

Record of Meeting held on 3rd February 2012 at One Kemble Street between EPSRC and nominated representatives from the mathematics community

The purpose of this note is to provide a summary of the key issues and points raised. The note does not set out to be a full transcript of the discussion or to make particular attributions of the points made. The note also does not set out to record the temporal order in which points were made but rather has sought to group them under the headings to which they seemed to best relate.

Present:

Professor Sir John Ball, University of Oxford

Professor Patrick Dorey, Durham University

Professor Michael Duff, Imperial College

Mr Attila Emecz, EPSRC Director Communications, Information and Strategy

Dr Philippa Hemmings, EPSRC Mathematics Theme Leader

Professor Robert MacKay, University of Warwick

Apologies:

Professor Peter Green, University of Bristol

Professor Burt Totaro, University of Cambridge

General Points

1. EPSRC described the background to the meeting and the input it hoped to receive as a result of the consultation with the representatives nominated by the Council for Mathematical Sciences and the Institute of Physics. This information would be provided as input to the Mathematics Scientific Advisory Team before shaping decisions in the mathematical sciences area were made, with decisions due to be announced at the end of March.
2. In discussion it was agreed that the most appropriate use of time was for this particular session was for representatives to gather information that could be then used to inform the input the representatives then individually provided to EPSRC.
3. It was agreed that, unless specifically mentioned as being in confidence, the discussion would be on the record. The note would be sent to all six Learned Society nominees, the Council for Mathematical Sciences and the Institute of Physics. EPSRC did not intend publish on its web site.

The Shaping Capability Strategy

4. The community representatives were interested in understanding what EPSRC was trying to achieve with the shaping capability strategy and why that strategy was deemed necessary.
5. EPSRC explained that the two core objectives behind all its strategies (of which shaping was only one) were:
 - a. To maintain, if not improve, the international standing of the UK research base. In this respect, EPSRC saw its responsibilities as being for long term research.

- b. To ensure that the research funded has its potential impact maximised. EPSRC saw that the first (but by no means only) step in achieving impact was funding excellent research.

Shaping had been devised as a strategy principally as a result of the increasing global competition in research with a number of countries, of which India and China were just the two most obvious examples, investing significantly and with plans to increase that further. EPSRC believed that as a consequence different strategies were necessary to ensure the UK could maintain its international standing. Most obviously, it was important to ensure that, where the UK chose to invest in research, it had the critical mass in infrastructure or aggregations of skills to compete with the best worldwide. It was agreed that the definition of critical mass varied across disciplines and even within disciplines. In pure mathematics, it was suggested by the community representatives that critical mass might be one person.

6. Another driver, although a subsidiary one, was the fact that EPSRC was now under greater resource pressure than it had ever been since its formation; indeed it was facing real terms budget decreases. This served to sharpen the need for shaping and was an important reason behind the timing of the introduction of the strategy. EPSRC faces budget decreases now.
7. In many ways, EPSRC saw the shaping strategy as being evolutions of previous strategies (such as the use of special initiatives) for prioritisation. In the past, with increasing budgets, it had been possible to grow some research areas while maintaining investment in other areas. That strategy was no longer possible and any increase in one area could now only occur at the expense of another area. EPSRC values transparency and because of that believed it important to signal to the research community the areas of both higher priority and the areas of lower priority.
8. The discussion then considered why this approach was needed given EPSRC's public commitment to the primacy of excellence. Why could excellence itself not just be used as a method for achieving what EPSRC want? EPSRC explained that other approaches had been used – for example the simple signposting of priority areas but this had not delivered the outcomes that had been expected to a sufficient extent. Furthermore, an approach based on an evolution of the portfolio just on excellence was unlikely to achieve outcomes needed in the timescales EPSRC have available (given the pressures being faced).
9. There were questions around whether EPSRC could provide any evidence that its strategies, taking account of impact, would be effective. EPSRC stated that the evidence for the appropriateness of the strategy comes from the collective input, discussion and decisions of EPSRC Council and the Council's advisory bodies. The individuals on these bodies all have significant experience and have been appointed for their ability to take strategic judgements.
10. An area still to be resolved was how these initial shaping decisions would be reviewed and the strategy evolved as the portfolio itself evolves. EPSRC would be interested in exploring this aspect to identify the most effective way for this to happen and which could improve confidence.
11. While dividing mathematics into a dozen or so areas is a reasonable thing to do when managing a portfolio, it was pointed out by the community representatives that the current division has various deficiencies. The large AGTN area needs sub dividing, and a notable omission was an area for mathematics in the life sciences. It was crucial to ensure that all mathematics could be rationally assigned to one or more of the areas.

12. It was suggested by the community representatives that the interconnection of the different subject areas in mathematics (as represented by the taxonomy areas) made the proposal to identify which would increase, decrease or stay the same meaningless. The community representatives argued that this level of granularity is too fine and many grant proposals did not fit neatly into one of the areas. An additional worry was how this would affect the total funding for mathematics, which was not made clear. Indeed after the abolition of TOP and UP the whole process of allocating budgets for different areas is unclear. Nevertheless, the community representatives recognised that it is important for EPSRC to understand what is happening in different parts of mathematics, e.g. so that appropriate initiatives can be considered.

Governance Issues and Relationship with Council

13. The meeting discussed who had been responsible for originating and deciding the shaping capability strategy and the relationship between the EPSRC executive and the Council. EPSRC confirmed that it was Council itself that had originated the strategy and that had provided the mandate and principles for its introduction. Council operated at a strategic level and the executive had taken this endorsement and had created options that were consistent with this mandate and the principles. Implementation decisions were often not agreed explicitly by Council but Council did explicitly endorse the overall approach.
14. EPSRC emphasised that Council members were appointed directly by Secretary of State and collectively had governance oversight. It is Council that has the final decision as to how EPSRC operates. The only member of the executive that was a formal Council member was the chief executive. The executive were servants of Council and empowered to take decisions only so far as Council agreed. The levels of empowerment could change and have changed over time depending, for example, on Council's perceived risk of an issue.
15. The issue of who decides what constitutes impact and how it is then applied was discussed. EPSRC explained that impact is broadly defined and that while economic impact was important its view of impact was much broader. Social impacts were important as was, for example, alignment with identified grand challenges.
16. EPSRC explained that the relationship between EPSRC and government involved an iterative process where influence extends in both directions. EPSRC, and indeed others such as the learned societies, provide input into government thinking but the iterative process culminates in government developing its own strategy. Once government has its priorities, elements of it will then be included in EPSRC's "allocation letter" describing the broad objectives government wish EPSRC to achieve with the funds it provides.
17. At another level, impact was discussed by Council and its advisory bodies as it sought to make decisions on relative programme or theme priorities e.g. how much to invest in energy. These decisions are described in the published Delivery Plan. The focus of shaping is to look within programmes or themes. It was noted that Impact could also apply at the project level. Although this aspect was noted at the meeting it was not discussed any further as other issues took priority.

Trust and Confidence in the Community

18. In the context of shaping, a series of questions were raised concerning: how EPSRC takes its implementation decisions, the credibility of that process and the wider relationship with the

research community. It was recognised that there were many models possible beyond those currently used by EPSRC e.g. NSF expert programme managers or formalised long standing committees.

19. The community representatives suggested that one of the root causes of the unfortunate breakdown of trust between mathematicians, other researchers, and EPSRC lay in the distancing of EPSRC from the research community that had been initiated by decisions of the first EPSRC Council, which had abolished the subject committees, decided to have non-expert programme managers and to use ad hoc panels with no continuity of members (who are not allowed to use their own expertise to evaluate proposals, only interpret the opinions of referees), and replaced the selection of referees by subject experts with the College and office selection. Concerns had been expressed about the operation of the Standing Subject Committees, though in mathematics the subject committee was respected and behaved with integrity. The representatives stated that the result of these policies has been that there is little in-house scientific expertise, and no adequate replacement in terms of ongoing advice from the community. They believed that this is particularly unfortunate in mathematics, where even experts have difficulties in understanding other branches of the subject, this being almost impossible for non-mathematicians, so that in particular it is difficult to understand advice that is sought. Now that EPSRC wishes to be more dirigiste as regards support for science this absence of expertise/ongoing advice had led to office decisions, such as that over postdoctoral fellowships, which had immediately been seen to be flawed by researchers, badly eroding confidence.
20. EPSRC stated that it had moved away from the previous system of standing committees as Council wanted individual EPSRC managers to be clearly accountable for decisions. This, and the use of generalist programme managers, had been reviewed and reaffirmed by Council on a number of occasions over the years. EPSRC was committed to engagement with the research community and this engagement happened in many different ways. A key approach in ensuring relevant expertise was available was the use of Strategic Advisory Teams (SATs).
21. The general way in which shaping decisions were dealt with in EPSRC was as follows: input and advice was received from a variety of sources, these were synthesised by the executive and a straw man set of conclusions reached. These were then tested with stakeholders and in particular with the SAT.
22. In discussion it was noted that EPSRC could take steps to improve the way SATs were used. The following suggestions were made by the community representatives :
 - a. Introduce ways to legitimise the appointments as this would help SAT members themselves and build confidence in the community.
 - b. Provide routes and mechanisms so that the SAT members can be sure they understand broader community issues and furthermore can also advocate for EPSRC once decisions were made.
 - c. Improve the connectivity between the theme leader and the SAT so the SAT could help in operational decisions and hence help avoid unintended consequences. This could be done through having a subcommittee with regular contact with the theme leader, and a chair who could be a point of contact with the research community.
 - d. Improve the transparency of the SAT discussions with the community.
23. It was noted by EPSRC that under EPSRC governance the SAT was advisory and did not itself take decisions. The SAT also existed within the context of policies and decisions. Often the SAT

may find that the advice it would like to see could not be enacted because of other decisions already taken. One way of handling such a context was as follows:

- a. Allow the SAT or others who are advising EPSRC to provide their ideas as to what the “ideal” would look like so that this could be fed back into the policy development process.
- b. Elicit additional information from these advisors that is consistent with the existing framework and policy context (even where the advisors believe that framework may be perceived to be flawed).

Fellowships

24. The decision process and rationale for restricting postdoctoral fellows were discussed. This linked into the strategy of developing leaders as well as shaping capability. A decision had been taken by EPSRC that resulted in the focusing of fellowship resources on the areas it had identified as priorities.
25. It was noted that one option, which had not been taken but which may have been preferable, would have been to have only introduced this [for mathematics] once all shaping decisions had been taken. It was suggested by the community representatives that a significant broadening of the areas open for fellowship support, as already done in the Physical Sciences theme, would be a positive way forward.
26. The representatives noted that this specific issue was extremely important to the wider mathematics community and the changes had resulted in a severe breakdown of trust with EPSRC, as the fellowships programme as previously constituted had been extremely popular. There had also not been full consultation with SAT.

Mathematical Physics

27. The community representatives explained that there was also a trust breakdown with the mathematical physicists many of whom believed that EPSRC was stopping support for that area and had changed its policies without being transparent.
28. EPSRC reaffirmed its position that it had not changed its policies but had sought to clarify the division of responsibilities with STFC and communicate this more clearly. EPSRC recognised that it may have inadvertently caused more confusion. This was unfortunate and EPSRC apologised for that. In particular, mathematical physics had been restored as a separate research area within the mathematics theme. In response to a range of questions, EPSRC made the following points:
 - a. The EPSRC mathematical programme was still responsible, as it had been, for the development of new mathematics for theoretical physics.
 - b. EPSRC worked closely with STFC colleagues at a number of levels and had agreed a statement regarding mathematical physics. Portfolio managers in the two Councils also discussed proposals on a case by case basis.
 - c. No research proposal would ever be considered as out of remit by all UK research Councils. All research proposals have a home in terms of their remit. There are no “cracks for a proposal to fall through”.
 - d. Research Councils often joint funded research proposals. However, Research Councils no longer allowed the same proposal to be independently considered by

separate Research Councils. A proposal cannot have “two bites of the cherry”. As a principle this had always been true but had it had perhaps not been applied systematically.

- e. EPSRC did not think having a rigid definition for mathematical physics (or any research area) would be helpful as research is so dynamic that such definitions would soon get in the way of ensuring the best work is done. The best way is for researchers to discuss proposals in advance with relevant EPSRC (or other Research Council) staff.

29. In response to the above, community representatives could not understand:

- a. How a change by EPSRC in the definition of Mathematical Physics from “Theoretical Physics with a significant mathematical content” to “new mathematics for theoretical physics” was compatible with no change in policy, especially since proposals submitted under the old wording of the remit are being rejected without peer review because they do not meet the new one.
- b. How working “closely with STFC” was compatible with the admission that no meetings between EPSRC and STFC on the subject of remits had taken place since their joint announcement of July 2011.
- c. How no “cracks for a proposal to fall through” was compatible with the above-mentioned office-rejection of postdoc applications in Mathematical Physics when STFC had no equivalent postdoc scheme.
- d. Why, in its Action Plan in response to The International Review of Mathematical Sciences, EPSRC ignored all the panel’s recommendations pertaining to Mathematical Physics, including those on the EPSRC/STFC interface.
- e. How the shifting definitions: “Theoretical Physics with a significant mathematical content” to “as it had been (sic), for the development of new mathematics for theoretical physics” to no “rigid definition”, and the removal from the EPSRC webpage of the subject areas “classical and quantum field theory, gauge theory, theory of gravity and string theory, general relativity” could be construed as anything other than EPSRC stopping support for these areas by a non-transparent change of policy.

Taxonomy of Research Areas

- 30. Many in the mathematics community had questioned the appropriateness of the taxonomy that EPSRC had developed to describe its portfolio. The representatives suggested that EPSRC should use the AMS Mathematical Sciences Classification, as that in use internationally. Advantages would be that (i) each current area in the taxonomy could be populated with primary classification numbers, ensuring that all subjects were covered, (ii) it would provide EPSRC with an immediate way to compare its levels of activity in different areas with that internationally, (iii) secondary classification numbers would give information about links between areas, (iv) proposers (even retrospectively) and potential referees could be asked for primary and secondary classification numbers which could then be used to allocate grants to areas and aid in the selection of referees, (v) grants could easily be reassigned in any future reorganization of areas using their classification numbers.

31. It was noted that Complexity Science would not be covered by the AMS MSC, but as it is a cross-programme area for EPSRC, rather than purely Mathematical Sciences, it would make sense to treat it separately.
32. EPSRC explained that it had developed its own taxonomy reflecting the research that was in its portfolio (which may only be a subset of research in mathematical sciences) and to provide manageable units. Too few or too many areas would not be sensible. EPSRC recognised that its taxonomy had limitations but believed that was the case with all taxonomies. However, as a result of the feedback it had received, EPSRC would be making changes as follows:
 - a. It would be subdividing pure mathematics into three areas,
 - b. It would supplement the research area dimension with other cross-cutting dimensions e.g. mathematical biology to enable a more subtle understanding of the portfolio to be developed.
33. It was noted that EPSRC staff classified proposals against the taxonomy. Given the importance now relating to portfolio decisions, there was a feeling that EPSRC should seek greater assurance regarding the appropriateness and robustness of the classification attributions it makes.

Peer Review

34. Community representatives noted that EPSRC had not yet communicated about how shaping would work in peer review and that this uncertainty was itself causing some concern. Furthermore, it was not clear how EPSRC could deliver shaping while also maintaining its commitment to excellence. EPSRC were asked for an update on this specific aspect.
35. EPSRC agreed that ideally it would have been desirable to have been able to have alerted the community to how peer review would work. However, the timing was such that the work to define portfolio shaping outcomes had to be undertaken in parallel with the peer review work. The intention was though for peer review changes to be announced in March which was when the final tranche of shaping would also be announced (including those for mathematical sciences).
36. EPSRC explained that the importance of and sensitivities around shaping and peer review were such that Council itself would agree the changes and that the intention was for this to happen at the meeting on 7th March.
37. The process used was/is as follows:
 - a. A group of advisors drawn from the SATs, Council itself, Council's strategic advisory network and experienced peer reviewers met to identify an option set for consideration. The options were required to: i) maintain commitment to excellence ii) allow shaping to happen and iii) be consistent with EPSRC's published principles of peer review e.g. process is clear from the start, right to reply to reviewers comments. The group met in December and 4 Options identified.
 - b. The options were tested in four panels (one panel for each option) all using applications that had been recently submitted and reviewed and drawn from across the EPSRC remit. Members of the pilot panels were all experienced peer reviewers.
 - c. The four options will be presented to a sub-group of Council who will then consider what changes were necessary before making recommendations to Council. The experiences of the pilot panel work would be an important input.
 - d. Council will make the final decision on 7th March.

38. To illustrate the points, EPSRC outlined the core features of two of the options considered by the pilot panels. As none of the options had been discussed or agreed, they are not described in this document.
39. As they had mentioned earlier in the meeting, the representatives emphasised the need for peer review panels to be able to challenge the EPSRC view as to the classification of a research proposal.
40. The issue of how to calibrate referee reports and panel members' ratings across the wide range of subjects in the Mathematical Sciences was raised.