THE ROYAL SOCIETY

24th March 2016

Royal Society submission to the Stern Review of the Research Excellence Framework

Summary

1. Maintaining the UK's world-leading standing in research requires a supportive research landscape and culture. This landscape needs to help researchers undertake excellent work and reflect how research is undertaken in the 21st century. A research landscape based on the principles outlined below will help excellent researchers make a full contribution to the UK's culture, society and economy.

- **Excellence in science,** encouraging curiosity and the freedom to pursue intellectual interests.
- **Collaboration** including interinstitutional, multi- and interdisciplinarity to generate novel approaches to tackle major local, national and international challenges.
- **Diversity** in people, disciplines, institutions, sectors, locations and funders so that research benefits from a range of approaches.
- **Openness** to earn public trust, increase transparency and support the widest possible dissemination and honest discussion of research outputs.
- **Agility** so that ground breaking ideas and proposals receive appropriate levels of funding and infrastructure, facilities and equipment are of sufficient quality and scale to support cutting edge research.

2. The dual support system is a crucial part of this landscape. Robust mechanisms are needed to ensure that Quality Related (QR) and Research Council funding are managed and administered independently, both now and in the future.

3. The Research Excellence Framework (REF) is another key part of this landscape and should be designed around its primary purpose – the allocation of QR funding – with consideration for the culture it can create. Guiding the REF along the principles outlined above will best support the UK's research landscape and culture.

4. The Society recommends a more institutionally-focussed system where institutions submit outputs to be assessed by discipline-specific panels. This better reflects the role of REF in determining the QR funding allocated to institutions as a whole and fosters a research culture in line with the Society's principles for a strong research landscape. This approach should support all the elements that enable excellent researchers to do excellent science, including multi- and interdisciplinary research, team science, interinstitutional collaboration and confirming others' results.

5. Despite its administrative burden, the Society believes that peer review should remain at the heart of the REF, although judiciously selected and interpreted metrics can supplement decision making in a number of disciplines.

6. The Society supports the inclusion of impact as one of the features of the REF. Both basic and applied research often have impact. However, the impacts of curiosity-driven research are often not apparent until long after the original research has been taken place.

7. Excellent science should be supported wherever and by whomever it is done. Addressing unconscious bias is one way to draw upon the widest range of talent. The Society recommends that all REF panel members should be provided with unconscious bias guidance so they are aware of differences in how research might be presented, how to recognise bias in oneself and others, and how to recognise inappropriate advocacy or unreasoned judgement.

THE ROYAL SOCIETY

Introduction

8. The Royal Society is the UK's national academy of science. It is a self-governing Fellowship of many of the world's most distinguished scientists working in academia, charities, industry and public service. The Society draws on the expertise of the Fellowship to provide independent and authoritative advice to UK, European and international decision makers. As the UK's national academy of science, the Society is concerned with the health of the nation's research, innovation and education system as a whole.

9. This submission was written following consultation with a selection of Fellows of the Society representing a wide range of scientific disciplines, as well as researchers earlier in their careers funded by the Society.

Building the right research landscape and culture

10. The UK has created a world-leading research base[1]. It provides the foundation for new ideas and discoveries, and fuels economic growth and the creation of skills, high value jobs and entrepreneurial businesses in our knowledge-driven economy[2]. Decision makers in business and government draw on expertise and advice from UK research to tackle national and global challenges from water scarcity to terrorism, from population change to the effects of new technology on our everyday lives. Research helps make the UK an open, vibrant and enquiring society with a deep cultural base and helps us to live healthier, fuller and better lives.

11. Maintaining the UK's world-leading standing in research requires a supportive research landscape and culture. This landscape needs to help researchers to undertake excellent work and reflect how research is undertaken in the 21st century. This landscape is currently undergoing change following the Nurse Review[3] and this Review of the REF will further shape the system. A research landscape and culture based on the following principles will help research to make a full contribution to the UK's culture, society and the economy.

    - **Excellence in science,** encouraging curiosity and the freedom to pursue intellectual interests.
    - **Collaboration** including interinstitutional, multi- and interdisciplinarity to generate novel approaches to tackle major local, national and international challenges.
    - **Diversity** in people, disciplines, institutions, sectors, locations and funders so that research benefits from a range of approaches.
    - **Openness** to earn public trust, increase transparency and support the widest possible dissemination and honest discussion of research outputs.
    - **Agility** so that ground breaking research ideas and proposals receive appropriate levels of funding and infrastructure, facilities and equipment are of sufficient quality and scale to support cutting edge research.

12. These principles should direct funding policy, including the design of the REF. A strong research landscape and culture will foster a culture of scientific research that supports and encourages science that is high-quality, ethical and valuable[4].

[1] BIS and Treasury (2014) Our plan for growth: science and innovation – evidence paper https://www.gov.uk/government/publications/our-plan-for-growth-science-and-innovation-evidence
[2] Ibid
[3] Paul Nurse (2015) Ensuring a successful UK research endeavour https://www.gov.uk/government/collections/nurse-review-of-research-councils
[4] Nuffield Council on Bioethics (2014) The culture of scientific research in the UK http://nuffieldbioethics.org/wp-content/uploads/Nuffield_research_culture_full_report_web.pdf

The role of the dual support system and QR

13. The dual support system is a crucial part of the UK's current and future research landscape that the Society strongly supports. The Research Councils, other funders of specific research projects, and QR components support excellent research, provide resource, enable collaboration and interdisciplinarity, and promote diversity and openness. The Society welcomes the Government's commitment to the dual support system in the recent Higher Education Green paper[5].

14. QR is a unique component of the system that has served UK Higher Education Institutions (HEIs) well by providing core funding, allocated based on the REF, to allow institutions to pursue their self-determined research strategies and partner with charities and industry. The REF is therefore a valuable tool in the creation of the right research landscape and culture.

15. The Nurse Review raises the option of transferring responsibility for the REF and QR to a new body, called Research UK, which would also include the Research Councils. Robust mechanisms are needed to ensure these two funding streams are managed and administered independently, both now and in the future. Crucially, the autonomy of the leadership of these separate funding streams must be maintained, and as they have different roles, they need different assessment criteria.

A REF that supports the right research landscape

16. The REF should be designed around its primary purpose – the allocation of QR funding – with consideration for the culture it can create. To support best the UK's research landscape the REF should be guided by the principles outlined above.

17. The REF and its outputs may also be useful for other functions, such as institutional performance management and informing regional economic strategies, but these should be secondary considerations during design. Other systems may also be better placed to be utilised for such activities.

18. HEIs can use the REF's current focus to constrain individual performance management systems to a narrow interpretation of REF criteria. This has had a damaging effect on research culture and does not match the goal of QR funding to support creative and diverse research. The current system provides strong financial incentives to maximise the number of individuals who produce four research outputs perceived to meet the institutional interpretations of the REF assessment criteria, which are usually very narrow. This approach undervalues important contributions to delivering a high-quality research environment, for example by disincentivising the appointment of technology specialists, or the development of projects involving large teams within and between HEIs where it may be harder to attribute contributions to individuals. The REF can also affect institutions' decisions about who teaches and who conducts research, which can weaken the teaching-research link and create divides between staff if not done with support of the faculty. While the Society realises that these consequences are not the necessary result of the REF, they reflect the known conservatism of the HEI landscape.

19. The REF also poses an administrative cost burden on institutions, which must select researchers to enter into the exercise, request outputs from them and cross check outputs to avoid duplication. The current approach of linking outputs to individual researchers complicates this task.

20. While the REF is not the sole driver of these unproductive pressures in academia, it is widely believed to be a significant part of the problem. There is a perception among researchers that

[5] BIS (2015) Higher education: teaching excellence, social mobility and student choice https://www.gov.uk/government/consultations/higher-education-teaching-excellence-social-mobility-and-student-choice

publishing in high impact factor journals is the most important element of assessment by the REF[6]. This perception can discourage and disadvantage multi- and interdisciplinary research, team science and researchers undertaking other activities related to their research such as teaching, outreach or commercialisation. It can also discourage the pursuit of lines of inquiry not believed to be favoured in assessment, such as confirming others' results. The Nuffield Council on Bioethics has identified that many researchers are also unaware or untrusting of the instructions given to REF assessment panels not to make any use of journal impact factors in assessing the quality of research outputs[7].

21. No system will remove all perverse incentives, costs and burdens but there is opportunity to evolve the current approach to address the problems above.

A more institutionally focused system

22. The Society recommends a more institutionally focussed system, with assessment of outputs by discipline specific panels, that decouples outputs from individual researchers. This will better reflect the role of REF in determining the QR funding allocated to institutions as a whole and foster a research culture in line with the Society's principles for a strong research landscape.

23. Decoupling outputs from researchers was advocated in the *REF Managers Report*, which said *"To substantially reduce the burden associated with a future exercise, more radical changes would be needed. We suggest serious consideration of the feasibility of decoupling the selection of staff and outputs, although that may present challenges in identifying a robust volume measure for funding purposes"*[8].

24. There are many details and challenges that would need to be addressed in the development of such a system. The Society would welcome the opportunity to provide advice on this to the Review and the Government. This submission outlines how a more institutionally-focussed REF may operate; it should be considered as the beginning of a discussion rather than a final proposal.

25. In a more institutionally-focused REF, outputs would be determined at the institutional rather than individual level, then assessed by expert peer review using discipline-specific panels (see below). The number of outputs, which the Society suggests should be significantly fewer than the present system, might be determined through an algorithm applied to HESA data[9] on research staff (and possibly PhD students and post-docs), which might also form the basis of the volume measure. Alternative options for the volume measure could also be explored, such as research income received during the REF period from QR, research councils, EU, charities and industry.

26. Institutional strategies might be submitted as part of the environment statement and assessed qualitatively against criteria based on the features of a strong research landscape described above. This process should recognise that the institutional strategy cannot be too prescriptive and should give a broad overview of how the institution plans to develop and support its activities. The institutional strategy should inform the institution's selection of outputs for assessment. This would then help tackle excessive competition and narrow measures of success as good strategies should encompass a richer array of outputs that help build a stronger research landscape.

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[6] Nuffield Council on Bioethics (2014) The culture of scientific research in the UK http://nuffieldbioethics.org/wp-content/uploads/Nuffield_research_culture_full_report_web.pdf
[7] Nuffield Council on Bioethics (2014) The culture of scientific research in the UK http://nuffieldbioethics.org/wp-content/uploads/Nuffield_research_culture_full_report_web.pdf
[8] Graeme Rosenberg (2015) Research Excellence Framework 2014: Manager's report http://www.ref.ac.uk/media/ref/content/pub/REF_managers_report.pdf
[9] https://www.hesa.ac.uk/

27. One overall environment submission should be made for the institution, including the single institutional strategy. Discipline-specific sections of the environment template may be allocated to the appropriate panels for assessment.

Peer review and metrics

28. Despite its administrative burden, the Society believes that peer review should remain at the heart of the REF. The judicious use of metrics could help to reduce some of the burden of the REF. The Society agrees with the conclusion of *The Metric Tide* report that *"no metric can currently provide a like-for-like replacement for REF peer review"*[10]. The Society supports the use of metrics as a tool to inform and supplement, rather than replace, expert review in some disciplines. It also supports the decision to allow expert panels to decide whether to use citation data and to what extent.

29. The Society is a signatory to the San Francisco Declaration on Research Assessment (DORA)[11], which states that journal-based metrics, such as journal impact factors, should not be used as a surrogate measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion or funding decisions. Therefore the Society supports the exclusion of journal impact factors as a consideration for panels.[12]

Impact

30. The Society supports the inclusion of impact as one of the features of the REF, and outputs and impact case studies should continue to be assessed by expert peer review using discipline-specific panels. Impact case studies from the 2014 REF provided evidence of the many ways in which research benefits society, people's health and the economy. These ways include public engagement and working with policy makers to ensure policy is based on the best available evidence. Both basic and applied research often have impact. However, the impacts of curiosity-driven research are often not apparent until long after the original research has taken place. It is therefore important that the REF continues to include research undertaken outside of the REF assessment period for impact assessment. It is also important to have a broad definition of impact as different disciplines have the potential to make very different types of impacts.

31. The Society notes that the definition of impact for the impact case studies in the REF guidance[13] does not accept impact on other academic research. The REF guidance states that this is because academic impact is assessed in the outputs section. The Review should consider whether this is the most appropriate way to assess academic impact, as it creates a divide between academic outputs and other types of outputs. All outputs should be assessed according to their excellence and their impact should be assessed separately. In particular, the Review should recognise that there is significant impact not captured through the current mechanism of case studies.

Operation of the REF panels

32. Discipline-specific assessment conducted by peer review through the Units of Assessment (UoA), allowing for consideration of interdisciplinary research, continues to be the most appropriate model for the REF as this most accurately reflects the research process and environment. The current number of UoAs is about right. In most cases, the panel sizes and

[10] James Wilsdon *at al.* (2015) The metrics tide
http://www.hefce.ac.uk/pubs/rereports/Year/2015/metrictide/Title,104463,en.html
[11] http://www.ascb.org/dora/
[12] REF (2012) Panel criteria and working methods
http://www.ref.ac.uk/media/ref/content/pub/panelcriteriaandworkingmethods/01_12.pdf
[13] REF 2014 (2011) Assessment framework and guidance on submissions
http://www.ref.ac.uk/pubs/2011-02/

discipline coverage appropriately balance the need for expertise to sufficiently scrutinise submissions with the need to have the breadth of expertise to assess different types of research.

33. The UoAs approximately align with the discipline-based structures found in most HEIs. The scores they return can therefore be valuable for monitoring performance and understanding the different strengths of HEIs, both for internal management and external observers and regulators. The Society recommends that the Stern Review should consider whether the feedback provided in the REF 2014 is sufficient for it to be used in this way. However, this purpose is secondary to the allocation of QR funding and should not guide the design of the REF.

34. The Society welcomed the changes made to the REF to include four new measures to support interdisciplinary research. The results of the REF 2014 showed that interdisciplinary research was found to be of equal quality to disciplinary outputs[14]. It is still too early to say if this support has helped to overcome the challenges faced by those working in interdisciplinary research, however, the recognition of interdisciplinary research in the REF should continue by ensuring it is rewarded to an equal extent to research submitted to and assessed by only one panel.

Diversity

35. Excellent science should be supported wherever and by whomever it is done. Addressing unconscious bias is one way to ensure that the process draws upon the widest range of talent. The Society recommends that all REF panel members should be provided with unconscious bias guidance so they are aware of differences in how research might be presented, how to recognise bias in oneself and others, and how to recognise inappropriate advocacy or unreasoned judgement. This reflects the practice of the Society's own selection panels.

For further information, please contact Becky Purvis, Head of Public Affairs (rebecca.purvis@royalsociety.org)

[14] REF 2014 (2014) Research Excellence Framework 2014: The results http://www.ref.ac.uk/pubs/201401/