

RESEARCH COUNCILS UK CONSULTATION ON EFFICIENCY AND EFFECTIVENESS OF PEER REVIEW PROJECT

EVIDENCE SUBMITTED BY THE SOCIETY FOR GENERAL MICROBIOLOGY (SGM)

Introduction

In 2006 the Research Councils UK (RCUK) conducted a study to identify the full economic cost of the peer review system and the potential of improving its efficiency whilst maintaining the same standard of quality review.

Previous reviews (the Boden Report, 1990; the Royal Society Report, 1995) as well as the present review have all concluded that 'peer review remains the most effective mechanism for taking funding decisions'. However, the burden of reviewing placed on the scientific community is high, and difficulties of various kinds arise when the success rates of funding become low.

Detailed costings of the review process have been produced. The overall cost for RCUK is slightly under £200 million per annum, of which 84% falls on producing and processing the full proposals. In recent years, the number of grant proposals has increased substantially (by 20% over the past 8 years), whilst the average success rate fell from 41 to 28% (between 1988/89 and 2005/06). In some areas of research funding the success rate is lower. The pressure on scientists to apply to research councils or other outside funding agencies for research funding is high for a complex number of reasons. The administration costs of the research councils (4%) are low.

The scientific community overwhelmingly (93%) supports a review-based grant distribution system. Even a high rate of unsuccessful applications (> 50%) is not regarded as inefficient, but as supporting the creation and maintenance of a healthy and innovative research base. There are projections, though, that the present average success rate of 28% may fall further in the years to come. The question arises: Within which range is a success rate acceptable? In the Research Councils Project Board's view a rate of above 20 and below 50% appears to be acceptable.

The Project Board considered a number of options (RCUK Report, Annex 2) of which some were unacceptable from the start (with negative effects of various kinds outweighing savings), some produced only moderate savings (in detailed costed option appraisals, including risk and benefit analyses), and only four options offered significant potential savings. Those were summarized under the headings of:

- consolidation
- institutional level quotas
- controlling resubmissions
- outline usage

The majority of questions raised in the covering consultation document relate to those four options, and this opinion ('view') will concentrate on them. However, comments will also be given on some aspects of options not yet

fully considered (RCUK Report, Executive Summary, Point 22), and on some additional issues.

Consultation Questions

Consolidation of research grant funding (RCUK Report, pp 56 – 58: Questions 1 – 3)

A greater proportion of Research Council funding could be devoted to larger research grants, which would be offered either to research groups, or to departments and/or institutions and would consolidate support for a number of projects within a single large grant. Investigators supported by such a grant would then face some restriction on further proposal submission, e.g. they may not be permitted to apply in responsive-mode for the duration of the award. The aim would be to provide long-term and flexible support for leading research groups, departments or institutions, whilst reducing the burden incurred by the preparation and peer review of multiple proposals. In addition, or alternatively, the Research Councils could seek to increase the length of research grants and thereby reduce the frequency with which grant holders need to apply for further funding.

1. How might such changes be implemented in a manner that would meet the needs of your organisation and the UK research base, whilst maintaining the characteristics of an efficient and effective peer review system?
2. What level and length of funding, relative to your current Research Council funding, would be required for your organisation to consider this option more attractive than the opportunities currently available in responsive-mode?
3. What steps might Research Councils and research organisations take to ensure that more use of larger or longer-term grants would not reduce innovation and dynamism within the research base, and the support of new people and ideas?

The shift of emphasis of research council funding to larger research grants favouring leading research groups/departments/institutes, which would then be excluded from individual grant applications in responsive mode, should be considered but only flexibly applied.

Some of the risks identified:

- discouraging collaborative projects or interdisciplinary research
- disadvantaging early career stage researchers
- loss of flexibility towards emerging fields of research
- supporting complacency and inertia of some of the staff

are regarded as serious enough to approach this option with caution. Top groups are likely to attract good to excellent, often young people. For them, the flexibility to pursue their own ideas and ask for funding if their proposals are new and transgress the objectives of the group/departmental/institutional grant must be maintained. Thus, Model 2 (RCUK Report, page 57, top) would be favoured.

Out of the same considerations, the length of funding should be kept flexible, and exemptions from the average 3 year duration of awards, extending to 4 or 5 years, should be allowed. This would free additional time of productive individuals/ groups to do original research.

The steps to be taken would involve having a flexible system in which grants of different size, spanning different numbers of people and between 3 and 5 years would be allowed. This practice is already in place in some of the research councils. As stated above, flexibility would be key: the system of grant distribution should be of highest relevance to the needs of a productive scientific community. SGM subscribes to the sentence: “Research Councils would not have to adopt the same approach to consolidation, and indeed there is a strong case for ensuring that methods are tailored to meet the specific needs of the target research community” (RCUK Report, page 58, paragraph 3).

Institutional level quotas (RCUK Report, pp 60 – 61: Questions 4 – 6)

A quota could be established for the maximum number of proposals each institution could submit during an identified period of time. The aim would be to control the number of proposals submitted to the Research Councils, and thereby the burden on the research community incurred by their preparation and peer review. One variant of this option might be to apply it only to institutions with the lowest success rates.

4. How might this change be implemented in a manner that would meet the needs of your organisation and the UK research base, whilst maintaining the characteristics of an efficient and effective peer review system?
5. What steps might Research Councils and research organisations take to ensure that institutional quotas do not result in a comparable or increased level of peer review cost due to the establishment and operation of selection processes within research organisations?
6. What steps might Research Councils and research organisations take to ensure that institutions would continue to submit proposals for collaborative, high risk and interdisciplinary research, and proposals from early-career researchers?

The option of institutional level quotas has not been fully thought through (e.g. with regard to the basis and rationale of a distribution algorithm; RCUK Report, page 60, paragraph 2). As all costs are rightly calculated as ‘potential cash equivalent savings’ – i.e. as it is recognized that the savings are not real but ‘only’ favouring research instead of grant application and peer review work, in this particular situation – the review time at research council level would be transferred (‘recreated’; RCUK Report, page 61) as review and triage work at department level. The assumed success rate increase (RCUK Report, page 60, paragraph 3) would probably not be fully realized, as fewer applications may contain an increase in requests from a pot of funds the size of which is not assumed to have increased. The risk analysis arguments (RCUK Report, page 60, bottom) are accepted as having a negative effect. This opinion fully subscribes to the conclusion: “The ability to fund high quality individuals and projects within the wider research base is a strength of the current UK system that should not be readily compromised.” (RCUK Report, page 61, paragraph 4).

Thus, institutional level quotas are not considered to be an attractive option.

Controlling resubmissions/Recycled proposals (RCUK Report, pp 64 – 65: Question 7)
Research Councils would introduce measures to control the number of proposals that, following an initial unsuccessful pass through the full peer review process, are modified and then resubmitted. In one variation all resubmissions would be prevented, in another only “invited” resubmissions would be allowed.

7. How might the Research Councils best manage resubmissions from the research community? In particular, what steps could be taken by Research Councils to distinguish between a resubmitted proposal and a genuinely new proposal?

Other grant distribution systems, e.g. of the US National Institutes of Health, make resubmission of an initially rejected proposal an almost regular feature of the process, arguing that a resubmitted application is likely to have lost all or some of its weaknesses as a consequence of the reviewing process. In this opinion, the idea of only allowing ‘invited’ resubmissions makes sense and should be seriously considered. Some research councils already use this tool. There are grant applications that are beyond repair, and these should be identified. Some of the issues here overlap with those relating to the outline proposal system (see comments below).

Note: As the question “Has this application been submitted before/elsewhere and with which outcome” is included in most grant application forms, it is not quite clear why the number of resubmissions is not known or difficult to establish.

Greater use of outlines (RCUK Report, pp 65 – 67: Questions 8 – 10)

Short outline proposals, comparable to those currently used in some directed programmes, would be required for responsive-mode proposals. These would be subject to a light-touch peer review, which would inform a substantial sift or triage. Full proposals would only be accepted from among the outlines selected. The aim would be to reduce the time spent on the preparation and peer review of detailed proposals, and thereby the overall burden of peer review.

8. How might this change be implemented in a manner that would meet the needs of your organisation and the UK research base, whilst maintaining the characteristics of an efficient and effective peer review system? For example, how might any potential impacts on increasing the time taken to fund new research or reduced effectiveness in identifying the highest quality research proposals be minimised?
9. What impact would the greater use of outline proposals have on the number of outline and full proposals submitted to the Research Councils, both within your organisation and across the UK research base?
10. What steps might Research Councils and research organisations take to ensure that the overall time saved on the preparation and peer review of full proposals would be greater than that incurred by an increase in the number of outline proposals?

Extension of the tool of outline proposals (‘outlines’ in the following) to all grant applications should be seriously considered. The use of outlines may

save 'cash equivalents' but this critically depends on a) demand and b) sift rates. "In managed programmes, an important sifting criterion is the degree of fit with the strategic objectives of the programme and these are carefully defined. In responsive mode, the principal criterion is the intrinsic research merit of the proposal." (RCUK Report, page 66, paragraph 2, end). This distinction is important to note, but the intrinsic research merit should always be the main criterion.

Under the main risks identified for this option (RCUK Report, page 66, bottom), the following statement is required: that in order to avoid 'erroneous sifting out of a strong proposal' the triage referee/panel has to be experienced and be in possession of a balanced judgement over a wide range of research topics. However, it is believed that this risk can be managed with the enormous amount of expertise available in the UK and abroad. It is also felt that a good expert opinion on an outline proposal will be of great help to the majority of applicants, in particular to younger researchers. Whilst the review process time may be slightly expanded by a triage system, it will save a substantial portion of reviewer time on full proposals. It will also entice people to focus on the production of substantial, meaningful and concise outline proposals. In this opinion, the production and initial critical reviewing of outlines would increase the quality of full research proposals.

Among the steps to be taken by the research councils to ensure that "the overall time saved on the preparation of research proposals and peer review of full proposals would be greater than that incurred by an increase in the number of outline proposals" (Consultation Action paper, page 4, question 10), the most important measure would be the recruitment of very experienced and very bright people who would avoid the outlined risks whilst achieving the savings equivalents. The impact of introducing an outline-based triage system may be an increase in demand. However, this in itself should be considered a positive consequence and 'a good thing'. The quality of the full proposals will critically depend on the quality of the triage system.

Assessing potential economic impact (RCUK Report, pp 46: Questions 11 – 12)
The Worry report recognised the contribution peer review could make in increasing the economic impact of Research Councils' activities. In this respect, the report recommended that Research Councils should ensure that:

- *peer review panels contain members expert in identifying work of potential economic importance;*
- *reviewers' training includes the importance of economic relevance to the overall Council mission;*
- *guidelines for reviewers are clear on how they should score the economic impact of bids and how this score is related to the other measures by which bids are assessed;*
- *applications for responsive mode funding identify potential beneficiaries of the research*

11. Without compromising research quality, how could Research Councils develop the peer review process to ensure that potential economic impact is effectively reflected within proposal assessment?

12. How can Research Councils ensure that reviewers have the skills, experience and information necessary to assess effectively potential economic impact?

Applications for research funding span a wide spectrum, ranging from highly original basic research proposals, with no obvious economic impact at the time of review but very high value as a contribution to knowledge, to very applied research proposals, where the economic impact/benefit is obvious or easy to assess but which may be of less originality and more 'mainstream'. 'High risk' projects take a special place in this spectrum (see comments below).

Admittedly, questions in grant application forms relating to the potential for patent applications or economic benefit of the proposed research are often not answered in a very enlightened way, as scientists themselves may be unable to make predictions in this respect at the time of the proposal.

It should not be forgotten nor be underestimated that major economic benefits have often arisen from discoveries initially made by curiosity-driven research. Management of research funds under the aspect of potential economic impact could be accommodated in a special section of managed programmes but does not meet with the main motivation of good to excellent research. On the other hand, there are very successful researchers/entrepreneurs with a positive impact of research results on economic benefit which may be ploughed back into further research. The Reith Lectures 2005 of Lord Alec Broers, President of the Royal Academy of Engineering and Chairman of the House of Lords Committee on Science and Technology [Broers, A. (2005). *The Triumph of Technology: The BBC Reith Lectures 2005*. Cambridge: Cambridge University Press; ISBN 0-52167-965-6] are a vivid testament to this. Other examples for productive research/economic benefit links can be found in the recent report *Globalization, Biosecurity and the Future of the Life Sciences* [The Committee on Advances in Technology and the Prevention of Their Application to Next Generation Biowarfare Threats (2006). *Globalization, Biosecurity and the Future of the Life Sciences*. Washington, DC: National Academies Press; ISBN 0-30910-032-1].

In support of this aspect of research impact the research councils have established the RCUK Knowledge Transfer and Economic Impact Group (KTEIG) (RCUK Report, page 46). However, whilst research programmes of economic impact can be constructed and managed (RCUK Report, page 52, paragraph 4), they do not necessarily cater for essential aspects of basic research, which is less interest- or impact-bound and mainly driven by scientific curiosity and the exploration of hypotheses emanating from established research data. A fine balance between basic research and research linked with economic impact has to be struck. Providing reviewers with review papers or presentations from people with experience in knowledge transfer may help to raise awareness of this aspect of research.

General questions (Consultation Action paper, pp 5: Question 13)

13. If the four options (i.e. consolidation; institutional quotas; controlling resubmissions; greater use of outlines) were to be implemented in the manner you have suggested, which would you recommend?

The general introduction of the usage of outlines, provided there are appropriate staff /panels organised for their evaluation, would benefit the system on both sides, very likely produce savings equivalents and therefore be first choice. On consolidation issues a very flexible approach is recommended. Resubmissions by invitation only could be considered but the issue is better dealt with by an outline proposal system. Institutional level quotas are not considered attractive.

Under the 'consolidation' heading SGM sees benefit coming from a more standardized, weighted and appropriately scored review system that would increase transparency among reviewers on panels and for applicants¹. In this context the strategic and operational considerations of Section 8.6.2 (RCUK Report, pp 58-59) are thought to be very important. A good information and communication system between research councils and applicants (mainly from university departments) is highly desirable. At the operational level the identification of 'best practice in the process of managing research applications' could be at various levels. The above mentioned structured, standardized and transparently scored approach to reviews of grant applications would help applicants, reviewers and the decision making committees alike.

General questions (Consultation Action paper, pp 5: Question 14)

14. The Project Board considered that selective disincentives (pp 61 -62) for individuals, or indeed organisations, with particularly low success rates may offer a way to improve efficiency but considered that charging for proposals (pp 63-64) would not produce material savings. We would welcome your views on these conclusions and your input on the types of disincentives (including charging) that you thought would be effective and how they could be best applied.

The option of individual-level quotas (RCUK Report, pages 60-61) is rightly not pursued.

¹A well defined structuring for review of a grant application in conjunction with a carefully considered scale of scores are considered covering the components:

- Significance of the proposal
- Approach
- Innovation and originality
- Standing of the applicant
- Scientific environment
- Wider impact of the research
- Budget
- Overall evaluation

Regarding possible sanctions at individual level, based on lack of success with one grant application per year, it is noted “that the success rate for applicants who have previously submitted one (previous) unsuccessful application was not significantly below the average success rate (RCUK Report, page 62, paragraph 1). The Project Board rightly rejected this option. The option of cash incentives for reducing the number of grant applications (RCUK Report, page 63, paragraph 3) seems to be odd and to contradict the impetus of a healthy research base. The option was rightly rejected. Equally, charging for the processing of proposals (RCUK Report, pages 63-64) seems to be counterproductive as it would charge people/institutions devoted to doing research, for what they are paid to do! The further negative consequences are rightly outlined in the RCUK Report (page 64, paragraph 3). This is an option not to be touched.

General questions (Consultation Action paper, pp 5: Question 15)

15. Are there any options not mentioned in the report that you consider would enhance the efficiency and effectiveness of the Research Councils’ peer review processes? If there are, please provide details.

Some proposals for improvements at the operational level have been made in the reply to question 13.

General Comments

Cash equivalent savings

The Report makes it clear that the project was not aimed at making real savings, but to explore possibilities for so-called ‘cash equivalent savings’ on the peer review system that could be used more productively for original research. SGM wishes to point out that the review of data/methods/hypotheses/proposals are an integral and essential part of the scientific process on which its quality critically depends. It is counterproductive to force ‘savings’ onto a comprehensive peer review system of research funding that enjoys the confidence of the vast majority of individuals/groups/panels/institutions involved. Enforced ‘savings’ on an essential part of the scientific process will backfire.

Success rate of grant funding

The Project Board’s view that a success rate below 50 and above 20% represents an acceptable balance (RCUK Report, page 4, bottom) causes uneasiness at a time when the average success rate is approaching the lower limit – the real success rate in particular areas of research is already at 20% or even lower – and when future decreases are forecast. With regard to the review system a point is approached when “peer review finds it more difficult to select the best research projects (as fine judgements are needed to distinguish between uniformly high quality proposals), and ... consistency of decision making falls to an unacceptable level” (RCUK Report, page 51, paragraph 2). This is highly unsatisfactory for everybody and raises other, more general considerations outlined in the following paragraph.

The cause of falling success rates

In the light of falling success rates it is stated: “The Project Board concludes that action should now be considered to avoid further deterioration in success rates and system efficiency” (Report, page 5, top). The underlying facts for research funding by RCUK during the period 1988/89 – 2005/06 are (Report, pages 47 – 48):

	1988/89	2005/06
Cash value of research funded in £M	665.20	2456
indexed to 2005/06 prices in £M	1162.57	2456
% of 1988/89 value	100	211
Number of proposals	6402	14800
% of 1988/89 value	100	231

During this period the activity of the peer review system has substantially increased. The figures also allow the conclusion (although no detailed data are provided) that the average costs per funded grant have substantially increased, even when expressed in values indexed to 2005/06 prices. Thus, it appears that the falling success rate is driven mainly by increasing costs of research, which are mostly out of control of the peer review system.

Therefore, the approach to consider major changes to the peer review system (which is accepted as an integral part of the scientific procedure) in order to increase the success rate appears to be doubtful. The peer review system should be considered as an essential tool that can be improved, but not as the cause of a falling success rate.

The ‘high risk’ project and ‘high risk’ research

Several sections of the RCUK Report mention the danger that under tight funding conditions projects of ‘high risk’ and ‘high risk’ research in general are not favoured, but rather avoided (the key words are: risk aversion, conservatism, lack of effectiveness in assessing unorthodox ideas, less effort on assessing interdisciplinary research proposals, proposals by early research career staff potentially disadvantaged by the lack of a track record, etc). RCUK have clearly recognized the danger and have established schemes and mechanisms aimed at avoiding this trend. However, risk aversion is still engrained in the system (RCUK Report, page 17, paragraph 2). As mentioned above, many major developments in basic research and also research with economic impact have emanated from unorthodox ‘high risk’ research, and such work should be regarded as a vital element of the UK research base and be given every support possible.

Sources

This evidence has been prepared on behalf of SGM by Dr Ulrich Desselberger, SGM General Secretary, and Professor Niall Logan, Glasgow Caledonian University.

About the SGM

The Society for General Microbiology, founded in 1945, is an independent professional scientific body dedicated to promoting the 'art and science' of microbiology. It has now established itself as one of the two major societies in the world in its field, with some 5,500 members in the UK and abroad.

Society membership is largely from universities, research institutions, health and veterinary services, government bodies and industry. The Society has a strong international following, with 25% of membership coming from outside the UK from some 60 countries.

The Society is a 'broad church'; its members are active in a wide range of aspects of microbiology, including medical and veterinary fields, environmental, agricultural and plant microbiology, food, water and industrial microbiology. Many members have specialized expertise in fields allied to microbiology, including biochemistry, molecular biology and genetics. The Society's membership includes distinguished, internationally-recognised experts in almost all fields of microbiology.

Among its activities the Society publishes four high quality, widely-read research journals (*Microbiology*, *Journal of Medical Microbiology*, *Journal of General Virology* and *International Journal of Systematic and Evolutionary Microbiology*). It also publishes a highly respected quarterly magazine, *Microbiology Today*, of considerable general educational value. Each year the Society holds two major scientific meetings attended by up to 1500 microbiologists and covering a wide range of aspects of microbiology and virology research.

The governing Council of the SGM has a strong commitment to improving awareness of the critically important role of microbiology in many aspects of human health, wealth and welfare. It has in this connection recently initiated a 'Microbiology Awareness Campaign' aimed at providing information to the government, decision makers, education authorities, media and the public of the major contribution of microbiology to society.

An issue of major concern to the Society is the national shortage of experienced microbiologists, particularly in the field of clinical microbiology and in industry. To attempt to improve this situation long-term, the Society runs an active educational programme focused on encouraging the teaching of microbiology in university and college courses and in the school curriculum, including primary schools. Some 400 schools are corporate members of SGM.

Society for General Microbiology
Marlborough House
Basingstoke Road
Spencers Wood
Reading RG7 1AG, UK

Telephone: 0118 988 1812
Fax: 0118 988 5656
Web: www.sgm.ac.uk

Contact: Dr R S S Fraser, Executive Secretary (e-mail: r.fraser@sgm.ac.uk)