



Media Backgrounder

Informing Research Choices: Indicators and Judgment

The Report of the Expert Panel on Science Performance and Research Funding

In 2010, the Minister of Industry, on behalf of the Natural Sciences and Engineering Council of Canada, approached the Council of Canadian Academies to appoint an expert panel to answer the question:

What do the scientific evidence and the approaches used by other funding agencies globally have to offer, in terms of performance indicators and related best practices in the context of research in the natural sciences and engineering, carried out at universities, colleges, and polytechnics?

In response to this question, the Council assembled a multidisciplinary panel of 16 eminent Canadian and international experts. This Expert Panel was chaired by Dr. Rita Colwell, distinguished University Professor both at the University of Maryland at College Park and at Johns Hopkins University Bloomberg School of Public Health. Dr. Colwell also served as the eleventh Director of the National Science Foundation (NSF) from 1998 – 2004.

The report of the Expert Panel provides an in-depth assessment regarding science performance indicators and global practices that inform funding allocation. After examining the available evidence, the Expert Panel concluded:

I. Many science indicators and assessment approaches are sufficiently robust to be used to assess science performance at the field level in natural sciences and engineering.

Quantitative indicators can be useful in assessing the overall scientific impact of research in a field at the national level, and in characterizing research trends or national research capacity in certain assessment contexts. For example, citation-based indicators, when appropriately normalized, can be useful in assessing the overall scientific impact of research in a particular field at the national level.

II. Quantitative indicators should inform, rather than replace, expert judgment in science assessment for research funding allocation.

Quantitative indicators should not be used to support research funding allocation without expert judgment. The available evidence recognizes that the most promising assessment strategies rely on a balanced use of quantitative indicators and expert judgment. Many countries – including Australia and the UK – have employed science assessment strategies combining indicators and expert judgment in various contexts.

III. International “best practices” offer limited insight into science indicator use and assessment strategies.

No single indicator, set of indicators, or assessment strategy offers an ideal solution in research assessment contexts for natural sciences and engineering discovery research. The individual circumstances of the assessment and the research funding context must be considered. The assessment must reflect goals (in terms of desired output or results) and the ultimate objectives of the funding program or organization. For example, funding decisions by a granting council such as NSERC would need to consider the objectives of its' funding program and also the overarching strategy of the government.

IV. Mapping research funding allocation directly to quantitative indicators is far too simplistic, and is not a realistic strategy.

Neither the existing body of evidence nor the experience of international funding processes justifies a simplistic funding allocation or application of a specific indicator. Funding agencies may choose to increase allocation resources to an area of research weakness to bolster performance, or, alternatively, direct resources away from areas of research weakness and towards strengths. These choices are driven by strategy.

In addition, there is no compelling reason for certainty that past successes will lead to future successes or past failures to future failures. As a result, science indicators – essentially a measure of past performance – may not always provide a reliable guide to future prospects.

The Expert Panel also developed four guiding principles to support research funding agencies undertaking science assessments in support of budget allocation, they are: context matters; do no harm; transparency is critical, and expert judgment remains invaluable. The principles are expanded upon with the Panel's report.

For more information, or to download a free copy of the report, *Informing Research Choices: Indicators and Judgment* please visit: **www.scienceadvice.ca**