a limited number of promising ideas in order to manage the cognitive burden of searching through all possible ideas, but this can lead them to accept adequate solutions without considering potentially superior alternatives[4–10]. Here we show that people systematically default to searching for additive transformations, and consequently overlook subtractive transformations. Across eight experiments, participants were less likely to identify advantageous subtractive changes when the task did not (versus did) cue them to consider subtraction, when they had only one opportunity (versus several) to recognize the shortcomings of an additive search strategy or when they were under a higher (versus lower) cognitive load. Defaulting to searches for additive changes may be one reason that people struggle to mitigate overburdened schedules[11], institutional red tape[12] and damaging effects on the planet[13,14].

The downsides of model complexification…

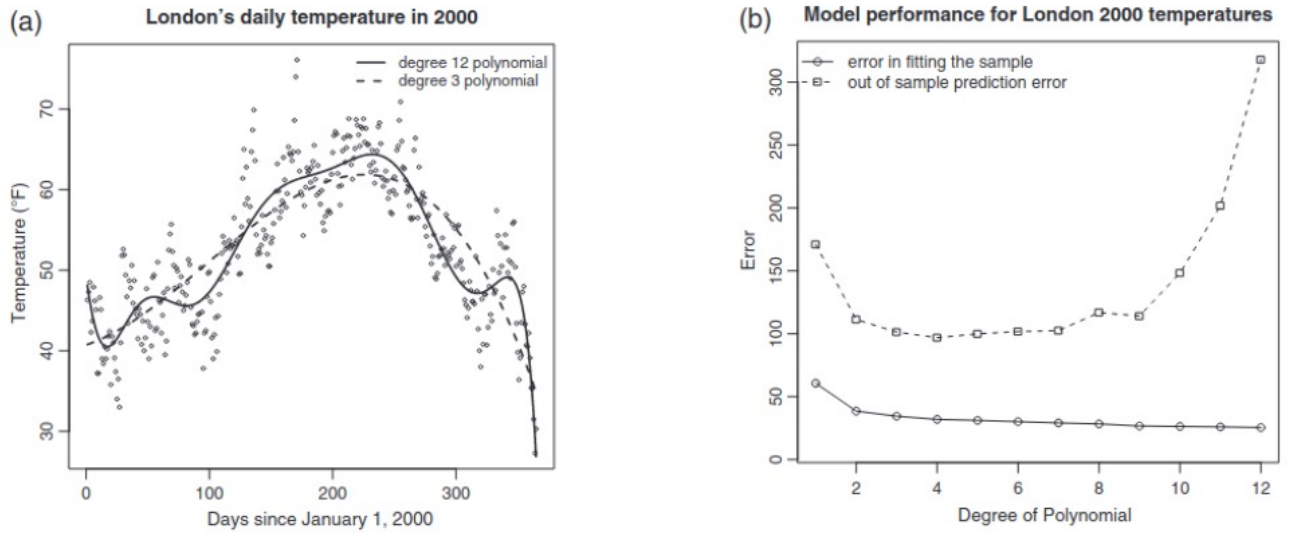
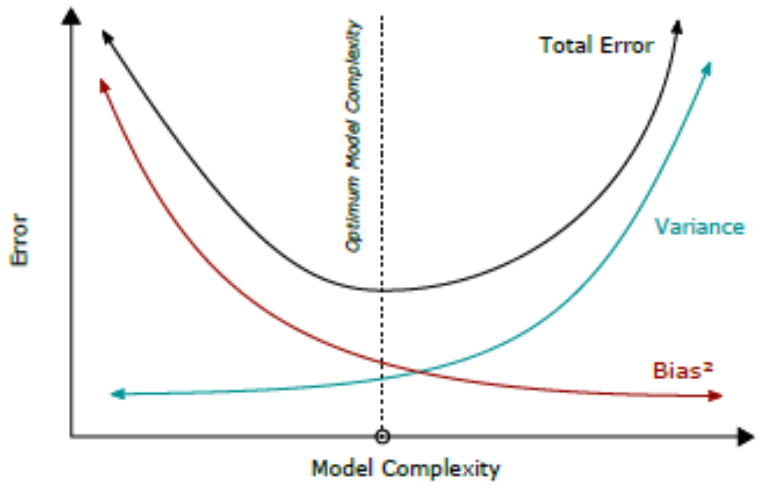


Figure 1: *Plot (a) shows London's mean daily temperature in 2000, along with two polynomial models fitted using the least squares method. The first is a degree-3 polynomial with 4 parameters (the simpler model), and the second is a degree-12 polynomial with 13 parameters (the more complex model). Plot (b) shows both the mean error in fitting samples of 30 observations (the training data), and the mean* predictive *error of the same models against the test data, both as a function of degree of polynomial. Figure and modified caption from Brighton and Gigerenzer (2012).*

Prediction vs. Explanation



- Simpler prediction models may have higher bias but lower variance.
- Prediction models do not require causality between explanatory and outcome variables.

Advocacy for status quo change

- Rooted in cognitive dissonance: an unpleasant feeling stemming from incongruence between perceptions/beliefs and reality.

- Reducing cognitive dissonance can be achieved by:

  - Changing beliefs so that they match reality.
  - Denying or distroting reality to preserve core beliefs (mistaking the map for the territory).

- Contentious topics will most likely lead to conflicts between advocacy and accuracy: gender, race, sexual orientation, and environmentalism.

Tetlock's superforecasters

- A **hedgehog** is someone who relies on a single, overarching framework or big idea to interpret the world, often showing high confidence in their predictions.

- A **fox** uses a diverse range of perspectives, integrates multiple viewpoints, and remains open to updating their beliefs, making them generally better at accurate forecasting.

The wanted-unwanted framework: example 1

	Undesired forecast outcome	*Desired forecast outcome*
Undesired data/algorithms	**Unwanted-unwanted** Undesired model results in undesired outcome DEI modeling.	**Unwanted-wanted** Undesired model results in advocated outcome. Status quo doesn't work.
Desired data/algorithms	**Wanted-unwanted** Advocated model results in undesired outcome. Status quo change doesn't work.	**Wanted-wanted** Advocated model results in advocated outcome. Climate Modeling.

DEI example

- DEI advocates contend that any underrepresentation of minority groups must be *because of* discrimination.

  For example, Harvard got sued over admission discrimination against Asians.

- However, such attempts ignore years of affirmative actions to get minority groups into college.

- They also ignore other explanatory factors like an ability/achievement gap.

  SAT scores for Asian and white applicants were significantly higher than those for Hispanic and black applicants.

- More individual-level data (SAT scores) and deep learning models challenge DEI's focus on equitable outcomes.

The wanted-unwanted framework: example 2

	Undesired forecast outcome	*Desired forecast outcome*
Undesired data/algorithms	**Unwanted-unwanted** Undesired model results in undesired outcome DEI modeling.	**Unwanted-wanted** Undesired model results in advocated outcome. Status quo doesn't work.
Desired data/algorithms	**Wanted-unwanted** Advocated model results in undesired outcome. Status quo change doesn't work.	**Wanted-wanted** Advocated model results in advocated outcome. Climate Modeling.

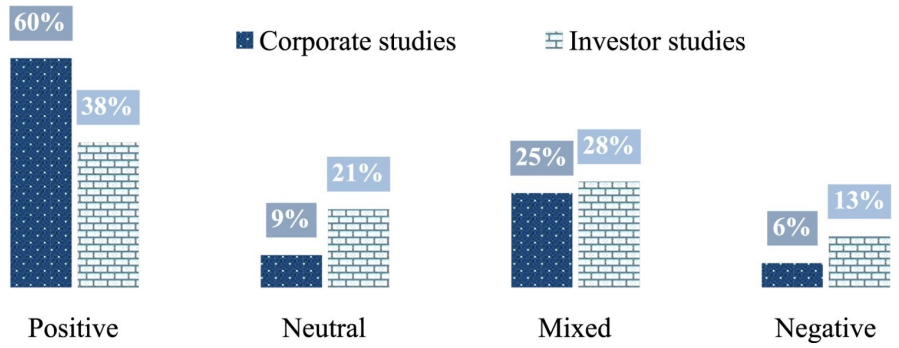
Climate modeling

- Climate models are squarely in the unknown-unknown quadrant / Black swans are not predictable
  - An Oxford-led experiment showed that adjusting five climate model parameters within reasonable limits resulted in forecasts ranging from no warming to over 10°C (Stainforth et al., 2005).

- Several unknowns determine the outcomes of climate models:
  - Data quality issues, especially for historical and under sampled locations.
  - Feedback effects from slowing human population growth, increased wealth/education, more efficient use of natural resources, etc.

- Relying on a single model can be problematic, whereas combining predictions from multiple models offers greater reliability.
  - This assumes however that observations are independent, which they are not.

The effect of environmental performance on profitability



- Investing in sustainability is positively correlated with financial performance.
- However, possible alternative explanations:
  - Effect sizes are very small: 1-4% of the explained variance.
  - Reverse causality: strong financial performance leads to investments in sustainability?
  - Signaling: investments in sustainability signal (to investors) that companies do well financially and that they are well-managed.

Conclusions

- Wanted outcomes are more likely to result from big data contexts least able to provide accurate forecasts, i.e., the unknown-unknown quadrant.

- If advocacy becomes dominant, its proponents will get the favorable reviews, the grants, the citations, the promotions.

- Science is no longer solely about uncovering truth but often about reinforcing prevailing narratives, securing funding, or aligning with political and corporate interests.

- This shift prioritizes conformity over innovation!

Evidence of streetlight effects?

Source: Park, Leahey, Funk 2023

Fig. 2: Decline of disruptive science and technology.

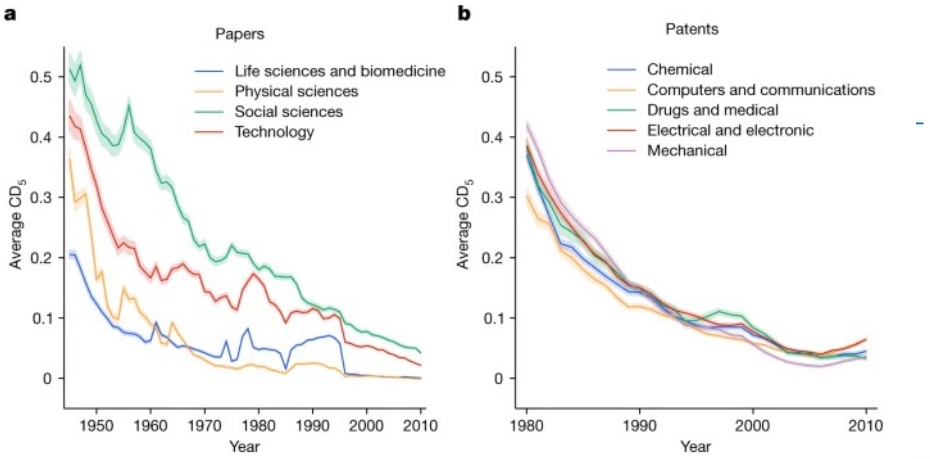
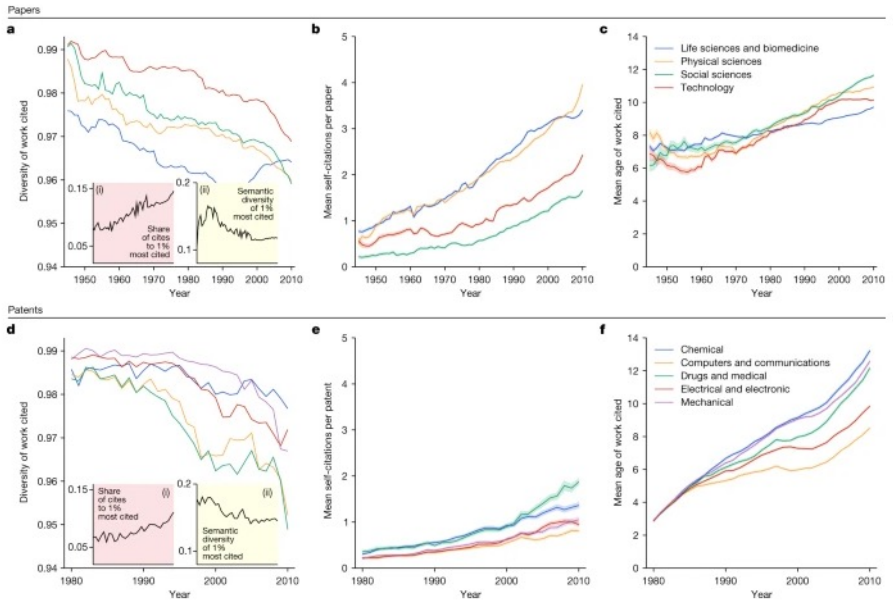


Fig. 6: Papers and patents are using narrower portions of existing knowledge.



Where do we go from here?

- A few suggestions for improvement:
  - make it OK to work on traditional topics
  - less focus on fads / That's interesting!
  - increased transparency about data & modeling choices
  - more replication studies
  - more emphasis on prediction (versus explanation)
  - more openness, diversity, & respect for opposing viewpoints

Two views of management research

Management research as a justice/emancipation/advocacy project:
Exposing, protesting inequality, exploitation, poverty, hierarchy + devising alternatives that are more emancipatory, egalitarian (see Spicer & Alvesson, 2024); "the world as it should be."

versus

Management research as a scientific project:
The value neutral analysis of the "business universe," using the attained knowledge for purposes of design / applied science (Simon, 1969).