About the social relevance of research indicators

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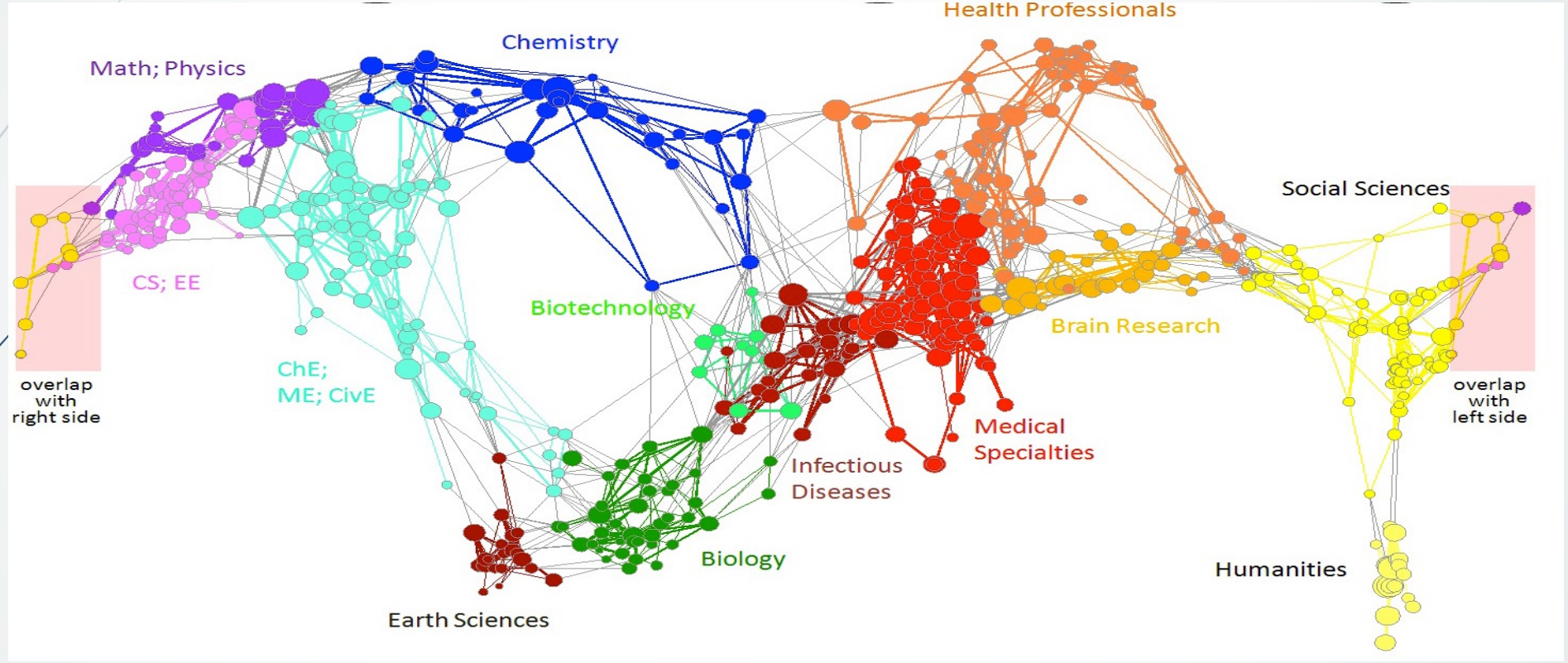
Journeys

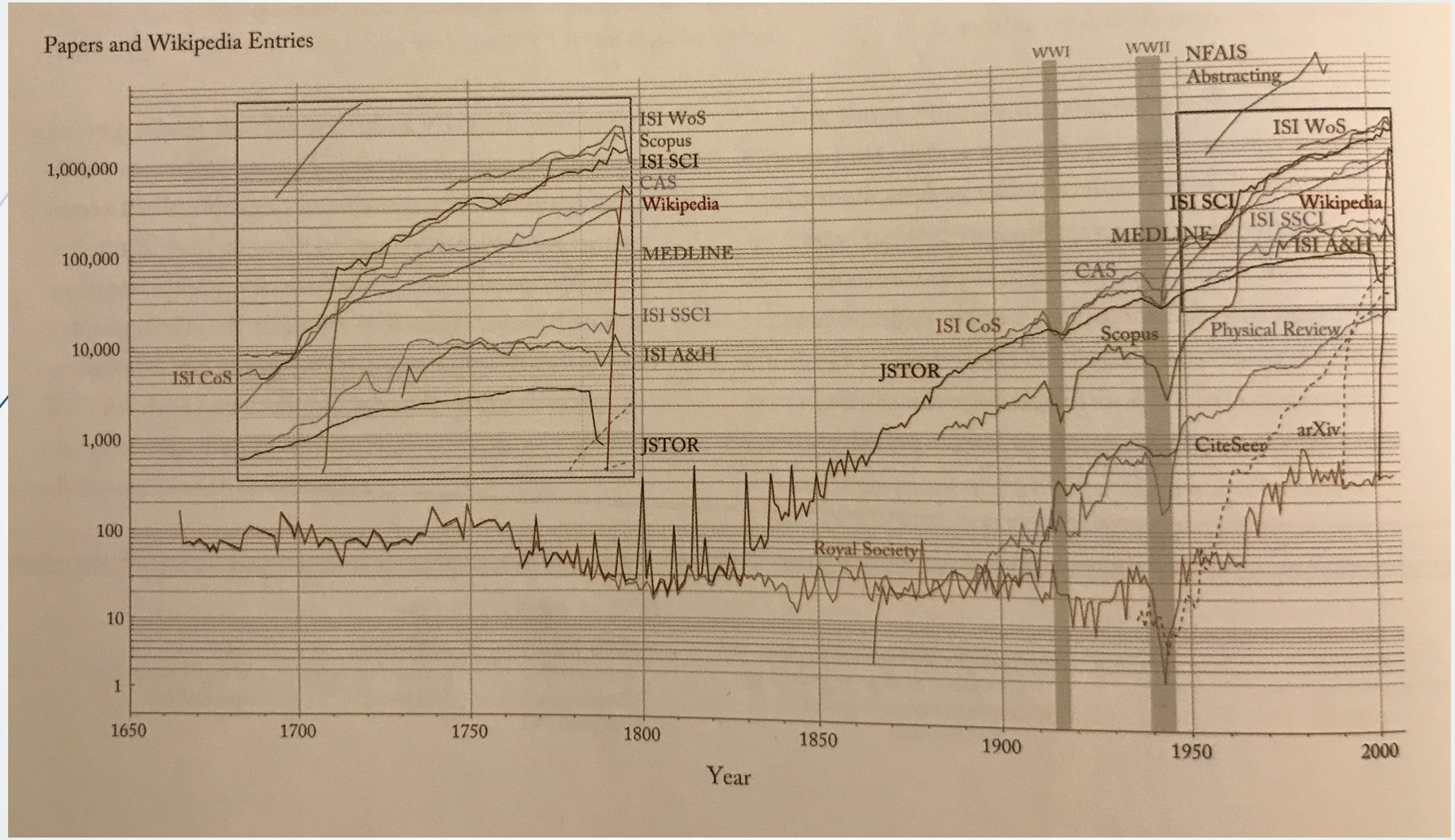


Klavans, Richard and Kevin W. Boyack. 2007. *Maps of Science: Forecasting Large Trends in Science*. Courtesy of Richard Klavans, SciTech Strategies, Inc. In "3rd Iteration (2007): The Power of Forecasts," *Places & Spaces: Mapping Science*, edited by Katy Börner and Julie M. Davis. http://scimaps.org.

Overview

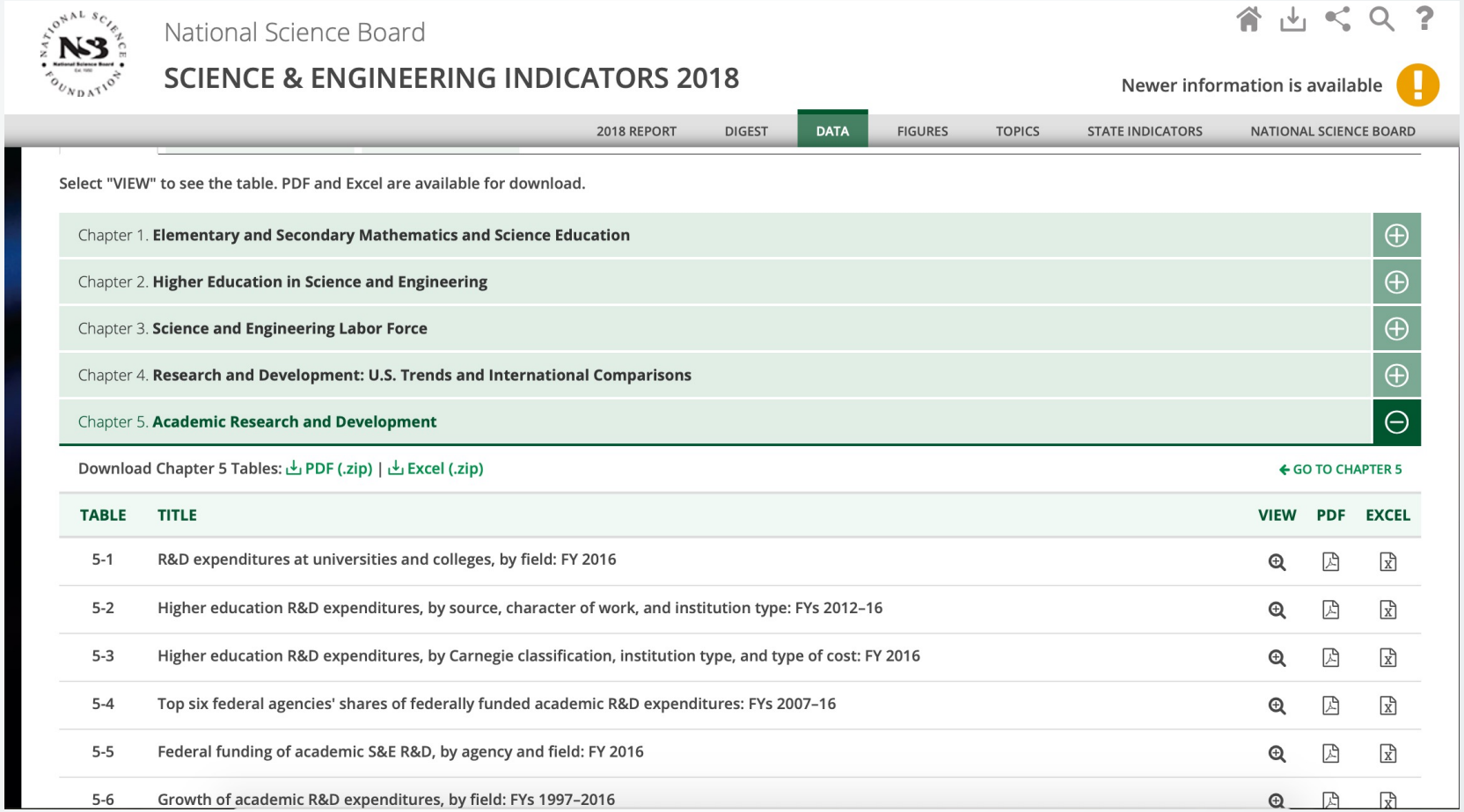
Journeys	
After WWII	Science and Technology Indicator systems
60s/70s	Citation Indexing
80s	Bibliometrics as profession
90s	WWW
2000s	Crisis of bibliometrics
2010s	New technology, new players
2020s	Open Science, Responsible Innovation/Science and Metrics
Conclusions	

Journeys



Photocopy: Borner, K. (2010). Atlas of science: Visualizing what we know. Cambridge, Mass: MIT Press.

Science and Technology Indicators



https://www.nsf.gov/statistics/2018/nsb20181/data/tables
https://web.archive.org/save/https://www.nsf.gov/statistics/2018/nsb20181/data/tables

Citation Indexing

Unique Advantages of Citation Indexes

The ISI® databases differ from traditional indexing and abstracting services in several other ways as well. From the outset, the Science Citation Index® (SCI®), Social Sciences Citation Index® (SSCI®), and Arts & Humanities Citation Index® (A&HCI®) have been multidisciplinary. They cover virtually all disciplines whereas traditional services are limited to a single field or discipline. In this latter respect, VINITI abstracting in Moscow has also been multi-disciplinary. But it still does not produce a single unified index.

The advantages of a multidisciplinary index can be exemplified by the work of the Nobel Prize chemist Harold C. Urey. His now classic paper, published in Science[3] in 1962, "Lifelike forms in meteorites" described the chemical compounds contained in meteorites that were essential to the formation of life. The first slide is a reproduction of an advertisement for the 1966 Science Citation Index which demonstrates its multi-disciplinary coverage in biology, cosmology, chemistry, earth sciences, geochemistry, and so on.

E. Garfield (1997) Concept of Citation Indexing: A Unique and Innovative Tool for Navigating the Research Literature. Speech presented at Far Eastern State University Vladivostok - September 4, 1997

http://www.garfield.library.upenn.edu/papers/vladivostok.html

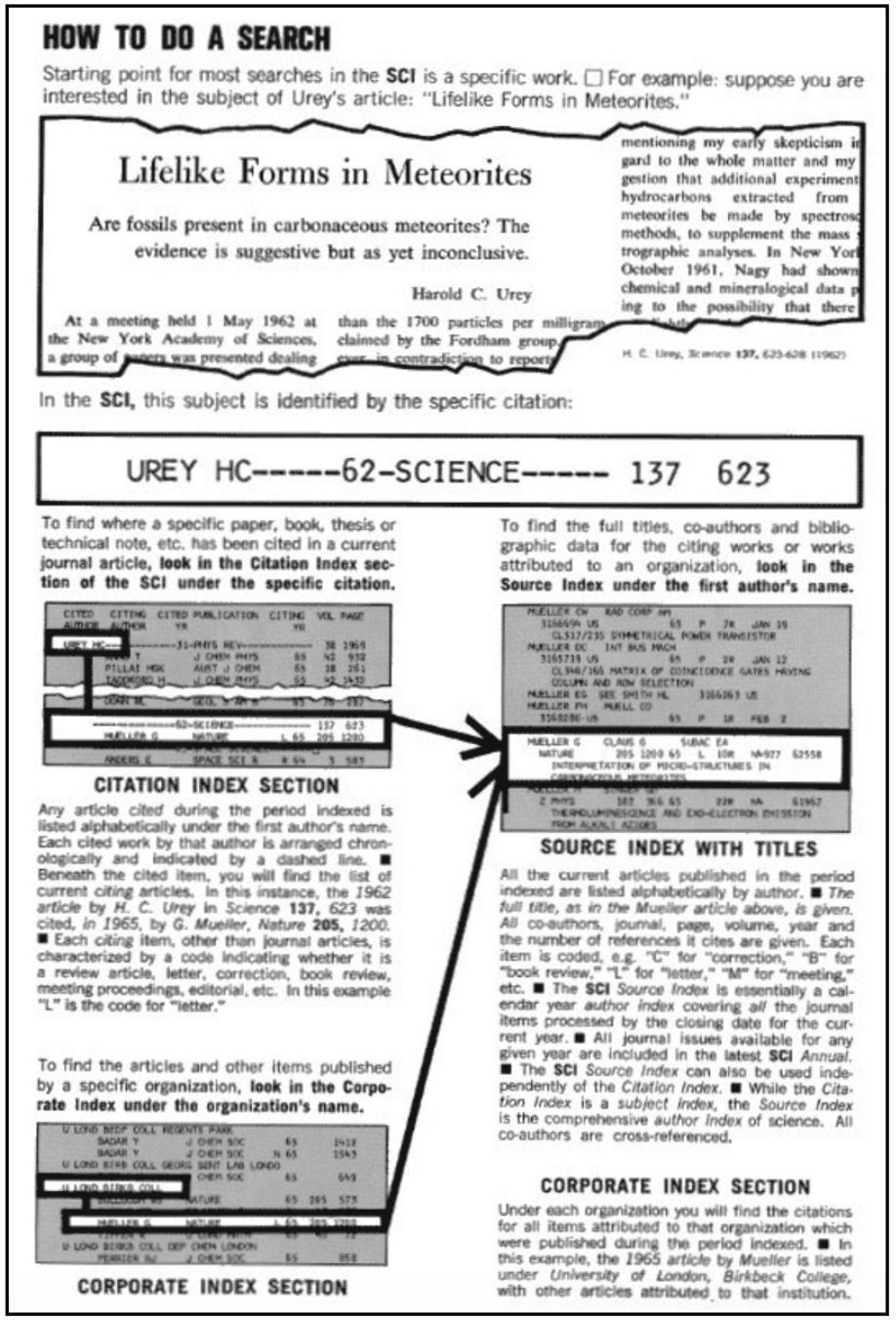


FIGURE #1 : HOW TO SEARCH

Bibliometrics as profession

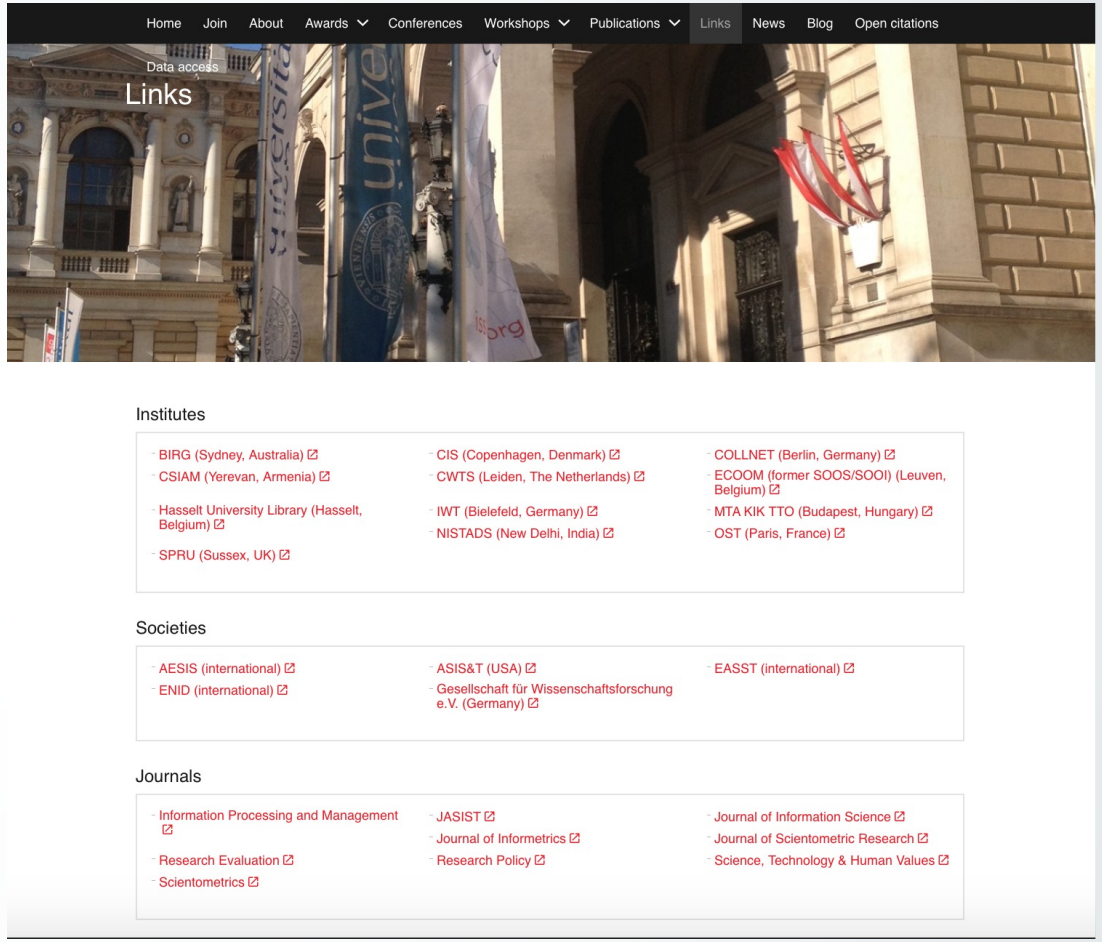
1978 Journal *Scientometrics*

Since 1984 Derek de Solla Price Memorial Medal

1993 The International Society for Scientometrics and Informetrics (ISSI)

CWTS B.V.

European Research Infrastructure for Science, technology and Innovation policy Studies (RISIS) (2014-2022)



https://www.issi-society.org/links/

‘Crisis’ of bibliometrics

“Before 2000, there was the Science Citation Index on CD-ROM from the Institute for Scientific Information (ISI), used by experts for specialist analyses. In 2002, Thomson Reuters launched an integrated web platform, making the Web of Science database widely accessible. Competing citation indices were created: Elsevier's Scopus (released in 2004) and Google Scholar (beta version released in 2004). Web-based tools to easily compare institutional research productivity and impact were introduced, such as InCites (using the Web of Science) and SciVal (using Scopus), as well as software to analyse individual citation profiles using Google Scholar (Publish or Perish, released in 2007).
In 2005, Jorge Hirsch, a physicist at the University of California, San Diego, proposed the *h*-index, popularizing citation counting for individual researchers. Interest in the journal impact factor grew steadily after 1995 (see 'Impact-factor obsession').
Lately, metrics related to social usage and online comment have gained momentum — F1000Prime was established in 2002, Mendeley in 2008, and Altmetric.com (supported by Macmillan Science and Education, which owns Nature Publishing Group) in 2011.
As scientometricians, social scientists and research administrators, we have watched with increasing alarm the pervasive misapplication of indicators to the evaluation of scientific performance. The following are just a few of numerous examples. Across the world, universities have become obsessed with their position in global rankings (such as the Shanghai Ranking and *Times Higher Education*'s list), even when such lists are based on what are, in our view, inaccurate data and arbitrary indicators.”

Hicks, D., Wouters, P., Waltman, L. *et al.* Bibliometrics: The Leiden Manifesto for research metrics. *Nature* **520,** 429–431 (2015). https://doi.org/10.1038/520429a

And the response: Leiden Manifesto

http://www.leidenmanifesto.org

- Quantitative evaluation should support qualitative expert assessment
- Measure performance against the research missions of the institution, group or researcher.
- Protect excellence in locally relevant research.
- Keep data collection and analytical processes open, transparent and simple.
- Allow those evaluated to verify data and analysis.
- Account for variation by field in publication and citation practices.
- Base assessment of individual researchers on a qualitative judgement of their portfolio.
- Avoid misplaced concreteness and false precision.
- Recognize the systemic effects of assessment and indicators.
- Scrutinize indicators regularly and update them.

Automatisation and Internet/WWW

Lost or Found? Discovering Data Needed for Research

Gregory, K., Groth, P., Scharnhorst, A. & Wyatt, S., 30 Apr 2020, In: Harvard Data Science Review.

Research output: Contribution to journal/periodical › Article › Scientific › peer-review

Open Access File

Research Practice | Typology | Evidence | Interaction

208
Downloads
(Pure)

SIOR: An Egalitarian Scientific Agora

Oliver, E., Scharnhorst, A., Cabré, J. & Ionescu, V., 2020, In: Qualitative Inquiry. 26, 8-9, p. 955-961 7 p.

Research output: Contribution to journal/periodical › Article › Scientific › peer-review

Open Access File

Social Effects | Citizen | Peer Review | Open Access | Research Results

70
Downloads
(Pure)

https://pure.knaw.nl/portal/en/persons/andrea-scharnhorst/publications/

New technology, new players

Dimensions

WHY DIMENSIONS ABOUT DIMENSIONS WORKING TOGETHER RESOURCES CONTACT US

Free data access for scientometric research projects

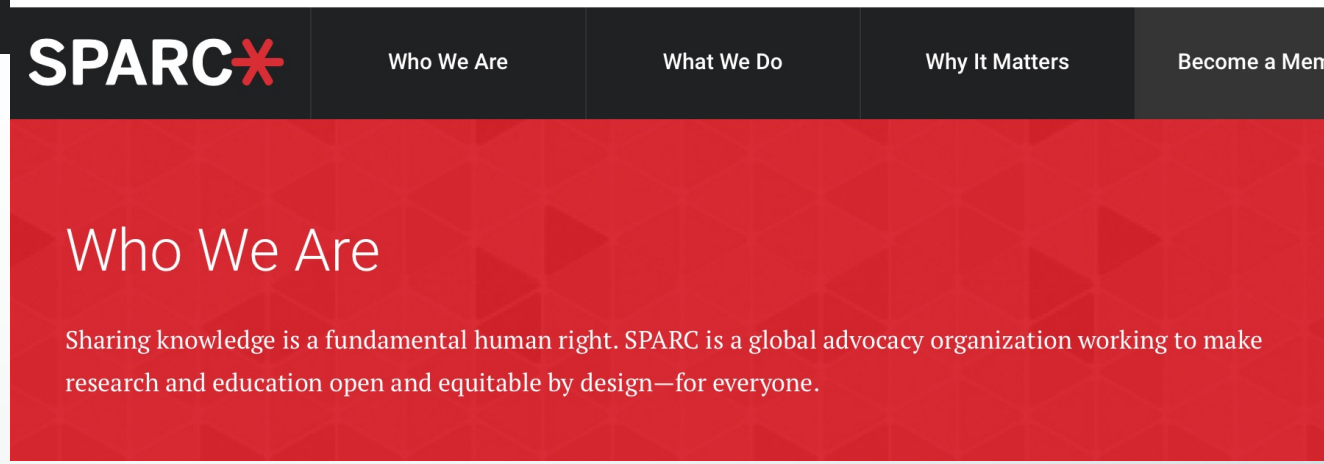
- Free access to Dimensions data for noncommerical scientometric research projects.
- Support provided via email.
- Opportunities to collaborate with Digital Science on both scientometric studies and projects that improve Dimensions data for all.
- Special consideration for International Society for Scientometrics and Informetrics members.

APPLY FOR FREE DATA ACCESS

Open Science, responsible innovation/science/metrics

Claudio Aspesi
CWTS Friday Webinar | 22.01.2021 |
Data Analytics applied to academic institutions: why inaction is not an option?

https://infrastructure.sparcopen.org/2020-update



Conclusions – Take-away

- Without indicators one cannot possibly manage and steer academia.
- Sciences/Academia and the society in which it is embedded are complex systems.
  - Relative autonomy of the science system, different laws of subsystems of society (Luhmann)
  - Anticipatory systems (Leydesdorff)
  - Multiple actors in and along the boundaries of those subsystems with partly conflicting interests
  - Meaning: there is always more than one dimension, always layers
- Research indicators
  - Been used for understanding and/or managing
  - Theory: How? (Methods) Why? (Impact of Impact measures)
  - Practice: the link to the 'How?' is necessary; the link to the 'Why?' would be beneficial
  - Costs versus benefits – not all what can be measured is worth to be measured
  - Input versus Output: Performance measures make only sense when the boundary condition under which performance is delivered is taken into account!
  - Use your common sense: do indicators deliver more insights or are they an excuse for cutting resources?

Further readings

Topics	Literatur
Science maps	Borner, K. (2010). Atlas of science: Visualizing what we know. Cambridge, Mass: MIT Press. Borner, K. (2015). Atlas of knowledge: Anyone can map. Cambridge, Mass: MIT Press.
Indicators, Indexing, history	Godin, B. (2009). The value of science: changing conceptions of scientific productivity, 1869 to circa 1970. Social Science Information, 48, 4, 547-586. Wouters, Paul. 1999. "The Citation Culture." PhD diss., University of Amsterdam. http://garfield.library.upenn.edu/wouters/wouters.pdf Garfield, E. (1962-93). Essays of an information scientist. Vol1-15. Philadelphia, Pa. : ISI Press – OpenAccess http://www.garfield.library.upenn.edu/essays.html
Matthew effect of science	M. Bonitz, E. Bruckner, A. Scharnhorst: Characteristics and Impact of the Matthew Effect for Countries. Scientometrics 40 (3) (1997) 407–422.
Bibliometrics as profession	Introduction texts on bibliometrics (Wolfgang Glänzel's group) https://www.ecoom.be/en/research/bibliometrics
Crisis of bibliometrics	Hicks, D., Wouters, P., Waltman, L. *et al.* Bibliometrics: The Leiden Manifesto for research metrics. *Nature* **520**, 429–431 (2015). https://doi.org/10.1038/520429a
Open Science and responsible innovation/science/metrics	Aspesi, C., & Brand, A. (2020). In pursuit of open science, open access is not enough. *Science*, *368*(6491), 574–577. https://doi.org/10.1126/science.aba3763 https://infrastructure.sparcopen.org Ludo Waltman, Sybille Hinze, Andrea Scharnhorst, Jesper Wiborg Schneider, Theresa Velden (2018) Exploration of reproducibility issues in scientometric research Part 1: Direct reproducibility. Preprint: https://arxiv.org/abs/1804.05024 Theresa Velden, Sybille Hinze, Andrea Scharnhorst, Jesper Wiborg Schneider, Ludo Waltman (2018) Exploration of Reproducibility Issues in Scientometric Research Part 2: Conceptual Reproducibility. Preprint: https://arxiv.org/abs/1804.05026
Science system as a complex system	Scharnhorst, Andrea, Katy Börner, and Peter Besselaar (Eds.) (2012). Models of Science Dynamics. Berlin, Heidelberg: Springer Berlin Heidelberg. doi:10.1007/978-3-642-23068-4. Leydesdorff, Loet (2021) The Evolutionary Dynamics of Discursive Knowledge. Springer OpenAccess