Introduction – How can we evaluate the value of research?

The value of the research done by individuals is used by institutions as part of the process of allocating resources to that individual; those resources being salary, job title, tenure, use of facilities, etc. Similarly, the aggregate value of all the research coming from a research institution is sometimes used by funding institutions as part of the process of allocating resources.

Traditionally, the process of evaluating the value of research has largely depended on bibliometric methods, such as citation counts or journal impact factors. However, there are many criticisms of the accuracy, or even the appropriateness, of these various bibliometrics, when used for valuing research (cf. MacRoberts and MacRoberts 1989, van Raan *et al.* 2007, Butler 2008, Adler *et al.* 2009, van Eck *et al.* 2013). Perhaps more importantly, bibliometric methods do not capture the wider value of research—the "full range of economic, social, public policy, welfare, cultural and quality-of-life benefits" (Grant *et al.* 2009) that can result from research (van Raan *et al.* 2007).

In the following, first I detail some of the most popular bibliometric methods, how they work, and the criticisms of their use in evaluating the "research impact"—as opposed to the "socio-economic impact" or "practical impact"—of an individual researcher, research group or research institution.

I then describe some examples of how organizations and institutions have tried to, or have at least recommended as a way to, combine the evaluation of research impact and practical impact in order to arrive at an understanding of the "complete impact of research". It should be noted that the primary intent for some of those evaluation frameworks (e.g., the Research Quality Framework in Australia) was to provide input on the allocation of funds to research institutions (Donovan 2008). If the influence of practical impact on the allocation of resources to research institutions increases, presumably its influence on the allocation of resources to individual researchers will also increase.

References

- Adler, Robert, John Ewing, and Peter Taylor. 2009. "Citation Statistics." *Statistical Science* 24 (1): 1–14. doi:10.1214/09-STS285.
- Butler, L. 2008. "Using a Balanced Approach to Bibliometrics: Quantitative Performance Measures in the Australian Research Quality Framework." *Ethics in Science and Environmental Politics* 8 (June): 83–92. doi:10.3354/esep00077.
- Donovan, Claire. 2008. "The Australian Research Quality Framework: A Live Experiment in Capturing the Social, Economic, Environmental, and Cultural Returns of Publicly Funded Research." *New Directions for Evaluation* 2008 (118): 47–60.
- Grant, J., P. B. Brutscheer, S. Kirk, L. Butler, and S. Wooding. 2010. "Documented Briefing: Capturing Research Impacts–a Review of International Practice". *DB-578-HEFCE*. RAND Documented Briefings, RAND Corporation. http://www.rand.org/pubs/documented_briefings/DB578.html. Retrieved November 4, 2014.
- MacRoberts, Michael H., and Barbara R. MacRoberts. 1989. "Problems of Citation Analysis: A Critical Review." *Journal of the American Society for Information Science* 40 (5): 342–49. doi:10.1002/(SICI)1097-4571(198909)40:5<342::AID-ASI7>3.0.CO;2-U.
- van Eck, Nees Jan, Ludo Waltman, Anthony F. J. van Raan, Robert J. M. Klautz, and Wilco C. Peul. 2013. "Citation Analysis May Severely Underestimate the Impact of Clinical Research as Compared to Basic Research." *PloS One* 8 (4): e62395. doi:10.1371/journal.pone.0062395.
- van Raan, A., H. Moed, and T. van Leeuwen. 2007. "Scoping Study on the Use of Bibliometric Analysis to Measure the Quality of Research in UK Higher Education Institutions". *HEFCE 2007/34*. http://webarchive.nationalarchives.gov.uk/20120118171947/http://www.hefce.ac.uk/pubs/rdreports/2007/rd18_07/. Retrieved February 8, 2015.