

Chairperson: Dr Kevin McGuigan

Please reply to:  
Dr. Sheila Gilheany  
Policy Officer  
Institute of Physics in Ireland  
School of Physics  
University College Dublin  
Belfield, Dublin 4  
T: +353 86 2600903  
E: sheila.gilheany@iop.org

Mr. Jim McManus, Committee Clerk  
Committee for Enterprise, Trade and Investment  
Room 375, Parliament Buildings  
Ballymiscaw, Stormont  
Belfast  
BT4 3XX

15<sup>th</sup> December 2011

**Re: Inquiry into Developing the Northern Ireland Economy through Innovation,  
Research & Development**

Dear Mr McManus

The Institute of Physics in Ireland welcomes the opportunity to submit a response to the Committee for Enterprise, Trade and Investment's inquiry.

The Institute of Physics in Ireland is a scientific membership organisation devoted to increasing the understanding and application of physics in Northern Ireland and the Republic of Ireland. It has over 2000 members, and is part of the Institute of Physics.

The Institute of Physics has a world-wide membership of over 40,000 and is a leading communicator of physics-related science to all audiences, from specialists through to government and the general public. Its publishing company, IOP Publishing, is a world leader in scientific publishing and the electronic dissemination of physics.

This submission was prepared in consultation with the IOP in Ireland's governing committee, the Institute's Business and Innovation Board, with input from members of the Institute members working in small and large businesses that depend on physics.

The attached document highlights key issues of concern to the Institute.

If you require any further information or clarification, please do not hesitate to contact the Institute at the above address.

Yours sincerely,



Dr. Kevin McGuigan  
Chairperson  
Institute of Physics in Ireland  
The Institute of Physics, 76 Portland Place, London W1B 1NT, UK  
Tel +44 (0)20 7470 4800 Fax +44 (0)20 7470 4848 Email [physics@iop.org](mailto:physics@iop.org) [www.iop.org](http://www.iop.org)

# **Inquiry into Developing the Northern Ireland Economy through Innovation, Research & Development**

## **Response from the Institute of Physics in Ireland**

**December 2011**

The Institute certainly concurs with the view that there is a significant need to rebalance the Northern Ireland economy by increasing economy growth and promoting new investment. Policymakers and economists are generally in agreement that innovation is a major driver of growth and a critical aspect of innovation is physics.

In the UK, physics-based businesses have long punched above their weight in the economy, accounting for as many jobs as the construction sectors and as much gross value added as finance, banking and insurance.<sup>1</sup> Areas such as communications, medical technology, space industry and energy are all significant drivers in the UK economy. In addition these are highly productive jobs with a Gross Value Added (GVA) per employee at £69,000 - 70% higher than the UK average. Given Northern Ireland's current low GVA per employee, as noted in the consultation document, it is clear that it is growth in this type of employment which is essential for the region.

Northern Ireland's economy is particularly weak in relation to high tech manufacturing. In the UK, physics-based manufacturing contributes over 50% of manufacturing GVA. However, in Northern Ireland, that number drops to under 25%. In terms of total employment: in the UK, physics-based manufacturing accounts for almost 48% of the manufacturing workforce; in NI that number is under 30%.<sup>2</sup>

To achieve growth, though, in these areas, there are a number of key, interrelated factors, which must be in place:

- Development and enhancement of the skills base in Northern Ireland

- Support for existing business to expand

- Creating the right environment for new business start-up and attracting foreign direct investment

The Institute of Physics' recommendations in these areas are based partly on a recent study of physics-based businesses<sup>3</sup> commissioned by the IOP and carried out by the Institute of Innovation Research at Manchester University's business school.

### **Skills Base**

As evidenced by the MATRIX reports of the Northern Ireland Science and Industry Panel<sup>4</sup>, and the Oxford Economics Skills Reports<sup>5</sup>, the demand for skills in the area of physical sciences will increase significantly in the coming years.

Equipping students and the workforce with key skills in this area is essential to promote both the provision of high-level jobs and innovation throughout the economy. The experience of the Republic of Ireland over the past two decades has shown that the availability of highly qualified, technological able graduates has been critical to the country's success in attracting foreign direct investment (IDA report 2009)<sup>6</sup>

The Institute considers that actions on Science, Technology, Engineering and Maths (STEM) related skills must take a high priority. All of the reports cited highlight the essential nature of such skills to the Northern Ireland economy. To facilitate this and to act as a driver for change, the IOP would strongly recommend the full implementation of the Northern Ireland STEM Review proposals and in particular would say the rapid appointment of a chief science advisor or champion is vital to ensure a strong, fully co-ordinated approach to the implementation of proposals in this area.

The Institute also believes that a necessary step to its implementation is to have a politically high-level science steering committee – comprised of ministers and senior civil servants from each of the relevant government departments in addition to the chief science champion. Ideally, this should be chaired by the First/Deputy First Minister. Such a committee would demonstrate the importance of STEM to the Northern Ireland economy and ensure a strong, cross-departmental approach to the implementation of proposals in this area.

In addition, the Institute has extensive materials and expertise in working with schools, colleges and employers to help deliver a strong message re the importance of STEM skills. We are very willing to continue and extend our engagement with the relevant government agencies to promote this area.

### **Business Support Actions**

The Institute recommends several measures to ensure that Northern Ireland extracts the maximum value for physics. These include:

#### **An expanded Research & Development tax credit scheme.**

Within the UK, the R&D tax credit schemes have been seen to be beneficial to both large and small companies alike.

Northern Ireland could lead the way in expanding these schemes. For example:

1. The criteria for eligibility of staff training under the schemes could be expanded. While there is some provision currently, this is drawn too tightly and training that could legitimately be seen as a necessary prerequisite for research and development is sometimes excluded.

Additionally, there is perhaps scope for increasing the options for recognition of companies working with universities or other public research centres. Such knowledge transfer work could include companies that provide student placements that are part of specific courses but cannot currently claim relief on the facilities and management overheads they provide.

In some specific cases, interaction with European grants has left companies worse off, since a prospective grant has forbidden retrospective tax credits of greater value.

Collaborative research and development is also not easily accounted for under the current system, both in terms of companies working with universities, and, more particularly, consortia of smaller companies who can find themselves at a disadvantage.

The net effect of such issues can be a significant increase in the time and resource that smaller companies must invest in applications, often needing to employ specialist consultants to manage their applications to the scheme – so incurring further expense (none of which is eligible for relief).

2. An issue, related perhaps more to practice than structure, is the perception from some physics-based businesses applying to the scheme that the assessors often have limited specialist knowledge of the processes that are involved in such organisations. If the scheme is to fulfil its potential as a driver of R&D in physics-based companies, it is essential that these companies have confidence in the scheme and those who operate it. We recommend that the training programmes of assessors be reviewed. This is an area that could perhaps benefit from greater interaction with the UK network of government Chief Scientific Advisers and would be a key area of interest for the proposed Northern Ireland chief scientist.

### **Venture Capital**

Small science-driven firms, in particular, require access to finance. Provision of long-term investment in start-ups through a large-scale, research-focused venture capital fund would be a highly important measure to assist young companies in Northern Ireland to innovate and expand. The Institute also believes that there should be consideration given to easing the regulatory burden on venture capitalists and angel investors.

There is currently an acute shortage of funds accessible to smaller science-based businesses seeking investment. Such companies play a key role in the innovation economy bringing science knowledge and disruptive technologies to the market. These businesses often require several years between the initial development of a product, to sales and eventually profit-making. As such, it is long-term investment that is essential for the success of these businesses. The recession, combined with its effect on the banking system has created a perfect storm for the finances of smaller science-based businesses and additional, focused support is needed.

### **Enhanced Knowledge Transfer Schemes**

The IOP strongly recommends enhanced support for collaboration and people-exchange between universities and industry. The Northern Ireland Science Park provides many good examples of the value of such interactions while Queen's University Belfast is the UK leader in the KTP scheme with physics playing a key role.

### **Marketing opportunities**

The IOP study of physics-based firms noted that the surveyed businesses said that in the future they would most like to receive assistance with identifying market opportunities and needs and support for internal skills development.

### **Small Business Research Initiative**

The IOP also calls for the roll-out of the Small Business Research Initiative (SBRI) across government departments in Northern Ireland.

SBRI is a programme of the UK's Technology Strategy Board which brings innovative solutions to specific public sector needs, by engaging a broad range of companies in competitions for ideas that result in short-term development contracts.

This would incentivise departments to engage with small science-based businesses. Coupled with this the IOP suggests a more creative approach to public sector

procurement, directing a fixed proportion of public expenditure to foster science based businesses and support innovative solutions.

Measures such as support for specific R&D projects will help to extract the maximum value from physics-based industries to the benefit of the sector and the Northern Ireland economy as a whole.

#### References:

1. Institute of Physics Report. Physics and the UK economy 2007.  
[http://www.iop.org/publications/iop/2007/page\\_42716.html](http://www.iop.org/publications/iop/2007/page_42716.html)
2. Annual Business Inquiry and IOP analysis
3. Supporting Physics in Business – an exploratory study into the innovation-related business support needs of physics-based firms in England.  
[http://www.iop.org/publications/iop/2011/page\\_50369.html](http://www.iop.org/publications/iop/2011/page_50369.html)
4. Matrix Reports, <http://www.matrix-ni.org/>
5. Forecasting Future Skill Needs in Northern Ireland, April 2009, Oxford Economics Report for the Department of Employment and Learning, Northern Ireland
6. IDA Annual Report 2009 <http://www.idaireland.com/news-media/publications/annual-reports/>