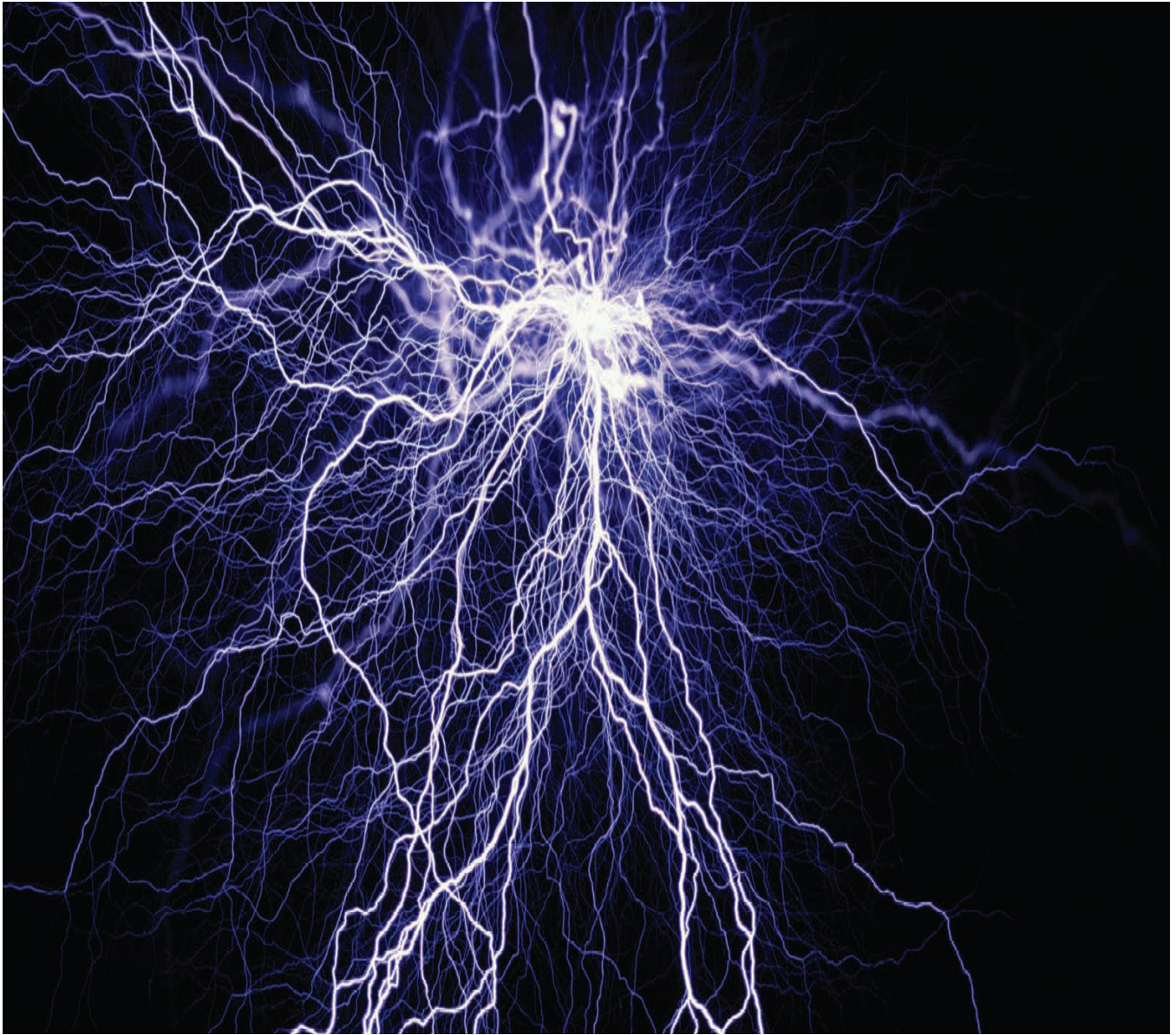


Science and Innovation Strategy for Scotland



**Response from Scottish Optoelectronics Association,
ScotlandIS, and National Microelectronics Institute
to
2006 Consultation Paper**

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Response to Scottish Executive's 2006 Consultation Paper

Scottish Optoelectronics Association, ScotlandIS, and National Microelectronics Institute, members of the Scottish Technology Forum¹, welcome the opportunity to input to this consultation. Innovation and science are essential elements in the creation of a high technology, knowledge based economy.

Key Points :

A **much greater degree of vision** is required than is implied by the consultation paper. Goals need to be set that will **stretch** all elements of the science and technology economy, rather than accepting incremental improvements.

The **emphasis** of the paper should be on **Innovation** and Science and not the other way around. As has been argued succinctly elsewhere:

“Research converts money into knowledge -
Innovation converts knowledge into money”

It is the latter element we need to improve within the Scottish economy. European Community research addresses funding businesses, institutes and academia in that order. Scotland needs to redress the balance, which is currently concentrated on academia.

The Scottish science base is already recognised as being world class – while we should not be complacent about this, it is arguably functioning well. The emphasis of the strategy should therefore address the issues surrounding innovation – which falls well short of international comparisons. The strategy must drive **a step change in innovation**. The themes should be re-ordered to recognise this.

Considerably greater priority must be given to **engaging the general population** with the “science nation” concept.

The issue of **science in education** is stark and requires serious and immediate action to address it.

¹ The Scottish Technology Forum is a partnership between [ScotlandIS](#), [MX Alliance](#), [National Microelectronics Institute](#), [Scottish Optoelectronics Association](#), and [Scottish Semiconductor Supply Forum](#).

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Strategic Themes

The consultation sets out seven strategic themes:

- Maintaining and developing the excellence of the science research base
- Enhancing international connections and capturing overseas investment
- Intensifying knowledge exchange between academia and business
- Expanding business innovation and investment in R&D
- Modernising science education and promoting science careers
- Increasing public engagement with science
- Developing better use of science by government

In our view the Scottish science base is rightly recognised as world class, and is functioning well. At a national level we must not be seduced into concentrating resources around high profile research, whilst ignoring the imperative of innovation.

The priority must be for the Strategy to drive **a step change in innovation**, and the ordering and emphasis given to the strategic themes should recognise this, (so that in order of priority they would be 4, 3,5, 6,1, 7, and 2). Our paper addresses the themes in this order.

The recent appointment of the Chief Scientific Adviser for Scotland is a welcome step forward in co-ordinating and promoting science activity. Consideration should be given to identifying a **Chief Innovation Adviser** to provide similar focus for Innovation.

Expanding Business Innovation : Theme 4

The stated aspirations in this section are self evident but need to be much more inspirational – as a country we need to **create a thirst for innovation** so that all businesses recognise the benefit of research and development, and continually seek further innovation in products, services and processes.

Arguably many of the short to medium term action points identified in the paper are already being undertaken. Whilst there are areas of the economy where continual innovation has been achieved and in some cases openly embraced, an underlying conservatism as regards innovation is apparent in many businesses. These differences in business attitudes are highlighted to a small extent in the recent Scottish e-Business Survey undertaken by Scottish Enterprise.

Notwithstanding a long tradition of innovation, Scotland does not compete internationally as regards business investment in R&D. The need to increase the levels of innovation within businesses is widely recognised by policy makers but despite activity to date, there has been little improvement. It is important that whilst attracting R&D intensive inward investment may be part of this mix, it should not be used to blur the underlying lack of performance of the indigenous business base.

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Innovation in this sense is not only about developing new products, but creating business structures through product marketing and channel management to deliver commercial success.

Additionally business process innovation is also critically important, examples being moves to lean manufacturing and development, product and process re-engineering, distributed working, improved product marketing, and e-commerce processes. Business needs to increase the cross fertilization of ideas; many of the improvements developed amongst larger businesses can create significant benefit if deployed in SME's, and can lead to a culture of continuous business improvement. Business education programmes to support this should be considered.

We consider major work is required to tackle this market failure, and to create the step change we all wish to see.

Intensifying knowledge exchange between academia and business : Theme 3

The Missing Link

It has been identified, and we agree, that the Research base is strong and well funded. Steps are in place under SUPA, SICSA, ISLI and other initiatives to create a critical mass in areas of world class pure research strength to perpetuate the funding stream coming to Scotland. Awareness of national and global priorities is being taken into account. An example, within SUPA, is that the Photonics theme is aligned with and relates to increased funding streams available in Europe and UK. This funding should continue to fund pure research.

However, the infrastructure to develop appropriate market identified research into commercial products needs to be strengthened without diluting or diverting the pure research activity. This presumes a complementary pool of people and facilities performing **applied research** with engagement from industry and the ITI's, which will become the ultimate user of the research.

The engagement with industry must recognise the company structure in Scotland. This in the high technology sector, as in many others, is predominantly SME's and start-ups. Funding for this 'development' activity should be greater than for pure research, as it is recognised that as the product development cycle advances the cost for each step increases.

We propose this should be new money not taken from that allocated to pure research. The pure and applied research pools should be separate but strongly linked to understand what is happening in the other group. A limited exchange of personnel could well cement the links as well as benefiting each entity by transferring knowledge of the practices of the other.

The IP generated by the research pool should pass on a first refusal basis to the applied research pool free of charge, as a national asset paid for by tax income. The subsequent licensing of the IP to industry should follow a common practice with any fees paid back into the pools funding pure and applied research.

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Modernising Science Education and Promoting Science Careers : Theme 5

The issue of science education and promoting science careers must be addressed **urgently**, and we are concerned that the consultation document gives insufficient stress to this.

From all sides, representative groups from CBI Scotland to the universities to the Scottish Technology Forum are voicing serious concern over the lack of emphasis on science in schools and further and higher education.

The Science Centres just scratch the surface of what needs to be done to excite children and young people about science. It is questionable whether the general public is aware that the individual science centres are (a) science centres rather than visitor attractions, and (b) connected to each other in any way. If they are to be showcases to children and young people they need to be accessible to all in the same way as eg the National Museum of Scotland; this includes looking at the pricing structures. (Glasgow Science Centre entry fees : Family of four, £22 - £56; National Museum of Scotland :Free)

Continuing skills development should also be included in this theme. Life long learning is a pre-requisite in today's environment, and whilst a number of professional bodies (eg BCS, IEE) actively promote and support Continuing Professional Development, these do not cover all forms of skills development. Eg Masters degrees

There are numerous small initiatives which aim to foster an interest in science amongst young people, but they are individually too small and generally unconnected. We consider that Careers Scotland should be tasked and resourced to give science top priority and co-ordinate all activity, at all levels of education.

Specific points that should be considered are :

Schools

- Utilise the excellent materials developed for other parts of UK education system within the Scottish curriculum
- Give serious consideration to merging 5th/6th years in geographically near schools to allow concentration of science resources and "scale".

Careers

- Extend the current pilot of Industrial fellowships to a larger programme, and bring it under the aegis of the Royal Society of Edinburgh, on similar lines to the Enterprise fellowships.
- For the planned Future Skills Scotland Study the demand side should not just focus on the UK – just as the Science strategy aims to encourage international scientists to come to Scotland our young scientists should consider working abroad for a period.

Continuing Skills Development

- Consideration should be given to assisting SME's to fund skills development where appropriate.

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Increasing public engagement with science : Theme 6

Statements such as “Scotland as a science nation” are insufficient in themselves. To be truly a science nation everyone must recognise the importance of science and understand its place in the economy. We must all “**walk the talk**”.

We are all potential ambassadors for Scotland, and everyone is potentially the parent of a science student. If our science base is recognised internationally amongst the cognoscenti but not at home amongst the general population, we will not meet the aspiration of a “science nation”. Go back fifty years and everyone knew that Scotland was an engineering nation, whether in the shipyards, the printing works or the mines; today that heritage is still widely recognised.

If we aspire to be a “science nation” then the same breadth of shared view has to be developed. A major marketing exercise is needed within Scotland as well as abroad. This is a vastly larger task than is envisaged by the Scottish Science Centre Network Strategy.

Maintaining and Developing the Excellence of the Science Research Base : Theme 1

As already stated we consider that the research base functions well in terms of the ‘research element’ of the “research and development” equation. Greater encouragement should be given to universities regarding commercialisation ie the ‘development’ element.

Over the years the University sector has proved highly adept at meeting the challenges they require to address in order to attract research funding. Increased emphasis should be given to metrics that recognise where suitable research is either commercialised or passed to the

appropriate body for commercialisation (for example the applied research environment mentioned at “Intensifying knowledge exchange between academia and business : Theme 3” above).

Initiatives such as the Prospekt Project at the University of Edinburgh which allow for the necessary skills to be developed internally should be the model, rather than providing support through other public agencies.

The university sector should seek to apply the Knowledge Transfer Grant more effectively so that it really acts as a direct incentive for those academics and researchers investing effort in knowledge transfer.

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Developing better use of science by Government : Theme 7

The consultation document expresses well how government can use the science base to advise on key policy decisions. However Government can also directly act as a driver for innovation through its procurement policy. Economic theory has long shown that a “demanding customer” drives innovation in local business.

As a major procurer of goods and services, adoption of innovation by public sector would be a huge incentive to locally based SME's to be more innovative.

Government should work with local businesses in defining innovative solutions to a wide variety of issues (transportation, the environment, energy, communications etc etc). Government can then use procurement to drive this innovation forward by encouraging local businesses to tender for supply.

An excellent example is congestion charging in London which has given UK industry a global lead in number plate recognition systems.

Enhancing international connections and capturing overseas investment : Theme 2

Scotland must be in a position to attract and retain the best innovative talent from around the world. The various new talent initiatives are welcomed, as is the continuing work of Scottish Development International.

However care must be taken to ensure that the positive encouragement for indigenous innovation and business success as detailed in other parts of the document is not diluted by an overzealous portrayal that (only) externally based organizations have the capability to be innovative. Transparently equal support, encouragement and bespoke investment must be available to indigenous companies with the potential to be truly innovative global players.

Historically Scottish businesses have not sought European Research funding. This is particularly true of the SME community, who find the barriers to entry to be beyond them. The lack of large indigenous companies to act as sponsors/partners for collaborative research is an additional barrier to increased involvement. Thought must be given to creating mechanisms to address these barriers, actual and perceived, in order that Scottish businesses can benefit from both access to the research monies available and the new networks and supply chain opportunities these collaborations foster.

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Respondents

Scottish Optoelectronics Association, ScotlandIS, National Microelectronics Institute, are partners in the Scottish Technology Forum, an umbrella body bringing together trade associations across the information industries in Scotland to create a single voice for the industry to policy makers, and a focal point for action.

Scottish Optoelectronics Association represents companies and academic interests in optoelectronics and photonics in Scotland

ScotlandIS, the trade body for software, telecomms and IT in Scotland, represents members from all ICT disciplines - from small specialist businesses to global companies.

The National Microelectronics Institute is the trade body supporting commercial and technological development of the microelectronics industry in the UK and Ireland.

The members of all three organisations are involved in service and product development and science based high technology research.

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RESPONDENT INFORMATION FORM

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

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

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 - We will treat your response as confidential