How journal rankings can suppress interdisciplinary research: A comparison between Innovation Studies and Business & Management

Ismael Rafols

September 2012

Abstract

This study provides quantitative evidence on how the use of journal rankings can disadvantage interdisciplinary research in research evaluations. Using publication and citation data, it compares the degree of interdisciplinarity and the research performance of a number of Innovation Studies units with that of leading Business & Management Schools (BMS) in the UK. On the basis of various mappings and metrics, this study shows that: (i) Innovation Studies units are consistently more interdisciplinary in their research than Business & Management Schools; (ii) the top journals in the Association of Business Schools' rankings span a less diverse set of disciplines than lower-ranked journals; (iii) this results in a more favourable assessment of the performance of Business & Management Schools, which are more disciplinary-focused. This citation-based analysis challenges the journal ranking-based assessment. In short, the investigation illustrates how ostensibly 'excellence-based' journal rankings exhibit a systematic bias in favour of mono-disciplinary research. The paper concludes with a discussion of implications of these phenomena, in particular how the bias is likely to affect negatively the evaluation and associated financial resourcing of interdisciplinary research organisations, and may result in researchers becoming more compliant with disciplinary authority over time.

Highlights

► We compare Innovation Studies (IS) units with Business and Management Schools (BMS).

► IS are found to be more interdisciplinary than BMS according to various metrics.

► BMS have higher performance according to indicators based on journal rankings.

► This higher performance of BMS is not supported by citation-based indicators.

► The analysis suggests that journal rankings are biased against interdisciplinarity.

Introduction

At a time when science is under pressure to become more relevant to society (Nightingale and Scott, 2007, Hessels, 2010), interdisciplinary research (IDR) is often praised for contributing to scientific breakthroughs (Hollingsworth and Hollingsworth, 2000), for addressing societal problems (Lowe and Phillipson, 2006) and for fostering innovation (Gibbons et al., 1994). Reasons given for supporting IDR include suggestions that it is better at problem-solving (Page, 2007, p. 16), that it generates new research avenues by challenging established beliefs (Barry et al., 2008), and that it is a source of creativity (Heinze et al., 2009, Hemlin et al., 2004). These are all claimed to help rejuvenate science and contribute towards its ongoing 'health' (Jacobs and Frickel, 2009, p. 48).

However, IDR is also widely perceived as being at something of a disadvantage when it comes to research evaluation (Rinia et al., 2001a, p. 357; Nightingale and Scott, 2007, pp. 546–547). Various qualitative studies have provided evidence that peer review tends to be biased against IDR (Laudel and Origgi, 2006, Langfeldt, 2006, p. 31). However, only a few quantitative investigations have been undertaken of this claim, and they have been mostly inconclusive (Porter and Rossini, 1985, p. 37; Rinia et al., 2001a).

Here we explore potential biases in the evaluation of IDR in the particular case of Innovation Studies (IS) units in the UK. Innovation Studies is a diverse and rather ambiguously bounded area of social science that studies the causes, processes and consequences of innovation (Fagerberg et al., 2012). Given its problem-oriented and interdisciplinary nature, Innovation Studies research is conducted in diverse types of research units that experience a variety of institutional challenges (Clausen et al., 2012), in particular a lack of fit with discipline-based assessment panels.

The UK is a particularly suitable setting for this enquiry, as it has a sizeable and well established IS community, a comparatively homogenous higher education system, and a long history of research assessment (Collini, 2008). The UK has also witnessed repeated concerns about possible biases against IDR – not least following the Boden Report (ABRC, 1990). Under the funding conditions prevailing in the UK, many IS units have in recent years been (at least partly) incorporated into, or linked with, Business & Management Schools (BMS) (e.g. in Oxford, Imperial, Manchester, Cardiff and recently Sussex). BMS face acute pressures to achieve high performance in institutional rankings, both for

reputational purposes and because of the financial incentives associated with the research assessment procedures of the UK's national funding council, HEFCE1. This assessment exercise (which was formerly known as the research assessment exercise or RAE) is currently referred to as the 'Research Excellence Framework' (REF) (Martin and Whitley, 2010, p. 61). BMS in the UK are also subject to a narrowly conceived formal ranking scheme for journals, provided by the British Association of Business Schools (ABS) (ABS, 2010).

The use of journal rankings2 (such as those provided by ABS) in research evaluations has become increasingly popular. It is seen as a means to 'objectify' research assessment and thus avoid or compensate for any biases in peer review (Taylor, 2011). Yet journal-based evaluation has been severely criticised as being inappropriate for this role (Seglen, 1997, Oswald, 2007). Despite this, the proliferation of journal ranking schemes indicates increasingly wide usage across disciplines (both explicitly and implicitly) for a variety of quality assessment purposes, such as resourcing, recruitment and promotion. A range of studies have demonstrated that the journal ranks of a department's publications are by far the strongest predictor of the results obtained in the 2008 UK's RAE, although journals rankings were not formally used in the evaluation (Kelly et al., 2009, Taylor, 2011, pp. 212–214). As a result, university managers are making increasingly explicit use of such journal rankings to prepare future assessments.

In this study, three centres for IS in the UK are compared with the three leading British BMS. The choice of BMS as comparators is influenced by the fact that many IS centres are now closely associated with BMS and hence will be assessed by the Business & Management panel in the forthcoming REF. We investigate quantitatively the relationship between the degree of interdisciplinarity and perceived performance, as shown by the ABS journal rankings. We then compare the results with arguably more reliable article-based citation indicators. In summary, the results suggest that ABS journal rankings favour research within the dominant disciplines of BMS (mainly business, management, economics and finance) and disadvantage interdisciplinary IS units. Given the close correlation between RAE grades and assessments based on journal ranks in previous RAEs (Taylor, 2011), this effect is large enough to have a substantial negative impact on the funding of IS units.

This study makes two contributions. First, it is (to our knowledge) the first to demonstrate a bias against IDR on a firm quantitative basis (Porter and Rossini, 1985, p. 37; Rinia et al., 2001a). Second, it shows

that bias against IDR may arise not only in peer review – as well documented by qualitative studies (Laudel and Origgi, 2006) – but also in purportedly objective assessment, such as quantitative journal rankings. The policy implications of these results will be discussed in the light of studies on the consequences of biases in assessments. For example, research suggests that British economics departments have narrowed their recruitment to favour 'main-stream' economists (Harley and Lee, 1997, Lee and Harley, 1998, Lee, 2007), thus reducing the cognitive diversity of the research system's ecology. This may lead to intellectual impoverishment in the medium or long term (Molas-Gallart and Salter, 2002, Stirling, 1998, pp. 6–36; Stirling, 2007, Martin and Whitley, 2010, pp. 64–67).

In addition to its primary focus on the bias against IDR in research assessment, this article also aims to make a more general contribution to advancing the state-of-the-art with regard to the use of bibliometric indicators for policy purposes. First, it provides an introduction to a variety of concepts, mathematical operationalisations and visualisations for the study of interdisciplinarity using bibliometric data. Second, it highlights that conventional measures of performance for IDR publications remain problematic, and suggests 'citing-side normalisation' as an improved alternative. Third, it illustrates the use of multiple indicators for the study of multidimensional concepts such as interdisciplinarity or research performance. In this, we follow Martin and Irvine's (1983) seminal argument that, since no simple measures exist that can fully capture the research contributions made by scientists, one should use various partial indicators. Though incomplete (as well as being imperfect and subject to contingency and distortion), this more 'plural and conditional' (Stirling, 2010) form of bibliometric analysis may be considered to be more reliable when diverse indicators converge to yield broadly the same insights. Since plurality is more easily captured by multidimensional representations, we illustrate this point with a full set of maps (available at http://interdisciplinaryscience.net/maps/ and in the supplementary materials).

For the sake of focus, a number of otherwise relevant issues related to the subject will not be dwelt on in this article. In particular, the present study does not offer any kind of assessment of the individual organisations examined – this would entail a broader evaluation than the exclusive focus on publication output and impact used here. Second, it does not discuss the relative benefits of IDR. We simply note that IDR is highly valued by many researchers and policy-makers – which is

sufficient to render important the question of whether IDR is fairly assessed. Third, we do not look into the broader societal impact of research. The concern here is whether there is a bias against IDR only when considering conservative, internal measures of scientific merit. Finally, we do not elaborate the details of conceptualisations and operationalisations of interdisciplinarity and performance. Instead, we build on fairly conventional indicators of performance and on published research on IDR. Given the length of the paper, some readers may prefer to skip Section 2 (literature review), Section 3 (data and methods), and Section 5 (discussion), and concentrate their attention on Section 4 (results) and Section 6 (conclusions), before returning to the rest of the paper.

Section snippets

The evaluation of interdisciplinarity research

Various notions of interdisciplinarity have become prominent in science policy and management (Metzger and Zare, 1999). IDR is seen as a way of sparking creativity, supporting innovation and addressing pressing social needs (Jacobs and Frickel, 2009, p. 48). This is well-illustrated by a variety of high profile initiatives, such as the UK's Rural Economy and Land Use Programme (RELU3, Lowe and Phillipson, 2006), the US Integrative Graduate Education and Research

Methodological framework: converging partial indicators

Assessments of scientific performance and interdisciplinarity remain controversial and exhibit no consensus on appropriate frameworks and methodologies, even when based on narrow quantitative measures such as publication outputs (Bordons et al., 2004, Huutoniemi et al., 2010). This should come as no surprise, given that both performance and interdisciplinarity are essentially multidimensional concepts, which can only be partially captured by any single indicator (Martin and Irvine, 1983, Narin

Interdisciplinarity of organisational units

The following sections present the results of this investigation. First we show that IS units are more interdisciplinary than BMS according to three different perspectives and their associated metrics.

Mechanisms of bias amplification

Although the forthcoming UK research assessment exercise (RAE, now retitled the Research Excellence Framework) does not officially rely on journal rankings, the widespread perception, at least in the field of Business & Management, is that the number of publications in top

journals (as judged by ABS in this case) will strongly influence the outcome. As noted previously, various studies have shown this was the case for the 2008 assessment (Taylor, 2011, pp. 212–124; Kelly et al., 2009; David

Conclusions

This empirical investigation has responded to wider concerns that have been raised in science policy debates about the evaluation of IDR. It has involved a more rigorously 'plural and conditional' approach to research evaluation, making use of a number of 'converging partial indicators'. Using a range of innovative maps and metrics, the paper has confirmed that IS units are indeed more interdisciplinary than leading BMS when viewed under various perspectives. More importantly, it has shown that

Acknowledgements

We thank colleagues from various British Business & Management Schools for feedback. We are grateful to Jan Fagerberg, Ben Martin and three anonymous referees for comments and to Diego Chavarro for designing the website www.interdisciplinaryscience.net. IR and AO were funded by the US NSF (Award no. 0830207, http://idr.gatech.edu/) and the EU FP7 project FRIDA (grant 225546, http://www.fridaproject.eu). The findings and observations contained in this paper are those of the authors and do not

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