



Data Driven Research Strategy

Insights from US research development professionals

September 2011



Introduction

With increased competition for financial resources, research institutions around the world are taking a strategic approach to research development. In countries where national research assessment exercises are in place, university funding and research performance data have arisen as key elements in strategic development. Not surprisingly, the US, lacking a similar national assessment, has a research funding structure that is quite different from, for example, the UK and Australia. Due to these organizational differences, many American universities do not have structured data sources equivalent to their British and Australian peers. Regardless, US institutions are adapting effective research strategies to increase funding and prestige, and going forward, they feel the role of metrics in research strategy can help them inform and monitor their success.

At the National Organization of Research Development Professionals (NORDP) Third Annual Conference in June 2011, Elsevier hosted a roundtable discussion, 'Evidence-based research strategy formulation,' to discover how universities and research institutes in the U.S. develop their strategies and determine whether objective evidence could be better used. This white paper reports the main findings of this discussion, with the first two sections containing research presented during the discussion and subsequent sections covering the discussion and information provided in a questionnaire. Due to the confidential nature of the information provided during the discussion, the names of participants and their institutes have been omitted.

Globally, universities face the same challenges: regardless of location, size and pedigree, competition for income and prestige is rising while funding is decreasing. How are universities responding to this challenge?

Though each university may have a strategy in place, strategy is a broad term. For universities, it involves a combination of assessment to understand their current standing and the development of a comprehensive set of goals. For university leaders, strategic development means the identification of research competencies, performance tracking and showcasing their institute to funding agencies, potential research collaborators, and top-notch researchers.

Research strategy in general

Strategy checklist

To kick off the conversation, a presentation featured the elements of a typical strategy, compiled from *Research strategy development and management at European universities* by Sybille Reichert, European Universities Association (see Further Reading, below), amended for the presentation and supplemented by suggestions made during the discussion:

1. List of **research strengths** (centers of excellence)
2. List of areas to **build strength** (potential centers of excellence)
3. Intention to develop closer **relationships** with funding agencies, government, industry, and how this can be achieved
4. Internal objectives, often including plans to **measure and improve performance** (of departments, researchers, teams etc) using incentives and rewards
5. A plan to **attract researchers** into centers of excellence and potential centers of excellence to build capacity and prestige
6. Targets to **increase income and/or prestige**, often expressed as key performance indicators (KPIs). For instance, to increase income (from industry, non-governmental sources etc) by X% or raise the numbers of publications, impact, citations etc
7. Ambitions regarding **graduates**, such as increasing numbers, quality, completion rates, satisfaction rates, employment rates etc
8. A desire to increase **collaborations**, alliances, interdisciplinary research, and how this can be achieved
9. Proposals on how to **optimize resources and infrastructure** (e.g. by allocating labs/equipment strategically)



Can metrics improve strategy? A case study from the UK

At some UK institutions, metrics represent a fundamental element of institutional strategy. These strategies can provide key lessons to American universities on how to better incorporate measurement into their long-term plans. As an example, a few institutions in the UK have adopted strict frameworks for using metrical evidence to support their research strategy formulation and evaluation, and subsequently saw their performance increase significantly. The following is an interesting example of how one such institution implemented this process, as described to an Elsevier research team.

First, the institute collected internal data, such as publications and funding; external data, including how funding agencies allocate their research budgets, the government-driven

Research Excellence Framework*; and data from competitors. After reviewing and analyzing this data, they identified strengths and weaknesses, then developed their strategy based on this analysis.

The strategy was then converted into key performance indicators (KPIs) at the institute, department and individual researcher levels. These KPIs were reviewed on a monthly basis to track progress against the strategic objectives to see which were on track, which might need intervention or additional support, and which were unrealistic.

As a result, the institution improved funding income by 59% over five years and gained ground in both national and international rankings.

Case Study

Delivering results through performance management

Strategy	Research strategy developed using internal and external research data
	Senior academic team used research data to identify strengths and weaknesses
	Research income targets and milestones incorporated into research strategy
Execution	Strong emphasis on evidence based decision making by the Vice Chancellor
	Key performance indicators set at faculty level and progress reviewed monthly by the Vice Chancellor and heads of faculty
	Individual level targets set by heads of faculty and reviewed against external peers
Results	Performance against targets and feedback fed into annual appraisal mechanism
	Individual level review is not mandatory but take up is high (c.100%)
	RAE 2001 to RAE 2008 performance = +6 places
	Research income growth (2005 to 2008) = +59%
	Research income growth ranking (2005 to 2008) = +18 places



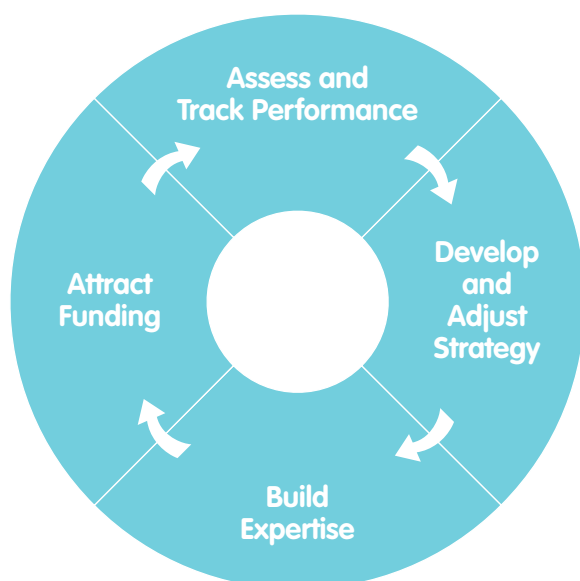
Research strategy cycle in the US

As the aforementioned UK case study indicates, metrics can be incredibly useful in strategy development. UK institutions have the advantage of access to rich information due to the fact that universities have to produce comparable data for government analysis to allocate block funding. However, in the US, where funding is more competitive, Principal Investigators (PIs) seek funding on an individual/team basis and there is no requirement for universities to produce standardized data that other universities can use for benchmarking purposes.

Most strategy is developed at the institutional level, but some is also developed at the interdepartmental and researcher level. The use of quantitative data is not widespread, and while KPIs are used, they are not used by all institutes, and not in all areas. Though there was discussion regarding the value of KPIs, not everyone agreed that KPIs would be beneficial in performance appraisals. Interestingly, some US universities have focused their strategies to better align with what the funding agencies (e.g. NIH, NSF, USDA) are doing.

Constructing the Cycle

Regardless of how universities collect data and attract funding, the research strategy process is typically circular, passing through four key stages: 1. Assess and track institution performance, 2. Develop and adjust strategy, 3. Build expertise through recruitment, collaboration and networking, and 4. Attract funding in order to sustain the research enterprise.



Institution Assessment

The primary stage of any research strategy development process requires understanding where your institution currently stands, determining the level of progress and establishing a vision for the future.

A good starting point is to identify and develop your centers of research excellence. Two panel members from two different states described their strategies to position their respective institutions as regional centers of excellence in specific areas, with one noting: “The strategic thinking that we’re doing is about regional networking, so we can draw together our capacities and then leverage all of those into something bigger than the sum of its parts.”

It is important that a well-developed strategy also include some form of progress monitoring, with key performance indicators (KPIs) created, against which performance can be tracked. Ideally, performance measurement and development tracking should be assessed against past performance and future goals, rather than solely relying on national averages. By doing so, the focus areas are more visible, allowing for needed adjustments if necessary. Metrics can guide strategic direction, indicating whether adjustment entails minor changes, a complete rewrite or confirmation that your current strategy is just.

In terms of specific activities to reach research goals, many participants focused specifically on writing more and better grant proposals: “[look at] your success rate at each agency in the last five years. That’s better than taking the national average – look at your own average. So if your success rate is 22%, then you know that to meet your numbers a year or two from now, you should have five times as many proposals going out as dollars you have to bring in. If nobody writes proposals, you know you’re not going to meet your targets. So there is one that you literally can track on a quarterly basis, and we do that.”



Develop and adjust strategy

Once the institution assessment has been completed and the future direction of the institution determined, strategic focus can be then directed towards the finer points of how these objectives will be achieved, with a deeper look at execution. For example, one practical method is to develop long-term plans of two to five years with a review on a regular (for example, annual) basis.

It is important to take into consideration that sub-strategies also need to be developed at the field/faculty level, as different fields require different approaches to achieve the institute-level goals.

In looking at strategic goals, most participants expressed modest, achievable ambitions: smaller universities want to be bigger players and teaching institutes want to develop research capabilities, mainly to attract more funding. "We're not trying to be an R1 institute, but we want more. We want to enhance the prestige of our campus. We want to make this a better institution by building our research capacity."

Build expertise

The next phase involves building and enhancing expertise at one's institution through strategic recruitment and collaboration. Once areas of research excellence have been established, priority must be placed on the recruitment of researchers who will enhance and guarantee the present and future reputation of your institution. Identifying and advertising your centers of research excellence also ensures that one's institution has another means to attract the highest-caliber faculty.

One participant shared a successful experiment: "One of our colleges [...] did a strategic planning process, identified a few areas of strategic strength, and decided to do cluster hires around one of those areas. The college also adopted a framework to classify faculty as either research-intensive, teaching-intensive or balanced. I think it's a really great idea to hire people who will work together in a theme that's already strengthened the college."

The promotion and support of networking and collaboration within one's institution and with external institutions can benefit both researchers and administration. Many grant proposals now require research projects to be of a multidisciplinary nature, and collaborating with departments conducting similar research in

other parts of the state or country can provide research teams with a competitive edge.

One participant is already working on bringing various departments at his institution together on grant proposals: "We're [now] trying to get some of the philosophers and social scientists together with [research teams] in the environment and in health sciences, because there are a lot of opportunities."

Attract funding

The ultimate goal of any research strategy is to attract more funding; ensuring your institution is a recognized leader in specific research fields is only part of a wider picture. Winning funding relies in great measure on the approach made to the funding agencies.

Most of the participants dedicate a great deal of their strategic thinking to this key objective. First, they identify the most suitable funding targets (at agencies), then they concentrate resources on winning these grants. A high importance is placed on predicting the direction of national funding, with the tailoring of an institution's strategy to the funding agencies' requirements. A fair degree of flexibility must be contained within this strategy to enable the fulfillment of the funding agencies' future demands.

"[A lot of strategy is] influenced by the funding agencies. For example, the USDA last year decided 70% of their funding is going to go towards large, multidisciplinary, multi-PI, multi-university proposals."

Approaching this topic from another angle found that many participants seek to influence the funding agencies' direction. "Number four on our list of things to do is get on panels and start working the panels," said one participant. Another agreed: "Be part of the strategic planning that goes along with those agencies."

Others sought new streams of income: "Our institute has placed more emphasis on diversifying the potential funding source portfolio. If everyone is submitting far more grants than are being funded, then there absolutely is a push towards finding alternatives and putting more energy on the administrative side to enable those alternatives, such as philanthropic foundations, contracts with industry, etc."



Role of metrics

While metrics cannot dictate the strategic cycle, they can provide insight into each of the four phases, prompting thought provoking questions that lead to helping institutions develop better-informed strategies. It is, first of all, essential to have a clear understanding of one's institution and to formulate clear questions. Depending on the type and quantity of data available, this information can then be integrated into the assessment and decision-making processes. Data will not be able to predict the direction of an institution in the future, but it can support benchmarking, for instance. Therefore, an institution should aim to define what success would look like and develop tangible KPIs to achieve these goals.

An ample supply of data from a variety of sources can play an important role in helping to support the evolution of research strategy. Many universities use funding data from the agencies as well as in-house data regarding research expenditure and income (including research grants) to see where they are investing and where they have been successful. To complement the financial data, institutions may use indicators such as faculty reputation, awards, publication history, and association memberships to pool researchers and create centers of excellence. They also rely on broad indicators to assess progress, such as departmental recruitment, retention and attrition. One participant commented that "the tell tale sign is in which units are you seeing faculty hired so that they can become part of the research team... or in which units do you see faculty moving to other institutions?"

Objectivity of metrics

While most of the participants said they wanted to use more objective data in their research strategies, they also face huge challenges in data acquisition. In particular, they face the challenge of analyzing data that they consider consistent and comparable.

In general, however, the group agreed on two key benefits of metrics: their ability to justify decisions; and to dispel 'institutional' myths because metrics may help identify underperforming departments and reveal hidden gems or rising stars. Concrete data are also considered a strong way to communicate effectively and support decisions internally. Overall, participants believe that consistent metrics can provide a clearer path to successfully achieve their research

mission. In addition to internal decision making, some thought the data could also be used for external communication and defense, and that the metrics may support limited-submission opportunity selection.

Inconsistency of metrics

Although metrics clearly provide significant benefits, all participants expressed problems in collecting and comparing data. One participant remarked that his university is examining how to collect publication data, but the university is struggling as "the only source [they] have is the annual reports" from which it is difficult to extract accurate data. The individual went on to explain how data discrepancies and interpretation can be difficult, especially if multiple authors are contributing. For this participant, the most important thing was finding a simple way to access data that could be easily understood.

This led to problems in the application of competitor data, as one participant suggested that competition must be considered during research strategy formation. The contributor admitted that the term 'competition' was itself difficult to define or use in this setting, but consistency was essential between institutions because "...[competition is] very difficult when you judge it in one way and they judge it another way." The participant would like to see a more 'common' structure for defining evaluation metrics.

Looking for external agencies to provide some standardization or consistency, another participant mentioned that the National Research Council provides excellent studies, but unfortunately, their publications tend to lag. Regrettably, "by the time they analyze the data and publish the study, it's five years too late." Another participant went on to explain that when implementing evidence-based strategy, there is a clear lack of consistent metrics across academia and even inside a single university, and that these "barriers and hurdles" exist across the United States. The individual said that if you are trying to assess whether your institute, division or university is successful, the definition of these entities is critical because one needs to accurately delineate the comparative group. "If you're trying to ask...am I successful against [my peers]? What does that mean exactly? Am I successful because my individual people are successful, et cetera?" This participant assumed that making comparisons with outside groups is even farther off in time than internal assessments.



Future of metrics

Several participants also pointed out that such analysis could only reveal the past and present: it cannot tell you where to direct your strategy. Identifying research centers of excellence is useful, but it cannot indicate where the funding agencies will be in 10 years. They also agreed that if there is no resolve within the university to make difficult decisions and support change, data is ineffective and will be easily ignored when it does not support popular opinion. One participant summarized the grey-area in which the data may fall when there is a lack of consistency and objectivity: "I think the hardest part about using metrics, real metrics, as a tool for strategizing, is that a lot of these metrics are not black and white, they're not miracles; they're not quantitative, they're qualitative."

With all of the inconsistencies around data collection and analysis, the group tried to determine which people, groups or agencies should be involved with the formulation of standards. One participant responded that it should be self-managed by interest groups or committees like those found at NORDP; the administrative level of the universities and institutes are in a uniquely knowledgeable position to define the standards that they will then use.

Measuring return on investment

The group described how they are increasingly asked to justify investment by demonstrating the return on investment (ROI). Such requests originate from funding agencies as well as institutional management. Demonstrating ROI is challenging, in part because there needs to be agreement on what constitutes ROI. As one participant described: "Return is always more than just money. Sometimes it's difficult to express to people who are not research-oriented that there is more to life than getting back money. [What] you invest in research dollars does not always lead to intellectual property or royalties, but value to humanity, if you will, publications and the quality of those publications, the reputation of your people. All that plays into this idea of return on investment."

In addition to challenges in quantifying ROI through tangible metrics, there's also the issue of tying an increase in quality or output back to strategy or investment. In other words, how to prove one was a result of the other? One participant explained the complex analysis required: "You could have resources on one side and have faculty capacity on the other side. Then you could begin to track these outputs as you change the combination of inputs. It is much more complex than one can just do on the back of an envelope."

In spite of the mentioned challenges, it was expected that requests for ROI analysis would continue to increase in number.



Conclusions and Next steps

US universities employ a wide range of methods and information sources to inform and evaluate their research strategy. Although there is no formal, standardized approach to strategic planning, the methods and obstacles discussed were common across the board. As one participant joked at the end: "I found this conversation to be very useful. It's reassuring, in a way, to know that I'm in the same boat with everybody else. Even if it is the Titanic!"

All participating institutes have incorporated the use of objective data in their strategy formulation process to some extent over the past few years. Internal and external funding data was emphasized as indispensable given the dependency on competitive extramural funding. There was a general desire to expand the range of data and metrics in order to better justify decisions, and to create more transparency into the "true performance" of departments, groups and individuals. Although participants saw potential for using metrics in the research strategy cycle, the retrospective nature of most metrics makes them more applicable for evaluating strategy than for formulating it.

In order to find out more about how higher education institutes in the US manage their research information, Elsevier has partnered with the University of Tennessee to execute an in-depth study, similar to the one conducted in the UK (see case study, above), and will distribute a report in several months. This study will review the sector's success in implementing research-management systems and processing research-related data in support of institutional research-strategy development, as well as identify future needs, with the goal to share good practices and provide a holistic picture of research-management metrics from bid management through to economic impact.



Further reading

Research information management: Developing tools to inform the management of research and translating existing good practice.
Imperial College London & Elsevier, sponsored by JISC.

http://www.jisc.ac.uk/media/documents/programmes/RIM/RIMTNT_FinalReport.pdf

Research strategy development and management at European universities.

Sybillie Reichert, European Universities Association.

http://www.eua.be/eua/jsp/en/upload/Research_Strategy.1150458087261.pdf

Assessing Europe's University-Based Research: Expert Group on Assessment of University-Based Research.

European Commission, Directorate-General for Research.

<http://ec.europa.eu/research/era/docs/en/areas-of-actions-universities-assessing-europe-university-based-research-2010-en.pdf>

Benchmarking to improve efficiency: Status Report November 2010.

Higher Education Statistics Agency.

http://www.hesa.ac.uk/dox/Benchmarking_to_improve_efficiency_Nov2010.pdf

Knowledge, networks and nations, Global scientific collaboration in the 21st century.

The Royal Society in conjunction with Elsevier.

http://royalsociety.org/uploadedFiles/Royal_Society_Content/Influencing_Policy/Reports/2011-03-28-Knowledge-networks-nations.pdf

National Organization of Research Development Professionals (NORDP).

<http://nordp.org/>

SciVal White Papers

SciVal Perspectives – Identifying Organizational Inefficiencies in Research Institutions.

<http://www.info.scival.com/resource-library/subject/perspectives>

SciVal Perspectives – Aligning Research Strengths For Informed Recruitment.

<http://www.info.scival.com/resource-library/subject/perspectives>

White Paper – New Research Landscapes: New Tools for Driving Success.

<http://www.info.scival.com/resource-library/subject/white-papers>



Acknowledgements

This roundtable on 'Evidence-based research strategy formulation' could not have been organized without the support of the National Organization of Research Development Professionals (NORDP).

For the lively debate and valuable insights into research strategy in US higher education, we extend our gratitude to the institutes that shared their experience and knowledge.

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