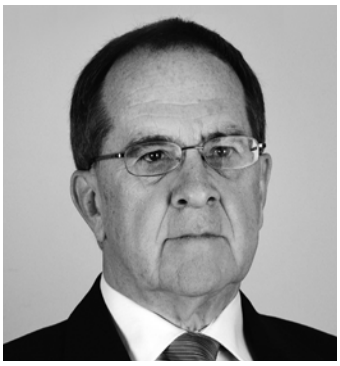
# Evidence-based decision making in academic research: The "Snowball" effect

By John T. Green, Fellow of Queens' College, University of Cambridge



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In this era of Big Science, I don't think any executive would dispute the need for metrics to make informed management decisions. Within academia, however, we might agree that we were a little late to the table. We first had to overcome the perceived threat to academic freedom, as well as the belief that you could not quantify the immeasurable. Only a bottom-up approach has enabled us to start to overcome these barriers with measures developed and adopted by academics themselves.

If you are a chief university officer responsible for research, and if you want to calculate the efficiency of your research enterprise, you are first going to have to define some terms: for example, "What is a researcher?" And if you want to compare the efficiency of your organization to major competitors across the nation or around the globe, you will want to verify that they are using those same definitions.

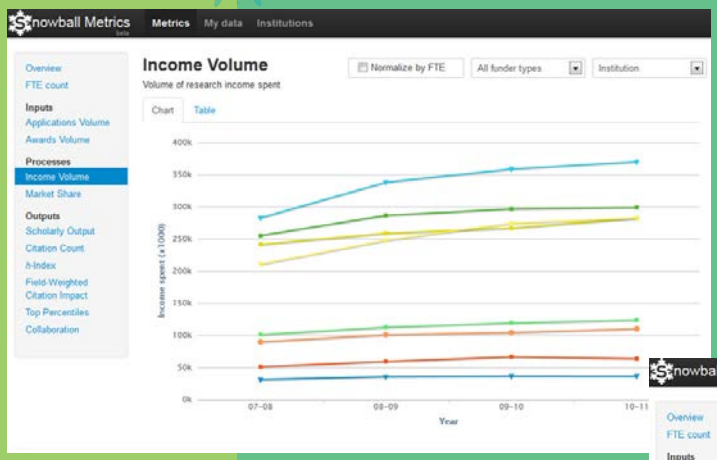
This is the idea behind Snowball Metrics, an agreed set of robust and consistent definitions for tried-and-tested metrics across the entire spectrum of research activities. These metrics enable evidence-based strategic decision making and like-to-like comparisons across institutions. I chaired the Steering Group of eight leading UK research universities in this endeavor (including Oxford, Cambridge and Imperial College London).

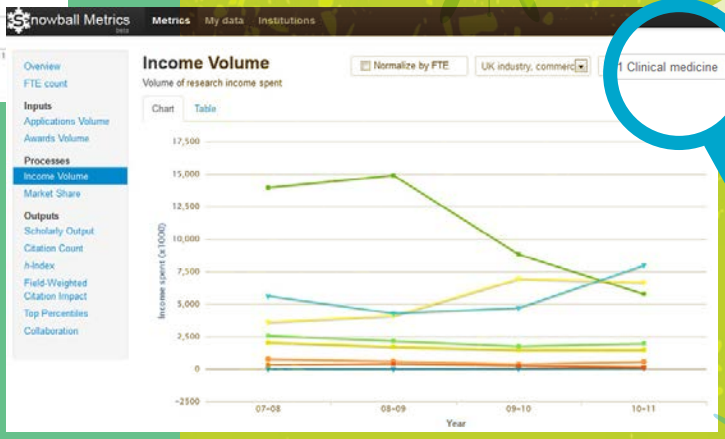
My own interest in research metrics grew in concert with the UK's downturn in higher education funding, when it became increasingly apparent that the academic research enterprise required the application of business principles in order to survive and thrive.

## Restructuring faculty

I joined Imperial College London in 1998 to achieve the enormous challenge of merging five independent medical schools into it. The UK government mandated the consolidation of research intensive medical schools in order to achieve efficiency in clinical services. We had an immediate need to develop an evidence-based decision-making model agreed on, and supported by, the faculty.

A key task involved eliminating less productive positions; however, at the most basic level, we could not even compare one curriculum vitae with another. One academic might list his last five years of publications, another his best, and another something entirely different. I turned the question over to them, asking, "How do you want to be assessed?" Then we brought information — on grants, on teaching, etc. — onto a consistent platform. Critical was that the academics themselves, with guidance, defined a range of criteria and benchmarks against which they should be assessed (and those varied in




**The university project partners tested their ability to all generate Snowball Metrics**

*according to a single method for benchmarking, regardless of their different research information management systems, via a tool built by Elsevier, a Snowball Metrics project partner. The screenshot on the left shows Income Volume at university level. The screenshot below shows the same metric at the level of a discipline within the universities and focused on a particular type of funder: "UK industry, commerce & public corporations." The colors belong to the same university in each screenshot. Note the differences in the lines.*

detail across specialty disciplines). In the end, we were able to eliminate 120–130 faculty positions with a fair and consistent approach. As a result, the faculty of medicine released an unproductive overhead, invested in new staff and quickly climbed to be the strongest UK medical school, as measured by any input or output research measure.

## A strategic approach to grant applications

As the new medical faculty coalesced, we began to monitor factors like success rates in applications for grants. We started looking at data to inform a strategic approach to applying for funding, and we used the data to model certain scenarios: "Joe" on his own might not get the grant, for example, but "Joe plus Harry" would have a better chance. This approach began to have a huge effect on success rates, because we became much more targeted in an evidence-based way.

## But there is no money in "X" anymore

As we were instituting these new approaches, it was common to hear a department head say "We are not getting as many grants in this or that discipline because there is no money there anymore." In one instance, we found our success rates and volume of awards from the Medical Research Council (the UK's version of the US National Institutes of Health) were going down. We started looking at how our competitors like Cambridge, University College London and Oxford were doing, and we could see that the money was still there, but that we were losing our share of the pie, while others were gaining it. Having established that this shift was real, we could

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- University of Oxford
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- Imperial College London
- University of Bristol
- University of Leeds
- Queen's University Belfast
- University of St Andrews
- Elsevier

Ordered according to productivity (source: Scopus)

then analyze why, and we then proceeded to turn the situation around in 18 months. Our metrics demonstrated that we had successfully addressed this concern.

## The Grand Legume

We also began to use data to support our recruiting decisions. Traditionally, a faculty head might make a recommendation to recruit a professor based only on reputation — a Grand Legume so to speak. The expectation in one case, for instance, was that a certain candidate, well known personally to the faculty head, would bring in large grants and ensure that we reached our desired research volume. What we found by looking at his data, however, was that his grants (and outputs) were down over the last five years, indicating that his career was also likely to be gearing down. Yes, he had been great in his field but was no longer. It is fascinating that within a scientific community, founded on the principles of evidence-based research that, when it comes to management decisions (such as recruitment), faculty can be tempted to rely on personal knowledge or impressions rather than on evidence.

## The "Snowball" effect

Success breeds success. A university administrator, such as I was, can only succeed by working in concert with faculty members: it is critical to gain their trust and become strongly aligned with heads of faculty. The "Snowball" Metrics program has had a similar trajectory. Peers from leading UK research institutions perceived the need for a freely available open standard to enable any university to calibrate its research inputs (funding), processes (effectiveness and efficiency in spending that money) and outputs (what the university achieves for the money spent), and compare themselves in a like-for-like manner.

Some data exists in the public domain in the UK but it is highly aggregated and we are not permitted to share data at a meaningful level. The Research Excellence Framework (REF) is one example of a large effort to quantify effort, quality and impact; however, it only happens every five to six years and looks at data from the past. It is also managed by the body in England that allocates government block funding, and is not necessarily aligned with the strategic needs of universities.

The eight institutions in the Snowball project are interested in bringing things into sharper focus. Productivity has been a good place to start, and the results of two years of effort were made available in 2012 in the Snowball Metrics Recipe Book (www.snowballmetrics.com), which shares the agreed and tested methodologies free-of-charge so they can be used by any organization. Building on the trust and working relationships we have established, we are now moving on to the challenge of how to define and measure impact, while at the same time working to expand the circle of universities that will base strategic decisions on Snowball Metrics. Uniquely, Snowball Metrics have been defined bottom-up by universities themselves, without the constraints of the myriad of top-down requirements imposed by government or funders.

Sharing our work openly via the Snowball Metrics website, webinars and open forums, we are hoping to broaden the discussion and accelerate its momentum. As academic research has evolved into a multi-billion-dollar enterprise, we too must evolve the systems, models and tools for its management. ■