FINDING MEANINGFUL PERFORMANCE MEASURES FOR HIGHER EDUCATION

A REPORT FOR EXECUTIVES

SCIENTIFIC

THOMSON REUTERS™

INTRODUCTION

THE NEW CONSTANTS: ACCOUNTABILITY, COMPETITION, AND STRATEGIC USE OF RESOURCES

Today, there is a constant need to measure and quantify activities and performance at colleges and universities. Higher education institutions need to comply with government mandates. Compete globally for researchers and students. Review programs and substantiate accreditation. Make strategic decisions about whether to build on existing strengths or develop new areas.

These and other new realities were evident when Thomson Reuters surveyed your higher education executive colleagues from across the globe who contributed to this report.

Their roles are changing – and whether they are meeting compliance regulations, identifying strategic needs and opportunities, or scanning a data dashboard to track progress, they are finding that measurement is central to their responsibilities.

MEASURING RESEARCH PERFORMANCE: AN INVESTMENT IN QUALITY

These leaders summed up the importance of research performance measurement as an investment in quality. These are the measurements that help them to set strategic goals, allocate budgets, and promote their institution's achievements to potential faculty, collaborators, funders, and students.

SEARCHING FOR INFORMATION: THE CHALLENGES

Finding, generating, and reconciling the necessary data was described as a complicated and time-consuming process.

So institutions seek data from a broad and varied array of sources, including data generated in-house and external databases from government, associations, and commercial providers.

But this piecemeal approach is often inadequate when it comes to answering the complex questions facing an institution. The data are often "too global" and don't easily break down across disciplinary or geographic lines.

Institutions also struggle to find or develop comparisons across peer institutions because — as one administrator put it, there are "no national standards ... no confirmation of the validity of the numbers."

And since few external datasets come with support, executives say that they and their staff spend a lot of time wrestling with questions about data interpretation and management.

SEARCHING FOR INFORMATION: THE CONSEQUENCES

This extra time spent generating and compiling internal data or reorganizing external data often makes it difficult for institutions to keep up with the demands for measurement.

Free or low-cost resources don't meet each institution's specific needs.. And executives largely assume that commercial third-party sources are too expensive and unlikely to be a solution for their data requirements. It becomes harder to move beyond simply measuring the past to a more proactive stance that helps executives build programs and set future goals.

Recognizing the importance of basing decisions on solid information, university leaders say they're willing to pay the price of time and effort. However, they acknowledge the need for more useful and customized data sources.

TABLE 1.

WHAT MEASURES DO INSTITUTIONS TRACK?

MEASURE	%
GRANT FUNDING	41
FACULTY SALARIES	36
RESEARCH EXPENDITURES	36
RANKINGS	23
PATENTS	18
RESEARCH OUTPUT	18
GRADUATION RATES	14
PRIVATE GIFTS	14
ENROLLMENT GROWTH	9
FACULTY REPUTATION	9

MAIN CHALLENGES

- Data are too general
- Need benchmarks for comparison
- Need more time and resources to interpret and manage data

(THERE ARE) "NO NATIONAL STANDARDS ... NO CONFIRMATION OF THE VALIDITY OF THE NUMBERS."

SEARCHING FOR INFORMATION: THE REQUIREMENTS

College and university administrators need data equal to their demands — information that they can easily tailor to their needs. Data that let them compare like to like as they set relevant benchmarks at the individual, department, institutional or national level.

As important as the data itself is the support that accompanies it — support that lets users organize, manage and integrate their findings into their existing workflow architecture.

Institutional leaders were clear: No one expects the need for performance measures to abate. Institutions can no longer rely solely on peer assessment and past reputation; they must be able to quantifiably account for current performance.

What conclusions can be gathered from the executive "wish list" in Table 2? These elements show the gap in quality, accessibility, and timeliness of some external data sources, as well as the limitations of self-generated data. They also reveal the need for standardized, flexible and convenient data sets to measure, in particular, faculty and student performance and achievement.

METRICS: THE POTENTIAL

Although many higher education executives indicated that they still build research teams through professional networks and word-of-mouth, the limitations of this subjective evaluation are becoming evident. Global competition for students and faculty has intensified. Government and funding agencies now routinely ask institutions to quantify their research program's results and decision-making process.

And so colleges and universities are turning to metrics, which quantify such basic information as numbers of papers, collaborations, conference presentations, frequency of citation, patents, and external revenue generated.

METRICS: A WINDOW ON PERFORMANCE

A library is faced with collection decisions. A foundation must make funding choices. A government organization weighs the effectiveness of a national research program.

The objective nature of metrics serves as an effective complement to the variety of qualitative and quantitative measures already at hand for assessment of institutional performance. One measure in particular, the Hirsch index – or h index – is emerging as a useful tool. The index is based on the distribution of citations received by a given researcher's publications. A scholar with an index of h has published h papers, each of which has been cited by others at least h times.

When Jorge E. Hirsch, Professor of Physics at the University of California, San Diego, first published an article describing the h-index in 2005, he called it "a useful index to characterize the scientific output of a researcher." (J.E. Hirsch, *An index to quantify an individual's scientific research output*, PNAS, 102(46): 16569-72, 15 November 2005.)

More recently, Hirsch published another paper on this subject. In it he stated that "h is preferable to other single-number criteria commonly used to evaluate scientific output of a researcher", but has also cautioned that the h-index "should only be used as one measure, not as the primary basis for evaluating people for awards or promotion." (J.E. Hirsch, *Does the h-index have predictive power?*," PNAS, 104(49): 19193-8, 26 November 2007.)

REAL-WORLD RESEARCH EVALUATION:
AUSTRALIA

- Because universities are assisted through two performance-based block funding schemes, periodic review (self-assessment and government evaluation) is part of the strategic planning process.
- An "academic profile," intended to remain stable for 5 to 10 years, includes the research strengths and priorities for the years ahead.
- Each faculty member is expected to contribute to the priority areas in some way; the faculty enabling their department to contribute to at least one priority area. Resources are mobilized to support activity toward the priorities.
- Alignment with the priority areas is reviewed annually by the vice chancellor and the institutional research unit.
- The Go8! Web site quantitatively compares performance measures of Australia's eight leading research universities.

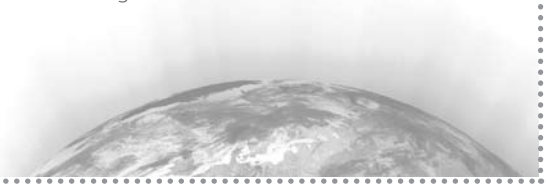


TABLE 2.

TOP 5 ELEMENTS OF THE IDEAL DATA SOLUTION

1	STANDARD DEFINITIONS	45%
2	BROADLY ACCESSIBLE DATA	41%
3	TIMELY UPDATES	32%
4	MULTIPLE PERFORMANCE MEASURES	14%
5	DATA GRANULARITY [PERSON, DEPT., FIELD, ETC.]	9%

"THE ULTIMATE AIM OF THE PERFORMANCE APPRAISAL IS TO CONTINUOUSLY MAINTAIN QUALITY AND CONTINUOUSLY IMPROVE QUALITY."

METRICS: POSSIBILITIES AND CONCERNS

Hirsch's point about the h-index applies to all metrics – although they're increasingly valuable as a measurement tool, they should not be used as the only method for evaluation. A selection of metrics and other benchmarks offer a context which helps users build a multi-faceted, meaningful view of research performance.

As with other areas of institutional performance, executives would like to be able to benchmark research performance. In fact, nearly four out of 10 named benchmarking data as the most important element in a citation-based evaluation tool. Specifically, they would like to know whether the research has what they call "cross-field impact", an effect beyond the predictable sphere of influence.

Another must-have is the ability to integrate research performance data with information on other areas of performance, such as student learning and student success.

Respondents were also concerned with the scope of metrics: Are data on research productivity focused solely on science, technology and mathematics? Can metrics also measure performance in the social sciences and humanities? And does the data focus solely on English-language journals, or is it more global?

DATA SOURCES EQUAL TO THE TASK

Thomson Reuters products and services address the concerns and needs voiced by the respondents in our studies by delivering high-quality data designed for accurate measurement, benchmarking, and customized analysis.

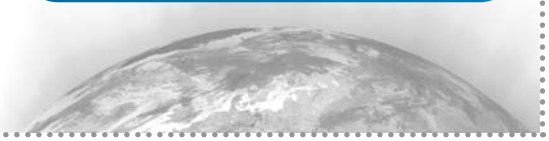
The Thomson Reuters journal selection process is based on a crucial principle formulated 70 years ago by a librarian and statistician named S. C. Bradford. This principle, often referred to as Bradford's Law, demonstrates that a relatively small core of publications account for a large percentage of the significant information in any given discipline.

The editorial process sorts out irrelevant material, helping to build a superior collection — not just an indiscriminate aggregation. Whether a journal is included — or whether it is retained — is determined on an ongoing basis by Thomson Reuters editorial experts. Each year, thousands of additional publications are systematically reviewed, and publications already indexed are continuously monitored to ensure they still maintain the high-quality standards and relevance that earned them an initial place.

REAL-WORLD RESEARCH EVALUATION: **JAPAN**

- Since 2001, when science and technology funding organizations were reorganized, universities have had to do a greater degree of self-evaluation.
- National universities are becoming more independent from government, with increased flexibility and autonomy.
- University-wide thematic evaluation focuses on research and educational activities by academic field.

"[T]HE FIRST GOAL IS TO ENSURE THAT STUDENTS ARE GETTING WHAT THEY NEED IN TERMS OF TEACHING QUALITY AND EDUCATIONAL SUPPORT. THESE EVALUATIONS ... ARE FOR THE BENEFIT OF THE STUDENTS. AND IN JAPAN, SINCE TEACHING STAFF IN GENERAL ARE APPOINTED FOR LIFE, THE WHOLE EVALUATION PROCESS IS USED TO MAKE IMPROVEMENTS IN TEACHING METHODS WHERE IT'S NEEDED TO DO SO."



PRIORITIES: WHAT ADMINISTRATORS NEED

When asked about what they need in a potential citation-based evaluation tool:

- Nearly 4 out of 10 (38%) named benchmarking data as the most important element.
- Two-thirds (64%) feel institutional metrics are very useful.
- Over half feel the number of papers published (56%) and the number of citations (54%) are very useful.

RIGOROUS SELECTION STANDARDS INCLUDE:

- Impact factor – Judges prestige and influence by measuring the frequency with which the average article in a journal has been cited in a particular year or period.
- Immediacy index – Indicates the speed with which citations of a specific journal appear in the published literature, and helps to identify journals in emerging areas of research.
- Timeliness – A regular release schedule indicates a healthy backlog of manuscripts and the ongoing viability and reliability of a publication.
- International editorial standards– The availability of informative titles and abstracts, complete conventions, standard bibliographic information for all cited references, and full author addresses eases retrievability of source articles.

No matter how high the quality of the data, it can always be misused. Those who evaluate research performance using publication and citation data can use this guide to ensure they are implementing metrics appropriately and accurately:

- Can the data available address the question?
- What publication types, fields, and years of data will be collected?
- Will whole or fractional counting be used?
- Must artifacts be removed?
- Is like being compared with like?
- Are both absolute and relative measures used?
- Are there multiple measures?
- Is the nature of citation data understood?
- Is the data collected relevant to the question?
- Are the results reasonable?

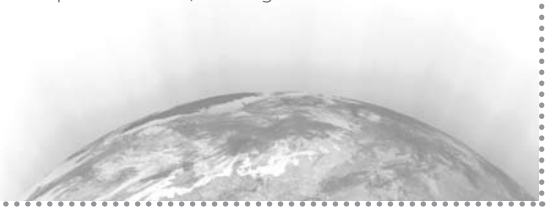
CONCLUSION

Different institutions and different countries have varying needs when it comes to research. But college and university leaders worldwide stressed the requirement for objective, reliable data when it comes to gathering and applying the information they use to determine strategy and future direction at their respective institutions. They recognize the increasingly important role played by metrics in tasks such as resource allocation, fundraising, faculty evaluation, and program review. And they are seeking the right combination of evaluative content and tools to complement their current methodologies for measurement.

For more information about Thomson Reuters Research Evaluation Solutions, visit http://scientific.thomsonreuters.com/products/solutions/researcheval/

REAL-WORLD RESEARCH EVALUATION:
UNITED STATES

- A private institution's leadership is placing emphasis on teaching, with the expectation that research activity enhances teaching. An accrediting agency has also suggested that research needs to be strengthened.
- A recently formed assessment office collects periodic reports from programs and departments.
- Standard measures of research performance used include publication in peer-reviewed journals, collaboration, conference presentations, funds generated.



"THERE ARE TWO REASONS THAT MOST UNIVERSITIES LOOK AT SOMETHING AS IMPORTANT ... IT ALLOWS US TO OPERATE ... IT ALLOWS US TO IMPROVE OUR IMAGE."

APPENDIX: ABOUT THE STUDIES

Between November 2004 and January 2008, Thomson Reuters commissioned and conducted a series of interviews with 89 college and university administrators in the United States, Canada, Australia, the United Kingdom, and countries in Europe, the Middle East, Africa and Asia. The interviews, which lasted from 20 to 60 minutes each, followed a protocol of uniform questions with opportunities for comment. A complementary study yielded survey responses from 151 high-level administrators representing North America, South America, Europe and Asia/Pacific describing use of metrics in evaluating research performance. A scan of the environment in August and October 2007 yielded information about the context for performance measurement in higher education.

Eduventures, for Thomson Reuters, concluding November 2004 (23 interviews with U.S. higher education executives).

Academic and Government, Thomson Reuters Market Research/Intelligence, concluding October 2007 (10 interviews with college and university leaders, North America, Europe Asia/Pacific).

Eduventures, for Thomson Reuters, concluding November 2007 (11 higher education executives from the United States, Canada, Europe, the Middle East, Africa, and Asia).

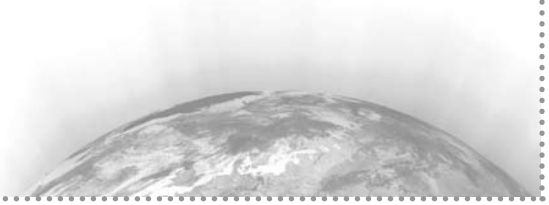
Answers Research, concluding December 2007 (45 interviews with higher education executives from North America, Europe, and Asia/Pacific).

Thomson Reuters Market Research/Intelligence, concluding January 2008 (151 survey respondents, higher education executives from the Brazil, Canada, Chile, Argentina, Australia, Finland, India, Italy, Norway, Portugal, Spain, and the United States).

Academic and Government, Thomson Reuters, August and October 2007 (scan of higher education's performance measurement environment).

REAL WORLD RESEARCH EVALUATION:
IRELAND

- In 2004, the Higher Education Authority (HEA) determined that the seven institutions in the national university system did not sufficiently assess themselves.
- As a result, HEA is currently identifying key performance indicators, with the intent of developing standardized data that allows meaningful comparisons.
- All levels (departments, committees, and executive administrators) will have access to and use the data



"I HAVE A SURVEY FROM OUR ACCREDITING AGENCY ... [IF] I COULD FILL THE THING OUT IN HALF A DAY THAT WOULD BE TERRIFIC. THE WAY IT IS, IT TAKES TWO WEEKS."

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