



A balanced and outward-looking approach to Scottish science & innovation

Response to the Scottish Executive's consultation on the development of its science and innovation strategy for Scotland

1. Campaign for Science & Engineering is pleased to submit this response to the Executive's inquiry into the science policy in Scotland. CaSE is a voluntary organisation campaigning for the health of science and technology throughout UK society, and is supported by over 1,500 individual members, and some 70 institutional members, including universities, learned societies, venture capitalists, financiers, industrial companies and publishers. The views of the membership are represented by an elected Executive Committee.
2. We have found it unproductive to follow the consultation's structure of answering 10 broad and general questions about each of seven themes with necessarily vague aspirations (who, for example, is likely to disagree with the aspiration to 'maintain and develop excellence in the Scottish science and research base'?). Rather, we have focused on a small number of what seem to us to be the major points of discussion drawn from each section of the consultation.

Definition of science

3. The definition of science and innovation given on page 3 of the consultation document is valuable in being inclusive of any discipline, but is concerning because it could be interpreted as excluding fundamental research. This work may not immediately be seen to benefit the economy, and no single project will necessarily 'be likely to benefit the economy or society' in an obvious way. Nevertheless, having a strong base of fundamental research is important for a number of reasons. It helps to ensure a high reputation, likely to attract the best people. Moreover, although individual blue-skies projects have a relatively low chance of contributing to wealth creation in the short term, *all* knowledge-driven economic advances are ultimately rooted in fundamental research. Further, without a broad base of basic researchers, Scotland cannot hope to have the expertise to understand – and take advantage of - unpredictable breakthroughs made elsewhere in the world.

Theme 1: The research base

4. CaSE strongly welcomes the fact that maintaining and developing the excellence of Scotland's science base is the first major theme being considered in the consultation. Without a strong research base, a science strategy does not make sense.
5. However, we are concerned at the apparent playing down of the importance of basic, fundamental research. It is inevitable that a small nation like Scotland will need to take a sensible view of the extent to which it can be fully engaged in all areas of science. But the consultation barely mentions basic research, except to point out (in paragraph 2) that it must compete for funds with what is described as more 'targeted' funding. The

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rest of the section talks about specific subjects such as 'e-science', 'drug discovery' and 'nanotechnology'. No core disciplines, such as chemistry, biology, physics or fields of engineering, are mentioned, despite being crucial to the narrower areas of research that are listed. Scotland will not discover new drugs if it does not have any researchers who could reasonably be described as chemists or biologists.

6. CaSE supports the thrust of much of what is included in the aims of this section, such as developing the capacity rapidly to identify new areas of scientific opportunity and supporting the policy of full economic costing. But these things will be irrelevant if CaSE has rightly judged the tone of this section consultation to be almost exclusively about how science can deliver short term economic and social benefits and neglecting the seed corn from which the relevant discoveries might come.

Theme 2: Overseas investment

7. CaSE agrees that Scotland cannot be inward looking in its science. It must look globally for partners and to attract the best people. We worry slightly at the prescriptive list of countries with which links are to be built. Why is Germany the only European economy mentioned and why is India apparently ignored completely?

8. Promoting Scotland as a 'science nation' is manifestly a good idea, but the aspiration appears to be wholly about education and research links, which are valuable and not about making Scotland a genuinely attractive and competitive place for private sector investment in science and innovation. In part, this is no doubt because some important policy levers (especially fiscal policy) are not devolved to the Scottish Executive and Parliament – Scotland cannot repeat the success of Ireland's low rates of corporation tax. But headline tax rates are not the only thing that make a country attractive to investors, and Scotland should be promoting its strengths globally. To this end, we would have expected the consultation to mention Scotland's involvement with the renewed emphasis by UK Trade & Investment to promote the UK as a whole as a good place for science-based companies.

Theme 3: Knowledge exchange

9. Systems of innovation that work tend to be those that have strong individual elements and strong links between them, so the Executive is right to identify the exchange of knowledge between academia and business as a crucial part of its science and innovation strategy. We must not, however, be too impatient. A huge culture change has occurred in the universities in recent years, and the benefits of that change will take decades to percolate fully through the economy, so we should be wary of forcing more and faster change on institutions that are underfunded and overstretched.

10. Linking SMEs better with the science base is the right priority, and in doing so, policy must recognise that the most significant barrier to achieving this is *not* the failure of academics to take commercialisation seriously. It is the lack of available time on the part of both parties, *especially* the SMEs. A typical small company is run by a small number of people who are already working flat out and cannot readily find the time to engage in a process of discussion with universities unless there are likely to be clear and relatively immediate benefits.

Theme 4: Business innovation

11. Businesses carry out innovation where the conditions are right. All that politicians can do is to create a policy landscape likely to optimise conditions. Some of these are not within the gift of the Executive and Parliament in Scotland – most obviously the tax regime. Others are, and most obvious among these is the quality of people and research available with which to collaborate. All of the short-term action points in the consultation

are worthy, but they will not solve the problem if the education system is not generating the skilled people needed to perform the innovative work.

Theme 5: Science education

12. The key to this section – above all else – is the supply of good mathematics and science teachers, which the Executive has correctly identified as a long term aspiration. The difficulty is in defining the mechanisms by which it will be achieved. The single most effective thing the Executive could do in this area is to produce genuine evidence about how to grow the pool of good schoolteachers in science and mathematics. The problem is shared across the UK and other parts of the industrialised world, and the countries that solve it will see significant benefits.

Theme 6: Public engagement

13. Scotland's level of support for its Science Centres sets it apart from the rest of the UK, and these should continue to be a major plank of Government's efforts to promote dialogue between scientists and the non-specialist public; they should receive adequate funding guaranteed over sufficient time periods, to ensure that their role can be fulfilled properly. But Government should remember that in this field, as with encouraging inward investment, its role is to provide a positive policy environment, not to undertake the work itself. People are suspicious of politicians and attempts at 'informal science education' are as likely to be harmful as to be productive unless they are in the hands of scientists themselves and unless the people involved are *seen* as trustworthy by the audience.

Theme 7: Use of science by Government

14. The appointment of a Chief Scientific Adviser by the Executive was an extremely positive step, and CaSE hopes the Government will take full advantage of the opportunities afforded by the role. In particular, it will be important to ensure that she has clout across a range of areas, not just within a narrow focus. Most science policies tend to separate schools policy from universities policy, or to disconnect research and teaching within higher education. A real science strategy can only work effectively if these boundaries are ignored and the system looked at as a whole.

15. The consultation document appears to be somewhat inward-looking in this section. A key aspect of the use of any kind of knowledge in policy-making is to recognise that the requisite knowledge could come from anywhere in the world. Indeed, in a nation the size of Scotland, it is far more likely that the best information to help develop a policy will be have been researched elsewhere than that it will happen to have occurred in Scotland's research base, which represents about one tenth of one per cent of the global total. Many of the problems that occurred in the use of science in policy-making at UK-level in the past came about because of an arrogant failure to recognise the need to cast the net widely when seeking advice. The old Ministry of Agriculture Fisheries and Food tended to assume that its in-house scientists could cover any subject, rather than attempting to identify who was genuinely best-placed to offer advice. The Scottish Executive should not make similar mistakes by assuming, as the consultation gives the impression of doing, that Scotland will always have the relevant in-house expertise.

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