

Chapter 5

Highlights and reflections: Rapporteur's report

by

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The OECD together with the Norwegian government organised the workshop, Performance-Based Funding for Public Research in Tertiary Education Institutions: Country Experiences, to do a stock-taking of the performance-based research funding systems (PRFSs) now in place in a number of countries. This chapter outlines the main topics discussed at the workshop, emerging key policy issues and possible next steps for work on this subject.

The changing role of universities

In industrialised countries, universities¹ have been profoundly modified over the last 50 years. They have moved from being rather elitist institutions to being key players in the knowledge society. They play three inter-connected roles: knowledge production, mainly through research; transfer of knowledge through education and formation; and the dissemination and application of knowledge through innovation. At the same time the emerging economies, especially the BRIC countries – Brazil, the Russian Federation, India and China – are rapidly expanding their higher education systems.

As the final stage of the formal educational system, the university still offers the highest level of education, but it is no longer for a small elite. The student population has increased rapidly, and its sociological and demographic composition has changed. Although research and scholarly work to advance knowledge and to fertilise teaching are still important aspects of the university's mission, applied research and outreach activities to strengthen national competitiveness and solve societal problems have taken on greater importance (Geuna, 1999).

Universities have evolved into multi-mission organisations operating in a complex and increasingly international context but still with a crucial local, regional and national role. As they become more entrepreneurial (Etzkowitz *et al.*, 2000), collaboration with industry and applications of research results have become additional sources of revenue to complement public funding from national, regional and supranational authorities and from charities.

The emerging knowledge economy has also had a profound impact on the public sector. Governments act less as operators and more as regulators and facilitators (Minc, 1985). As in many other sectors, public management reforms have afforded universities a certain degree of autonomy. At the same time, governments have introduced performance-based management and used market-type incentives to encourage universities to respond to governmental priorities. This has had a profound impact on the work environment of the academic staff, who often perceive these changes in terms of a loss of independence, a curtailment of academic freedom and a threat to the stability of research funding.

Performance-based research funding systems: a concept with many variations

While the United Kingdom's RAE is the oldest performance-based research funding system (PRFS), at least 13 countries have introduced such systems and selectively allocate institutional research funds to universities (see Chapter 1). Most countries explicitly or implicitly give a rationale for introducing a PRFS, the most frequent of which are to promote excellence through greater selectivity and concentration of resources and to better manage limited resources. The introduction of a PRFS is based on the assumption that it is possible to define research performance and, subsequently, to measure it. Performance is, however, a multidimensional phenomenon and is difficult to grasp.

Based on *ex post* evaluation, various aspects of research performance can be measured by indicators. These indicators can be classified in three main groups: first-order indicators directly aimed at measuring research performance by focusing on input, processes, structure and/or results; second-order indicators which summarise indexes in order to obtain simple measures for effect (*e.g.* journal impact factor and the H index); and third-order indicators from peer review panels that rate departments, for example. For quantitative indicators, data can be collected at any level; for practical reasons the peer review unit of analysis is the department or the field in the university.² The indicators are aggregated at university level for use in allocating block funding.

In most countries, the authorities have developed and often implemented the PRFS in close collaboration with the universities. However this did not always result in a large consensus on the indicators used in the different models. These indicators are in fact proxies that measure facets of a complex phenomenon. Critical comments, mostly formulated by academics, generally fall into two categories: the indicators themselves and their use in the funding formulas (see Chapter 4).

As research and innovation increasingly drove economies, science and innovation studies evolved into a mature research discipline, and sophisticated peer review methodologies and quantitative indicators were developed to evaluate and “measure” different aspects of the “business of science” and of science policy. However, it has become clear that there is no “ideal” methodology.

Peer review is the generic process of self-regulation of science and it provides indispensable credibility. Although it is held in high esteem by the academic community, it has limitations and potential biases (Cole *et al.*, 1981; Lawrence, 2003; Bornmann *et al.*, 2010). Quantitative indicators,

especially bibliometric indicators, become more robust at higher levels of aggregation; to evaluate individual (groups of) scientists they can only be used as background information for peer review. Moreover, the large, commercially available bibliographic databases such as the Web of Science or Scopus are not able to make scholarly work in social sciences and humanities and applied research sufficiently visible.

The intended and unintended consequences of PRFS are the subject of even more intense debate than indicators, although they are often intertwined. Distinctions must be made between reality and perception and between evidence-based and anecdotal evidence. As most systems were introduced at the end of the last and the beginning of this century, and taking into account that the impact of a PRFS is gradual, there is limited knowledge about their effects (see Chapter 2). Given its much longer history, it is not surprising that most studies are of the UK's RAE and that these provide the bulk of the available evidence.

As the foremost objective of the PRFS was to set up a funding allocation mechanism (partially) based on indicators of research performance, in order to make university funding (more) transparent and to make universities more accountable to the public authorities and the public at large, these objectives have been achieved. There are, especially in the United Kingdom, examples of management's response to or even anticipation of the introduction of a PRFS, such as departmental restructuring, strategic recruitment and a drive to create a culture of excellence. Another positive outcome in many countries is a significant improvement in the information management systems of universities or public administrations.

There is strong debate on the unintended consequences of PRFSs, with claims and counterclaims mostly based on anecdotal evidence. Quantitative and bibliometric indicators seem to generate the most aversion. A few often-heard criticisms and elements to refute them are:

- *The increase in scientific output is (largely) associated with game playing ("salami slicing" of publications).* However, no causality has been proven and the claim is counterintuitive as manuscripts go through a peer review process before they are published. Moreover, the combined use of publication and citation data in combination with journal impact factors would eliminate or limit possible biases.
- *Citations can be manipulated by citation fishing, citation cliques and self-citations.* The peer review process at journal level should be able to identify abusive use of self-citations and irrelevant citations.
- PRFSs have an impact on the disciplinary distribution of the research portfolio of research groups and of universities, owing to differences

in publication and citation culture between disciplines. The use of journal impact factors can correct for differences in citation culture. With Norway as the trail blazer, national or regional bibliographic databases have been set up to better cover scholarly work in humanities and social sciences.

- Excessive emphasis on publications and citations stimulates risk averseness, and hinders blue-sky, interdisciplinary and collaborative research, and training of PhD students. Bibliometric studies show that (international) collaborative research and interdisciplinary research have greater visibility than research carried out at a single institution or disciplinary work. Risk averseness would reduce the scientific relevance of results. Even if the work is accepted for publication, it would receive fewer citations. To reward the investments made in training PhD students, some governments use numbers of PhD students or of PhD degrees awarded as indicators.
- *The use of publication and citation data hampers collaboration with industry and other outreach activities.* Scientifically outstanding groups often also collaborate closely with industry. Moreover, governments can use indicators for industrial collaboration and application of research results.

For PRFS based on quantitative indicators, data on individual researchers' work are collected, but these data are amalgamated at institutional level and used to allocate fractions of the lump sum among universities based on relative performance. The management allocates the lump sum internally based on the university's mission statement and its priorities but within the regulatory framework laid down by the government. Some criticisms are often an appeal for stronger institutional management to counterbalance perceived or real negative consequences of PRFS.

As experience was gained with PRFS, the authorities often took criticisms into account, without always seeking proof of the allegations. Adjustments were made to correct for real or alleged biases. The UK Higher Education Funding Council of England (HEFCE), for example, modified the assessment methodology based on the evaluation of successive RAEs. In some cases, additional indicators were introduced to reflect new governmental priorities. These modifications and additions often increased the complexity of the system and the overall cost of managing it, in some cases to the detriment of consistency.

Some policy issues

Over the next few years universities will be confronted with challenges on the content of their “social contract”. These challenges are already apparent in discussions about the balance between education, research and outreach activities, between private and public funding, between blue-sky research and commercially oriented research, and between institutional autonomy and accountability (Zusman, 2005).

Given the impact of the present economic downturn on public expenditures and the societal implications of new challenges such as an ageing population and the effects of globalisation on economic competitiveness, university funding will be under pressure. Universities will be asked to do more with less and to demonstrate that they use the available public funds effectively and efficiently. Universities become increasingly “privatised” as they must look for additional funding outside the public sphere, especially through industry funding for academic research and university/industry partnerships. Although governments remain an important funding source, these developments have implications for the relationship between universities, the public authorities and the public at large as well as for academic staff (Geiger, 2004).

But public management of the higher education sector and the cost of managing funding models will also be scrutinised as governments try to reduce their administrative costs.

A possible research agenda to develop more robust PRFS

The literature contains few studies that examine in detail the impact of PRFSs by using data analysis or well-structured surveys and qualitative investigations. Such studies must demonstrate causality between changes in funding and systemic effects visible at the national, institutional, departmental and individual levels. Taking into account all competitive (and non-competitive) funding sources, the regulatory framework for the higher education sector, all the components of the universities’ mission and the relatively small fraction of the lump sum allocated using PRFS, this is a daunting task (Lane, 2010).

To mention only a few topics to be investigated:

- The interaction of PRFS with the educational mission and outreach activities of universities.
- The relationship – if any – between the size of the lump sum (re-) allocated based on PRFS and its impact at the national, regional, institutional and departmental level.
- The relationship between the total cost to set up and manage the PRFS and its economic and societal benefits.

- The effects of PRFS on the university management as at least a fraction of the funding is available for discretionary spending, taking into account the regulatory framework in which it has to operate.
- If selectivity and concentration are objectives, is there an optimum to be realised with PRFS?
- Is the mere existence of PRFS a strong enough incentive to stimulate performance or is there an optimal fraction of institutional and/or total public research funding to be allocated using PRFS?
- Is the use of PRFS creating a more or a less attractive research environment for young researchers and tenured staff (brain drain, brain gain)?
- Is the allocation of funds based on relative rather than absolute performance the most appropriate? PRFS based on relative performance can counterproductive as they may not reward improved potential.
- Given the fast development of data mining and full text search tools, is it possible to develop and to introduce more sophisticated measures, such as citations to sub-sections of papers (Campbell, 2008), download statistics of documents, and contextual citation impact of journals (Moed, 2010) and to design better information management tools?³
- Especially for smaller countries, is benchmarking universities within the national system the most appropriate method?

It is true that a good metric is difficult to develop, but it is not a reason not to take up the challenge in order to make better funding decisions, stimulate excellence and reward the best scientists. It is preferable to carry out this work in a transnational setting and in close collaboration with universities. As indicated above, a group of OECD countries have set up PRFS with fairly similar objectives. Each system is embedded in its national context and is implemented differently. International comparative studies on PRFS demand in-depth knowledge of the national systems. Much of the indispensable information is not available in the scholarly literature and is buried in legal documents and grey literature written in the national languages. Benchmarking should not be limited to countries that have implemented PRFS and should also include countries with a large number of private universities.

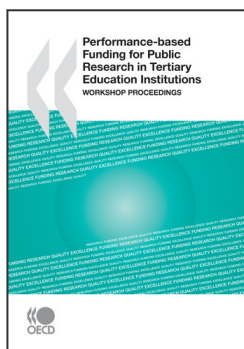
The studies' outcomes could be of great benefit to national authorities and universities in their efforts to increase the effectiveness and the efficiency of institutional funding, not only for countries using PRFSs but also for countries interested in setting up such systems.

Notes

1. Although private higher education institutions play an important role in some countries, the term “universities” is used here to designate public higher education institutions and publicly funded higher education institutes.
2. However, the Spanish *sexenio* and the New Zealand PBRF grade individual researchers and their research record. The *sexenio* is used to set the researcher’s salary.
3. See, for example, <http://lattes.cnpq.br/english/index.htm>.

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