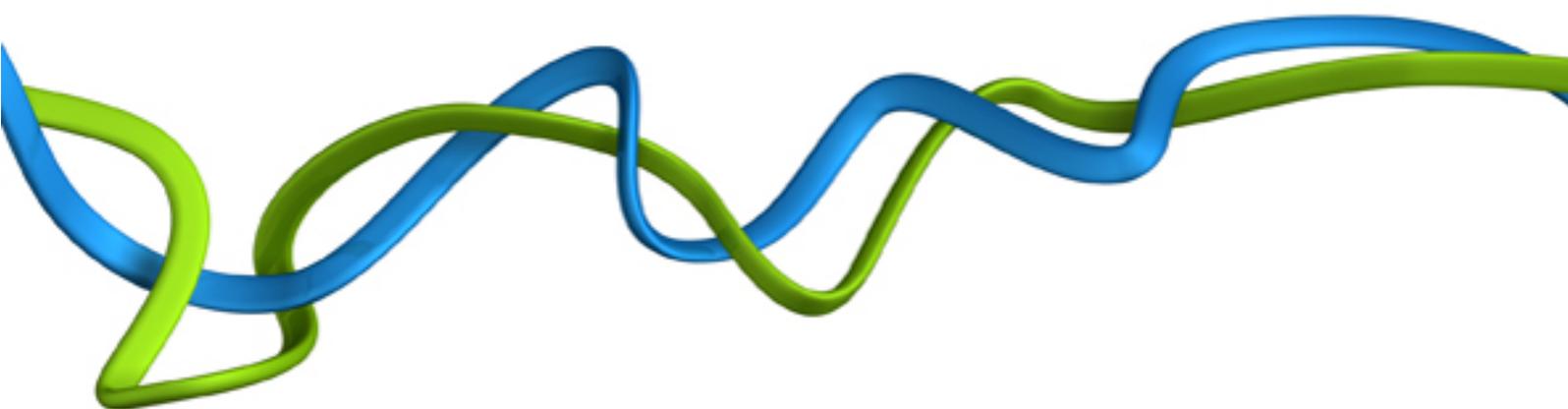


Research Excellence Framework

Lord Stern's Review of the Research Excellence Framework

Submission from the Royal Academy of Engineering

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About the Royal Academy of Engineering

As the UK's national academy for engineering, we bring together the most successful and talented engineers for a shared purpose: to advance and promote excellence in engineering.

Research Excellence Framework

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Introduction

The Royal Academy of Engineering is pleased to respond to Lord Stern's review of the Research Excellence Framework (REF). This response has been prepared following consultation with Fellows of the Academy who were members and assessors of Main Panel B and its sub-panels, and Fellows involved in compiling REF submissions within their institutions.

1. What changes to existing processes could more efficiently or more accurately assess the outputs, impacts and contexts of research in order to allocate QR? Should the definition of impact be broadened or refined? Is there scope for more or different use of metrics in any area?

- 1.1. The Academy is supportive of the REF, and believes that REF 2014 successfully fulfilled its threefold purpose: to inform the selective allocation of funding for research, to provide benchmarking information and establish reputational yardsticks, and to provide accountability for public investment in research and produce evidence of the benefits of this investment. REF 2014 brought a welcome focus on the diverse impacts which can arise from research, including impacts which were not anticipated or planned when the underpinning research was undertaken.¹ For engineering, REF 2014 saw an increase in both the quality of engineering research and the number of staff submitted.²
- 1.2. Academy Fellows involved in the assessment process believed that REF 2014 demonstrated high accuracy overall. Significant calibration and moderation activities were undertaken to ensure consistency, accuracy and confidence in the assessment process, including, for the first time, in the assessment of impact. The REF places a significant burden of work on those involved in assessment, therefore increases in efficiencies which result in a reduction of the burden of work would be welcomed. However, the engineering community feels strongly that accuracy should be prioritised over efficiency.
- 1.3. The introduction of the assessment of impact through case studies is perceived as a success and widely welcomed by the engineering community which believes that research which naturally lends itself to application is now receiving increased recognition. The case study format appears to have successfully captured diverse impacts across the full breadth of excellent research the UK supports. Furthermore, the impact case studies provide a unique resource to enable higher education institutions (HEIs) to showcase their impact activities, and a rich source of data to be utilised by the government and the wider research community.³
- 1.4. The format of the impact case studies and the assessment process proved to be an accurate and reliable way to assess impacts arising from research.⁴ Nevertheless, there are lessons to be learnt from the first assessment of impact in the UK. Further

¹ [REF 2014: Overview report by Main Panel B and Sub-panels 7 to 15](#), 2015

² [REF 2014: Overview report by Main Panel B and Sub-panels 7 to 15](#), 2015

³ [Assessing the economic returns of engineering research and postgraduate training in the UK](#), RAEng and EPSRC, 2015, and [The Dowling Review of Business-University Research Collaborations](#), 2015

⁴ [Assessing impact submissions for REF 2014: an evaluation](#), RAND, 2015

guidance on suggested standards, objective measures and definitions would be welcomed. Clarity of content should be prioritised over presentation, following feedback from Fellows involved in the REF assessment process that overly journalistic case study submissions required paring back for effective and comparative assessment. The sharing of exemplars from REF 2014 might be useful.

- 1.5. For many of the impact case studies, particularly for engineering, it was necessary for industry to corroborate claims of the benefits cited, frequently through the provision of supporting statements and evidence. Although industry has strongly welcomed the increased focus on impact in academia, companies were, understandably, sometimes reluctant to divulge commercially sensitive corroborating information, despite assurances of confidentiality.⁵ Having witnessed the first round of impact assessment, it is hoped that industry will be more confident in the strengths of the confidentiality measures for the next impact assessment. Industry was also often reluctant to evidence the benefits of impact in purely financial terms, preferring instead to use non-monetary quantifications, such as CO₂ emission reductions. Future guidance on REF case studies should not articulate a preference for economic benefits, as this may discourage business involvement. Implementation of robust mechanisms to ensure companies are aware that they are being cited as the locus of impact and are able to verify any corroborating statements would be welcomed.
- 1.6. For Main Panel B and its sub-panels, the research user members and assessors made valuable contributions and were key to the assessment of impact and environment.⁶ However, demands on the time of these individuals were substantial, and unlike those from the academic community, allowances were not always made by their employer to accommodate and support their participation in the REF assessment process. Thought should be given to ways of incentivising and accommodating participation from these communities. As noted in the Dowling Review of Business-University Research Collaborations, concerns have been expressed that the composition of sub-panels meant not all types of impact were considered of equal importance.⁷ If true, action should be taken to ensure the composition of the sub-panels does not introduce biases.
- 1.7. The definition of impact used in REF 2014 captured a wide range of impacts arising from research within Main Panel B, including impacts on the economy, public policy and services, culture and creativity as well on the economy, security and products. The overall consensus in the engineering community is that the definition of impact as used in REF 2014 remains appropriate. Furthermore, maintaining the definition for the next REF exercise will be beneficial as it will allow learning from REF 2014 to be further embedded in the community. Such consistency also has the potential to reduce the burden on HEIs in compiling their impact case studies as they can build on their experience from REF 2014.
- 1.8. Nevertheless, consideration should be given to including impacts arising from underpinning research undertaken by research students. Further clarity on assessing the relationship between public engagement impact and its underpinning research would also be welcomed. Furthermore, there is a perception in the engineering community that one of the most significant and substantial impacts generated by

⁵ <http://www.ref.ac.uk/about/guidance/datamanagement/confidentialimpactcasestudies/>

⁶ REF 2014: Overview report by Main Panel B and Sub-panels 7 to 15, 2015

⁷ The Dowling Review of Business-University Research Collaborations, 2015

academia is the 'impact of people' associated with introduction of skilled postgraduates to the workforce, who transfer knowledge and facilitate translation.

1.9. The usefulness of the impact template has been questioned. In some instances, the impact template proved valuable for capturing contextual information to inform the assessment of the units' impact case studies. However, many Fellows suggested that incorporation of the impact template into the environment element of the assessment may be beneficial (see paragraph 5.4).⁸

1.10. The direct cost of REF 2014 to the funding bodies was £14M over six years and £246M to the higher education community as a whole, totalling 2.4% of the research funding disbursed by the REF 2014.⁹ Despite criticisms in some quarters of cost, both direct and opportunity, this does not seem disproportionate in view of the important role played by the REF. Nevertheless, limiting changes to the next REF exercise would prevent escalation of these already significant costs, as would timely notification of any changes.

1.11. Data and metrics are frequently posited as a means to reduce the burden and bureaucracy of the REF. The Academy has taken a strong interest in the assessment of the quality of engineering research over many years, including extensive discussion about the possibility of metrics-based assessment. The Academy maintains that the most common and developed form of metrics, bibliometric indicators, are not yet capable of providing a robust indication of research quality for engineering subjects.¹⁰ This conclusion is similar to that reached in the recent independent review of the role of metrics in research assessment.¹¹ The Academy continues to support the peer review process, regarding it as a trusted and reliable way of ensuring that quality prevails.

2. If the REF is mainly a tool to allocate QR at institutional level, what is the benefit of organising an exercise over as many Units of Assessment as in REF 2014, or in having returns linking outputs to particular investigators? Would there be advantages in reporting on some dimensions of the REF (e.g. impact and/or environment) at a more aggregate or institutional level?

2.1. As has already been outlined, the REF has several aims, which must be borne in mind when considering the appropriate number of units of assessment (UOA). During the development of REF 2014 the Academy, along with others in the engineering community, engaged in extensive discussions about how engineering research should best be represented in UOA.¹² The consensus then, as now, was that if engineering research was to be amalgamated into a single UOA the risks would outweigh the benefits.

2.2. There are concerns that the overall quality of the research assessment would reduce, as the ability to identify small pinnacles of excellence could decrease, as could the

⁸ [Assessing impact submissions for REF 2014: an evaluation](#), RAND, 2015

⁹ [REF Accountability Review: Costs, benefits and burden](#), Technopolis, 2015

¹⁰ [RAEng, IET, ICE and IMechE Joint response to Research Excellence Framework, second consultation](#), 2009; [RAEng response to Research Excellence Framework](#), 2008; [RAEng response to Reform of Higher Education Research Assessment and Funding](#), 2006

¹¹ [The Metric Tide](#), Wilsdon et al., 2015

¹² [RAEng, IET, ICE and IMechE Joint response to Research Excellence Framework, second consultation](#), 2009

likelihood of research outputs being peer-reviewed by the most relevant experts. The effectiveness of the REF as a benchmarking tool would also be significantly limited, as aggregation would reduce the richness of the conclusions that could be drawn from the REF. There is a widespread presumption in the research community that if the REF did not exist, HEIs would need to find other mechanisms to replace its benchmarking role. At the current level of UOA, the environment element captures valuable information about the overall health of disciplines.

2.3. The Academy has heard concerns that institutional level strategies and activities which have significant benefits at the UOA level, particularly with regard to impact, are not always captured by the REF; their inclusion in the environment element and impact template should be encouraged.

3. What use is made of the information gathered through REF in decision making and strategic planning in your organisation? What information could be more useful? Does REF information duplicate of take priority over other management information?

3.1. According to the vast majority of Fellows who provided comments to inform the Academy's submission, the REF is one of a number of factors which is used to inform institutional decision making and strategic planning, and although the level of importance placed on the REF results varies by HEI, it rarely takes precedence over other management information. Moreover, if the REF did not exist it is suggested that institutions would have to collect similar information and subject it to scrutiny themselves. The exact details of how HEIs utilise the results of the REF differ, reflecting the different missions of HEIs and their autonomy in determining institutional strategies.

4. What data should REF collect to be of greater support to Government and research funders in driving research excellence and productivity?

4.1. Questions 4 and 5 have been answered together.

5. How might the REF be further refined or used by Government to incentivise constructive and creative behaviour, such as promoting interdisciplinary research, collaboration between universities, and/or collaboration between universities and other public or private sector bodies?

5.1. The inclusion of impact in the REF has had a hugely positive influence on increasing the prominence of business-university collaborations (see paragraph 6.2). Supporting and facilitating the mobility of researchers between industry and academia has been widely acknowledged as critical for collaboration and knowledge exchange. As noted in the Dowling Review, the REF could be adapted to provide explicit recognition for staff who have moved between industry and academia by offering allowances, similar to those made for researchers who have taken parental leave, for staff who have moved between industry and academia in either direction.¹³ To minimise the risk of game-

¹³ [The Dowling Review of Business-University Research Collaborations](#), 2015

playing a quality filter could be applied for the time spent out of academia which would require approval by the panel (e.g. the awarding of a competitive Fellowship to support the secondment or submission of a report detailing what was achieved during the time spent in industry). The introduction of any such provision needs to be communicated effectively to academics and university staff to encourage full utilisation of the provision.

- 5.2. The environment element could also be used to give more recognition to business-university collaborations if HEIs were required to provide relevant information such as the number of collaborative grants awarded and data about mobility between the submitting UOA and businesses, both inward and outward.¹⁴
- 5.3. There is a frustration expressed by many in the engineering community that the requirement to trace impact back to underpinning institutional research limits the impact that is captured by the REF. Activities that support and encourage translation and delivery of impact, such as providing incubator space, partnerships with science parks, industrial secondments, networking events and entrepreneurial mentoring, as well as the key role universities can play in start ups rather than spin outs, are not recognised and rewarded.
- 5.4. Consideration should be given in the next iteration of the REF to capturing details about activities that support the full breadth of knowledge exchange and translation activities. The inclusion of such information would be useful for benchmarking and would provide further evidence for the benefits of the investment in research, but would need to be tensioned against the role the REF has assessing research excellence. It would be preferable for any additional information to be recorded in a quantitative, easy to process way, where appropriate. Although such information would seem most aligned with the impact template, the usefulness of the impact template has been questioned (see paragraph 1.9). Combining the impact template with the environment template would have the advantage of encouraging HEIs to embed their impact strategies within their research strategies.
- 5.5. Main Panel B and its sub-panels noted an increase in the amount of interdisciplinary research submitted, reflecting an increased focus on interdisciplinary research for the engineering community.¹⁵ The impact case studies also demonstrated the results and benefits of interdisciplinary working. The changes introduced in REF 2014 to assist with the assessment of interdisciplinary research were broadly welcomed by the engineering community, with the ability to cross-refer research outputs fully embraced and deemed effective.¹⁶ However, care is required to ensure that all sub-panels have adequate representation of members who fully appreciate the challenges faced by interdisciplinary researchers.
- 5.6. Pursuing a career in interdisciplinary research, or moving between disciplines, tends to be viewed as an inherently risky choice, especially for early career researchers.¹⁷ Concerns that interdisciplinary research means publishing in journals which often have lower impact factors leads to researchers presuming they will face penalties both in career progression and in the REF, despite REF 2014 stating that it would not make

¹⁴ [The Dowling Review of Business-University Research Collaborations](#), 2015

¹⁵ [REF 2014: Overview report by Main Panel B and Sub-panels 7 to 15](#), 2015

¹⁶ [REF 2014: Overview report by Main Panel B and Sub-panels 7 to 15](#), 2015

¹⁷ [RAEng submission to British Academy's review of Interdisciplinarity](#), 2015

any use of journal impact factors. To prevent the REF, along with internal promotion criteria, acting as unintended disincentives to the development of new, often interdisciplinary research areas, appropriate messaging from the REF and HEIs needs to be communicated effectively to researchers. Explicit recognition for staff who have 'discipline hopped', similar to the allowances to those made for researchers who have taken parental leave, may also help to address concerns that interdisciplinary research is not valued by the REF.¹⁸

6. In your view how does the REF process influence, positively or negatively, the choices of individual researchers and/or higher education institutions? What are the reasons for this and what are the effects? How do such effects of the REF compare with effects of other drivers in the system (e.g. success for individuals in international career markets, or for universities in global rankings)? What suggestions would you have to restrict gaming the system?

- 6.1. It is well established that the UK has an excellent research base, and it is generally considered that the UK's efforts, starting with the Research Assessment Exercise in 1986, to define and measure research excellence have contributed to the UK's world-class standing. The focus on research excellence has not been matched by a concomitant focus on teaching excellence therefore the Academy welcomes the principle of a teaching excellence framework.¹⁹
- 6.2. The inclusion of impact in REF 2014 has had a hugely positive influence on universities, encouraging them to articulate and ultimately improve the translation of their research into social, environmental or economic benefits. In particular, impact appears to be changing the way in which university–business collaborations are viewed and valued, including by stimulating a more positive attitude among academics towards working with business. Evidence for the positive influence of impact's inclusion in the REF came through strongly in submissions received by the Dowling Review, both from business and academia.²⁰ Businesses' enthusiasm for the cultural change that impact is effecting has been further reinforced by input to inform the Academy's submission to this review.
- 6.3. Career progression and research excellence are linked, with both considered to rely heavily on the quality of a researcher's publication record and ability to win grant funding. Consequently, in determining the extent to which the REF drives individual researchers to aspire to, and maintain, research excellence, it is near impossible to separate the effect of the REF from other drivers in the system, such as internal promotion criteria. However, considerable care is required to ensure that the interpretation of institutional messaging around the REF, research excellence and promotion does not result in an unhelpful overemphasis on the REF.
- 6.4. The selection of staff for submission to the REF appears to have been influenced by the number of impact case studies required.²¹ For Main Panel B, approximately 30% of submissions were within one full time member of staff of the threshold for an

¹⁸ [The Dowling Review of Business-University Research Collaborations](#), 2015

¹⁹ [RAEng submission to BIS consultation on Higher Education, teaching excellence, social mobility and student choice](#), 2016

²⁰ [The Dowling Review of Business-University Research Collaborations](#), 2015

²¹ [Consultation on the second Research Excellence Framework](#), HEFCE, 2015 and [Preparing impact submissions for REF 2014: An evaluation](#), RAND, 2015

additional case study, thus suggesting that eligible staff may not have been submitted to the REF.²² Such behaviour is concerning and may be divisive considering the relationship in some HEIs between being returned for the REF and promotion criteria. One proposed approach which may minimise such behaviour is to introduce fractional weighting of impact case studies, whereby 'the choice between submitting an additional case study for reducing the number of staff selected is eased by weighting the weakest case study in proportion to the number of FTE over the threshold'.²³ However, care would be required to ensure that the weighting is appropriate and still encourages submission of high quality impact case studies.

6.5. Concerns about staff submission extend to the overall selection process. It has been widely acknowledged that the process of staff selection is particularly burdensome to HEIs, in terms of time, cost and bureaucracy.²⁴ However, it is important to note that the burden is, to a considerable extent, a reflection of the internal processes employed by HEIs to try to ensure they receive the best REF result, such as running mock REF exercises or choosing to submit a small fraction of their staff. Since REF is intended to identify excellent research rather than provide a comprehensive assessment of all UK research, an element of selection in submissions to be assessed seems unavoidable, it is therefore difficult to see how game playing could be entirely eliminated. There may not be one solution which can address both game playing and the perceived burden and bureaucracy.

6.6. Taking the aims of the REF into account, the engineering community believes improvements should be made to limit game-playing through staff selection. Assuming the mechanism of staff selection is to remain the same, a much greater emphasis on reporting the proportion of eligible staff submitted by each HEI at UOA level could be the simplest approach. Although HESA published the figures on the number of staff eligible to be submitted for each UOA and HEI, these figures could have been of greater benefit if they had been incorporated into the reporting of the REF results, or had been available for consideration during the assessment period, potentially as part of the environment element.

6.7. For others in the engineering community a preferred solution would be to mandate that all eligible staff must be submitted to the REF. However, this is not without challenges, for example it may increase the risk of changes to staff employment contracts, which could have negative effects on researchers' career prospects. An increased burden on those involved in the assessment process would also be seen, if the number of outputs were to stay the same. A reduction in the number of outputs or sampling would decrease the assessment burden, but neither approach would be without disadvantages.

7. In your view how does the REF process influence the development of academic disciplines or impact upon other areas of scholarly activity relative to other factors? What changes would create or sustain positive influences in the future?

7.1. See answer to question 5.

²² [REF 2014: Overview report by Main Panel B and Sub-panels 7 to 15](#), 2015

²³ [Consultation on the second Research Excellence Framework](#), HEFCE, 2015

²⁴ [REF 2014: Manager's report](#), HEFCE, 2015

8. How can the REF better address the future plans of institutions and how they will utilise QR funding obtained through the exercise?

8.1. The Academy believes that the current purpose of quality related (QR) funding to reward performance retrospectively, as assessed by the REF, should be maintained. Therefore the REF should not have a role in addressing the future plans of institutions. QR funding provides a valuable funding stream that allows institutions to achieve their own strategic objectives, which may include deploying the funds in a rapid and responsive manner to pursue risky or innovative activities.