



Highlands & Islands ENTERPRISE

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Hazel Gibson
Office of the Chief Scientific Adviser
Scottish Executive
Room 1 N01
St Andrew's House
EDINBURGH
EH1 3DG

Dear Hazel,

SCIENCE AND INNOVATION STRATEGY CONSULTATION: HIGHLANDS AND ISLANDS ENTERPRISE RESPONSE

Thank you for the opportunity to respond to this consultation document on Science and Innovation. Our response is provided below.

Highlands and Islands Enterprise is the Scottish Executive's Agency responsible for economic and community development across the northern half of Scotland, a diverse geographical area which is home to more than 460,000 people. Established in 1991, the Network has played a major role in diversifying the area's economy by assisting locally based businesses and attracting new ventures, and helping people acquire work related skills. The HIE strategy, *A Smart Successful Highlands and Islands*, sets out our 20-year aspirations to grow the population to 500,000 years, to create 20,000 full-time equivalent jobs, to raise income levels by 10-15 percent in real terms, and to become part of the international shop window for *A Smart Successful Scotland*.

Science and technology offer a diverse and exciting range of opportunities, from medical research and health sciences, to high tech production and marine biotechnology, to nuclear decommissioning and renewable energy. HIE supports our existing and new enterprises in their use of STEM and knowledge to grow their businesses. Equally, the creation of the University of the Highlands and Islands as a world class teaching and research institution is regarded as a hugely important milestone and a key driver for the region's economy.

It is within this context that we provide our response to this important issue for Scotland. I have provided a summary of some of the main points below:

- The Scottish science research base should pursue not only excellence and knowledge transfer, but also relevance to the Scottish company base.



- The long term aspiration of a globally connected Scotland should be extended so that the benefits of Scotland being a Science Nation should extend to all geographical parts of the Nation, not just clusters around the major cities.
- Similarly, the Science and Innovation Strategy should explicitly include a goal to ensure that a fully functioning Scottish Innovation System covers the entire landmass of Scotland.
- HIE proposes the use of an “innovation adoption ladder” which targets interventions and awareness in a way which more easily engages or re-engages businesses in a wide spectrum of improvement – product, process, skills, marketing - as a useful first step and which can then move on to the stimulating of business R&D and innovation.
- Further initiatives like the director development programme run by the Institute of Directors are needed, along with mentoring of senior managers, encouraging a more outward-looking approach to the global market and facilitating more business transformation with advice and placements.
- HIE would wish to see the SETPOINT infrastructure strengthened and developed to deliver tailored, relevant outreach activity to rural communities which is high quality and recognises the needs of the local labour market and engages with local business.

If you have any questions or require any further information please contact Jeff Howarth on 01463 244535.

Your sincerely
S. J. C. S.

SCIENCE AND INNOVATION STRATEGY CONSULTATION: THE HIGHLANDS AND ISLANDS ENTERPRISE RESPONSE

General comments

HIE supports the main premise of this consultation, that the linking science and innovation in a single policy framework will be of lasting value, as is reflected in the shaping of themes for the science base and business. To be a "science nation" with a scientifically literate workforce and population, science engagement must not be seen as a stand alone activity separate from the world of business and academic research, but an area of activity for which all sectors of the wider science community should take some ownership. Although clearly developed in theme 3, this linkage has perhaps had a less obvious impact on the other themes, which should be considered in the development of the framework.

An additional point of particular importance to the Highlands and Islands but of great relevance for the whole of Scotland is that of the physical infrastructure to support the Science Nation. This could be considered as a specific addition to the scope of the strategy.

Theme 1: maintaining and developing the excellence of the science research base

HIE considers that this theme requires new approaches to obtain the best return for the people of Scotland.

With respect to excellence, HIE supports the short and long term aspirations of this theme. There are however further issues to be considered. A recent review of the Scottish Innovation System (SIS) emphasised not only the importance of knowledge exchange and connectivity, but also the mismatch between the research output of Scottish universities and potential users of knowledge in the Scottish company base, and the need for Scottish HEIs to be repositioned to more closely meet the needs of the Scottish economy. This is a supply side issue which should be considered under Theme 1.

HIE strongly supports the aims within Theme 1 related to the excellence, global competitiveness and UK-connectedness of the Scottish research base which are well founded. The type of activity currently funded by Main Quality Research Grant, SRDG and the Research Councils, if subjected to the processes of restructuring, strengthening and strategic re-focusing, will deliver value to Scotland.

Equally, continuing the trend towards increasing support for knowledge transfer from the research base will bring an increasing measure of economic impact.

The missing link however seems to be the absence of a direct behaviour-changing focus on the creation of the type of knowledge capable of being actually transferred within Scotland aligned with our sectoral opportunities, and in terms of accessibility and relevance to the Scottish company base – multinational or indigenous, SME or non-SME. The ITIs clearly operate in this space, creating a significant market-based mechanism with which the science research base can engage. This approach should be widened into the mainstream HEI funding processes, such that the three themes - excellence, knowledge transfer, and relevance to Scottish companies - should be equally represented in the science and innovation framework. In order to maximise the effect, the whole spectrum of HEI, from the research intensives to the new institutions, should be fully engaged.

The above issues are greatly exacerbated by rurality and peripherality, where The Highlands and Islands, and other rural areas are effectively excluded from dynamic interaction with the science research base. World-wide experience shows that the impact of HEIs drop off significantly beyond their immediate geographical catchments. Re-dressing this imbalance should also be included as a top level issue for the science research base - put simply, Scotland cannot afford to disenfranchise >10% of its company base from the nations knowledge assets.

HIE is investing significantly in co-operation with other stakeholders in the creation of sustainable academic research capacity in the Highlands, particularly in UHIMI and its partners. The goal is the creation of local science base with both niche excellence based on unique assets within the region, contributing fully to the Scottish and UK level, and also with research outputs directly targeting economic, cultural and social benefit to the region and to Scotland. This process will continue and expand over the coming decade, with reference to the necessary national bodies and stakeholders of science research base.

Theme 2: enhancing international connections and capturing overseas investment

HIE strongly supports the view that a globally connected Scotland will play an increasing role economic growth. We support the long term aspiration of this theme, and indeed would extend it, stressing that the benefits of Scotland being a Science Nation should extend to all geographical parts of the Nation, not just clusters around the major cities.

HIE in partnership with SDI is creating an Education Sector team partly based in the Highlands and Islands. The team will be responsible for working with the largely HE and FE to support co-ordinated international development. Their remit will extend to wider international development including supporting the establishment of collaborative links on course delivery and research, and the delivery of courses to overseas audiences. Other sector teams within SDI and HIE will continue to promote Scotland's research and development capabilities as a key asset for potential inward investors. HIE and SDI will also work with UHI to support them to develop a strategic approach to exploit the international opportunities.

Similarly Careers Scotland runs an internationally renowned competition called Space School. Over 150 young people go to Space School in Strathclyde University each year to take part in STEM activities organised and managed by people involved in the various space programmes across the globe. 30 winners each year go to NASA to meet with US Astronauts and work with people on involved in the space programme.

Our connections and involvement with European, particularly Scandinavian groups involved in innovation, will continue with specific aim of linking the business community of the Highlands into European networks.

In order to attract researchers and scientists from around the world to Scotland, a flexible and innovative approach needs to be taken, focussing on relevant partnerships, and appropriate student and researcher fellowship programmes. Over the past 3 years HIE has demonstrated this with it's partnership with the Massachusetts Institute of Technology in Cambridge, Boston. HIE's sponsorship arrangement with the MIT Media Lab, and membership of the MIT Industrial Liaison Programme, has resulted in a wide range of knowledge transfer activities, post graduate research programmes, and the attraction of world class researchers and academics to new research institutes within the UHIMI. HIE has an on-going programme of facilitating contact through learning journeys for Highland businesses to Boston.

Theme 3 looks to "intensify knowledge exchange between academia and business ... not yet located in the H&P", and even from our low numbers, HIE is using academic research capability to develop and support a proposition that may encourage an inward investor (business) to locate in the H&I area. Consideration could be given to this being a short to medium term action point, reflecting the co-operation of the ITI teams, the Enterprise networks and SDI.

Theme 3: intensifying knowledge exchange between academia and business

Whilst agreeing with the long term goal to fully understand the SIS, and ensure it works as smoothly as possible, HIE would like to highlight one of the key findings of the recent SIS mapping exercise, namely that large areas of Scotland – the Highlands and Islands and the borders – were effectively excluded. However the success of Lifescan (Scotland) plc in Inverness clearly demonstrates the potential high value contribution these areas can make to the Scottish economy. The Science and Innovation Framework should reflect the need

to re-dress this unbalanced provision. HIE would suggest that the Science and Innovation Strategy should explicitly include a goal to ensure that a fully functioning SIS covers the entire landmass of Scotland.

HIE has identified the issue of a Regional Innovation System as a key priority for the Highlands and Islands, both because of the region's disconnection from the Scottish system, and in response to the distributed nature of the regions economic units. The creation of evidence-based policies for stimulating the regional innovation system in the HIE area will be taken forward. The opportunity exists to influence the way the innovation system will eventually operate – as a university led, entrepreneur-led or an institution-led system.

Within the Highlands and Islands, a key market failure would appear to be in the area of human networking. In a fully functioning system the different players naturally interact, however, as a result of the immaturity of the developing structure in the Highlands and Islands and geographical constraints, this is not currently the case.

The success of the smaller Scandinavian countries in promoting innovation is considered to be largely due to the fact that measures to promote high levels of research activity and promote innovation capability in businesses have been accompanied by significant attempts to build networks, clusters and links between the science and knowledge base and the company base. This should be a key objective of the Science and Innovation Strategy, using all the measures outlined in the Short to Medium Term action points.

At the same time the structural and cultural issues which inhibit Higher Education and SME interaction, detailed in the SIS mapping study, need to be addressed. Again experience in Scandinavia, namely the Swedish technology University model, and the approach of Finland's Tekes agency to funding business focussed research may be appropriate for further study.

HIE strongly supports the view that FE colleges can make a more significant contribution to the science and innovation agenda through knowledge exchange. The SEEKIT process supports the UHIMI Hi-LINKS project which has made a step change in the effective links between local businesses, local FE colleges and main Scottish science base. However our recent experience highlights a number of key issues in the manner in which College staff are funded and resourced and which prevent them working with SMEs in any meaningful manner. Releasing the value FE can deliver to business innovation requires that barriers these barriers are addressed as they are for HE.

We believe that there are new opportunities resulting from the formation of a joint Scottish Funding Council, including increasing the contribution of FE to business possibly through tertiary models of education

Careers Scotland run the teacher placement service in Scotland and this allows us to put teachers out of school into business and other academic units as well as using it to bring business people into schools to help teachers develop the curriculum.

Theme 4: expanding business innovation

HIE generally supports the long and short term actions, although it is not enough to simply "maintain" a pipeline of support for commercialisation of research; the support needs to be developed with innovative financial instruments and creative business models to generate more commercialisation and encourage both more academics to want to commercialise their ideas, and more businesses to want to exploit those ideas. Also the objective is not about using funding; rather it is about increasing business R&D. Such a clear focus on the grants under FP7 will not necessarily help businesses to think clearly about their strategies for business growth through R&D.

HIE considers that the level of business investment in R&D shown does not fully recognise the impact of the service sector on Scotland's (& this region's) economy and the level of dynamism in the economy as far as innovation is concerned is understated. Experience also shows that companies in many sectors are involved

in innovation but do not consider it to be innovation - they are simply involved in managing their companies. A different way of measuring this should be considered.

HIE works to support the whole spectrum of business innovation and R&D. The particular geography and company base of the Highlands and Islands creates unique challenges in the area of business R&D and innovation. The commentary does not reflect the composition of the business community in the Highlands & Islands, which is predominantly micro businesses, rather than SMEs. Several of the short term action points could well require more resources to be made available from the public sector to the business community if they are to be realised in this region therefore, and are likely to take longer to realise probably.

Our experience confirms the well understood observation that businesses can be encouraged into innovation if the engagement begins with the issues of short term impact and benefit, but within a process with easy routes into the next steps. HIE has defined an "innovation adoption ladder" which targets interventions and awareness in a way which engages or re-engages businesses in a wide spectrum of improvement – product, process, skills, marketing. The Business Transformation Programme supports very flexible collaborations between businesses, colleges and the science base, in a way which minimises the threshold for involvement, but which is designed then to move the company up the innovation ladder in to mainstream innovation support. HIE suggests this as a possible approach for promoting innovation in the wider company base.

Working with businesses to encourage ubiquitous innovation is vital, but this should be broadened to include helping business managers increase their strategic planning capability, since by raising performance in this area, the benefits and need for constant innovation will be better understood. Further initiatives like the director development programme run by the Institute of Directors are needed, along with mentoring of senior managers, encouraging a more outward-looking approach to the global market and facilitating more business transformation with advice and placements.

Theme 5: modernising science education and promoting science careers

We would agree with the main issues listed, but suggest that more cohesion is required across stakeholders to develop the drive and desire to constantly update and refresh the science curriculum. Whilst the current offering of Higher science courses benefit from having only one awarding body, it also may lead to complacency and the teaching of outdated and in appropriate materials.

It is recognised that primary school children find science and maths inspiring but this seems to be lost in early secondary school. This therefore represents an important area for intervention if we are to achieve our knowledge economy aspirations. A range of issues are possible here such as novel approaches to the school day, employing physical environments which promote creativity, and more productive links to industry.

HIE would also suggest that opportunities for teacher, parent and careers adviser CPD, should be made widely available.

The longer term aspiration for those living in rural and remote communities should be to have access to science in society and other outreach activities co-ordinated through regional SETPOINTS which should be steered and directed by local stakeholders to ensure that science engagement activities can be relevant to a region. They should assist with the career guidance and development role.

If rural communities across the HIE region are to fully benefit from Scotland's Science Centre Network, investment is required in those technologies which facilitate distance reducing communication which will bring communities in their widest sense closer together and allow would allow more cost effective models of science engagement to be pursued. This may mean that Science Centres need to consider themselves as both broadcasters and visitor centres.

It's also important that Science based education is not simply delivered through Schools. Embedding an interest and excitement in science within the wider community, through events such as local science festivals,

and encouraging other youth based activities to include science and technology in everyday activities is vital. Linking entrepreneurship and science is also a key activity, and in some cases this can be more effective if undertaken outwith the formal school curriculum. HIE's successful ICT Youth Challenge competition is a good example here.

Further actions which will advance the aspirations in this theme would be to enable re-enforce the connection between science and other subjects taught in the curriculum, and to extend the understanding of attitudes towards science beyond pupils at school.

Theme 6: increasing public engagement with science

HIE would concur with the long term aspirations, but would add that that Scotland's population must be seen to be up-skilling and becoming increasingly science literate in order compete internationally, attract inward investment and to the World's most talented scientists to its universities and businesses. A science literate population is not only required to work, but to be the market for new innovation and research. The Science Centre Network and SETPOINT infrastructure is a platform for the science community to engage with the wider population with the aim of providing information from which the public can make informed decisions.

HIE would agree that science engagement activities require an improved level of co-ordination, should support and compliment formal learning, but this will require some local input and flavour to ensure that scientists are trained to meet local labour market requirements. To this end, HIE would wish to see the SETPOINT infrastructure strengthened and developed to deliver tailored, relevant outreach activity to rural communities which is high quality and recognises the needs of the local labour market and engages with local business.

Highlands & Islands Enterprise
21 December 2006

Annex B

RESPONDENT INFORMATION FORM: SCIENCE AND INNOVATION STRATEGY FOR SCOTLAND

Please complete the details below and return it with your response. This will help ensure we handle your response appropriately. Thank you for your help.

Name: *HIGHLANDS & ISLANDS ENTERPRISE*

Postal Address: *COWAN HOUSE, INVERNESS REPAIR & BUSINESS PARK, INVERNESS, IV2 7GF.*

1. Are you responding: (please tick one box)

(a) as an individual go to Q2a/b and then Q4

(b) on behalf of a group/organisation go to Q3 and then Q4

INDIVIDUALS

2a. Do you agree to your response being made available to the public (in Scottish Executive library and/or on the Scottish Executive website)?

Yes (go to 2b below)

No, not at all We will treat your response as confidential

2b. Where **confidentiality is not requested**, we will make your response available to the public on the following basis (please tick one of the following boxes)

Yes, make my response, name and address all available

Yes, make my response available, but not my name or address

Yes, make my response and name available, but not my address

ON BEHALF OF GROUPS OR ORGANISATIONS:

3 The name and address of your organisation **will be** made available to the public (in the Scottish Executive library and/or on the Scottish Executive website). Are you also content for your response to be made available?

Yes

No We will treat your response as confidential

SHARING RESPONSES/FUTURE ENGAGEMENT

4 We will share your response internally with other Scottish Executive policy teams who may be addressing the issues you discuss. They may wish to contact you again in the future, but we require your permission to do so. Are you content for the Scottish Executive to contact you again in the future in relation to this consultation response?

Yes

No