

SCOTTISH EXECUTIVE CONSULTATION ON A SCIENCE AND INNOVATION STRATEGY FOR SCOTLAND

EVIDENCE SUBMITTED BY THE SOCIETY FOR GENERAL MICROBIOLOGY (SGM)

Introduction

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.

General Comments

The share of UK Research council funding coming to Scotland ranged from 10.7 – 12.2% between 1998 and 2004. However, expenditure on science appears to be levelling out in 2004 – 2006 or even decreasing. Furthermore Scotland's gross expenditure in R&D is only 75% of the UK average. If Scotland is to continue to aspire to be a 'science nation' this needs to be improved.

Commendable progress has been made in Scotland since the first strategy was launched in 2001 and in some areas this has been positively exciting. Examples in clinical research include new research collaborations which are beginning to bring rewards in terms of opportunities and funding, if not yet in outcomes and support for the provision of new clinical research facilities, building on the success of the Wellcome Trust Millennium Clinical research Facility in Edinburgh; and more widely, increased public awareness as shown by the growing range of 'Science Festival' type initiatives and the appointment of a lead Chief Scientific Advisor, Professor Anne Glover.

The reasons given for updating the strategy are all valid. Too much emphasis has indeed been placed on Life sciences and Biomedical investments because these were already recognised as Scottish strengths, but from school pupils onwards, other areas of science continue to need development and investment. The use of the term 'framework' rather than 'strategy' by the stakeholder group (consultation paper page 2, clause 9) may allow wider input and ownership.

The basic premise behind the strategy document is laudable, but to work, there will be a need for better education in science/technology, finance for research, and the support of industry. School children need to be shown the benefits of science and technology (science can be fun!) to encourage continued study at universities/colleges. If the British science base is eroded then there will be serious consequences for the future. Also, it is worrying that British industry seems slower to develop (British) research results into new products than their overseas counterparts. These issues must be addressed or such strategies are doomed to failure.

Specific Consultation Questions

Theme 1: Maintaining & developing the excellence of the science research base, Question 1

In general, the long term aspirations of the strategy are agreed with. If Scotland truly aspires to be a technology-led country then Theme 1 is of paramount importance. However, this will require funding. Replacing 'develop strategic investment' (page 10, point 4) with 'increase strategic investment' would be supported. According to the Progress Report investment decreased in 2005-2006 compared with 2002-2005 (page 15, Chart B).

Theme 1, Question 2

More pooling initiatives and discipline-hopping collaborations should be encouraged and supported. Research pooling has worked in some disciplines, such as physics; however for some subjects, e.g. marine biotechnology, there is limited expertise across Scotland, and there is an inherent danger that some organisations might invent "expertise" in order to qualify for funding. To work, there has to be a desire to co-operate, which is not always apparent. Internal competitiveness should be contained under the generic banner of 'University Scotland', which in healthcare should be matched by NHS Scotland.

The value of the policy of Full Economic Costing (point 2) as it currently stands is not convincing. It may give support to Universities for certain funding opportunities but could have a detrimental effect on the research community overall e.g. Chief Scientist Office (CSO) response mode funding will not go so far because of the large amounts payable through FEC; where FEC is not available there are already more attempts to off load research costs to other partners, such as laboratory tests and imaging requests in clinical research. To work fairly, Full Economic Costing has to be applied across the sector, and there is some indication that organisations may try to pitch the total costs below the true economic costs in order to have a competitive advantage when tendering for research contracts.

Number four of the short to medium term action points is also agreed with; the Scottish science research base needs to be fully connected to the UK funders, but it is necessary for such funders to be fully committed to Scotland.

Theme 1, Question 3

The biggest single problem is lack of resources.

Theme 2: Enhancing international connections and capturing overseas investment, Question 1

The long term aspirations of this theme are, in general, agreed with. However, we must be careful not to 'sell ourselves' too easily, e.g. from taking on too many postgraduates from countries such as China where language problems can sometimes mean additional investment is required locally for productive benefit.

Theme 2, Question 2

Scotland is a small country but with a strong heritage of learning. There is a need to capitalise the knowledge-base with strong partnerships overseas, but will the funding (for these partnership) follow? There has been a move to develop a North Atlantic consortium for Marine Biotechnology (to include Scotland, Ireland, Norway, Canada and France). However, the idea was not developed because of a lack of finance. Scotland will attract and retain top researchers as long as the infrastructure and sources of funding exist. Scotland could also improve retention of the best for longer periods under a variation of the Fresh Talent scheme.

Theme 3: Intensifying knowledge exchange between academia and business, Question 1

This theme is laudable, but industry needs to make decisions in a timely manner and this is a perceived weakness in certain areas of British industry. Academics need to be convinced of the benefits of commercialising research. In addition, new ways are required to encourage people to share ideas, e.g. from practice rather than expecting them all from research. This is particularly true for innovations that might come from NHS staff. The setting up of Scottish Health Improvements Ltd is an important first step and has achieved a lot since its initial funding from the Department for Trade and Industry, Scottish Executive and CSO but too few people have the confidence that their idea is worth pursuing. This may be part of the Scottish psyche, but needs to be addressed.

In terms of knowledge exchange, more thought is required into what is meant by the 'business community'. For example, Knowledge Transfer Partnerships between academia and the NHS are constrained because of the need for 'cash' transfer into the academic sector from the business partner, while there may be other resources that could be exchanged.

Academics are generally good at research and not commercialisation, with lack of time and knowledge cited as the typical reasons for not being involved.

Theme 4: Expanding business innovation, Question 1

The long term aspirations of this theme should go further. Business investment in R&D to match Scotland's competitors is essential, but requires expertise at a time when many areas of industry seem to be cutting back for financial reasons.

Rather than simply 'encouraging the acceptance of a climate that encourages business investment' (point 2), Scotland should positively support institutions which encourage business investment. Tax advantages could be provided for SMEs that have innovation development as a key performance indicator.

Theme 4, Question 2

The short to medium term action points might be difficult to achieve, insofar as they will require a dramatic change in attitude by industry.

Theme 5: Modernising science education and promoting science careers, Question 1

All of the points in the long term aspirations are extremely important. It is nevertheless disappointing to find that this area has shown little progress since 2001. This theme needs to start with better training for (science) specialist teachers in secondary schools. This is the stage that will encourage or dissuade school pupils to pursue careers in science.

Theme 5, Question 2

All of the short to medium term actions points are also important. However, without a major change of attitude, these may not be achieved. Updating knowledge and continuing professional development should be an annual requirement for science (indeed all) teachers just as it is for other professional groups (not simply 'support the programme of teacher CPD ...', point 3). Scotland should lead the way here by being more prescriptive in the returns required associated with the McCrone settlement. There could be positive support for initiatives that bring HEI and FE science educators into schools and vice versa bring school pupils into science based environments. The old idea of Science Societies in secondary schools should be revamped so that membership is seen as cool and exciting by pupils.

Theme 5, Question 3

One of the major issues is to persuade competent, innovative scientists to go into teaching rather than research. There is undoubtedly an issue of finance after the debt incurred during undergraduate years. There is the related issue encouraging talented scientists to enter academia rather than to seek higher financial rewards in industry. Talent needs to be rewarded not only with competitive salaries, but also with research funding.

Theme 6: Increasing public engagement with science, Question 1

Little issue could be taken with the aspirations listed. It is hoped that by encouraging not just dialogue, but interactive involvement between the public and scientists (e.g. as in the Edinburgh Science Festival), some of the inquisitiveness and inspiration which produced brilliant Scottish scientists in the past may be transferred to others. Scotland should not rely on bringing in expertise to support its concept of a 'science nation', but rather it is essential that the country 'grows its own' and instils a sense of pride in the level of scientific knowledge across communities.

Also, scientists need to be prepared to talk to the media – this is a tricky and, at times, daunting prospect for most scientists. Training in public speaking/giving interviews is needed.

Theme 7: Developing better use of science by Government, Question 1

This is an interesting prospect, but Government needs to convince the public that it is serious in making use of science.

In addition, it is currently difficult for devolved assemblies to maintain a balance between their distinct identities and own policies, while strengthening and co-ordinating structures to manage science and innovation across the UK. An example of this would be the Department of Health's linkage of NHS R&D funding with Medical Research Council funding. The consultation undertaken for the Cooksey Review was very wide and Scottish interests were recognised, but there were serious concerns that Scotland, which attracts more than its share of MRC funding, could lose out because health matters are devolved. The role of the Chief Scientific Adviser is absolutely crucial in developing the science strategy both within Scotland and across the UK.

Sources

This evidence has been prepared on behalf of SGM by Professor Brian Austin, Heriot-Watt University and Professor Heather Cubie, Royal Infirmary of Edinburgh.

About the SGM

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.

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Appendix A: Consultation questions

In relation to each theme:

1. Do you agree with the long term aspirations listed at the end of each theme?
2. Do you agree with the short to medium term action points listed at the end of each theme?
3. What do you consider are the two or three most important or pressing science and innovation policy issues under this theme that need to be addressed, and how should the Executive address them?
4. How should activity under this theme be developed to have most impact on supporting environmental sustainability?
5. How should activity under this theme be developed to have most impact on improving the quality of life of the people of Scotland?
6. How should activity under this theme be developed to have most impact on encouraging innovation?
7. How should activity under this theme be developed to have most impact on improving connections and synergies between the science research base in Scotland and other sectors, both within Scotland at a UK level and internationally?
8. Which developments or investments under this theme could generate the best return for the people of Scotland, and why?
9. Which major areas of achievement or excellence under this theme should be promoted by the Executive and its partner organisations?
10. Which performance measures under this theme should be introduced to track Scotland's progress as a "science nation"? What would be appropriate targets?

General issues

11. Do you consider the themes identified are the most useful, or are there others which should be added? Are there any that should be dealt with in another way?
12. Please feel free to comment on any important aspect of science and innovation strategy that you think is not adequately covered by the themes and questions above.